Komoditas : Kapas
Tahun 2004-2008 (388 judul)

K. Thomas Klasson, Lynda H. Wartelle, Isabel M. Lima, Wayne E. Marshall, Danny E. Akin, Activated carbons from flax shive and cotton gin waste as environmental adsorbents for the chlorinated hydrocarbon trichloroethylene, Bioresource Technology, Volume 100, Issue 21, November 2009, Pages 5045-5050, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.02.068.
(http://www.sciencedirect.com/science/article/B6V24-4WK3YFM-4/2/c8a5dcc5a415efa1e70c5fdb49db8393)
Abstract:
Agricultural by-products represent a considerable quantity of harvested commodity crops. The use of by-products as precursors for the production of widely used adsorbents, such as activated carbons, may impart a value-added component of the overall biomass harvested. Our objective in this paper is to show that flax shive and cotton gin waste can serve as a precursor for activated carbon that can be used for adsorption of trichloroethylene (TCE) from both the liquid and gas phases. Testing was conducted on carbon activated with phosphoric acid or steam. The results show that activated carbon made from flax shive performed better than select commercial activated carbons, especially at higher TCE concentrations. The activation method employed had little effect on TCE adsorption in gas or vapor phase studies but liquid phase studies suggested that steam activation is slightly better than phosphoric acid activation. As expected, the capacity for the activated carbons depended on the fluid phase equilibrium concentration. At a fluid concentration of 2 mg of TCE/L of fluid, the capacity of the steam activated carbon made from flax shive was similar at 64 and 80 mg TCE/g of carbon for the vapor and liquid phases, respectively. Preliminary cost estimates suggest that the production costs of such carbons are $1.50 to $8.90 per kg, depending on activation method and precursor material; steam activation was significantly less expensive than phosphoric acid activation.
Keywords: Activated carbon; Agricultural by-products; Cotton gin waste; Flax shive; Trichloroethylene

Ahsan Abdullah, Analysis of mealybug incidence on the cotton crop using ADSS-OLAP (Online Analytical Processing) tool, Computers and Electronics in Agriculture, Volume 69, Issue 1, November 2009, Pages 59-72, ISSN 0168-1699, DOI: 10.1016/j.compag.2009.07.003.
(http://www.sciencedirect.com/science/article/B6T5M-4WXXV3J-1/2/454c54732429a95820dd291affd869e3)
Abstract:
Traditionally the agriculture expert's knowledge is descriptive and experimental, therefore, it is difficult to describe it mathematically and subsequently build agriculture Decision Support Systems (DSS). Furthermore, the corresponding data may be in such a raw form that it cannot be used in a DSS. The Agriculture Decision Support System (ADSS) is a 26-month project based on the Agro-met data from 2001 to 2006 of Punjab (the bread-basket of Pakistan), its ADSS-OLAP, i.e. Online Analytical Processing tool (www.agroict-olap.org) allows for quick analysis of all possible interesting aggregates of the ADSS data by employing drag-drop and mouse-click and is used in this paper to identify the effective pesticide groups related to the mealybug incidence. Pakistan is the world's fifth-largest producer of cotton, but the emergence of the mealybug as a new cotton pest is likely to reduce the cotton yield by 1.3 million bales. The research work reported in this paper is based on the detailed pest-scouting data of 2300+ farmers of District Multan (cotton hub of Pakistan) for the years 2005 and 2006. This paper will also provide guidelines for the design

and development of similar complex systems/tools and discusses the issues of agricultural data-quality management, particularly in the field of insect-pest management.
Keywords: Decision Support System; Agriculture; Data Warehouse; Mealybug; Pest; Cotton; Pesticide; Data quality; OLAP

Mohamed Hashem, Nabil A. Ibrahim, Wfaa A. El-Sayed, Shereef El-Husseiny, Elham El-Enany, Enhancing antimicrobial properties of dyed and finished cotton fabrics, Carbohydrate Polymers, Volume 78, Issue 3, 15 October 2009, Pages 502-510, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.05.007.
(http://www.sciencedirect.com/science/article/B6TFD-4W9XG81-4/2/13620635380c84f5afb2d4259f8b09fa)
Abstract:
1,2,3-Benzothiazole-7-thiocarboxylic acid-S-methylester (commercially known as Actigard(R) AM-87) was utilized to impart cotton fabric durable antimicrobial properties. Finishing treatment was carried out under a variety of conditions. The latter were included, effect of pH, concentration of antibacterial agents, curing temperature and curing time. The effect of fabric construction, mercerization, and dyeing with different dyestuff were also investigated. The study was also extended to investigate the technical feasibility of combining antimicrobial finishing treatment in question with other finishing treatment generally carried out on cotton fabric, like soft finishing and crease recovery finishing. The treated fabrics were monitored for antimicrobial properties before and after washing. The treated fabrics were also evaluated for the physio-mechanical properties like fabric tensile strength, elongation at break (or bursting strength for knitted fabric), wettability, crease recovery angle, whiteness index and roughness. Results obtained show that, the most appropriate conditions for treatment cotton fabric with Actigard(R) are: padding the cotton fabric in aqueous solution containing 6% Actigard(R) at pH 5 (adjusted using formic acid) then squeezed to wet pick up of 100%, dried at 80 [degree sign]C for 5 min then cured at 100 [degree sign]C for 150 s. The untreated cotton fabric did not show any antimicrobial activity towards Staphylococcus aureus or Escherichia coli. Treatment of cotton fabric with Actigard(R) improves its antimicrobial properties towards S. aureus or E. coli. It is also observed that, treatment of cotton fabric with Actigard(R) marginally decreases fabric tensile strength, elongation at break, roughness and WI, whereas; both wettability and crease recovery angle remain practically intact. This was observed whether the fabric was pre-mercerized or not.
Keywords: 1,2,3-Benzothiazole-7-thiocarboxylic acid-S-methylester; Antimicrobial; Biocides; Cotton fabric; Finishing

Vesna Ilic, Zoran Saponjic, Vesna Vodnik, Branislav Potkonjak, Petar Jovancic, Jovan Nedeljkovic, Maja Radetic, The influence of silver content on antimicrobial activity and color of cotton fabrics functionalized with Ag nanoparticles, Carbohydrate Polymers, Volume 78, Issue 3, 15 October 2009, Pages 564-569, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.05.015.
(http://www.sciencedirect.com/science/article/B6TFD-4WDNKSN-1/2/b0ec2cc07abe44d25b2f5bb040d7a71c)
Abstract:
The aim of this study was to examine the antimicrobial efficiency and color changes of cotton fabrics loaded with colloidal silver nanoparticles which were synthesized without using any stabilizer. The influence of colloidal concentration and consequently, the amount of silver deposited onto the fabric surface, on antimicrobial activity against Gram-negative bacterium Escherichia coli, Gram-positive bacterium Staphylococcus aureus and fungus Candida albicans as well as laundering durability of obtained effects were studied. Although cotton fabrics loaded with silver nanoparticles from 10 ppm colloid exhibited good antimicrobial efficiency, their poor laundering durability indicated that higher concentrated colloids (50 ppm) must be applied for obtaining long-term durability. Additionally, the influence of dyeing with C.I. Direct Red 81 on

antimicrobial activity of cotton fabrics loaded with silver nanoparticles as well as the influence of their presence on the color change of dyed fabrics were evaluated. Unlike color change, the antimicrobial efficiency was not affected by the order of dyeing and loading of silver nanoparticles.
Keywords: Silver nanoparticles; Cotton; Antibacterial efficiency; Direct dye

Lili Wang, Wei Ma, Shufen Zhang, Xiaoxu Teng, Jinzong Yang, Preparation of cationic cotton with two-bath pad-bake process and its application in salt-free dyeing, Carbohydrate Polymers, Volume 78, Issue 3, 15 October 2009, Pages 602-608, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.05.022.
(http://www.sciencedirect.com/science/article/B6TFD-4WGF12V-1/2/78e1764f09811607b23ad3c2cd94d510)
Abstract:
Cationic cotton was prepared by a designed two-bath pad-bake process with 3-chloro-2-hydroxypropyltrimethylammonium chloride as cationizing reagent to realize recycle utilization of the reagent and continuous processing of cationization. Experiments showed that 8.0% (o.w.bath) of the reagent, 1:1 of molar ratio of sodium hydroxide to the reagent, 60 [degree sign]C and 6 min of baking temperature and time were selected for cationization and the obtained cationic cotton was suitable for application in salt-free reactive dyeing. The structures of both the untreated and cationic fibers were investigated by X-ray diffraction and scanning electronic microscopy. Higher dye utilization and color yields could be realized on the cationic cotton than that on the untreated one in the conventional dyeing. Levelness dyeing and good fastness properties of the dyes on the cationic fabrics were obtained. Besides, colorimetric properties and mechanical strength of the dyed fabrics were both evaluated to show applicability of this preparation process of cationic cotton.
Keywords: Cationic cotton; Two-bath pad-bake process; Salt-free dyeing; Reactive dyes

Roberta Cassano, Sonia Trombino, Teresa Ferrarelli, Rita Muzzalupo, Lorena Tavano, Nevio Picci, Synthesis and antibacterial activity evaluation of a novel cotton fiber (Gossypium barbadense) ampicillin derivative, Carbohydrate Polymers, Volume 78, Issue 3, 15 October 2009, Pages 639-641, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.05.030.
(http://www.sciencedirect.com/science/article/B6TFD-4WGDR3F-1/2/26b4ec92a50583788edb93bc0da6285a)
Abstract:
We prepared cellulose cotton fibers containing ampicillin moieties and evaluated their antibacterial activity. In spite of recent progress in experimental and clinical medicine, the problem of chronic wounds treatment remains to be solved. In fact conventional methods are based on solutions of antibiotics and antiseptics and ointment bandages but the efficacy of this method is low and so the idea to use modified cotton gauzes would have to prevent infections insorgence during wounds healing. Ampicillin, a large spectrum antibiotic, was covalently coupled to cellulose backbone of hydrophilic cotton fibers by a heterogeneous synthesis to produce a functionalized biopolymer with a satisfactory degree of substitution (DS) and antibacterial activity. The obtained biopolymer was characterized by infrared spectroscopy (FT-IR). Finally, the antibacterial activity in inhibiting microorganism growth in Petri dishes, was evaluated. The results suggested that these biomaterials posses an excellent 'in vitro' antibacterial activity and so they can be efficiently employed in biomedical fields for chronic wounds management to ensure a valid protection against infections and contaminations. Biopolymers so functionalized were found to be very efficient to contrast sensible bacteria growth.
Keywords: Biopolymers; Cotton fibers (Gossypium barbadense); Ampicillin; Antibacterial activity

Zhenan Hou, Weiping Chen, Xiao Li, Lin Xiu, Laosheng Wu, Effects of salinity and fertigation practice on cotton yield and 15N recovery, Agricultural Water Management, Volume 96, Issue 10, October 2009, Pages 1483-1489, ISSN 0378-3774, DOI: 10.1016/j.agwat.2009.04.019.
(http://www.sciencedirect.com/science/article/B6T3X-4WBY52S-3/2/23ed4c831beb7946870a9d545a3ed3c0)
Abstract:
The purpose of optimal water and nutrient management is to maximize water and fertilizer use efficiency and crop production, and to minimize groundwater pollution. In this study, field experiments were conducted to investigate the effect of soil salinity and N fertigation strategy on plant growth, N uptake, as well as plant and soil 15N recovery. The experimental design was a 3 x 3 factorial with three soil salinity levels (2.5, 6.3, and 10.8 dS m-1) and three N fertigation strategies (N applied at the beginning, end, and in the middle of an irrigation cycle). Seed cotton yield, dry matter, N uptake, and plant 15N recovery significantly increased as soil salinity level increased from 2.5 to 6.3 dS m-1, but they decreased markedly at higher soil salinity of 10.8 dS m-1. Soil 15N recovery was higher under soil salinity of 10.8 dS m-1 than those under soil salinity of 6.3 dS m-1, but was not significantly different from that under soil salinity of 2.5 dS m-1. The fertigation strategy that nitrogen applied at the beginning of an irrigation cycle had the highest seed cotton yield and plant 15N recovery, but showed higher potential loss of fertilizer N from the root zone. While the fertigation strategy of applying N at the end of an irrigation cycle tended to avoid potential N loss from the root zone, it had the lowest cotton yield and nitrogen use efficiency. Total 15N recovery was not significantly affected by soil salinity, fertigation strategy, and their interaction. These results suggest that applying nitrogen at the beginning of an irrigation cycle has an advantage on promoting yield and fertilizer use efficiency, therefore, is an agronomically efficient way to provide cotton with fertilizer N under the given production conditions.
Keywords: Drip irrigation; Soil salinity; Fertigation strategy; 15N recovery; Cotton

Jian Shi, Ratna R. Sharma-Shivappa, Mari S. Chinn, Microbial pretreatment of cotton stalks by submerged cultivation of Phanerochaete chrysosporium, Bioresource Technology, Volume 100, Issue 19, October 2009, Pages 4388-4395, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.10.060.
(http://www.sciencedirect.com/science/article/B6V24-4W7B50N-4/2/3b78b70769af6bacdb8dd46463e5abd3)
Abstract:
This study used the fungus, Phanerochaete chrysosporium, to pretreat cotton stalks with two methods, shallow stationary and agitated cultivation, at three supplemental salt concentrations. Pretreatment efficiencies were compared by evaluating lignin degradation, solid recovery and carbohydrate availability over a 14-day period. Shallow stationary cultivation with no salts gave 20.7% lignin degradation along with 76.3% solid recovery and 29.0% carbohydrate availability. The highest lignin degradation of 33.9% at a corresponding solid recovery and carbohydrate availability of 67.8% and 18.4%, respectively, was obtained through agitated cultivation with Modified NREL salts. Cultivation beyond 10 days did not significantly increase lignin degradation during 14 days of pretreatment. Manganese addition during shallow stationary and agitated cultivation resulted in higher solid recoveries of over 80% but lower lignin degradation. Although agitated cultivation resulted in better delignification, results indicate that pretreatment under submerged shallow stationary conditions provides a better balance between lignin degradation and carbohydrate availability.
Keywords: Fungal pretreatment; Biofuel; Phanerochaete chrysosporium; Cotton residue; Delignification

Yufeng Ge, J. Alex Thomasson, Ruixiu Sui, Cristine L.S. Morgan, A module-specific post-processing calibration method to improve cotton yield mapping, Computers and Electronics in

Agriculture, Volume 68, Issue 2, October 2009, Pages 161-167, ISSN 0168-1699, DOI: 10.1016/j.compag.2009.05.007.
(http://www.sciencedirect.com/science/article/B6T5M-4WP4BD5-1/2/093d7cada1d0f4e4f9ce095cb4815ecb)
Abstract:
Calibrating cotton yield monitor data is difficult, because there are many confounding factors, such as landscape, soil, ambient light and temperature, defoliation level, and variety that can cause sensor response to shift from field to field and even within a field. The conventional calibration method involves in situ weighing of basket loads, which is costly, logistically unfavorable, and not adequate to account for inconsistent performance of yield monitor sensors. In this work a module-specific post-processing method was used to calibrate cotton yield data. The method was enabled by a wireless communication and GPS based electronic system that can delineate the harvest location of each cotton module in the field during machine harvest. Module-specific correction coefficients were calculated as the ratio of module weight determined at the gin to the yield monitor based module weight integrated over the module harvest area. Module-specific lint turnout, also determined at the gin, was used to convert seed cotton yield to lint yield. The method was field tested on 16 cotton modules harvested from two study areas near College Station, TX. Results showed that yield monitor based weight deviated substantially from the actual weight for some modules, with errors ranging from -41.0% to +13.9%. Lint yield maps produced with module-specific post-processing calibration showed more reliable spatial patterns than maps produced with field-based post-processing. Combining the wireless communication and GPS system with the cotton yield monitor could greatly enhance the quality of cotton yield maps, making them more suitable for various precision agriculture applications.
Keywords: Cotton; Precision agriculture; Wireless communication; GPS; Yield calibration; Yield monitor

Xianliang Song, Tianzhen Zhang, Quantitative trait loci controlling plant architectural traits in cotton, Plant Science, Volume 177, Issue 4, October 2009, Pages 317-323, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2009.05.015.
(http://www.sciencedirect.com/science/article/B6TBH-4WGVPMN-1/2/6e2ebd97503864e32f0fa4576bdbb03f)
Abstract:
Cotton plant architecture is an important characteristic influencing the suitability of specific cotton varieties in cultivation, fiber yield and quality. However, complex multigenic relationships and substantial genotype-environment interaction underlie plant architecture, and will hinder the efficient improvement of these traits in conventional cotton breeding programs. An enhanced understanding of the molecular-genetic regulation of plant morphological developmental can aid in the modification of agronomically relevant traits. In this study, an interspecific Gossypium hirsutum and Gossypium barbadense BC1 population was used to identify QTL associated with plant architectural traits. Twenty-six single QTL were identified for seven plant architecture traits. The phenotypic variation explained by an individual QTL ranged from 9.56% to 44.57%. In addition, 11 epistatic QTL for fruit branch angle (FBA), plant height (PH), main-stem leaf size (MLS), and fruiting branch internode length (FBI) explained 2.28-15.34% of the phenotypic variation in these traits. The majority of the interactions (60%) occurred between markers linked to QTL influencing the same traits. The QTL detected in this study are expected to be valuable in future breeding programs to develop cultivars exhibiting desirable cotton architecture.
Keywords: Cotton; Plant architecture; QTL mapping; Epistatic QTL

Xuehong Ren, Akin Akdag, Hasan B. Kocer, S.D. Worley, R.M. Broughton, T.S. Huang, N-Halamine-coated cotton for antimicrobial and detoxification applications, Carbohydrate Polymers,

Volume 78, Issue 2, 5 September 2009, Pages 220-226, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.03.029.
(http://www.sciencedirect.com/science/article/B6TFD-4VY2C90-4/2/2fb6e9e563db80d9f91f32bfbcb7a5eb)
Abstract:
A new N-halamine precursor, 3-(2,3-dihydroxypropyl)-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decane-2,4-dione (TTDD diol), was synthesized and bonded onto cotton fabrics. Fabrics with variable amounts of chlorine loading were prepared by using several concentrations of TTDD diol. A second N-halamine precursor, 3-(3-triethoxysilylpropyl)-7,7,9,9-tetramethyl-1,3,8-triazaspiro[4.5]decane-2,4-dione (TTDD siloxane), was also synthesized and bound to cotton for comparison purposes. The coated cotton fabrics contained two types of N-Cl moieties after chlorination of the amine and amide groups. Swatches with variable chlorine loadings were challenged with Staphylococcus aureus and Escherichia coli O157:H7 as a function of contact time. The biocidal test results showed that the chlorine loadings and surface hydrophobicities influenced the antimicrobial efficacies. The chlorinated swatches have also been employed to oxidize the simulant of chemical mustard to the less toxic sulfoxide derivative.
Keywords: Biocidal; Cellulose; Bacteria; Antimicrobial; N-Halamine

Amira El Shafie, Moustafa M.G. Fouda, Mohamed Hashem, One-step process for bio-scouring and peracetic acid bleaching of cotton fabric, Carbohydrate Polymers, Volume 78, Issue 2, 5 September 2009, Pages 302-308, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.04.002.
(http://www.sciencedirect.com/science/article/B6TFD-4W1BV7K-6/2/405135f48df0113a0f6a4d65f6fbb0f5)
Abstract:
In this study, we investigated the utilization of peracetic acid (PAA) formed in situ from reaction of tetraacetylethylenediamine (TAED) with sodium perborate to affecting simultaneous desizing and bleaching whereas cellulase, pectinase and their mixture were utilized to affect bio-scouring. In this regards, two parallel studies were designed, the first were, separate desizing either with PAA or ammonium persulphate followed by bio-scouring and PAA bleaching in one step. The second sets of experiments were involved one-step process for desizing, bio-scouring and PAA bleaching. Residual starch, fabric wettability, residual wax content retained tensile strength elongation at break and fabric whiteness index were taken as a measure of the extent of cotton desizing, scouring and bleaching. Results obtained show that, cotton fabric bleached with PAA and either cellulase or pectinase enzyme shows excellent wettability and acceptable whiteness index (WI). This indicated that the combination between PAA and either cellulase or pectinase enzyme did not detract from the effectiveness these enzyme towards bio-scouring or the effectiveness of PAA towards low temperature bleaching of cotton fabric. The optimum bleaching recipe consists of utilizing a bath containing 25 g/L, TAED; 15 g/L, sodium perborate; 2 g/L, pectinase and 5 g/L Egyptol(R) (non-ionic wetting agent) and the treatment was carried out at 60 [degree sign]C for 90 min. Desizing with PAA prior to bio-scouring and bleaching enhances the WI to 73.5 the retained tensile strength remain at 85.5%. One-step process for desizing, bio-scouring and PAA was also feasible, which involved treatment the loomstate cotton fabric with the same recipe. Although, the fabric bleached with one-step process shows lower WI compared with two-step processes, but its wettability was excellent and no detectable residual starch was found.
Keywords: Cotton; Peracetic acid; Bleaching; Bio-scouring; Pretreatment; Tetraacetylethylenediamine

Stephen P. Milroy, Michael P. Bange, Pongmanee Thongbai, Cotton leaf nutrient concentrations in response to waterlogging under field conditions, Field Crops Research, Volume 113, Issue 3, 4 September 2009, Pages 246-255, ISSN 0378-4290, DOI: 10.1016/j.fcr.2009.05.012.

(http://www.sciencedirect.com/science/article/B6T6M-4WSR0R6-1/2/35ca94c011da409f1ac0613d6e07ba65)
Abstract:
Cotton is known to be poorly adapted to waterlogged conditions. When grown on soils with inherently low drainage rates, combined with the use of furrow irrigation and with summer dominant rainfall patterns, there is a significant risk of intermittent waterlogging. Good surface drainage is the most effective management option but when land-forming is poor or when substantial rain occurs soon after an irrigation application, significant yield loss can occur. Two field experiments were conducted in which cotton was subjected to waterlogging by extending the duration of furrow irrigation events. In order to assess the impact of waterlogging on plant nutrition, mineral nutrient concentrations in the youngest fully expanded leaves were measured repeatedly during the imposition of waterlogging, during recovery and through to the end of the growing season. Almost all nutrient concentrations were reduced by waterlogging but the extent and timing of recovery varied. A single early waterlogging event had a much greater impact (especially on N, P and K) than a single event late in development. Recovery from waterlogging appears to have been impaired during the period of rapid boll growth. During this period also, normal irrigation events caused transient reductions in some nutrients if the crop had been previously waterlogged. As with other studies on waterlogging, there was evidence that sodium concentration in leaves increased. While P and K concentrations were negatively associated with leaf sodium, there was no evidence that this relationship was altered by waterlogging.
Management of nutrition after waterlogging has previously focused on the correction of leaf N and Fe concentrations. The wide range of nutrients that was affected in our experiments suggests that the value of correcting nutrients other than N needs to be explored. In addition, the results suggest that there is also a need to promote growth after waterlogging, rather than only correcting the nutrient concentration, to provide a larger reserve of key nutrients to meet reproductive demand.
Keywords: Cotton; Gossypium hirsutum; Mineral nutrition; Nitrogen; Phosphorus; Potassium; Sodium; Waterlogging

D.J. Hunsaker, D.M. El-Shikha, T.R. Clarke, A.N. French, K.R. Thorp, Using ESAP software for predicting the spatial distributions of NDVI and transpiration of cotton, Agricultural Water Management, Volume 96, Issue 9, September 2009, Pages 1293-1304, ISSN 0378-3774, DOI: 10.1016/j.agwat.2009.04.014.
(http://www.sciencedirect.com/science/article/B6T3X-4WB379J-1/2/a9d97587232bbd6a3f5c89081b5db32d)
Abstract:
Observations of the normalized difference vegetation index (NDVI) from aerial imagery can be used to infer the spatial variability of basal crop coefficients (Kcb), which in turn provide a means to estimate variable crop water use within irrigated fields. However, monitoring spatial Kcb at sufficient temporal resolution using only aerial acquisitions would likely not be cost-effective for growers. In this study, we evaluated a model-based sampling approach, ESAP (ECe Sampling, Assessment, and Prediction), aimed at reducing the number of seasonal aerial images needed for reliable Kcb monitoring. Aerial imagery of NDVI was acquired over an experimental cotton field having two treatments of irrigation scheduling, three plant density levels, and two N levels. During both 2002 and 2003, ESAP software used input imagery of NDVI on three separate dates to select three ground sampling designs having 6, 12, and 20 sampling locations. On three subsequent dates during both the years, NDVI data obtained at the design locations were then used to predict the spatial distribution of NDVI for the entire field. Regression of predicted versus imagery observed NDVI resulted in r2 values from 0.48 to 0.75 over the six dates, where higher r2 values occurred for predictions made near full cotton cover than those made at partial cover. Prediction results for NDVI were generally similar for all three sample designs. Cumulative transpiration (Tr) for periods from 14 to 28 days was calculated for treatment plots using Kcb values estimated from

NDVI. Estimated cumulative Tr using either observed NDVI from imagery or predicted NDVI from ESAP procedures compared favorably with measured cumulative Tr determined from soil water balance measurements for each treatment plot. Except during late season cotton senescence, errors in estimated cumulative Tr were between 3.0% and 7.3% using observed NDVI, whereas they were they were between 3.4% and 8.8% using ESAP-predicted NDVI with the 12 sample design. Thus, employing a few seasonal aerial acquisitions made in conjunction with NDVI measurements at 20 or less ground locations optimally determined using ESAP, could provide a cost-effective method for reliably estimating the spatial distribution of crop water use, thereby improving cotton irrigation scheduling and management.
Keywords: Remote sensing; Crop coefficients; Irrigation management; Crop water use

Jonghan Ko, Giovanni Piccinni, Evelyn Steglich, Using EPIC model to manage irrigated cotton and maize, Agricultural Water Management, Volume 96, Issue 9, September 2009, Pages 1323-1331, ISSN 0378-3774, DOI: 10.1016/j.agwat.2009.03.021.
(http://www.sciencedirect.com/science/article/B6T3X-4W9S2S8-2/2/0321824ded8d43f69127ad468629ba72)
Abstract:
Simulation models are becoming of interest as a decision support system for management and assessment of crop water use and of crop production. The Environmental Policy Integrated Climate (EPIC) model was used to evaluate its application as a decision support tool for irrigation management of cotton and maize under South Texas conditions. Simulation of the model was performed to determine crop yield, crop water use, and the relationships between the yield and crop water use parameters such as crop evapotranspiration (ETc) and water use efficiency (WUE). We measured actual ETc using a weighing lysimeter and crop yields by field sampling, and then calibrated the model. The measured variables were compared with simulated variables using EPIC. Simulated ETc agreed with the lysimeter, in general, but some simulated ETc were biased compared with measured ETc. EPIC also simulated the variability in crop yields at different irrigation regimes. Furthermore, EPIC was used to simulate yield responses at various irrigation regimes with farm fields' data. Maize required ~700 mm of water input and ~650 mm of ETc to achieve a maximum yield of 8.5 Mg ha-1 while cotton required between 700 and 900 mm of water input and between 650 and 750 mm of ETc to achieve a maximum yield of 2.0-2.5 Mg ha-1. The simulation results demonstrate that the EPIC model can be used as a decision support tool for the crops under full and deficit irrigation conditions in South Texas. EPIC appears to be effective in making long-term and pre-season decisions for irrigation management of crops, while reference ET and phenologically based crop coefficients can be used for in-season irrigation management.
Keywords: Crop model; EPIC; Crop evapotranspiration; Irrigation management

Abolle Abolle, Loukou Kouakou, Henri Planche, The viscosity of diesel oil and mixtures with straight vegetable oils: Palm, cabbage palm, cotton, groundnut, copra and sunflower, Biomass and Bioenergy, Volume 33, Issue 9, September 2009, Pages 1116-1121, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2008.01.012.
(http://www.sciencedirect.com/science/article/B6V22-4S094XB-1/2/83a5caeb1f8a84a619148aec369cc7e2)
Abstract:
The feed back experience of using straight vegetable oil (SVO) as a fuel in the existing diesel engines evidences the need for fitting several physical properties, among them the fuel viscosity. An empirical modelling is proposed in order to interpolate viscosity to any kind of diesel oil/SVO blend. This model is fitted on an experimental viscosity database on blends, varying the SVO mass proportion in the blend, the blend temperature between cloud point and 353 K, and including six vegetable oils varying the fatty acids composition. Extrusion rheology was also checked by varying the pressure drop. Measurements show that blends behave Newtonian.

Keywords: Straight vegetable oils (SVOs); Elaesis guineensis; Sabal palmetto; Gossypium hirssutum; Arachis hypogea; Cocos nucifera; Helianthus annuus; Fuel blend; Viscosity; Biofuel; Diesel fuel

Takeshi Haga, Niho Murayama, Yuya Shimizu, Akatsuki Saito, Takumi Sakamoto, Tetsuo Morita, Katsuhiro Komase, Tetsuo Nakayama, Kazuyuki Uchida, Tetsuro Katayama, Akio Shinohara, Chihiro Koshimoto, Hiroshi Sato, Hironori Miyata, Kiyoaki Katahira, Yoshitaka Goto, Analysis of antibody response by temperature-sensitive measles vaccine strain in the cotton rat model, Comparative Immunology, Microbiology and Infectious Diseases, Volume 32, Issue 5, September 2009, Pages 395-406, ISSN 0147-9571, DOI: 10.1016/j.cimid.2007.11.011.
(http://www.sciencedirect.com/science/article/B6T5H-4RRXJ92-5/2/5e45e4c2c4767279ddaab488bb8bdb78)
Abstract:
Measles virus (MeV) vaccine strain, AIK-C, is temperature sensitive (ts), which is thought to be associated with attenuation of virus pathogenicity. In this study, replication and antibody response were examined in cotton rats using viruses carrying different forms of the P gene, which is responsible for the ts phenotype of strain AIK-C and its parental Edmonston strain. When cotton rats were inoculated intranasally, ts viruses neither replicated in lungs, nor reproducibly generated an antibody response. When inoculated intramusculary (i.m.), however, ts strains raised an antibody titer in all animals. This response was not observed when ultraviolet-inactivated virus was used. ts virus, inoculated i.m., was recovered from cotton rat drainage lymph nodes. These results suggest that ts virus, inoculated i.m., could replicate in the cotton rat, presumably at the superficial lymph node, and induce an antibody response. Therefore, cotton rats can serve as a small-animal model for investigating immune responses to safer ts vaccine, as well as recombinant vaccine using AIK-C as a vector for protection against other infectious agents.
Keywords: Cotton rat; Measles vaccine; Temperature sensitive; Rat Sigmodon, Vaccin contre la rougeole, Modele animal, Virus sensible a la temperature

Xiuming Wu, Fuguang Li, Chaojun Zhang, Chuanliang Liu, Xueyan Zhang, Differential gene expression of cotton cultivar CCRI24 during somatic embryogenesis, Journal of Plant Physiology, Volume 166, Issue 12, 15 August 2009, Pages 1275-1283, ISSN 0176-1617, DOI: 10.1016/j.jplph.2009.01.012.
(http://www.sciencedirect.com/science/article/B7GJ7-4VXT0P2-1/2/0056e97801bd8f13e646f300e0ff9f8b)
Abstract: Summary
Regeneration is an essential step for recovery of transgenic plants following gene transfer. However, most cotton cultivars fail to respond to the current regeneration protocols for cotton. This hinders the use of gene transfer technology to improve this crop. Identification of the genes involved in cotton somatic embryogenesis (SE) may provide information that will help to improve regeneration protocols. To investigate the genes expressed during cotton SE, we constructed a suppression subtractive hybridization (SSH) library using cDNA from nonembryogenic callus as driver and those from embryogenic callus as tester. From this library, 368 cDNA clones that hybridized conspicuously to the forward-subtracted and unsubtracted tester probes, but not to the reverse-subtracted or unsubtracted driver probes, were obtained and sequenced. Among the 241 putative unigenes, the functions of 152 genes (63%) could be assigned using existing databases. In addition to many previously reported SE-related genes, some new genes, such as members of ethylene pathway and auxin pathway, were discovered in our library. The expression of eight genes, including an Aux/IAA responsive gene, was analyzed by reverse-transcription-polymerase chain reaction and found to be upregulated during the SE. This is in agreement with previous studies showing that embryogenesis involves auxin signaling.

Keywords: Auxin; Cotton; Ethylene; Somatic embryogenesis; Suppression subtractive hybridization

Jonghan Ko, Giovanni Piccinni, Thomas Marek, Terry Howell, Determination of growth-stage-specific crop coefficients (Kc) of cotton and wheat, Agricultural Water Management, In Press, Corrected Proof, Available online 8 August 2009, ISSN 0378-3774, DOI: 10.1016/j.agwat.2009.06.023.
(http://www.sciencedirect.com/science/article/B6T3X-4WYCT4H-1/2/78e2b91297242a983ab70d921cc9929c)
Abstract:
Development of crop coefficient (Kc), the ratio of crop evapotranspiration (ETc) to reference evapotranspiration (ETo), can enhance ETc estimates in relation to specific crop phenological development. This research was conducted to determine growth-stage-specific Kc and crop water use for cotton (Gossypium hirsutum) and wheat (Triticum aestivum) at the Texas AgriLife Research field at Uvalde, TX, USA from 2005 to 2008. Weighing lysimeters were used to measure crop water use and local weather data were used to determine the reference evapotranspiration (ETo). Seven lysimeters, weighing about 14 Mg, consisted of undisturbed 1.5 m x 2.0 m x 2.2 m deep soil monoliths. Six lysimeters were located in the center of a 1-ha field beneath a linear-move sprinkler system equipped with low energy precision application (LEPA) and a seventh lysimeter was established to measure reference grass ETo. Crop water requirements, Kc determination, and comparison to existing FAO Kc values were determined over a 2-year period on cotton and a 3-year period on wheat. Seasonal total amounts of crop water use ranged from 689 to 830 mm for cotton and from 483 to 505 mm for wheat. The Kc values determined over the growing seasons varied from 0.2 to 1.5 for cotton and 0.1 to 1.7 for wheat. Some of the values corresponded and some did not correspond to those from FAO-56 and from the Texas High Plains and elsewhere in other states. We assume that the development of regionally based and growth-stage-specific Kc helps in irrigation management and provides precise water applications for this region.
Keywords: Crop coefficient; ET measurement; Weighing lysimeter

Aulus Estevao Anjos de Deus Barbosa, Rodrigo da Rocha Fragoso, Djair dos Santos de Lima e Souza, Erika Freire, Osmundo Brilhante de Oliveira Neto, Antonio Americo Barbosa Viana, Roberto Coiti Togawa, Luciane Mourao Guimaraes, Natalia Florencio Martins, Edivaldo Cia, Diana Fernandez, Liziane maria de Lima, Maria Cristina Mattar Silva, Thales Lima Rocha, Maria Fatima Grossi-de-Sa, Differentially expressed genes in cotton plant genotypes infected with Meloidogyne incognita, Plant Science, In Press, Corrected Proof, Available online 8 August 2009, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2009.07.013.
(http://www.sciencedirect.com/science/article/B6TBH-4WYDMVF-2/2/0b79a65fe11a062789cb64e46ad47196)
Abstract:
Meloidogyne incognita is a nematode responsible for huge losses of economically important crops. The control of this pathogen is heavily centered on chemical nematicides, which are toxic to humans and environment, besides being very expensive. Alternatively, resistant varieties of cotton generated from conventional breeding programs represent an attractive strategy for the control of M. incognita. In this context, the goal of the work reported here was to analyze the gene expression profile of one resistant and one susceptible cotton genotype infected with M. incognita aiming to understand the mechanisms involved in resistance. EST libraries of cotton in both resistant and susceptible to infection by M. incognita were constructed and sequenced, generating 2261 sequences that were assembled into 233 contigs and 1593 singlets. Genes differentially expressed were observed in both resistant and susceptible cotton. Twenty genes were found to be expressed exclusively in the resistant cotton genotype, with functions related to pathogen recognition, signal transduction, defense mechanisms and protein synthesis transport and

activation. The coordinated action of these genes suggests the existence of a complex defense pathway towards nematode attack in cotton. Our data indicate some candidate genes for validation and use through transformation in other agronomically important plants.
Keywords: Root-knot nematode; Meloidogyne incognita; Resistance genes; Gossypium hirsutum; Cotton

Kyung San Choi, Jae Min Lee, Jong Ho Park, Jum Rae Cho, Jeong Heub Song, Dong Soon Kim, Kyung Saeng Boo, Sex Pheromone Composition of the Cotton Caterpillar, Palpita indica (Lepidoptera: Pyralidae), in Korea, Journal of Asia-Pacific Entomology, In Press, Accepted Manuscript, Available online 7 August 2009, ISSN 1226-8615, DOI: 10.1016/j.aspen.2009.07.003.
(http://www.sciencedirect.com/science/article/B8JJN-4WY6K50-1/2/1f4b080416b21bc2d2b0125096944c79)
Abstract:
This study was conducted to investigate the sex pheromone composition of Palpita (=Diaphania) indica (Saunders) (Lepidoptera: Pyralidae) in Korea. Two sex pheromone components, E11-16:Al and E,E-10,12-16:Al, were identified by GC and GC-EAD analysis of sex pheromone gland extracts. The mean ratios of the two components, E11-16:Al and E,E-10,12-16:Al, were about 6.5:3.5 and 7.5:2.5 in gland extracts and in SPME collection, respectively. In field bioassays, maximum attraction occurred in traps baited with a 7:3 ratio of E11-16:Al and E,E-10,12-16:Al. The head extracts of P. indica stimulated the sex pheromone production of P. indica, as well as Hez-PBAN and PssPT, indicating that a PBAN-like substance exists in the head extracts of P. indica. Whole-mount immunocytochemistry showed that three groups of neurosecretory cells showed PBAN-like immunoreactivity in the SEG of P. indica. The PBAN-like immunoreactivity connected to the Corpora Cardiaca, a neurohemal organ. Also, PBAN-like immunoreactivity was found in the brain and in the thoracic and third/fourth abdominal ganglia. The addition of sex pheromone components of Peridroma saucia to the sex pheromone of P. indica greatly improved the attraction of P. indica males. The mixing of the sex pheromone components of S. exigua did not significantly increase the catches of P. indica, while the sex pheromone of H. armigera completely inhibited the attractiveness.
Keywords: Palpita indica; EAG; (E)-11-hexadecenal; (E,E)-10,12-hexadecadienal; GC-EAD; PBAN

Yves Carriere, Christa Ellers-Kirk, Manda G. Cattaneo, Christine M. Yafuso, Larry Antilla, Cho-Ying Huang, Magfurar Rahman, Barron J. Orr, Stuart E. Marsh, Landscape effects of transgenic cotton on non-target ants and beetles, Basic and Applied Ecology, In Press, Corrected Proof, Available online 6 August 2009, ISSN 1439-1791, DOI: 10.1016/j.baae.2008.10.010.
(http://www.sciencedirect.com/science/article/B7GVS-4WXXVBW-1/2/0f5630f6cf554e0d1ed15d69d3fbd74f)
Abstract:
Transgenic crops producing toxins from Bacillus thuringiensis (Bt) can be planted in the same field for many years, and many insects exploiting such crops must disperse to other habitats to persist. Accordingly, effects of transgenic crop farming could accumulate through time and affect insect populations across agricultural landscapes. We monitored the population density of seven ant genera and beetle families and of rare ants and beetles in 84 non-cultivated sites abutting agricultural fields in Central Arizona. We assessed the short-term (during planting year) and long-term (over 5-6 years) landscape effect of farming Cry1Ac cotton on ant and beetle density in non-cultivated sites, in addition to several local and regional variables. Landscape variables (e.g., sequence of crops planted in neighbouring fields, crop diversity, and abundance) were more frequently associated with insect density than local variables (e.g., plant productivity and diversity in non-cultivated sites). In the short-term, use of Bt relative to non-Bt cotton in neighbouring fields was positively associated with density of one ant and two beetle groups in non-cultivated sites. However, acreage of Bt cotton located within 1 km from non-cultivated sites had more negative

effects than acreage of non-Bt cotton on density of one ant and one beetle group. In the long-term, the proportion of years that Bt cotton was planted in neighbouring fields was positively associated with ant density but not beetle density. Results suggest that the farming of Bt cotton in neighbouring fields frequently resulted in positive short- and long-term landscape effects on ants and beetles in non-cultivated sites, while Bt cotton planted farther away had less frequent negative short-term impacts.
Keywords: Bacillus thuringiensis; Landscape effects; Herbicide tolerance; Nontarget arthropods; Regional effects; Remote sensing; Risk assessment; Transgenic crops

N. Jiang, J.Y. Chen, D.V. Parikh, Acoustical evaluation of carbonized and activated cotton nonwovens, Bioresource Technology, In Press, Corrected Proof, Available online 6 August 2009, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.10.062.
(http://www.sciencedirect.com/science/article/B6V24-4WXXV58-5/2/4b867a356ee74d683c68176eee6c2864)
Abstract:
An activated carbon fiber nonwoven (ACF) was manufactured from a cotton nonwoven fabric. For the ACF acoustic application, a nonwoven composite of ACF with cotton nonwoven as a base layer was developed. Also produced were the composites of the cotton nonwoven base layer with a layer of glassfiber nonwoven, and the cotton nonwoven base layer with a layer of cotton fiber nonwoven. Their noise absorption coefficients and sound transmission loss were measured using the Bruel and Kjaer impedance tube instrument. Statistical significance of the differences between the composites was tested using the method of Duncan's grouping. The study concluded that the ACF composite exhibited a greater ability to absorb normal incidence sound waves than the composites with either glassfiber or cotton fiber. The analysis of sound transmission loss revealed that the three composites still obeyed the mass law of transmission loss. The composite with the surface layer of cotton fiber nonwoven possessed a higher fabric density and therefore showed a better sound insulation than the composites with glassfiber and ACF.
Keywords: Activated carbon fiber; Nonwoven; Cotton; Noise absorption; Transmission loss

E.S. Abdel-Halim, Mostafa M.G. Fouda, I. Hamdy, F.A. Abdel-Mohdy, S.M. El-Sawy, Incorporation of chlorohexidin diacetate into cotton fabrics grafted with glycidyl methacrylate and cyclodextrin, Carbohydrate Polymers, In Press, Corrected Proof, Available online 6 August 2009, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.07.050.
(http://www.sciencedirect.com/science/article/B6TFD-4WY13YP-1/2/36324bc905e3862c01ad82996ed0ecca)
Abstract:
Linear electron beam radiation was used to induce grafting of glycidyl methacrylate/[beta]-cyclodextrin mixture onto cotton fabric. Chlorohexidin diacetate was incorporated to the cavities of cyclodextrin fixed on the cotton fabric to form an inclusion complex having antimicrobial activity. After incorporating chlorohexidin diacetate, the fabric was subjected to several washing cycles to examine the durability of the antimicrobial finishing. Control and grafted cotton fabrics (before and after loading with antimicrobial agent) were characterized for their antimicrobial activity against different kinds of bacteria and fungi.
Grafted fabrics loaded with antimicrobial agent were found to show good antimicrobial activity in comparison with control and grafted fabrics which are not loaded with antimicrobial agent. The grafted fabrics loaded with antimicrobial agent were found also to exhibit good antimicrobial activity after five washings and this lasting antimicrobial activity can be attributed to the inclusion complex formed between chlorohexidin diacetate molecules and the cavities of cyclodextrin.
Keywords: Chlorohexidin diacetate; [beta]-Cyclodextrin; Inclusion complex; Cotton fabric; Antimicrobial finishing

Rebeka Fijan, Michele Basile, Romano Lapasin, Sonja Sostar-Turk, Rheological properties of printing pastes and their influence on quality-determining parameters in screen printing of cotton with reactive dyes using recycled polysaccharide thickeners, Carbohydrate Polymers, Volume 78, Issue 1, 4 August 2009, Pages 25-35, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.03.022.
(http://www.sciencedirect.com/science/article/B6TFD-4VWB192-4/2/26b1b4e6d51a6569a6964d1cd2b636f3)
Abstract:
Alginate, carboxymethylated guar gum and carboxymethylated cellulose, used as thickeners in printing pastes for monoreactive dyes, were recycled from wastewater concentrates (separated by ultrafiltration from wastewater after screen printing of cotton), and from printing paste residues (obtained from the cleaning of printing equipment and application systems in the printing machine). The printing performance, using original and recycled polymers, was studied via rheological properties of printing pastes and quality-determining parameters of printing.
A quantitative interpretation of the flow and the viscoelastic properties, which are strongly connected to the qualitative parameters of printing, was obtained using rheological models (Cross and Friedrich-Braun model). Recycled thickeners are easily reused for screen printing of cotton with monoreactive dyes, provided that the printing paste recipe fits a rheological constraint of equal viscosity in the steady shear conditions. The results of quality-determining parameters of prints using recycled thickeners are comparable to those obtained with the original thickeners.
Keywords: Polysaccharides; Reactive dye printing pastes; Thickener recycling; Textile printing; Rheology; Quality-determining parameters

Dusko Cakara, Lidija Fras, Matej Bracic, Karin Stana Kleinschek, Protonation behavior of cotton fabric with irreversibly adsorbed chitosan: A potentiometric titration study, Carbohydrate Polymers, Volume 78, Issue 1, 4 August 2009, Pages 36-40, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.04.011.
(http://www.sciencedirect.com/science/article/B6TFD-4W6Y364-1/2/9ccca68c78ee4f4babca67d5044234a4)
Abstract:
The protonation of cotton fabric with irreversibly adsorbed medical chitosan (CO-CT) was measured in aquatic medium at 0.1 M ionic strength by means of potentiometric titrations, and compared with the results obtained for pure cotton and chitosan. For CO-CT, the charging isotherm exhibits a charge reversal around pH[approximate]6.0, which is identified as the point of zero charge (PZC). The pure chitosan and the acid fraction that is present in cotton, protonate according to the one-pK model, with pKCT=6.3 and pKCO=4.7, respectively. At pH>PZC, the charge of the acid fraction in CO-CT is negative and constant, and the proton binding is attributed purely to the adsorbed chitosan. On the other hand, the cotton-bound acid exhibits a more complex protonation mechanism in CO-CT than in the pure fabric, which is evidenced as an excess positive charge at pH<PZC and a deviation from the one-pK behavior.
Keywords: Chitosan; Cotton; Protonation; Adsorption; Charge; pH; pK; Titration; Potentiometric; Medical; Antimicrobial

Jin Yin, Yucheng Sun, Gang Wu, Megha N. Parajulee, Feng Ge, No effects of elevated CO2 on the population relationship between cotton bollworm, Helicoverpa armigera Hubner (Lepidoptera: Noctuidae), and its parasitoid, Microplitis mediator Haliday (Hymenoptera: Braconidae), Agriculture, Ecosystems & Environment, Volume 132, Issues 3-4, August 2009, Pages 267-275, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.04.010.
(http://www.sciencedirect.com/science/article/B6T3Y-4W9S2N1-3/2/81f14ef3c1a03b7282e4adf166819bad)
Abstract:

Estimating the population consumption of an insect population under elevated CO2 is an important step in understanding the effects of elevated CO2 on herbivore-crop interactions. Two successive generations of cotton bollworm, Helicoverpa armigera Hubner, were reared on milky grains of spring wheat (Triticum aestivum L.) grown in open-top chambers under increased carbon dioxide (CO2) concentration. H. armigera development, wheat consumption, and parasitism by Microplitis mediator Haliday were examined, as were the effects of elevated CO2 on the wheat itself. We experimentally tested the hypotheses that, by quantifying the population consumption of H. armigera, elevated CO2 enhanced the pest-control ability of M. mediator again H. armigera. Decreases in protein, total amino acid, and nitrogen (N) content were noted in spring wheat when grown in an elevated-CO2 environment, as were increases in total non-structure carbohydrates (TNCs) and in the ratio of TNC to N. In the first generation of H. armigera reared under elevated CO2, no significant changes were observed in population generation time (T) or in the intrinsic rate of increase (rm) between CO2 treatments. However, in the second treatment generation, longer generation time resulted in a lower rm value. Elevated-CO2 levels caused no significant changes in the H. armigera population's total wheat consumption. The rates of parasitism, cocooning, and emergence by M. mediator were also unaffected, as were its average weight and adult lifespan. As no significant changes in wheat consumption by H. armigera or in the parasitic rate of M. mediator were revealed, the results indicate that the population relationship between H. armigera and M. mediator is unlikely to vary due to future elevated atmospheric CO2 concentrations.
Keywords: Elevated CO2; Helicoverpa armigera; Microplitis mediator; Parasitism rate; Population consumption; Spring wheat

Hongmei Shu, Zhiguo Zhou, Naiyin Xu, Youhua Wang, Mi Zheng, Sucrose metabolism in cotton (Gossypium hirsutum L.) fibre under low temperature during fibre development, European Journal of Agronomy, Volume 31, Issue 2, August 2009, Pages 61-68, ISSN 1161-0301, DOI: 10.1016/j.eja.2009.03.004.
(http://www.sciencedirect.com/science/article/B6T67-4W55T61-1/2/b9f842c46f673859a0cb12d6e9c50520)
Abstract:
The effects of low temperature on sucrose content and activities of key enzymes related to sucrose metabolism in cotton (Gossypium hirsutum L.) fibre were investigated. Two cotton cultivars, Kemian 1 and Sumian 15, were grown in the field at two sowing dates in 2006 and three sowing dates in 2007, the differences of environmental conditions during fibre development period (from flowering date to boll opening date) for different sowing dates were primarily on temperature. Low temperatures (MDTmin of 21.1, 20.5 and 18.1 [degree sign]C) in late sowing dates (25 May/10 June) prolonged the fibre development period, and had significant effect on cellulose synthesis and sucrose metabolism. Results showed that, under low temperature, sucrose content was increased, cellulose content and sucrose transformation rate were decreased, and the variability of cellulose content and sucrose transformation rate through sowing dates in Sumian 15 was more than that in Kemian 1. The measurable activities of sucrose phosphate synthase (SPS), sucrose synthase (SuSy) and acid/alkaline invertases in sucrose metabolism were affected by low temperatures. Under low temperatures, activities of SuSy and invertase in sucrose degradation were increased, and two cultivars had the similar change. In contrast, the activity of SPS in sucrose synthesis was lower than the activity in developing fibre at normal environmental condition, and the time to peak activity was delayed, SPS activity in response to temperatures differed between two cultivars. The results indicated that restrained cellulose synthesis and sucrose metabolism under low temperature were mainly attributed to the changed activities of enzymes (SPS, SuSy and invertase), and the difference of cellulose synthesis and sucrose metabolism in response to temperature in fibre cells for two cotton cultivars was mainly determined by the level of SPS activity.
Keywords: Cotton fibre; Low temperature; Sucrose metabolism; Enzyme activity

Jheng-Hua Lin, Yung-Ho Chang, You-Hong Hsu, Degradation of cotton cellulose treated with hydrochloric acid either in water or in ethanol, Food Hydrocolloids, Volume 23, Issue 6, 9th International Hydrocolloids Conference, August 2009, Pages 1548-1553, ISSN 0268-005X, DOI: 10.1016/j.foodhyd.2008.10.005.
(http://www.sciencedirect.com/science/article/B6VP9-4TRK0TD-4/2/cffd8a631d770aca59454b02d5b74a99)
Abstract:
Cotton cellulose was acid treated either in water or in ethanol, containing 1.39% HCl, at 45 and 65 [degree sign]C for 1-5 h. The morphology and molecular weight distribution of celluloses before and after acid treatments were observed, and the differences in the structure of celluloses treated at different conditions were compared. The soluble sugar contents of celluloses during acid treatment were lower than 6%. Native cellulose showed smooth surface, whereas tiny pin-holes (15-20 nm in diameter) and wrinkles were found on the surface of acid-treated cellulose. Cellulose tended to have pin-holes after treated in ethanol at 65 [degree sign]C. When treated in the same media, the weight-average degree of polymerization (DPw) of cellulose decreased with increasing treatment time or temperature. The degradation rate of cellulose treated in ethanol was faster than that of cellulose treated in water, while the temperature effect on degradation rate was more profound for cellulose treated in water. Nevertheless, the crystallinity of cellulose after acid treatments remained constant or slightly increased. Results indicate that acid treatment in ethanol has more profound effect on the molecular degradation and surface structure of cellulose than the acid treatment in water.
Keywords: Cellulose; Acid treated; Medium effect; Molecular weight distribution; Degradation rate

Avishag Levi, Lianne Ovnat, Andrew H. Paterson, Yehoshua Saranga, Photosynthesis of cotton near-isogenic lines introgressed with QTLs for productivity and drought related traits, Plant Science, Volume 177, Issue 2, August 2009, Pages 88-96, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2009.04.001.
(http://www.sciencedirect.com/science/article/B6TBH-4W32KH2-1/2/57effa8dfc95b8108ba75c69ef996c6f)
Abstract:
Quantitative trait loci (QTLs) for yield and drought related traits were exchanged via marker-assisted selection (MAS) between elite cultivars of two cotton species, Gossypium barbadense (GB) cv. F-177 and Gossypium hirsutum (GH) cv. Siv'on. The resulting near-isogenic lines (NILs) manifested in many cases the expected drought-adaptive traits, but rarely exhibited an advantage in yield relative to the recipient parents. In the current study we characterized the photosynthetic activity of two selected NILs and their recipient parents under dryland and irrigated field conditions. The GB NIL exhibited a stable net rate of CO2 assimilation (A) across a wide range of leaf water potentials with a notable advantage over its recipient parent, F-177, under severe drought, associated with lower stomatal limitation, greater maximum velocity for carboxylation of Rubisco and greater electron transport rate. The GH NIL exhibited greater mesophyll conductance under drought conditions than its recipient parent, Siv'on, but these genotypes did not differ in A. Nevertheless, both NILs did not differ from their recipient parents in yield. This study provides further support to our previous conclusion that MAS is a useful means to enhance drought-adaptive traits of cotton but complimentary conventional breeding is required to achieve high yield potential.
Keywords: Gas exchange; Gossypium; Leaf water potential; NIL; MAS

Nooshin Zandi-Sohani, Parviz Shishehbor, Farhan Kocheili, Parasitism of cotton whitefly, Bemisia tabaci on cucumber by Eretmocerus mundus: Bionomics in relation to temperature, Crop

Protection, In Press, Corrected Proof, Available online 31 July 2009, ISSN 0261-2194, DOI: 10.1016/j.cropro.2009.07.003.
(http://www.sciencedirect.com/science/article/B6T5T-4WWP9WB-1/2/d9c4e494f96dc1c2d64b2d6d27476a9a)
Abstract:
Selected life history characteristics of Eretmocerus mundus Mercet parasitizing the cotton whitefly, Bemisia tabaci (Gennadius) on cucumber were studied at four constant temperatures (20, 25, 30 and 32 [degree sign]C). Egg to adult developmental time of female ranged from 23.57 days at 20 [degree sign]C to 11.6 days at 32 [degree sign]C. An average of 266 degree-days is required to complete development above the lower threshold temperature (8.1 [degree sign]C). Preimaginal survivorship was 71, 98, 84.8 and 59.2% at 20, 25, 30 and 32 [degree sign]C, respectively. Mean adult longevity of female E. mundus ranged from 10.5 days at 20 [degree sign]C to 3.8 days at 32 [degree sign]C. Mean total fecundity ranged from 68 to 173 eggs/female. The sex ratio (female %) ranged from 48 to 55%. Intrinsic rate of increase (rm) increased with temperature from 0.098 at 20 [degree sign]C to 0.287 at 30 [degree sign]C and then decreased to 0.230 at 32 [degree sign]C. Generation time decreased from 23.9 to 11.5 days with increasing temperature. These data can be used to maximize the production of E. mundus from mass rearing facilities and to develop computer simulation models to predict E. mundus development and population dynamics for release programs.
Keywords: Eretmocerus mundus; Bemisia tabaci; Biology; Life table parameters; Cucumber

M. Djanaguiraman, J. Annie Sheeba, D. Durga Devi, U. Bangarusamy, P.V.V. Prasad, Nitrophenolates spray can alter boll abscission rate in cotton through enhanced peroxidase activity and increased ascorbate and phenolics levels, Journal of Plant Physiology, In Press, Corrected Proof, Available online 31 July 2009, ISSN 0176-1617, DOI: 10.1016/j.jplph.2009.05.018.
(http://www.sciencedirect.com/science/article/B7GJ7-4WWP9WF-1/2/3abbd2e4e859515797eaf8558057f8dc)
Abstract: Summary
Field studies were conducted from 2002 to 2005 to evaluate foliar spray of Atonik (a plant growth regulator (PGR) containing nitrophenolates) on cotton boll abscission rate by assessing various reactive oxygen species (ROS) contents, antioxidant content and antioxidant enzyme activity from 1 to 9 days after anthesis (DAA). The result indicated that the nitrophenolate spray reduced hydrogen peroxide (H_2O_2), superoxide anion (O_2^-) accumulation, lipid peroxidation (malondialdehyde - MDA), lipoxygenase (LOX) activity and membrane permeability relative to the control. Antioxidant enzyme activity (superoxide dismutase, SOD; ascorbate peroxidase, APX; peroxidase, POX; glutathione peroxidase, GSH-Px) was significantly increased by the nitrophenolate spray. The POX (217%) and GSH-Px (242%) activities were enhanced compared with APX (7.7%) activity at 9 DAA. Enhanced accumulation of ascorbate (245%), phenol (253%) and proline (150%) was observed in nitrophenolate-sprayed plants compared with control at 9 DAA. Because ascorbate content is increased by higher dehydroascorbate reductase (DHAR) enzyme activity, the ascorbate was able to replenish reducing equivalents to phenoxyl radicals, resulting in an increase of phenolic compounds. The increased phenolic acid content may be involved in scavenging the ROS produced in developing cotton boll. The role of DHAR and glutathione reductase (GR) in keeping higher levels of reduced ascorbate and low levels of endogenous H_2O_2 in the developing cotton boll may be the prerequisite for boll retention. Based on the present work, we conclude that nitrophenolate-sprayed plants counteracted the deleterious effects of ROS by the peroxide/phenolics/ascorbate system, which causes reduced boll abscission and increased yield.
Keywords: Antioxidant enzymes; Ascorbate; Oxidative stress; Peroxidase; Phenolics

Ali Hebeish, Mohamed Hashem, Nihal Shaker, Mohamed Ramadan, Bahiya El-Sadek, Marwa Abdel Hady, Effect of post- and pre-crosslinking of cotton fabrics on the efficiency of biofinishing with cellulase enzyme, Carbohydrate Polymers, In Press, Corrected Proof, Available online 28 July 2009, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.07.046.
(http://www.sciencedirect.com/science/article/B6TFD-4WW2SKG-1/2/d4196e79abc756647307c0efbe8f8111)
Abstract:
Four different types of cotton-based fabrics, namely, loom-state cotton, cotton/polyester (50/50), cotton/polyester (35/65) and grey mercerized fabrics were bioscoured and bleached. The four substrates are given enzymatic treatment using cellulase enzyme to affect bio-polishing followed by crosslinking using N,N-dimethylol 4,5-dihydroxyethylene urea (DMDHEU) to affect easy care finishing. In another series of experiments the said bioscoured-bleached substrates were similarly crosslinked followed by bio-polishing. Technical properties of the treated fabric that were monitored include: nitrogen content, loss in fabric weight, tensile strength, elongation at break, tear strength, whiteness index, surface roughness and wrinkle recovery angle. Scanning electron micrograph was also examined. Conclusions arrived at from these studies indicated that: post-crosslinking and pre-crosslinking revealed marginal differences in N%, wrinkle recovery angle and whiteness index, a point which validates the argument that cellulase enzyme could not break down the DMDHEU crosslinks within the molecular structure of cotton-containing fabrics. Meanwhile the surface roughness obtained with pre-crosslinking is a bit higher than those of post-crosslinking. Moreover, post-crosslinking caused higher losses in strength properties than pre-crosslinking. Scanning electron micrograph shows that cotton sample pre-crosslinked is almost smooth than those post-crosslinked.
Keywords: Bio-polish; Cellulase enzyme; Cotton blend; Finishing; Easy care; Textile

T. Brevault, L. Couston, A. Bertrand, M. Theze, S. Nibouche, M. Vaissayre, Sequential pegboard to support small farmers in cotton pest control decision-making in Cameroon, Crop Protection, In Press, Corrected Proof, Available online 28 July 2009, ISSN 0261-2194, DOI: 10.1016/j.cropro.2009.07.004.
(http://www.sciencedirect.com/science/article/B6T5T-4WW16MT-1/2/dd770f70149719ac0dfb73b366a2a65b)
Abstract:
A method (SPID) based on sequential plan for individual decision with a pegboard was tested over the 2006 and 2007 cropping seasons in 15 cotton producing villages in Cameroon - covering almost 700 farmers and 2000 ha to help farmers decide on when to spray their cotton crops against bollworms. This method was promoted through training sessions, from researchers to farmers through the technical staff of the cotton company (SODECOTON). This innovation led to a significant reduction in the number of sprays in 5 village-years out of 17 (total number of villages for 2006 and 2007). The number of sprays was larger than in the calendar-based programme in nine village-years, mainly due to poorly controlled infestations of Diparopsis watersi (Rothschild). However, this larger number of sprays led to a greater (seven village-years) or equal (two village-years) seed-cotton yield than that obtained with the calendar-based programme. When the number of sprays was equal or smaller, seed-cotton yield was greater (two village-years) or equal (six village-years) to LPD. Lastly, income increased proportionally to seed-cotton yield. An analysis of decisions made by farmers using the pegboard, as well as an a posteriori evaluation test, showed that users successfully learned the method and were confident in its diagnosis. This new method is not hampered by the constraints experienced with the former LEC (`targeted staggered control') spraying decision method - sequential sampling reduces the number of plants to be monitored, spraying decisions are made for individual plots, income rises and the role of supervisors is reduced. However, large-scale dissemination of this innovation is being hampered

by the collective management of cotton production and the need to train a large number of farmers.
Keywords: Cotton; Bollworms; Spraying threshold; Sampling; Cameroon; Dissemination

H.M. Fahmy, M.H. Abo-Shosha, N.A. Ibrahim, Finishing of cotton fabrics with poly (N-vinyl-2-pyrrolidone) to improve their performance and antibacterial properties, Carbohydrate Polymers, Volume 77, Issue 4, 19 July 2009, Pages 845-850, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.03.003.
(http://www.sciencedirect.com/science/article/B6TFD-4VTCM73-D/2/887c746ee4c856ae065d9492a42fd167)
Abstract:
Cotton fabric was thermally crosslinked with poly (N-vinyl-2-pyrrolidone) (PVP) at different conditions including temperature, time, PVP concentrations and molecular weights. Results indicated that treating the cotton fabrics with 4% aqueous solution of PVP of molecular weight 10,000 Dalton followed by drying at 85 [degree sign]C for 5 min then curing at 160 [degree sign]C for 3 min results in crosslinking as will as an improvement in some performance properties of that fabrics such as resiliency, tensile strength, and acid dyeability. Post-treating PVP crosslinked fabric with 5% iodine in ethanol solution for 5 h at 50 [degree sign]C imparts antibacterial activity against Staphylococcus aureus and Escherichia coli. Moreover, incorporation of PVP in the easy-care finishing of cotton fabrics, as polymer additive, with N,N-dimethylol 4,5-dihydroxyethylene urea as a crosslinker enhances some of the performance properties of finished fabrics such as the nitrogen content, tensile strength and acid dyeability along with decreasing resiliency as well as whiteness index, whereas the ester crosslinking with citric acid, in presence of PVP, enhances resilience, tensile strength and whiteness indices accompanied with a reduction in the %N of the treated fabrics. Infra red spectrum of PVP crosslinked fabric as well as EDX analysis of loaded iodine on PVP crosslinked cotton fabric were investigated.
Keywords: Poly (N-vinyl-2-pyrrolidone); Crosslinking; Cotton fabrics; Easy-care finishing; Iodine solution; Antibacterial activity

Ali Hebeish, Mohamed Hashem, Nihal Shaker, Mohamed Ramadan, Bahiya El-Sadek, Marwa Abdel Hady, New development for combined bioscouring and bleaching of cotton-based fabrics, Carbohydrate Polymers, In Press, Corrected Proof, Available online 16 July 2009, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.07.019.
(http://www.sciencedirect.com/science/article/B6TFD-4WSHK46-1/2/6d33e8205a67f45c26a48bba3ce14fd5)
Abstract:
A thorough investigation into conditions appropriate for effecting combined eco-friendly bioscouring and/or bleaching of cotton-based fabrics was undertaken. Fabrics used include cotton, grey mercerized cotton, cotton/polyester blend 50/50 and cotton/polyester blend 35/65. The four cotton-based fabric were subjected to bioscouring by single use of alkaline pectinase enzymes or by using binary mixtures of alkaline pectinase and cellulase enzymes under a variety of conditions. Results of bioscouring show that, the bioscoured substrates exhibit fabrics performances which are comparable with these of the conventional alkali scouring. It has been also found that, incorporation of ethylenediaminetetraacetic acid (EDTA) in the bioscouring with mixture from alkaline pectinase and cellulase improves the performance of the bioscoured fabrics. Addition of [beta]-cyclodextrin to the bioscouring solution using alkaline pectinase in admixtures with cellulase acts in favor of technical properties and performance of the bioscoured fabrics. Concurrent bioscouring and bleaching by in situ formed peracetic acid using tetraacetylethylenediamine (TAED) and H2O2 was also investigated. The results reveal unequivocally that the environmentally sound technology brought about by current development is by far the best. The new development involves a single-stage process for full purification/preparation of cotton textiles.

The new development at its optimal comprises treatment of the fabric with an aqueous formulation consisting of alkaline pectinase enzyme (2 g/L), TAED (15 g/L), H2O2 (5 g/L), nonionic wetting agent (0.5 g/L) and sodium silicate (2 g/L). The treatment is carried out at 60 [degree sign]C for 60 min. Beside the advantages of the new development with respect to major technical fabric properties, it is eco-friendly and reproducible. This advocates the new development for mill trials.
Keywords: Bioscouring, Bleaching, Cotton Fabric, Pectinase enzyme, Peracetic acid, Polyester

Moustafa M.G. Fouda, A. El Shafei, S. Sharaf, A. Hebeish, Microwave curing for producing cotton fabrics with easy care and antibacterial properties, Carbohydrate Polymers, Volume 77, Issue 3, 11 July 2009, Pages 651-655, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.02.017.
(http://www.sciencedirect.com/science/article/B6TFD-4VP668D-6/2/5ee6becaf511d99de9166bb657c767e6)
Abstract:
A new microwave curing system was used to affect crosslinking of cotton fabric with nonformaldehyde finishes, namely, glyoxal, glutaraldehyde and 1,2,3,4 butanetetracarboxylic acid (BTCA). Water soluble chitosan was incorporated in the finishing bath in order to impart antibacterial activity to the fabric in addition to the ease of care characteristics. Glyoxal proved to be the best finish and, hence, it was studied along with the chitosan under a variety of conditions including chitosan concentrations, power and time of microwave curing. Besides the crease recovery and strength properties of the finished fabrics, the latter were also monitored for N%, antibacterial activity and characterized using scanning electron microscope (SEM) and FTIR spectra when compared. With conventional curing system, the microwave curing system was found advantageous in production of cotton fabrics with easy care antibacterial properties without high losses in strength properties.
Keywords: Chitosan; Microwave; Antibacterial; Finishing

S.T. Yoon, Gerrit Hoogenboom, Ian Flitcroft, Mohammad Bannayan, Growth and development of cotton (Gossypium hirsutum L.) in response to CO2 enrichment under two different temperature regimes, Environmental and Experimental Botany, In Press, Corrected Proof, Available online 7 July 2009, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2009.06.015.
(http://www.sciencedirect.com/science/article/B6T66-4WPJ62N-2/2/90dafff6fd030f0c5623db9b832e0b55)
Abstract:
An increase in atmospheric CO2 concentration ([CO2]) together with other climate change factors could greatly affect agricultural productivity. Understanding the impact of the change in atmospheric [CO2] in conjunction with the ongoing global change is crucial to prepare for mitigation and any adaptation for future agricultural production. The main goal of this project was to study the time-course pattern of cotton plant growth in response to [CO2] and temperature to investigate the hypothesis that whether response to elevated [CO2] would change at different temperatures. An experiment was conducted in the controlled-environment chambers of the Georgia Envirotron with two different day/night temperatures levels, e.g., 25/15 [degree sign]C and 35/25 [degree sign]C, and three CO2 concentrations, e.g., 400, 600 and 800 [mu]mol l-1. The experimental design was completely randomized with four replicates (plastic containers) per treatment. Growth analysis was conducted at bi-weekly intervals during the growing season. In addition, leaf area, leaf dry mass, root dry mass, square dry mass, boll dry mass and total above dry mass per plant were also measured at each sampling. Plant traits, including plant height, number of leaves, number of squares and number of bolls were recorded weekly. The number of days to emergence, squaring, flowering and maturity were also observed. The results showed that by increasing [CO2] to 600 [mu]mol l-1 total biomass increased at both temperature levels, but a further increase of [CO2] up to 800 [mu]mol l-1 increased total biomass only at the temperature of 35/25 [degree sign]C. Throughout the growing season, there was no significant effect of [CO2]

levels on LAI. Increasing temperature from 25/15 [degree sign]C to 35/25 [degree sign]C had a positive impact on LAI across all CO2 levels ($P < 0.05$). Increasing CO2 from 400 to 600 [mu]mol l-1 significantly increased the number of squares by 31.4%, but a further increase to 800 [mu]mol l-1 caused a 6.6% decrease (non-significant) in the number of squares. The interactive effects of [CO2] and temperature indicated that at a higher temperature, CO2 would be more beneficial as we proceed towards the end of the growing season. However, further studies are needed to really understand the interaction between higher [CO2] and temperature levels and cultivar characteristics.
Keywords: Global climate change; CO2 x temperature interaction; Gossypium hirsutum L.; Elevated CO2; Biomass and partitioning

Jennifer A. Whan, Elizabeth K. Dann, Linda J. Smith, Elizabeth A.B. Aitken, Acibenzolar-S-methyl-induced alteration of defence gene expression and enzyme activity in cotton infected with Fusarium oxysporum f. sp. vasinfectum, Physiological and Molecular Plant Pathology, In Press, Corrected Proof, Available online 7 July 2009, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2009.06.003.
(http://www.sciencedirect.com/science/article/B6WPC-4WPJ61D-1/2/6cd51050ca113b147ab92ccd738ef3bf)
Abstract:
The effect of acibenzolar-S-methyl (ASM) applied in the form of Bion(R) as a seed soak or a foliar spray, on transcript accumulation of six defence related genes, and activities of four defence related enzymes, was assessed after cotton was inoculated with Fusarium oxysporum f. sp. vasinfectum (Fov). Significant upregulation of chitinase class I, peroxidase, and [beta]-1, 3-glucanase transcripts occurred in the Bion(R) seed soak treatment with Fov inoculation compared to all other treatments. Bion(R) alone did not significantly increase transcripts compared with water control treatments in the majority of cases. Phenylalanine ammonia lyase transcript in Bion(R) treated plants following fungal inoculation was greater than in the respective Bion(R) alone treatments, and osmotin-like protein transcript was significantly greater in inoculated plants sprayed with Bion(R) than in all other treatments. Transcripts of 4-coumarate-CoA ligase-like protein were generally lower than for all other genes, and significant upregulation compared with water control occurred in extracts from Fov inoculated plants receiving no Bion(R) treatment, and Fov inoculated plants cultivated from Bion(R) treated seed. The greatest increases in chitinase, [beta]-1, 3-glucanase and peroxidase activity occurred in root and shoot tissue from Bion(R) seed treated material inoculated with Fov. Bion(R) treatment alone did not consistently enhance enzyme activities above those measured in water treated controls. Polyphenol oxidase activities were enhanced by various Bion(R) or Fov treatments at 3 days after inoculation only.
Keywords: Fusarium oxysporum f. sp. vasinfectum; Bion(R); Acibenzolar-S-methyl (ASM); Cotton; Induced defence; Real-time RT-PCR; Transcript accumulation; Chitinase; Phenylalanine ammonia lyase; [beta]-1; 3-Glucanase; Polyphenol oxidase; Peroxidase

R.C. Nuti, M.C. Lamb, R.B. Sorensen, C.C. Truman, Agronomic and economic response to furrow diking tillage in irrigated and non-irrigated cotton (Gossypium hirsutum L.), Agricultural Water Management, Volume 96, Issue 7, July 2009, Pages 1078-1084, ISSN 0378-3774, DOI: 10.1016/j.agwat.2009.03.006.
(http://www.sciencedirect.com/science/article/B6T3X-4W207FS-1/2/a2532036238cd2f4455674f1a0dc79c1)
Abstract:
The Southeast U.S. receives an average of 1300 mm annual rainfall, however poor seasonal distribution of rainfall often limits production. Irrigation is used during the growing season to supplement rainfall to sustain profitable crop production. Increased water capture would improve water use efficiency and reduce irrigation requirements. Furrow diking has been proposed as a

cost effective management practice that is designed to create a series of storage basins in the furrow between crop rows to catch and retain rainfall and irrigation water. Furrow diking has received much attention in arid and semi-arid regions with mixed results, yet has not been adapted for cotton production in the Southeast U.S. Our objectives were to evaluate the agronomic response and economic feasibility of producing cotton with and without furrow diking in conventional tillage over a range of irrigation rates including no irrigation. Studies were conducted at two research sites each year from 2005 to 2007. Irrigation scheduling was based on Irrigator Pro for Cotton software. The use of furrow diking in these studies periodically reduced water consumption and improved yield and net returns. In 2006 and 2007, when irrigation scheduling was based on soil water status, an average of 76 mm ha-1 of irrigation water was saved by furrow diking, producing similar cotton yield and net returns. Furrow diking improved cotton yield an average of 171 kg ha-1 and net return by $245 ha-1 over multiple irrigation rates, in 1 of 3 years. We conclude that furrow diking has the capability to reduce irrigation requirements and the costs associated with irrigation when rainfall is periodic and drought is not severe.
Keywords: Irrigation scheduling; Water capture; Water consumption; Best management practices; Conservation tillage

Narendra Reddy, Yiqi Yang, Properties and potential applications of natural cellulose fibers from the bark of cotton stalks, Bioresource Technology, Volume 100, Issue 14, July 2009, Pages 3563-3569, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.02.047.
(http://www.sciencedirect.com/science/article/B6V24-4VXJVTX-1/2/6fc1e6f3ef0334d34ef684cd86dc6e59)
Abstract:
Natural cellulose fibers have been obtained from the bark of cotton stalks and the fibers have been used to develop composites. Cotton stalks are rich in cellulose and account for up to 3 times the quantity of cotton fiber produced per acre. Currently, cotton stalks have limited use and are mostly burned on the ground. Natural cellulose fibers obtained from cotton stalks are composed of approximately 79% cellulose and 13.7% lignin. The fibers have breaking tenacity of 2.9 g per denier and breaking elongation of 3% and modulus of 144 g per denier, between that of cotton and linen. Polypropylene composites reinforced with cotton stalk fibers have flexural, tensile and impact resistance properties similar to jute fiber reinforced polypropylene composites. Utilizing cotton stalks as a source for natural cellulose fibers provides an opportunity to increase the income from cotton crops and make cotton crops more competitive to the biofuel crops.
Keywords: Biofibers; Cotton stalks; Cellulose; Biomass; Composites

G. Basini, S. Bussolati, L. Baioni, F. Grasselli, Gossypol, a polyphenolic aldehyde from cotton plant, interferes with swine granulosa cell function, Domestic Animal Endocrinology, Volume 37, Issue 1, July 2009, Pages 30-36, ISSN 0739-7240, DOI: 10.1016/j.domaniend.2009.01.005.
(http://www.sciencedirect.com/science/article/B6T62-4VWPSX0-2/2/5d0371755a5c691c46cc7b185b93e7aa)
Abstract:
Gossypol is a polyphenol isolated from the seed, roots and stem of cotton plant (Gossypium sp.) It has been associated with adverse effects on female reproduction, but recently also shown having promising effects against several malignancies. Its mechanisms of action are however still not fully understood. This study was therefore conducted to investigate the effect of 5 or 25 [mu]g/mL gossypol on swine granulosa cell steroidogenic activity, redox status and Vascular Endothelial Growth Factor (VEGF) production. Study demonstrated that gossypol significantly ($P < 0.001$) inhibited granulosa cell estradiol 17[beta] and progesterone production, an effect that could be at least partially mediated by an increase ($P < 0.05$) of nitric oxide and superoxide anion production as a consequence of superoxide dismutase inhibition. Moreover, gossypol stimulates ($P < 0.001$)

VEGF production. In conclusion, study has demonstrated effecs of gossypol on swine granulosa cell function in vitro. Effects on female swine fertility can not be excluded.
Keywords: Angiogenesis; Ovary; Free radicals; Steroids; Reproduction

Wenfeng Li, Zhiguo Zhou, Yali Meng, Naiyin Xu, Michel Fok, Modeling boll maturation period, seed growth, protein, and oil content of cotton (Gossypium hirsutum L.) in China, Field Crops Research, Volume 112, Issues 2-3, 26 June 2009, Pages 131-140, ISSN 0378-4290, DOI: 10.1016/j.fcr.2009.02.009.
(http://www.sciencedirect.com/science/article/B6T6M-4VXT0WC-1/2/5d2161a5ce37b7d2d89c2ada34d85cc5)
Abstract:
The simulation of cottonseed (Gossypium hirsutum L.) growth is still an area of great uncertainty, especially in the process of cottonseed quality formation. A simple process-based model was developed to predict cotton boll maturation period and simulate cottonseed biomass accumulation, protein, and oil content. The cotton boll maturation period module took solar radiation and N nutrition factors into account in addition to temperature and variety maturity profile. Based on the hypothesis that the accumulation of biomass, oil, and protein are mainly sink-determined, the model was developed by considering parameters of cultivar characteristics, weather (temperature and solar radiation), and crop management variables (precisely N supply). The subtending leaf N concentration of cotton boll was simulated by a new semi-empirical model, and worked as the direct indicator of the N nutrition effect on cottonseed growth and development. The model was calibrated using data obtained in experiment conducted in Nanjing (the lower reaches of Yangtze River Valley) in 2005 and 2006. The model was then tested using two field experimental data sets. One was obtained in Nanjing, China in 2007, and the other in the Yellow River Valley (Xuzhou and Anyang) and the lower reaches of Yangtze River Valley (Huaian), China in 2005. The simulated values of boll maturation period by the model were very consistent with the observed values, with root mean square error (RMSE) lower than 3 days. The RMSE of cottonseed dry weight, protein content, and oil content predictions were 8.9 mg seed-1, 2.19%, and 2.71%, respectively. The result showed that the model is sufficiently robust to predict the cotton boll maturation period, cottonseed dry weight, and quality in wide range of conditions. It is not only a necessary component of cotton growth model, but also provides a good platform for further study in modeling cottonseed protein and oil yield.
Keywords: Cottonseed; Crop model; Boll maturation period; Biomass accumulation; Protein content; Oil content

Biao Liu, Liang Wang, Qing Zeng, Jun Meng, Wenjun Hu, Xiaogang Li, Kexin Zhou, Kun Xue, Doudou Liu, Yangping Zheng, Assessing effects of transgenic Cry1Ac cotton on the earthworm Eisenia fetida, Soil Biology and Biochemistry, In Press, Corrected Proof, Available online 26 June 2009, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2009.06.004.
(http://www.sciencedirect.com/science/article/B6TC7-4WM6089-2/2/54ade8ba2fd04bc7a464069b9e8f18c0)
Abstract:
Transgenic insect-resistant cotton containing a synthetic version of the insecticidal toxin gene from Bacillus thuringiensis subsp. kurstaki has been planted in China in a large scale and may have adverse impacts on soil organisms. The leaves of the transgenic cotton and the non-transgenic parental cotton were collected and their impacts on the earthworm, Eisenia fetida, were tested in laboratory studies. No significant acute toxicity on E. fetida from oral exposure to the transgenic cotton line, GK19, was detected. The average weight, numbers of cocoons and new offsprings of E. fetida in the GK19 groups were all higher than in the Simian3 groups, but the differences were not significant.
Keywords: Transgenic; Cry1Ac gene; Cotton; Leaf; Eisenia fetida; Growth; Reproduction

Demetrius Zouzoulas, Spyridon D. Koutroubas, George Vassiliou, Emmanuel Vardavakis, Effects of ozone fumigation on cotton (Gossypium hirsutum L.) morphology, anatomy, physiology, yield and qualitative characteristics of fibers, Environmental and Experimental Botany, In Press, Corrected Proof, Available online 23 June 2009, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2009.05.016.
(http://www.sciencedirect.com/science/article/B6T66-4WKK1MK-1/2/209ae70680d5713f469c4debefd90bc1)
Abstract:
This experiment was conducted to study the effect of high ozone concentrations on two cotton (Gossypium hirsutum L.) cultivars. Two cotton cultivars (Romanos and Allegria) were exposed to control (CF < 4 ppb O3) and 100 ppb O3. Plant exposure to ozone began eight days after emergence and was interrupted one day before removing the leaves, to calculate the leaf area. Plants were exposed to ozone 7 h/day, in closed and controlled-environment chambers, during their illumination with artificial visible light.
In comparison to control plants, plants exposed to O3 showed chlorotic and necrotic patches on their leaves, increased stomatal or epidermal cell density and yellowness of cotton fibers. Elevated ozone concentration did not have a significant effect on stomatal width, total leaf thickness and thickness of histological components of leaves. Exposure to ozone concentration reduced non-glandular hair density of main leaf veins, plant height, mainstem internode length, chlorophyll content, net photosynthetic rate, stomatal conductance and length and area of bracts and petals. Elevated ozone treatment reduced the maximum length of staminal tube, anther number, pollen grain germination, leaf area, leaf dry weight, boll number, raw cotton weight, total branch length, dry weight of the mainstem-branches-bracts-carpophylls and of root dry weight. Furthermore, exposure to O3 reduced the seed weight, the lint weight, the yield, the ratio of lint weight to seed weight, the fiber strength, the micronaire, the maturity index and the fiber uniformity index values. This study shows that the exposure to high ozone concentrations mainly affected the rate of photosynthesis, raw cotton weight and strength of cotton fibers.
Keywords: Cotton; Ozone; Leaf epidermal characters; Growth characters; Flower characters; Pollen germination; Photosynthesis; Yield; Lint quality; Leaf anatomy

H. Tewolde, M.W. Shankle, A. Adeli, K.R. Sistani, D.E. Rowe, Macronutrient concentration in plant parts of cotton fertilized with broiler litter in a marginal upland soil, Soil and Tillage Research, In Press, Corrected Proof, Available online 17 June 2009, ISSN 0167-1987, DOI: 10.1016/j.still.2009.04.007.
(http://www.sciencedirect.com/science/article/B6TC6-4WJ919J-1/2/be4195b68a43209579fcac32974647f4)
Abstract:
Effectiveness of surface-applied unincorporated broiler litter as a fertilizer relative to conventional inorganic fertilizers under no-till or conventional-till cotton (Gossypium hirsutum L.) production systems in the upland soils of the southern and southeastern USA is not well documented. The objectives of this research were to (1) test if broiler litter improves plant macronutrient (N, P, K, and Mg) nutrition of cotton above that of cotton fertilized with conventional inorganic fertilizers and (2) determine if lack of incorporating litter into the soil reduces macronutrient concentration in cotton plant parts in an upland soil considered marginal for cotton. Six treatments consisting of an unfertilized control, a fertilized standard (STD), two litter-only, and two litter plus inorganic N as urea-ammonium nitrate solution (UAN) were tested in two adjacent fields, one under no-till (NT) and the other under conventional-till (CT) systems. Litter alone, UAN, or a combination of litter plus UAN were applied to supply 101 kg ha-1 plant available N assuming nearly all of the UAN-N and 50% of the total litter N becomes plant available during the cotton growing season. Concentration of N, P, K, and Mg were measured in leaves, stems, and reproductive parts on three or four dates

between early flowering and maturity. Cotton fertilized with the litter-only treatments always had less N concentration but greater P and K concentration in leaves, stems, and reproductive parts than cotton that received the STD treatment. Leaf and stem Mg concentration seems to depend on the N concentration in these plant parts. Lack of incorporating litter into the soil reduced N concentration in nearly all plant parts at all growth stages, suggesting some amount of the litter-derived N is lost due to lack of incorporation. Lack of incorporation also reduced leaf and stem Mg concentration, which seemed to be due to its reducing effect on N concentration. Unlike N and Mg, lack of incorporation did not consistently affect concentrations of P and K in all plant parts. Regardless of the incorporation treatment, fertilization with the litter-only treatments increased tissue P and K concentration and supported lint yield exceeding that of the STD without increasing tissue N concentration.
Keywords: Poultry litter; Manure; Incorporation; Tillage; Tissue nutrients

Mohamed Hashem, Nabil A. Ibrahim, Amira El-Shafei, Rakia Refaie, Peter Hauser, An eco-friendly - novel approach for attaining wrinkle - free/soft-hand cotton fabric, Carbohydrate Polymers, In Press, Corrected Proof, Available online 8 June 2009, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.06.004.
(http://www.sciencedirect.com/science/article/B6TFD-4WGDR3F-4/2/071f90d566ee14968f63c249230cc6b5)
Abstract:
A novel approach for upgrading both the wrinkle free and softness properties of cotton fabrics without adversely affecting their strength properties using an eco-friendly finishing regimes was investigated. Factors affecting the performance properties of the finished substrate such as pre-treatment, i.e., carboxymethylation (CMC) or ionic-crosslinking, post-treatment with amino functional silicone softener and its concentration, degree of carboxymethylation as well as thermofixation conditions were studied. The obtained results revealed that post-treatment with the amino based silicone micro emulsion (SiE) up to 30 g/L at pH 4 to a wet pickup of 100% followed by drying at 100 [degree sign]C for 5 min and curing at 170 [degree sign]C for 3 min results in a remarkable improvement in fabric resiliency (expressed as dry and wet wrinkle recovery angles), as well as in softness degree, without seriously affecting its retained strength. Improvement extent of the aforementioned properties is governed by the nature of the pre-treatment steps. Fixation of the amino-functional silicone softener onto/or within the modified cellulose structure is accompanied by a formation of semi-inter and/or intra-penetrated network (semi-IPN) thereby enhancing both the extent of crosslinking and networking as well as providing very high softness. FTIR analysis proved the formation of Si-O-Si-cellulose complex. Scanning electron micrograph shows that cotton, CMC and ionic crosslinked cotton fabrics treated with SiE shows higher surface smoothness and considerable reduction in protruding loose fibers, ditches and grooves compared with the untreated one.
Keywords: Cotton fabric; Eco-friendly finishing; Wrinkle-free; Soft-hand; Silicon microemulsion

Xiao-tang HU, Hu CHEN, Jing WANG, Xiao-bin MENG, Fu-hong CHEN, Effects of Soil Water Content on Cotton Root Growth and Distribution Under Mulched Drip Irrigation, Agricultural Sciences in China, Volume 8, Issue 6, June 2009, Pages 709-716, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60269-2.
(http://www.sciencedirect.com/science/article/B82XG-4WKTN1K-D/2/07f77d2e21cbfa405d4134f92818ddc1)
Abstract:
The relation between soil water content and the growth of cotton root was studied for the scheme of field water and cotton yield under mulched drip irrigation. Based on the field experiments, three treatments of soil water content were conducted with 90%[theta]f, 75%[theta]f, and 60%[theta]f ([theta]f is field water capacity). Cotton roots and root-shoot ratio were studied with digging

method, and the soil moisture was observed with TDR (time domain reflector), and cotton yield was measured. The results indicated that the growth of cotton root accorded with Logistic growth curve in the three treatments, the cotton root grew quickly and its weight was very high under 75%[theta]f because of the suitable soil water condition, while grew slowly and its weight was lower under 90%[theta]f due to water moisture beyond the suitable condition, and the root weight was in between under 60%[theta]f. For the three water treatments, the cotton root weight decreased with soil depth, and decreased more significantly in deeper soil layer with the soil moisture increasing. And the ratio of cotton root weight in 0-30 cm soil layer to the total root weight was the highest under 75%[theta]f. The cotton root system was distributed mainly in the soil of narrow row and wide row mulched with plastic film, and little in the soil outside plastic film. The weight of cotton root was the highest in the soil of narrow row or wide row mulched with plastic film under 75%[theta]f. Root-shoot ratio decreased with the soil moisture increasing. The soil water content affected cotton yields, and cotton yield was the highest under 75%[theta]f. The higher soil moisture level is unfavorable to the growth of cotton root system and yield of cotton under mulched drip irrigation.
Keywords: mulched drip irrigation; cotton (Gossypium hirsutum L.); soil water content; root

D.M. Olson, A.M. Cortesero, G.C. Rains, T. Potter, W. Joe Lewis, Nitrogen and water affect direct and indirect plant systemic induced defense in cotton, Biological Control, Volume 49, Issue 3, June 2009, Pages 239-244, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.02.011.
(http://www.sciencedirect.com/science/article/B6WBP-4VNH3Y5-5/2/05911284c1c4c6066b3c62d690662046)
Abstract:
Plants have direct and indirect constitutively produced and inducible defenses against herbivores and pathogens, which can substantially aid in their ability to defend themselves. However, very little is known about the influence of agronomic factors on such defenses. Here, we tested the effects of nitrogen levels and water availability on the ability of cotton plants to deter feeding by Spodoptera exigua through induction of anti-feedants, and to attract Microplitis croceipes through systemic induction of volatile emission. Cotton plants were grown with various nitrogen levels and were either exposed to water stress or normal water before being exposed to S. exigua for 48 h for induction of defenses. Dual choices of various nitrogen and water treatments were provided to M. croceipes in flight tunnel bioassays. Dual choices of leaf tissue from the various nitrogen and water treatments were provided to S. exigua larvae. Both water stress and nitrogen levels under and over the recommended levels increased leaf tissue consumption and decreased attraction of M. croceipes to the plants. Analyses of induced volatiles released from herbivore damaged plants indicate that their concentrations differ among the nitrogen levels tested with plants receiving no nitrogen or twice the recommended dose having amounts much lower than plants receiving the recommended dose. Because both direct and indirect plant defense mechanisms are negatively affected by improper nitrogen and insufficient water, we argue that these factors should be considered for a better natural control of pests in cotton and most probably in other crops.
Keywords: Gossypium hirsutum; Microplitis croceipes; Heliocoverpa zea; Spodoptera exigua; Nitrogen; Water stress; Direct and indirect induced plant defense; Volatiles; Anti-feedants

J.M. McKinion, J.N. Jenkins, J.L. Willers, A. Zumanis, Spatially variable insecticide applications for early season control of cotton insect pests, Computers and Electronics in Agriculture, Volume 67, Issues 1-2, June-July 2009, Pages 71-79, ISSN 0168-1699, DOI: 10.1016/j.compag.2009.03.004.
(http://www.sciencedirect.com/science/article/B6T5M-4W4BMCK-2/2/423b4a5fe029635af73f098e423840d3)
Abstract:
Our research has shown that cotton insect pests, specifically tarnished plant bugs, Lygus lineolaris (Palisot de Beauvois) (Heteroptera: Miridae) can be controlled early season in commercial cotton

fields in Mississippi, USA, using spatially variable insecticide applications. Technology was developed for using GIS-based map scouting and a technique called the line-intercept method for obtaining low-level insect population counts in both rapidly growing areas of cotton and poorer growing areas. Using these population characteristics in combination with heuristic knowledge of the cotton fields and with the GIS maps, a spatially sensitive map could then be developed that could drive a spatially variable insecticide application for the control of the insect pest. We outline the steps needed to develop an automated technology for overcoming the time-sensitive events for early season control of cotton pests. This technology not only includes software systems for processing multispectral images to spatially variable insecticide application maps for spray controllers in the field but also high-speed wireless local area network (WLAN) technology for automated delivery of these controller application maps and for acquisition of as-applied and harvest maps from the field.
Keywords: Multispectral; Imaging; Spatially variable; Automation; Insecticide; WLAN; Wireless; Network

M.N. Dogan, A. Unay, O Boz, D. Ogut, Effect of pre-sowing and pre-emergence glyphosate applications on weedsin stale seedbed cotton, Crop Protection, Volume 28, Issue 6, June 2009, Pages 503-507, ISSN 0261-2194, DOI: 10.1016/j.cropro.2009.01.013.
(http://www.sciencedirect.com/science/article/B6T5T-4VP1CH4-2/2/7d541d84f70788050ad65f7157ddfd04)
Abstract:
The effect of pre-emergence or pre-sowing glyphosate treatments in stale seedbed cotton was evaluated in 2005, 2007 and 2008. Main soil tillage at the experimental fields was carried out in early April to allow weed emergence before sowing. Glyphosate was applied on plots with or without seedbed preparation as pre-sowing or pre-emergence treatments. Efficacies of glyphosate treatments were compared with untreated control and plots which received seedbed preparation + trifluralin. 2 and 4 weeks after cotton emergence, weed cover was visually estimated and weed biomass determined, respectively. A combination of stale seedbed technique with glyphosate treatment can be considered an effective alternative weed control system to reduce weeds by up to 90% during the critical period. This would reduce the intensity, costs and negative environmental impact of mechanical and chemical treatments.
Keywords: Cotton; Stale seedbed; Glyphosate; Weed control

X.H. Tong, M.K. Daud, Y.Q. Sun, S.J. Zhu, Physiological and molecular mechanisms of glyphosate tolerance in an in vitro selected cotton mutant, Pesticide Biochemistry and Physiology, Volume 94, Issues 2-3, June-July 2009, Pages 100-106, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2009.04.007.
(http://www.sciencedirect.com/science/article/B6WP8-4W26GCV-1/2/631e5814c489b828f066e0dea69bc1b1)
Abstract:
We have selected an upland cotton (Gossypium hirsutum L.) cell line (R1098) that is highly tolerant to glyphosate. This cell line was developed by in vitro selection with gradually increasing glyphosate concentrations, and its mechanisms conferring glyphosate tolerance were studied. Based on a whole-plant dose-response bioassay, R1098 plants were tolerant to glyphosate at a concentration of 1500 g ae ha-1 glyphosate (1.5x the recommended field rate) whereas the control plants (Coker 312) were unable to survive at 150 g ae ha-1 glyphosate. Coker 312 accumulated 13.1 times more shikimate in leaves at 5 days after glyphosate treatment (1500 g ae ha-1) than that of R1098. Two distinct cDNAs for 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS), EPSPS-1 and EPSPS-2, were isolated from R1098. Both cDNAs were 97.7% identical within the common protein-coding region and the predicted sequences of the mature proteins were greater than 83% identical with EPSPS proteins from other known higher plants. In comparison to the

glyphosate-susceptible cotton Coker 312, sequence analysis of the EPSPS-1 gene indicated that R1098 has an alanine insertion at nucleotide position 1216 resulting in frameshift. It leads to two copy functional EPSPS genes in R1098. There was no difference between R1098 and Coker 312 in EPSPS mRNA levels before glyphosate treatment. However, its treatment caused a 2-4 times increase in the basal EPSPS mRNA level in R1098.
Keywords: Gossypium hirsutum L.; Cotton; Shikimate; Glyphosate; EPSPS; Real-time PCR

Daiyuan Zhang, Irma L. Pirtle, Stacy J. Park, Mongkol Nampaisansuk, Purnima Neogi, Sylvia W. Wanjie, Robert M. Pirtle, Kent D. Chapman, Identification and expression of a new delta-12 fatty acid desaturase (FAD2-4) gene in upland cotton and its functional expression in yeast and Arabidopsis thaliana plants, Plant Physiology and Biochemistry, Volume 47, Issue 6, Plant Lipids, June 2009, Pages 462-471, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2008.12.024.
(http://www.sciencedirect.com/science/article/B6VRD-4VD9X1N-1/2/6489944b45e055f979bb886c099fe728)
Abstract:
A cotton (Gossypium hirsutum L.) genomic clone encompassing a 17.9-kb DNA fragment was found to contain a delta-12 fatty acid desaturase gene (designated FAD2-4). The FAD2-4 open reading frame has 1,155 bp and is uninterrupted, encoding a conceptual FAD2-4 polypeptide of 384 amino acids that has 98% identity with the cotton FAD2-3 polypeptide. The FAD2-4 gene has a single intron of 2,780 bp in its 5'-untranslated region (5'-UTR). The 3'-flanking regions and 5'-UTR introns in the FAD2-4 and FAD2-3 genes are quite different, indicating that the genes might be paralogs in the cotton genome. Reverse transcriptase (RT)-PCR analysis indicated that the FAD2-4 and FAD2-3 genes were expressed in all tissues examined, including seeds, seedling tissues, young and mature leaves, roots, stems, developing flower buds, and ovule fibers. These constitutive patterns of expression were notably different from that of the FAD2-1 gene, which was restricted to seeds and developing flower buds, or to the expression of a newly-identified FAD2-2 gene isoform, which was barely detectable in roots, hypocotyls, stems, and fibers, but was expressed in all other tissues. The FAD2-4 coding region was expressed in yeast and shown to encode a functional delta-12 desaturase, converting oleic acid (C18:1) to linoleic acid (C18:2) in recombinant yeast cells. In addition, both the FAD2-4 and the FAD2-3 genes were transferred into the Arabidopsis thaliana fad2-1 mutant background where they effectively restored wild type fatty acid composition and growth characteristics. Finally, the cotton FAD2-4 green fluorescent protein (GFP) fusion polypeptide appeared to be localized in the endomembrane system of transgenic Arabidopsis plants in the complemented fad2-1 mutant background, supporting a functional ER location for the cotton FAD2-4 polypeptide in this heterologous plant system. Thus, a new functional member of the FAD2 gene family in cotton has been characterized, indicating a complex regulation of membrane lipid desaturation in this important fiber/oilseed crop.
Keywords: Delta-12 fatty acid desaturase 2; Gossypium hirsutum L.; Linoleic acid; Oleic acid; Polyunsaturated fatty acid metabolism

L.S. Pereira, P. Paredes, E.D. Sholpankulov, O.P. Inchenkova, P.R. Teodoro, M.G. Horst, Irrigation scheduling strategies for cotton to cope with water scarcity in the Fergana Valley, Central Asia, Agricultural Water Management, Volume 96, Issue 5, May 2009, Pages 723-735, ISSN 0378-3774, DOI: 10.1016/j.agwat.2008.10.013.
(http://www.sciencedirect.com/science/article/B6T3X-4V57Y19-1/2/90b15fd98190a314494a70c5738b9868)
Abstract:
The Central Asian countries face high water scarcity due to aridity and desertification but excess water is often applied to the main irrigated crops. This over-irrigation contributes to aggravate water scarcity problems. Improved water saving irrigation is therefore required, mainly through appropriate irrigation scheduling. To provide for it, after being previously calibrated and validated

for cotton in the Fergana region, the irrigation scheduling simulation model ISAREG was explored to simulate improved irrigation scheduling alternatives. Results show that using the present irrigation scheduling a large part of the applied water, averaging 20%, percolates out of the root zone. Several irrigation strategies were analyzed, including full irrigation and various levels of deficit irrigation. The analysis focused a three-year period when experiments for calibration and validation of the model were carried out, and a longer period of 33 years that provided for an analysis considering the probabilities of the demand for irrigation water. The first concerned a wet period while the second includes a variety of climatic demand conditions that provided for analyzing alternative schedules for average, high and very high climatic demand. Results have shown the importance of the groundwater contribution, mainly when deficit irrigation is applied. Analyzing several deficit irrigation strategies through the respective potential water saving, relative yield losses, water productivity and economic water productivity, it could be concluded that relative mild deficits may be adopted. Contrarily, the adoption of high water deficit that produce high water savings would lead to yield losses that may be economically not acceptable.
Keywords: Irrigation requirements; Deficit irrigation; Water savings; Water productivity; Economic water productivity

Diomides S. Zamora, Shibu Jose, Kara Napolitano, Competition for 15N labeled nitrogen in a loblolly pine-cotton alley cropping system in the southeastern United States, Agriculture, Ecosystems & Environment, Volume 131, Issues 1-2, Temperate agroforestry: When trees and crops get together, May 2009, Pages 40-50, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.08.012.
(http://www.sciencedirect.com/science/article/B6T3Y-4TGGCHG-2/2/20a0bcd0fae25afe3d4da5197ed4288f)
Abstract:
The ecological sustainability of agroforestry systems is dependent on minimizing competitive interactions between system components. However, our understanding of resource competition and resource use efficiency in agroforestry systems such as alley cropping is limited. The objective of this study was to quantify the extent of competition for nitrogen (N) between loblolly pine (Pinus taeda L.) and cotton (Gossypium hirsutum K. Koch.) and its effect on fertilizer-use efficiency and N movement, and the role of trees in capturing the N that is leached below the root zone of cotton. Two pine-cotton alley cropping systems, established in 1999, with narrow (8 m alley width) and wide (16 m width), were studied. Belowground competition between pines and cotton was eliminated through the installation of a belowground polyethylene root barrier in half the number of plots to provide two treatments - barrier and non-barrier. Percentage of N derived from fertilizer (%NDF) and fertilizer-use efficiency (UFN) were determined using 15N-enriched ammonium sulfate (5% atom enrichment) applied at 89.6 kg N ha-1. The barrier treatment in both the narrow and wide alley resulted in higher total cotton biomass (36% and 14%, respectively) compared to the non-barrier treatment. Mean %NDF of cotton was significantly lower in barrier treatment in both systems, representing 14% and 55%, respectively, for the narrow and wide alleys, compared to the non-barrier treatment. For %UFN, this trend was reversed, with plants in barrier treatment having a higher %UFN. Root trenching did not affect loblolly pine foliar N concentration, NDF and UFN, but it affected total leaf N content. In soil, N recovery at 90-120 cm depth was lower in non-barrier treatment, indicating tree root uptake of fertilizer N. It is likely that tree roots were able to capture N in non-barrier treatment, resulting in lower rates of leaching below the root zone. The alley cropping systems in this study demonstrates potential for efficient N cycling, given the apparent ability of loblolly pine to intercept and uptake fertilizer from deeper soil layers and return to surface soil via litterfall.
Keywords: Fertilizer-use efficiency; Tree-crop interaction; 15N recovery; Safety-net hypothesis; Temperate alley cropping

S. Kranthi, C.S. Dhawad, S. Naidu, A. Bharose, A. Chaudhary, V. Sangode, S.K. Nehare, S.R. Bajaj, K.R. Kranthi, Susceptibility of the cotton bollworm, Helicoverpa armigera (Hubner) (Lepidoptera: Noctuidae) to the Bacillus thuringiensis toxin Cry2Ab before and after the introduction of Bollgard-II, Crop Protection, Volume 28, Issue 5, May 2009, Pages 371-375, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.12.001.
(http://www.sciencedirect.com/science/article/B6T5T-4VBM46V-1/2/b6b3513667bc402bd62303c2ec7f9889)
Abstract:
The geographical variability in Helicoverpa armigera susceptibility levels to Cry2Ab toxin expressed by transgenic maize (not currently commercialized in India) was determined through log dose probit assays conducted on populations collected during 2004-05 (from 25 districts) and 2007-08 (from 22 districts) across India. While 2004-05 is the year prior to commercialization of dual gene Bollgard-II-Bt cotton that expresses Cry2Ab in addition to Cry1Ac, 2007-08 is two years after its commercial release. LC50 values ranged from 6.0 to 28.6 [mu]g Cry2Ab/ml of diet in 2004-05 and from 2.46 to 34.7 [mu]g Cry2Ab/ml of diet in 2007-08. The IC50 range in 2004-05 and 2007-08 was from 0.31 to 2.3 [mu]g/ml and 0.10-3.4 [mu]g/ml of diet, respectively. The probit analysis data of 2004-05 can be used as baseline indices to monitor for changes in the H. armigera susceptibility to Cry2Ab, subsequent to the introduction of Bollgard-II cotton in India. The probit analysis data of 2007-08 showed that the baseline has not undergone any significant changes two years after cultivation of Bollgard-II in India. The relatively low toxicity of Cry2Ab and its higher expression late in the cotton season compared with Cry2Ab, compounded with its presence in Bt hybrids on a separate linkage group from Cry1Ac suggest problems of resistance in the future.
Keywords: Helicoverpa armigera; Bt cotton; Bacillus thuringiensis; Resistance; Cry2Ab

T. Brevault, Y. Oumarou, J. Achaleke, M. Vaissayre, S. Nibouche, Initial activity and persistence of insecticides for the control of bollworms (Lepidoptera: Noctuidae) in cotton crops, Crop Protection, Volume 28, Issue 5, May 2009, Pages 401-406, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.12.006.
(http://www.sciencedirect.com/science/article/B6T5T-4VF0XMM-3/2/d0c4fad88933643b7b08eb27bcfe8078)
Abstract:
We evaluated six insecticides for their initial activity against the cotton bollworms Helicoverpa armigera (Hubner), Diparopsis watersi (Rotschild), and Earias spp., in sub-Saharan Africa (Cameroon). Residual activity and effect of simulated rainfall were also assessed in the case of H. armigera. Bioassays were conducted by transferring larvae on leaf discs collected from sprayed plots. Thiodicarb, endosulfan, and to a lesser extent emamectin-benzoate and indoxacarb had high initial activity against H. armigera, regardless of larval instars. Spinosad and cypermethrin-profenofos (CP) mix were effective at controlling larvae of first and second instars but not larvae of third to fifth instars. All tested insecticides effectively controlled Earias larvae (87-98% mortality). Regarding D. watersi, indoxacarb and endosulfan (77 and 82% mortality respectively) were less effective than spinosad and thiodicarb (95-99% mortality). Persistence was quantified by the duration after which an insecticide kills less than 50% of H. armigera neonates. Rain had a significant detrimental effect on insecticide persistence, except in the case of thiodicarb and emamectin-benzoate. In rainy conditions, thiodicarb (17.2 d) was the most persistent insecticide, followed by emamectin-benzoate and spinosad (10.6 and 8.9 d), and endosulfan, indoxacarb, and CP (2.7-5.2 d). Indoxacarb should be recommended for controlling sporadic outbreaks of H. armigera due to its high efficacy and low persistence, while CP should be used to control D. watersi infestations. More persistent insecticides such as spinosad and emamectin-benzoate should be recommended to control continuous and mixed-species populations of bollworms in the field.

Keywords: Insecticide; Residual activity; Pyrethroid resistance; Helicoverpa armigera; Earias spp.; Diparopsis watersi; Cotton

Lieselot Vercruysse, Guy Smagghe, Tanja Beckers, John Van Camp, Antioxidative and ACE inhibitory activities in enzymatic hydrolysates of the cotton leafworm, Spodoptera littoralis, Food Chemistry, Volume 114, Issue 1, 1 May 2009, Pages 38-43, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.09.011.
(http://www.sciencedirect.com/science/article/B6T6R-4TD4J0W-F/2/517286b6c5b7aa0fc86942f7a7feb118)
Abstract:
The larvae of the cotton leafworm, Spodoptera littoralis, were used as a source of food proteins exerting possible biological activities. A simulated gastrointestinal digestion (IC50 = 320 [mu]g/ml) and digestion by mucosal enzymes (IC50 = 211 [mu]g/ml) reveals a significantly higher in vitro ACE inhibitory activity compared to hydrolysis using thermolysin (IC50 = 1392 [mu]g/ml) and alcalase (IC50 = 827 [mu]g/ml) as pretreatment. This indicates that the choice of enzymes to generate ACE inhibitory peptides is important. All hydrolysates were also tested for antioxidant activity using two tests: a radical scavenging test using DPPH and the ferric reducing antioxidant power (FRAP) assay, and they showed a similar antioxidant activity which was relatively low compared to the standard antioxidants BHT and vitamin C. As a conclusion, the data obtained suggest that insect protein can be used to generate hydrolysates, exerting both ACE inhibitory and antioxidant activity, which might be incorporated as multifunctional ingredient into functional foods.
Keywords: Antioxidant; Bioactive peptides; ACE inhibition; Insect

Marta A. Polanska, Ewa Maksimiuk-Ramirez, Marcin A. Ciuk, Joanna Kotwica, Piotr Bebas, Clock-controlled rhythm of ecdysteroid levels in the haemolymph and testes, and its relation to sperm release in the Egyptian cotton leafworm, Spodoptera littoralis, Journal of Insect Physiology, Volume 55, Issue 5, Special Issue on Insect Clocks, May 2009, Pages 426-434, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2009.01.019.
(http://www.sciencedirect.com/science/article/B6T3F-4VNK81W-1/2/39d5b383ba7ba356c7b21765440f9e6e)
Abstract:
In Spodoptera littoralis, testicular sperm release occurs in a daily rhythm, which is controlled by endogenous circadian oscillator located in the male reproductive system. Although this rhythm is essential for male fertility, factors that initiate and maintain daily sperm release are not understood. In this study, we investigated a modulatory role for ecdysteroids in the sperm release rhythm and identified the source of ecdysteroids in adult males. We found that the onset of sperm release occurs two days pre-eclosion and coincides with a significant decrease in haemolymph ecdysteroids levels. 20-HE injection into the pupae prior to the first sperm release delayed its initiation and disrupted the developing rhythm in a dose dependent manner. 20-HE injection into adults depressed the number of sperm bundles leaving the testes. A day before the initial sperm release, ecdysteroid levels in the haemolymph and testes begin to oscillate in a circadian fashion. Ecdysteroid rhythms continue throughout imaginal life and correlate with the rhythm of sperm release. In each cycle, testicular sperm release coincides with a trough in testicular ecdysteroid concentration. Rhythmic changes in ecdysteroid levels are regulated by an endogenous circadian oscillator that continues to function in decapitated males. The generation of a complete cycle of ecdysteroid release by testes cultured in vitro indicates that this oscillator is located in the gonads. The haemolymph ecdysteroid levels are significantly lower and arrhythmic in males with removed testes, indicating that the testes are an important ecdysteroid source that may contribute to oscillations in haemolymph ecdysteroid levels.
Keywords: Peripheral clock; Circadian rhythms; Ecdysteroids; Sperm release; Moths

Erik J. Sacks, A. Forest Robinson, Introgression of resistance to reniform nematode (Rotylenchulus reniformis) into upland cotton (Gossypium hirsutum) from Gossypium arboreum and a G. hirsutum/Gossypium aridum bridging line, Field Crops Research, Volume 112, Issue 1, 30 April 2009, Pages 1-6, ISSN 0378-4290, DOI: 10.1016/j.fcr.2009.01.006.
(http://www.sciencedirect.com/science/article/B6T6M-4VT17R0-1/2/5c64bb897ed3715bff44774ce4f8b10c)
Abstract:
Gossypium hirsutum L. is the predominant cotton of commerce and all cultivars of this species are susceptible to the reniform nematode, Rotylenchulus reniformis. To introgress resistance to R. reniformis into the tetraploid 2(AD1) G. hirsutum, a resistant diploid A2-genome Gossypium arboreum accession (A2-190) was crossed with a hexaploid 2((AD1)D4) bridging line (G 371) to obtain a tetraploid triple-species hybrid. The triple-species hybrid was back-crossed to G. hirsutum and a population of 277 BC1 individuals was produced. The BC1s and controls were assayed in growth chambers for resistance to R. reniformis. Fortuitously, the hexaploid bridging line G 371 was also found to be resistant to R. reniformis. The BC1 segregated 3:1, resistant:susceptible, indicating that resistance was conferred by dominant genes at two different loci, with each originating from a distinct germplasm source. This study demonstrated that it is possible to introgress and pyramid genes for resistance to R. reniformis in G. hirsutum.
Keywords: Cotton; Reniform nematode; Resistance; Inheritance; Introgression; Wide cross

Jonghan Ko, Giovanni Piccinni, Characterizing leaf gas exchange responses of cotton to full and limited irrigation conditions, Field Crops Research, Volume 112, Issue 1, 30 April 2009, Pages 77-89, ISSN 0378-4290, DOI: 10.1016/j.fcr.2009.02.007.
(http://www.sciencedirect.com/science/article/B6T6M-4VVRCNP-1/2/9eb9f2e55e28cf5512ca107b2e7ce7a5)
Abstract:
Plant responses to water deficit need to be monitored for producing a profitable crop as water deficit is a major constraint on crop yield. The objective of this study was to evaluate physiological responses of cotton (Gossypium hirsutum) to various environmental conditions under limited water availability using commercially available varieties grown in South Texas. Soil moisture and variables of leaf gas exchange were measured to monitor water deficit for various varieties under different irrigation treatments. Lint yield and growth variables were also measured and correlations among growth parameters of interest were investigated. Significant differences were found in soil moisture, leaf net assimilation (An), stomatal conductance (g), transpiration rate (Tr), and instantaneous water use efficiency (WUEi) among irrigation treatments in 2006 while no significant differences were found in these parameters in 2007. Some leaf gas exchange parameters, e.g., Tr, and leaf temperature (TL) have strong correlations with An and g. An and WUE were increased by 30-35% and 30-40%, respectively, at 600 [mu]mol (CO2) m-2 s-1 in comparison with 400 [mu]mol (CO2) m-2 s-1. Lint yield was strongly correlated with g, Tr, WUE, and soil moisture at 60 cm depth. Relative An, Tr, and TL started to decrease from FTSW 0.3 at 60 cm and FTSW 0.2 at 40 cm. The results demonstrate that plant water status under limited irrigation management can be qualitatively monitored using the measures of soil moisture as well as leaf gas exchange, which in turn can be useful for describing yield reduction due to water deficit. We found that using normalized An, Tr, and TL is feasible to quantify plant water deficit.
Keywords: Photosynthesis; Water use efficiency; Yield

Hezhong Dong, Weijiang Li, Wei Tang, Dongmei Zhang, Early plastic mulching increases stand establishment and lint yield of cotton in saline fields, Field Crops Research, Volume 111, Issue 3, 3 April 2009, Pages 269-275, ISSN 0378-4290, DOI: 10.1016/j.fcr.2009.01.001.
(http://www.sciencedirect.com/science/article/B6T6M-4VJBCKY-1/2/3ef4362ed907cfe597255f91f09f4ed2)

Abstract:
Row covering with polyethylene film (plastic mulching) is a common practice for improving emergence, plant growth and yield of cotton in China. This is usually applied after sowing (conventional mulching, CM), but pre-sowing evaporation in spring would cause accumulation of salts and moisture loss in the surface layer of saline soils. Two experiments were conducted in Yellow River delta from 2004 to 2005 and during 2006, respectively to determine if row covering with plastic film 30 d before sowing (early mulching, EM) supports better productivity of cotton than CM in saline fields. In the first experiment, we studied the effects of EM versus CM and no-mulching (NM), on soil microclimate, seedling physiology, cotton yield and earliness. The second experiment was conducted in seven sites to compare cotton yield between the two mulching systems. Results from the first experiment showed that both EM and CM could effectively improve stand establishment, plant growth, earliness and lint yield of cotton relative to NM control. However, compared with CM, EM increased stand establishment rate by 11.4% and plant biomass by 9.9% and lint yield by 7.1%. EM, relative to CM and NM, increased the photosynthesis (Pn) rate 6.8% and decreased malondialdehyde (MDA) concentration 7.4% and Na+ level 8%. These improvements were due mainly to delayed accumulation of salts, elevation of soil temperature and reduction of moisture loss with EM. The revenue from EM was higher than that from CM and NM, suggesting the increased yield by EM was enough compensate for additional costs. The multi-site experiment in 2006 showed that the yield advantage of EM over CM was not significant in two sites with lower salinity (ECe = ~6 dS/m), but substantial (from 9 to 14%) in five sites with higher salinity (ECe = 10-12 dS/m). The overall results suggest that EM is a promising cotton production technique in the saline Yellow River Delta and other cotton-growing areas with similar ecologies.
Keywords: Cotton; Plastic mulching; Saline soil; Stand establishment; Lint yield

Xiulian Sun, Dong Wu, Xincheng Sun, Liang Jin, Yan Ma, Bryony C. Bonning, Huiyin Peng, Zhihong Hu, Impact of Helicoverpa armigera nucleopolyhedroviruses expressing a cathepsin L-like protease on target and nontarget insect species on cotton, Biological Control, Volume 49, Issue 1, April 2009, Pages 77-83, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.12.011.
(http://www.sciencedirect.com/science/article/B6WBP-4V8GB4W-3/2/6b1383053d0073e8f8793ad0d140ee0f)
Abstract:
Baculoviruses have been genetically engineered to improve their insecticidal properties and reduce crop damage. In this study, a recombinant Helicoverpa armigera nucleopolyhedrovirus (HearNPV-cathL) expressing a cathepsin L-like cysteine protease from the flesh fly, Sarcophaga peregrina, was constructed. Its insecticidal properties in the laboratory, occlusion body yield in diseased larvae, efficacy of protecting cotton from larval feeding damage and impact on predator densities in the fields were assessed. In the laboratory, the infectivity of this recombinant was not different from the wild-type parent (HearNPV-WT) and a recombinant virus (HearNPV-AaIT) which expresses an insect-selective neurotoxin from the scorpion Androctonus australis. The median survival times of 2nd or 3rd instar H. armigera larvae after infection with HearNPV-cathL were reduced about 26% in comparison to HearNPV-WT. Occlusion body yield in the diseased larvae inoculated with HearNPV-cathL, which were similar to that with HearNPV-AaIT, was reduced 63% in comparison to HearNPV-WT. In the field, when virus formulations were multiply applied to control natural infestations of H. armigera on cotton, both HearNPV-cathL and HearNPV-AaIT treatments protected cotton from larval feeding damage better than the wild-type virus treatment. Predator densities in the recombinant virus treatments were similar to those in wild-type virus treatments and untreated control. These results suggest that the recombinant HearNPVs have potential for practical use.
Keywords: Helicoverpa armigera nucleopolyhedrovirus; Genetically modified viruses; Cathepsin L-like cysteine protease; Insecticidal activity; Control efficacy

Kamal A.M. Abo-Elyousr, M. Hashem, E.H. Ali, Integrated control of cotton root rot disease by mixing fungal biocontrol agents and resistance inducers, Crop Protection, Volume 28, Issue 4, April 2009, Pages 295-301, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.11.004.
(http://www.sciencedirect.com/science/article/B6T5T-4V402CB-2/2/4b710cecd9d538ac7cc1288c2283acde)
Abstract:
The aim of this study was to evaluate mixtures of bioagents and resistance inducers for protection of cotton roots against root infecting fungal pathogens. Three biological control agents (BCAs); Trichoderma hamatum (TM), Trichoderma harzianum (TZ) and Paecilomyces lilacinus (PL) and two resistance inducers (RIs); Bion (benzo(1,2,3)thiadiazole-7-carbothioic acid S-methyl ester) (BTH), salicylic acid (SA) were applied individually or in combination to test their efficacy in controlling cotton root rot disease caused by Fusarium oxysporum (FO) and Pythium debaryanum (PD) under greenhouse and field conditions. In greenhouse experiments, all applied treatments protected cotton seedlings against FO root rot. Disease index percentage (DI%) was significantly reduced up to 78.8%, while germination percentage increased significantly up to 199.60% compared with the infected control. All treatments significantly reduced PD DI% compared to infected controls. In field experiments, the maximum protection of cotton roots against FO and PD resulted from application of TM + PL + SA + BTH, where DI% was reduced to 72.3% and 69.3% relative to infected controls, respectively. Increase in cell wall fractions (cellulose, hemicelluloses and lignin) resulted from application of both BCAs and RIs in case of PD. Lignin content significantly increased 1.68-1.93 (FO) and 1.07-1.39 (PD) fold over the infected controls. A significant increase in free phenolics content was positively proportional to the degree of plant resistance against the two pathogens. The main conclusion of this study is that by combining BCAs with RIs there was increased consistency of suppression of root rot of cotton seedlings caused by either F. oxysporum or P. debaryanum.
Keywords: Acibenzolar-S-methyl (ASM); Salicylic acid; Cotton, Root rot; Fusarium oxysporum; Pythium debaryanum; Paecilomyces; Trichoderma spp.

Rasoul Marzban, Qian He, Xiaoxia Liu, Qingwen Zhang, Effects of Bacillus thuringiensis toxin Cry1Ac and cytoplasmic polyhedrosis virus of Helicoverpa armigera (Hubner) (HaCPV) on cotton bollworm (Lepidoptera: Noctuidae), Journal of Invertebrate Pathology, Volume 101, Issue 1, April 2009, Pages 71-76, ISSN 0022-2011, DOI: 10.1016/j.jip.2009.02.008.
(http://www.sciencedirect.com/science/article/B6WJV-4VSB1HB-1/2/82413d45a87fb546cab213feac219014)
Abstract:
In this study, interactions on the mortality and debilitating effects between Cry1Ac, a toxic protein produced by Bacillus thuringiensis (Berliner) and HaCPV (Chinese strain) on first and third instars larvae of Helicoverpa armigera were evaluated in laboratory. When first instar was exposed to combination of Bt cotton leaf discs containing HaCPV (6 x 106, 1 x 107, and 3 x 107 PIB ml-1) the effect on mortality was additive, when such instar larvae exposed to combination of Cry1Ac (0.9, 2.7, or 8.1 [mu]g g-1) and the same concentrations of HaCPV the effect on mortality was additive except for the combination of Cry1Ac (0.3 [mu]g g-1) and HaCPV concentrations that showed synergism. When third instars of H. armigera were infected using a suspension containing both HaCPV and Cry1Ac, most combinations of them showed additive effect except for the combination of Cry1Ac (0.3 [mu]g g-1) and HaCPV (3 x 107 PIB ml-1) that showed synergism. However, when they exposed to Bt cotton leaf discs and HaCPV the effect on mortality was synergism except combination of Bt cotton leaf discs and HaCPV (6 x 106 PIB ml-1) that showed additive. Most of the combinations are showed additive effect in the toxicity and in combinations of Cry1Ac at lowest and HaCPV at highest concentrations synergism is observed. Not only were larval growth and development delayed, but pupation and pupal weight also decreased when larvae were fed on

artificial diet containing Cry1Ac and HaCPV or transgenic Bt cotton leaf discs specially in first instar.
Keywords: Bacillus thuringiensis; Cry1Ac; Helicoverpa armigera; Transgenic cotton; HaCPV; Combination; Synergism; Additive

D. Saravanan, N.S. Vasanthi, T. Ramachandran, A review on influential behaviour of biopolishing on dyeability and certain physico-mechanical properties of cotton fabrics, Carbohydrate Polymers, Volume 76, Issue 1, 2 March 2009, Pages 1-7, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.10.019.
(http://www.sciencedirect.com/science/article/B6TFD-4TT35W6-3/2/13b1a4227870d07dd1be3c0cf8a0f865)
Abstract:
Biopolishing treatment, given to the cotton fabrics using cellulases, often influences dyebility and certain physical properties of the fabrics after treatments, besides improving appearance and handle values. Cellulase treatments prior to dyeing facilitate the dyeing process subsequently, while reactions of cellulases are retarded by the dyestuff present in the fabrics to different extents. Removal of protruding fibres imparts smooth appearance and defibrillation of cotton fibres alters the moisture absorption properties of the fabrics. Reduction in fabric strength, increase in elongation at break are also realized in biopolishing in addition to improved handle values. An attempt has been made to review the influential behaviour of cellulase treatment on dyeability and physical properties of cotton fabrics.
Keywords: Biopolishing; Dyebility; Moisture; Surface morphology; Tensile; Pilling

H.E. Nasr, S.M. Sayyah, D.M. Essa, S.H. Samaha, A.M. Rabie, Utilization of acrylates emulsion terpolymer with chitosan as a finishing agent for cotton fabrics, Carbohydrate Polymers, Volume 76, Issue 1, 2 March 2009, Pages 36-45, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.09.025.
(http://www.sciencedirect.com/science/article/B6TFD-4TJTX7N-6/2/d320b24d70e63a9e918d1e02a3a9699d)
Abstract:
Cotton fabrics were treated with finishing bath formulation containing emulsion lattices based on acrylate monomers, chitosan and polyethylene glycol (PEG) to provide cotton fabrics with antibacterial, UV-protection as well as improvement of dyeing properties with direct, acid and reactive dyes. The terpolymer emulsion, chitosan and PEG concentrations as well as fabric pretreatment with alkali significantly affected the performance properties, antimicrobial activity, UV-protection and dyeing behavior of treated cotton fabric. The finished fabrics were characterized in terms of FTIR, X-ray diffraction, scanning electron microscope (SEM) as well as mechanical properties such as tensile strength, elongation at break (%), abrasion resistance and air permeability. The obtained data showed that the tested fabrics have appropriate antibacterial activity with highly UV-protection properties with increasing chitosan concentration up to 3%. The mechanical properties expressed as tensile strength and abrasion resistance increased after finishing treatment. Moreover, the performance of the finished fabrics and dyeing properties with different dyes classes were greatly influenced by the action of alkali pretreatment of cotton fabrics, adding the polyethylene glycol to the finishing bath formulation as well as emulsion and chitosan concentrations.
Keywords: Antibacterial; Characterization; Chitosan; Cotton fabric; Dyeing; Finishing; UV-protection

Omer Hema, Hugues Ninaon Some, Ouola Traore, John Greenplate, Mourad Abdennadher, Efficacy of transgenic cotton plant containing the Cry1Ac and Cry2Ab genes of Bacillus thuringiensis against Helicoverpa armigera and Syllepte derogata in cotton cultivation in Burkina

Faso, Crop Protection, Volume 28, Issue 3, March 2009, Pages 205-214, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.09.014.
(http://www.sciencedirect.com/science/article/B6T5T-4TY4MR4-1/2/87e2233c72bb0694d2bf974a5b2e8445)
Abstract:
As part of the research into alternatives to pyrethroids, to which lepidopteran cotton pests have begun to develop resistance, transgenic cotton expressing two endotoxins (Cry1Ac and Cry2Ab) of Bacillus thuringiensis Berliner (Bt), in the U.S. germplasms DP50 and Coker 312, was tested under field conditions in Burkina Faso in two contained areas. An untreated (no lepidopteran insecticidal sprays) conventional (non-transgenic) U.S. variety (Coker 312 in 2003; DP50 in 2004 & 2005) and two conventional local varieties (untreated and treated) were utilized in each test as comparators. The experiments conducted in 2003, 2004 and 2005 showed that the transgenic cotton plant significantly reduced larval populations of the cotton bollworm, Helicoverpa armigera, and the cotton leafroller, Syllepte derogata compared to untreated varieties. Plant damage analyses upon maturity revealed significantly higher levels of sound bolls in transgenic cotton plants. Seed cotton yields and lint quality were also higher for the transgenic cotton than for untreated convention varieties. The transgenic variety was always statistically equivalent or superior to the treated conventional one.
The transgenic cotton plant expressing two endotoxins (Cry1Ac and Cry2Ab) of B. thuringiensis Berliner (Bt) can therefore be an alternative to the use of pyrethroids and endosulfan in cotton cultivation in Burkina Faso. This will have dual advantage of significantly reducing the quantities of pesticides sprayed in the cotton fields while protecting yields and quality of lint.
Keywords: Transgenic cotton plant; Bacillus thuringiensis; Helicoverpa armigera; Syllepte derogata; Burkina Faso

M. Erhan Gore, Oncul K. Caner, Nedim Altin, M. Hadi Aydin, Oktay Erdogan, Funda Filizer, Arzu Buyukdogerlioglu, Evaluation of cotton cultivars for resistance to pathotypes of Verticillium dahliae, Crop Protection, Volume 28, Issue 3, March 2009, Pages 215-219, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.10.004.
(http://www.sciencedirect.com/science/article/B6T5T-4TY3XRJ-5/2/f83d8458fc4d4f84b61ddccb76c18f13)
Abstract:
After the recent detection of serious losses caused by Verticillium wilt of cotton, incited by the defoliating pathotype of Verticillium dahliae in the Aegean Region of Turkey, 28 of the most commonly grown cotton cultivars (Gossypium hirsutum L.) of Turkey, were evaluated for the presence of field resistance to wilt. Six-week-old plants were inoculated with a cotton nondefoliating (ND) or a cotton defoliating (D) pathotype of V. dahliae under controlled conditions. Resistance was evaluated on the basis of external symptoms by calculating areas under disease progress curves. The percentage of plants killed and of those which recovered from the disease was used as additional parameters for including a particular cultivar into a defined category. Most of the evaluated cultivars were susceptible, although at different levels, to both pathotypes of V. dahliae. All cultivars were more susceptible to the D than to the ND pathotype. The most promising cultivars in the experiments appeared to be Carmen and ST-373. Carmen showed differential resistance: it was susceptible to the D but resistant to the ND pathotype. ST-373 was moderately susceptible to both pathotypes of V. dahliae. A resistance related phenotypic reaction to the disease was quantified by using six growth parameters (plant height, number of nodes, leaf weight, stem weight, leaf to stem ratio, and total shoot weight) measured 13 d after inoculation. The percentage decrease in leaf-stem ratio and leaf weight were found to be the best indicators of resistance. Results obtained in this study will be useful to quantify resistance to V. dahliae and identify the best parameters to phenotype in genetic studies.
Keywords: Cotton; Resistance; Verticillium wilt; Pathotypes

David T.W. Chun, Jonn A. Foulk, David D. McAlister III, Testing for antibacterial properties of cotton/flax denim, Industrial Crops and Products, Volume 29, Issues 2-3, March 2009, Pages 371-376, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2008.07.009.
(http://www.sciencedirect.com/science/article/B6T77-4THS3GR-1/2/8015805636bdaae3b47c3cad01846162)
Abstract:
The `AATCC Test Method 100-1999, Antibacterial Finishes on Textile Materials: Assessment of' was modified by not assaying for the initial population density and only reporting the population density at the end of incubation for comparing treatments. This seemed to be a reasonable change since the assay challenges the treatments at the start with the same population inoculum density. This permitted the AATCC Test Method 100-1999 to be flexible and easier for testing materials that may or may not actually exhibit bacteriostatic properties. A substantial savings in material and time was gained by not taking the initial population density. This change allows testing more treatments, using more replicate samples, or shortens the time to conduct the assay which can permit more assays to be conducted. However, the control treatment needs to be integral with each assay; but since this is usually done, this would be a small inconvenience compared to the savings. The assay responded well when used to test fabric containing variable amounts of material with known antibacterial properties. The population density of the challenge bacteria decreased as the concentration of the antibacterial component of the fabric increased. The results from the use of the modified AATCC Test Method 100-1999 assay did not indicate that adding flax provided any additional bacteriostatic properties to the flax denim against the two challenge bacteria, Staphylococcus aureus and Klebsiella pneumoniae. The long held assumption that flax is bacteriostatic or antibacterial was not supported by the results and probably does not contribute to its resistance to rotting as much as its physical or chemical composition.
Keywords: Antibacterial properties; Bacteriostatic properties; Flax; AATCC Test Method 100-1999

Georgios Michailidis, Anagnostis Argiriou, Nikos Darzentas, Athanasios Tsaftaris, Analysis of xyloglucan endotransglycosylase/hydrolase (XTH) genes from allotetraploid (Gossypium hirsutum) cotton and its diploid progenitors expressed during fiber elongation, Journal of Plant Physiology, Volume 166, Issue 4, 1 March 2009, Pages 403-416, ISSN 0176-1617, DOI: 10.1016/j.jplph.2008.06.013.
(http://www.sciencedirect.com/science/article/B7GJ7-4TDYNPK-1/2/034b52aff09a6e7c19220df5bf8ea9d2)
Abstract: Summary
Multiple cellular pathways have been shown to be involved during fiber initiation and elongation stages in the cultivated allotetraploid cotton (Gossypium hirsutum). The cell wall enzymes xyloglucan endotransglycosylase/hydrolases (XTH) have been reported to be associated with the biosynthesis of the cell wall and the growth of cotton fibers, probably regulating the plasticity of the primary cell wall. Among various cotton fiber cDNAs found to be preferentially expressed in cotton fibers, a xyloglucan endotransglycosylase (XTH) cDNA was significantly up-regulated during the elongation stage of cotton fiber development. In the present study, we isolated and characterized genomic clones encoding cotton XTH from cultivated cotton (Gossypium hirsutum) and its diploid progenitors (Gossypium arboreum and Gossypium raimondii), designated GhXTH1-1, GhXTH1-2, GaXTH1 and GrXTH, respectively. In addition, we isolated and characterized, by in silico methods, the putative promoter of XTH1 from Gossypium hirsutum. Sequence analysis revealed more than 50% homology to XTH's at the protein level. DNA gel blot hybridization indicated that at least two copies of GhXTH1 are present in Gossypium hirsutum whereas the diploid progenitor species Gossypium arboreum and Gossypium raimondii has only a single copy. Quantitative real-time PCR and high-resolution melting experiments indicated that in Gossypium hirsutum cultivars, in cotton fibers during early stages of fiber elongation specifically expressing only the GhXTH1-1

gene and expression levels of GhXTH1-1 in fibers varies among cultivars differing in fiber percentage and fiber length.
Keywords: Cell wall; Cotton fiber; Gossypium spp.; Xyloglucan endotransglycosylase/hydrolase

Meng-Bin Ruan, Wen-Bin Liao, Xiu-Chun Zhang, Xiao-Ling Yu, Ming Peng, Analysis of the cotton sucrose synthase 3 (Sus3) promoter and first intron in transgenic Arabidopsis, Plant Science, Volume 176, Issue 3, March 2009, Pages 342-351, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2008.11.008.
(http://www.sciencedirect.com/science/article/B6TBH-4V1KMJH-1/2/2327d34b86056f1e8efa3de10323dea6)
Abstract:
Cotton sucrose synthase 3 (Sus3) plays an important role in the development of cotton fiber. In order to study the regulation of expression of Sus3, a 1705-bp 5' up-stream fragment including the 151-bp coding region was amplified from upland cotton (Gossypium hirsutum). The results of the GUS assays of the Sus3 promoter in transformed Arabidopsis showed that the promoter directs GUS expression in sink-tissues including trichomes and root hairs. 3' deletion analysis of different promoter fragments in transgenic Arabidopsis revealed that the first intron of the Sus3 coding region is a negative regulator of gene expression and specifically represses GUS expression in pollen. The intron had the same regulatory functions under the control of the 35S promoter in transgenic Arabidopsis indicating that this intron has an independent regulatory role during gene expression.
Keywords: Cotton Sucrose synthase 3; First intron; Gene expression; Promoter

R.C.R.E. Queiroga, M.F. Fernandes, A.N. Medeiros, R.G. Costa, C.J.B. Oliveira, M.A.D. Bomfim, I.C.D. Guerra, Physicochemical and sensory effects of cotton seed and sunflower oil supplementation on Moxoto goat milk, Small Ruminant Research, Volume 82, Issue 1, March 2009, Pages 58-61, ISSN 0921-4488, DOI: 10.1016/j.smallrumres.2009.01.003.
(http://www.sciencedirect.com/science/article/B6TC5-4VKDGV2-1/2/4fe2e1300f24d1f0d601acfa70be72a4)
Abstract:
The effects of two levels of cotton seed and sunflower oil supplemented to the concentrate fed to Moxoto milking goats on the physicochemical and sensory characteristics of milk were studied. Treatments consisted of a control group without oil (control), 3% cotton seed oil added to the dry matter, 5% cotton seed oil, 3% sunflower oil and 5% sunflower oil. The supplementation with both vegetable oils increased ($P < 0.05$) the fat content and dry matter of milk. However, such increase was higher ($P < 0.05$) in milk from goats supplemented with cotton seed oil compared to sunflower oil. Lactose contents were higher ($P < 0.05$) in milk from goats receiving oil-supplemented diets. Considering the sensory analysis, the treatment with cotton oil 5% led to stronger ($P < 0.05$) sensory attributes of odour and goatish odour in milk, leading to less acceptability of the milk. In conclusion, the addition of vegetable oil, in particular from cotton seed, to the diet of crossbred goats increased the fat content and strengthened the goatish flavour of milk.
Keywords: Fat supplementation; Flavour; Goat milk; Vegetable oil

Brigita Tomsic, Barbara Simoncic, Boris Orel, Metka Zerjav, Hans Schroers, Andrej Simoncic, Zoran Samardzija, Antimicrobial activity of AgCl embedded in a silica matrix on cotton fabric, Carbohydrate Polymers, Volume 75, Issue 4, 24 February 2009, Pages 618-626, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.09.013.
(http://www.sciencedirect.com/science/article/B6TFD-4TGS7G7-1/2/8774bd885ca7ebe2188bcdadbbb18a25)
Abstract:

An antimicrobial finishing for cotton fabric was prepared from commercial (iSys AG, Germany) silver chloride (Ag) dispersed at different concentrations in a reactive organic-inorganic binder (RB) (iSys MTX (CHT, Germany). Pad-dry-cure and exhaustion methods were used for the sols application, giving Ag-RB coating with Ag concentration from ca. 48 to ca. 290 ppm on the cotton fabric. The presence of silver on the cotton finishes was confirmed by measuring its concentration in the fabrics with the help of inductively coupled plasma mass spectroscopy (ICP-MS). The morphology of the finished fabrics was investigated by SEM, while their composition was established from EDXS measurements combined with the results of FT-IR spectral analysis. The antimicrobial activity of variously treated cotton fabrics was assessed before and after repetitive (up to 10x) washing by the application of standard tests: for the fungi Aspergillus niger (ATCC 6275) and Chaetomium globosum (ATCC 6205) by the modified DIN 53931 standard method, while the presence of Gram-negative bacterium Escherichia coli (ATCC 25922) was followed by using ISO 20645:2004 (E) and AATCC 100-1999 standard methods. Results revealed that the antimicrobial activity of the coatings strongly depended on the concentration of Ag in the corresponding Ag-RB dispersions, indirectly depending on the preparation method (pad-dry-cure vs. exhaustion) and that the Ag-RB coatings were more effective for bacteria than for fungi. The Ag concentrations on the cotton fabrics achieved by the pad-dry-cure method (48 and 52 ppm) were not sufficient to impart satisfactory antifungal activity to the cotton fabrics, though they assured excellent reduction of the bacterium E. coli (98-100%). A minimal inhibitory concentration of Ag in the coating providing a sufficient bacterial reduction of 60% was ca. 24 ppm. Effective antifungal activity was achieved only by applying the exhaustion method, enabling high initial Ag concentration in the Ag-RB coating (>100 ppm). The antibacterial activity depended on the washing treatment. No antifungal activity was noted for washed cotton fabric, even those with highly concentrated Ag (290 ppm) in the Ag-RB coating, but a 94% bacterial reduction was obtained for the corresponding cotton fabric, after 10 repetitive washings, corroborated by the Ag concentration on washed fabric of about 65 ppm.
Keywords: Cellulose; Modification; Antimicrobial; Finishing; Sol-gel coating; Ag concentration; Washing fastness

Z. El-Sayed Mohamed, M.H. Abo-Shosha, N.A. Ibrahim, Preparation of polyethylene glycol/polyacrylamide adduct and utilization in cotton finishing, Carbohydrate Polymers, Volume 75, Issue 3, 11 February 2009, Pages 479-483, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.08.026.
(http://www.sciencedirect.com/science/article/B6TFD-4TF7CB2-1/2/26cdedbe14e16ebb9a4512a82dd4f9be)
Abstract:
Highly concentrated aqueous solutions of acrylamide (Am) were polymerized in presence of polyethylene glycol (PEG) using ammonium persulfate as initiator under different conditions including ammonium persulfate concentration (0.02-0.06 g/gAm) temperature (60-95 [degree sign]C), Am/PEG400 ratio (1/1-1/5 g/g), PEG molecular weight (400-6000). At optimum reaction conditions a PEG 400/PAm adduct was prepared with a % total conversion of 99.7 in 2 min using ammonium persulfate (0.05 g/gAm), Am/PEG (1/2 g/g) at 70 [degree sign]C. The structure of the adduct was confirmed by FT-IR spectra. The adduct was utilized as a finishing additive for cotton fabric in presence and absence of dimethyloldihydroxy ethylene urea (DMDHEU) by the bad - dry - cure method. In absence of DMDHEU, the adduct improves the fabric tensile strength, stiffness and oily stain release rating without affect the wettability along with decreasing the fabric resiliency compared to the blank sample. Inclusion DMDHEU the finishing bath (50 g/l) results in improving the fabric resiliency and stiffness as well as decreasing the strength, wettability and oily stain release compared to those of fabric treated with adduct in absence of DMDHEU. However, at an adduct concentration of 40 g/l and in presence of 50 g/l DMDHEU the fabric properties are in general, superior to those of blank fabric.

Keywords: Acrylamide; Polyethylene glycol; Adduct; Fabric; Finishing

Yonghui Wang, Guoyou Ye, Na Luan, Jian Xiao, Yuan Chen, Dehua Chen, Boll size affects the insecticidal protein content in Bacillus thuringiensis (Bt) cotton, Field Crops Research, Volume 110, Issue 2, 10 February 2009, Pages 106-110, ISSN 0378-4290, DOI: 10.1016/j.fcr.2008.07.008.
(http://www.sciencedirect.com/science/article/B6T6M-4TC8J34-1/2/7f6a78809ab51b73aa3abc67fe8160d7)
Abstract:
Bacillus thuringiensis (Bt) transgenic cotton has been planting in large-scale for more than 10 years in China. It was observed that resistance to bollworm was reduced with the application of big-boll cultivars in China. The objective of the study was to investigate the effects of boll size on the contents of CryIA insecticidal protein in boll shell and cotton seed during the course of boll development. Two experiments were conducted at the Yangzhou University Farm, Yangzhou, China. In 2004, three cultivars including Sikang 1 (small-boll), Xiangza 3 (medium-boll) and Kemian 3 (big-boll) were compared for boll shell volume and 100-seed weight from 10 to 40 days after flowering (DAF), and insecticidal protein contents in boll shell and cotton seed from 10 to 50 DAF. As expected, the differences between cultivars were significant for all the four characteristics. Cultivars with bigger boll shell volume had higher 100-seed weight but lower insecticidal protein contents in both of the boll shell and cotton seed. The correlation between boll size and boll insecticidal protein content was negative (-0.653). The correlation between 100-seed weight and cotton seed insecticidal protein content was significantly negative (-0.645). In 2005, leaf cut (LC) and square removal (SR) treatments were applied to Sikang 1 and Sikang 3. The boll shell volume and 100-seed weight were decreased by LR, but increased by SR. LC significantly enhanced and SR significantly reduced the insecticidal protein contents of boll shell and cotton seed. The correlation between boll size and boll insecticidal protein content (-0.870) and the correlation between 100-seed weight and cotton seed insecticidal protein content were both highly significant and negative (-0.841). Therefore, the results of the study indicated that the boll insecticidal protein content was significantly affected by boll size. The implications of the observed results in breeding, cultural practices and pest management were discussed.
Keywords: Bt cotton; Boll size; CryIA insecticidal protein

Yun-lei ZHAO, Shu-xun YU, Chao-zhu XING, Shu-li FAN, Mei-zhen SONG, Wu-wei YE, Differential Gene Expression Between Hybrids and Their Parents During the Four Crucial Stages of Cotton Growth and Development, Agricultural Sciences in China, Volume 8, Issue 2, February 2009, Pages 144-153, ISSN 1671-2927, DOI: 10.1016/S1671-2927(09)60021-3.
(http://www.sciencedirect.com/science/article/B82XG-4VP7XPF-4/2/f530b2d4496e86c05e21f53a8a763d44)
Abstract:
The study aims to clarify the differential gene expression between cotton hybrids and their parents in order to better understand the molecular basis of cotton heterosis. The research focused on cotton heterotic and lower heterotic hybrids and their parents during the four crucial stages, which were analyzed using a differential display technique. The results indicated that there were both quantitative and qualitative differences in gene expression amongst them. The quantitative differences include over- and under-expression of parental genes and the dominant expression of highly-expressed parental genes in hybrids. In contrast, the qualitative differences are the following: (i) Bands were observed in both parents but not in the F1 hybrid (BPnF1); (ii) bands occurred in either of the parents but not in the F1 hybrid (UPnF1); (iii) bands presented only in the F1 hybrid but not in either of the parents (UF1nP); and (iv) bands were detected in either of the parents and the F1 hybrid (UPF1). Overall, the major differences of gene expression occurred in the qualitative level and four related differential patterns were observed. Furthermore, the amount

of differential patterns during the flowering stage was relatively higher than those of other stages. At this juncture, both the amount of hybrid-specific expression patterns at flowering stage and the silenced expression patterns at boll-forming stage in highly heterotic hybrids were found higher than those in the lower heterotic ones. It was concluded that significant differences of gene expression in leaves were present between cotton hybrid and its parents during the whole growing stages. Hence, these differences might be responsible for the observed cotton heterosis.
Keywords: cotton; heterosis; molecular mechanism; gene expression; differential display

S. Munir, S.S. Daood, W. Nimmo, A.M. Cunliffe, B.M. Gibbs, Thermal analysis and devolatilization kinetics of cotton stalk, sugar cane bagasse and shea meal under nitrogen and air atmospheres, Bioresource Technology, Volume 100, Issue 3, February 2009, Pages 1413-1418, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.07.065.
(http://www.sciencedirect.com/science/article/B6V24-4TK2P9N-1/2/61436fd03b11edfdbd63bb2be36260c1)
Abstract:
Thermal degradation, reactivity and kinetics for biomass materials cotton stalk (CS), sugarcane bagasse 1 (SB1), sugarcane bagasse 2 (SB2) and shea meal (SM) have been evaluated under pyrolysis (N2) and oxidising (dry air) conditions, using a non-isothermal thermogravimetric method (TGA). In the cases of CS and SB1 the peak temperatures were 51 [degree sign]C higher for pyrolysis compared with oxidative degradation, whereas for SB2 and SM the difference was ~38 [degree sign]C. However, the differences in the rates of weight loss were significantly higher under oxidising conditions for all the materials studied. Maximum rate of weight loss (% s-1) under pyrolysis conditions ranged from 0.10 to 0.18 whereas these values accelerated to the range of 0.19-0.28 under oxidising conditions, corresponding to respective peak temperatures. Samples ranked in order of reactivity (RM x 103) (% s-1 [degree sign]C-1) are CS = 1.31 [approximate] SM = 1.30 > SB2 = 1.14 > SB1 = 0.94 for air and CS = 0.54 > SB2 = 0.49 > SB1 = 0.45 > SM = 0.31 for nitrogen. Shea meal exhibited a complex char combustion behaviour indicating that there may be two distinct types of char derived from fibrous and woody components in the original material. Activation energy calculations were based on the Arrhenius correlation.
Keywords: Cotton stalk; Sugar cane bagasse; Shea meal; Thermal degradation; Kinetics

W.S. Kwak, Y.I. Kim, J.S. Seok, Y.K. Oh, S.M. Lee, Molasses and microbial inoculants improve fermentability and silage quality of cotton waste-based spent mushroom substrate, Bioresource Technology, Volume 100, Issue 3, February 2009, Pages 1471-1473, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.07.066.
(http://www.sciencedirect.com/science/article/B6V24-4TDYNV5-2/2/7a9d2084c7665543a7dd75f5f980f0d4)
Abstract:
A small-silo study was conducted to develop an effective ensiling storage method for the use of cotton waste-based spent mushroom substrate (SMS) as an animal feed. The SMS was ensiled with 5% molasses (DM basis), 0.5% (v/w) lactic acid bacteria (LAB, Lactobacillus plantarum) inoculant or 0.5% (v/w) yeast (Saccharomyces cerevisiae) inoculant. The treatments included 100% SMS (control), 95% SMS + 5% molasses (T1), 95% SMS + 5% molasses + 0.5% LAB (T2) and 95% SMS + 5% molasses + 5% LAB + 0.5% yeast (T3). The treatments were ensiled for 10. Change in chemical compositions was little ($P > 0.05$) according to the ensiling process and treatments. Compared with those before ensiling, 100% SMS (control) after ensiling showed unstable fermentative properties with high pH (5.2) and little lactic acid production. Compared with the ensiled control, treatments (T1, T2 and T3) resulted in decreased pH, 18-20 times higher concentrations of lactic acid, and greater populations of total bacteria ($P < 0.07$), LAB and yeast ($P < 0.07$). The addition of 5% molasses, 0.5% LAB and 0.5% yeast (T3) to the SMS resulted in the lowest pH (4.25) and the greatest microbial populations. Treatment T3 was selected for a large

scale silo study which was ensiled for 10, 20 and 30 d. As in the small-silo study, the T3 treatment showed favorable fermentative and microbial parameters, compared with the control, by decreasing pH and increasing lactic acid concentrations, LAB and yeast populations. The minimum ensiling period was 20 d, when pH was reasonably low and LAB and yeast populations were greatest. In conclusion, molasses and microbial inoculation improved silage quality of SMS.
Keywords: Spent mushroom substrate; Spent mushroom compost; Cotton waste; Ensiling; Microbes

Zi-jun WANG, Hai LIN, Ji-kun HUANG, Rui-fa HU, Scott Rozelle, Carl Pray, Bt Cotton in China: Are Secondary Insect Infestations Offsetting the Benefits in Farmer Fields?, Agricultural Sciences in China, Volume 8, Issue 1, January 2009, Pages 83-90, ISSN 1671-2927, DOI: 10.1016/S1671-2927(09)60012-2.
(http://www.sciencedirect.com/science/article/B82XG-4VFMC51-D/2/051106c1b0a90656b6267f9212a607cb)
Abstract:
The area sown to Bt cotton has expanded rapidly in China since 1997. It has effectively controlled the bollworm. However, in recent years, concern has surfaced about the emergence of secondary insect pests, particular mirids, in Bt cotton fields. This study measures the patterns of insecticide use based on farm-level from 1999 to 2006, the analysis demonstrates a rise in insecticide use to control mirids between 2001 and 2004, secondary insect infestations is largely related to the rise of mirids, but this rising did not continue in more than half of sample villages studied in 2004-2006. Moreover, the increase in insecticide use for the control of secondary insects is far smaller than the reduction in total insecticide use due to Bt cotton adoption. Further econometric analyses show that rise and fall of mirids is largely related to local temperature and rainfall.
Keywords: Bt cotton; secondary insect; mirid; China

N. Dagdelen, H. Basal, E. Yilmaz, T. Gurbuz, S. Akcay, Different drip irrigation regimes affect cotton yield, water use efficiency and fiber quality in western Turkey, Agricultural Water Management, Volume 96, Issue 1, January 2009, Pages 111-120, ISSN 0378-3774, DOI: 10.1016/j.agwat.2008.07.003.
(http://www.sciencedirect.com/science/article/B6T3X-4T5HJ1T-1/2/7f5caa2c0e84ffb678fdafcdff53a8e3)
Abstract:
Decreasing in water availability for cotton production has forced researchers to focus on increasing water use efficiency by improving either new drought-tolerant cotton varieties or water management. A field trial was conducted to observe the effects of different drip irrigation regimes on water use efficiencies (WUE) and fiber quality parameters produced from N-84 cotton variety in the Aegean region of Turkey during 2004 and 2005. Treatments were designated as full irrigation (T100, which received 100% of the soil water depletion) and those that received 75, 50 and 25% of the amount received by treatment T100 on the same day (treatments T75; T50 and T25, respectively). The average seasonal water use values ranged from 265 to 753 mm and the average seed cotton yield varied from 2550 to 5760 kg ha-1. Largest average cotton yield was obtained from the full irrigation treatment (T100). WUE ranged from 0.77 kg m-3 in the T100 to 0.98 kg m-3 in the T25 in 2004 growing season and ranged from 0.76 kg m-3 in the T100 to 0.94 kg m-3 in the T25 in 2005 growing season. The largest irrigation water use efficiency (IWUE) was observed in the T25 (1.46 kg m-3), and the smallest IWUE was in the T100 treatment (0.81 kg m-3) in the experimental years. A yield response factor (ky) value of 0.78 was determined based on averages of two years. Leaf area index (LAI) and dry matter yields (DM) increased with increasing water use for treatments. Fiber qualities were influenced by drip irrigation levels in both years. The results revealed that well-irrigated treatments (T100) could be used for the semi-arid climatic conditions under no water shortage. Moreover, the results also demonstrated that irrigation of

cotton with drip irrigation method at 75% level (T75) had significant benefits in terms of saved irrigation water and large WUE indicating a definitive advantage of deficit irrigation under limited water supply conditions. In an economic viewpoint, 25.0% saving in irrigation water (T75) resulted in 34.0% reduction in the net income. However, the net income of the T100 treatment is found to be reasonable in areas with no water shortage.
Keywords: Cotton; Drip irrigation; Water-yield relation; Fiber quality parameters; Water stress

R.G. Pratt, H. Tewolde, Soil fungal population levels in cotton fields fertilized with poultry litter and their relationships to soil nutrient concentrations and plant growth parameters, Applied Soil Ecology, Volume 41, Issue 1, January 2009, Pages 41-49, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2008.08.008.
(http://www.sciencedirect.com/science/article/B6T4B-4TKNJB5-2/2/c95276e4176409a8ea90162b19874ca3)
Abstract:
Application to land of large quantities of waste materials from concentrated animal production, without causing environmental pollution, presents a major challenge to agriculture in the 21st century. Effects of land-applied animal wastes on chemical contents of soil are well documented, but less is understood of their effects on microbial populations in soil. This study was undertaken to evaluate effects of commercial application of poultry litter (PL), as a fertilizer, on soil fungal population levels and components on cotton farms in Mississippi, and to determine relationships of fungal population levels to soil nutrient contents and cotton growth and yield. On each of two farms, soil fungal population levels were estimated by dilution plating from samples of soil collected at two sampling times during 2 years from replicated plots of four fertilization treatments: 0 fertilizer, conventional mineral fertilizer (CF), low PL, and high PL. Soil fungal population levels differed significantly (P = 0.05) according to years or seasons and fertilization treatments on both farms. Population levels often were higher in soils amended with low or high PL, or with CF, than in unfertilized controls. On one farm where PL was tilled into soil, fungal population levels increased significantly during the course of the experiment in PL and CF treatments, but not in unfertilized controls, as determined by linear regression. No such increases were observed on the second farm where PL was applied no-till. Population levels of Fusarium semitectum and Penicillium purpurogenum were significantly higher in PL-treated soils than in unfertilized controls in 1 or 2 of 4 sampling events at both farms, while levels of four other species or groups of fungi usually did not differ. Fungal population levels were significantly correlated (P = 0.05) with N concentrations of soils in 1-4 sampling events on each farm and less frequently correlated with concentrations of nine other elements. In 4 of 24 instances, soil fungal population levels were significantly correlated with leaf area index, chlorophyll content, or yield of cotton, and correlation coefficients with these plant parameters were always positive. Major conclusions derived from this study are (1) no deleterious effects on population levels of total or select soil fungi were observed with use of PL as a fertilizer for commercial cotton production; and (2) soil fungal population levels may increase over time in association with greater fertility and plant growth that is induced by both mineral fertilizer and PL applications.
Keywords: Fungal population levels; Poultry litter; Soil nutrient concentrations; Cotton; Animal waste disposal

Jian Shi, Ratna R. Sharma-Shivappa, Mari Chinn, Noura Howell, Effect of microbial pretreatment on enzymatic hydrolysis and fermentation of cotton stalks for ethanol production, Biomass and Bioenergy, Volume 33, Issue 1, January 2009, Pages 88-96, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2008.04.016.
(http://www.sciencedirect.com/science/article/B6V22-4SRM84D-1/2/67c0fc2ac9240306450b473a6ad7b058)
Abstract:

The potential of microbial pretreatment of cotton stalks by Phanerochaete chrysosporium to degrade lignin and facilitate fuel ethanol production was investigated under two culture conditions: submerged cultivation (SmC) and solid state (SSC) cultivation. Although microbial pretreatments showed significant lignin degradation (LD) (19.38% and 35.53% for SmC and SSC, respectively), a study on hydrolysis and fermentation of the microbial-pretreated cotton stalks showed no increase in cellulose conversion (10.98% and 3.04% for SmC and SSC pretreated samples, respectively) compared to untreated cotton stalks (17.93%). Solid state cultivation demonstrated better selectivity of 0.82 than 0.70 with submerged pretreatment. Washing of pretreated cotton stalks did not significantly increase cellulose conversion. However, heating and washing remarkably improved ($P<0.05$) cellulose conversion to 14.94% and 17.81% for SmC and SSC 14 day pretreatment, respectively. Ethanol yields, up to 0.027 g ethanol g-1 initial cotton stalks, were low for all untreated and pretreated samples mainly due to the low cellulose conversion. Although potential and some critical aspects of fungal pretreatment using P. chrysosporium have been explored in this study, additional investigation is still required especially to improve the selectivity for preferential LD and to optimize hydrolysis efficiency. The mechanism of catalytic binding of cellulolytic enzymes to cotton stalks as affected by the presence of fungal mycelia also warrants further study.
Keywords: Gossypium hirsutum L; Pretreatment; Phanerochaete chrysosporium; Lignin; Fuel ethanol; Cellobiose; Submerged cultivation; Solid state cultivation

E. Kantarelis, A. Zabaniotou, Valorization of cotton stalks by fast pyrolysis and fixed bed air gasification for syngas production as precursor of second generation biofuels and sustainable agriculture, Bioresource Technology, Volume 100, Issue 2, January 2009, Pages 942-947, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.07.061.
(http://www.sciencedirect.com/science/article/B6V24-4TDBM7W-1/2/f528e56c768760d7ead1a180a6f694d4)
Abstract:
In the present study, the potential of cotton stalks utilization for H2 and syngas production with respect to CO2 mitigation, by means of thermochemical conversion (pyrolysis and gasification) was investigated. Pyrolysis was conducted at temperature range of 400-760 [degree sign]C and the main parametric study concerned the effect of temperature on pyrolysis product distribution. Atmospheric pressure, air gasification at 750-950 [degree sign]C for various [lambda] (0.02-0.07) was also studied. Experimental results showed that high temperature favors gas production in both processes; while low [lambda] gasification gave high gas yield. Syngas (CO and H2) was increased with temperature, while CO2 followed an opposite trend. By pyrolysis, higher H2 concentration in the produced gas (~39% v/v) was achieved and at the same time lower amounts of CO2 produced, compared to air gasification.
Keywords: Cotton stalks; Air gasification; Pyrolysis; Kinetics; Syngas

Azam Jeihanipour, Mohammad J. Taherzadeh, Ethanol production from cotton-based waste textiles, Bioresource Technology, Volume 100, Issue 2, January 2009, Pages 1007-1010, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.07.020.
(http://www.sciencedirect.com/science/article/B6V24-4T8R1NS-5/2/87a66d5c52d2c754fb7763ff81d5bbc5)
Abstract:
Ethanol production from cotton linter and waste of blue jeans textiles was investigated. In the best case, alkali pretreatment followed by enzymatic hydrolysis resulted in almost complete conversion of the cotton and jeans to glucose, which was then fermented by Saccharomyces cerevisiae to ethanol. If no pretreatment applied, hydrolyses of the textiles by cellulase and [beta]-glucosidase for 24 h followed by simultaneous saccharification and fermentation (SSF) in 4 days, resulted in 0.140-0.145 g ethanol/g textiles, which was 25-26% of the corresponding theoretical yield. A

pretreatment with concentrated phosphoric acid prior to the hydrolysis improved ethanol production from the textiles up to 66% of the theoretical yield. However, the best results obtained from alkali pretreatment of the materials by NaOH. The alkaline pretreatment of cotton fibers were carried out with 0-20% NaOH at 0 [degree sign]C, 23 [degree sign]C and 100 [degree sign]C, followed by enzymatic hydrolysis up to 4 days. In general, higher concentration of NaOH resulted in a better yield of the hydrolysis, whereas temperature had a reverse effect and better results were obtained at lower temperature. The best conditions for the alkali pretreatment of the cotton were obtained in this study at 12% NaOH and 0 [degree sign]C and 3 h. In this condition, the materials with 3% solid content were enzymatically hydrolyzed at 85.1% of the theoretical yield in 24 h and 99.1% in 4 days. The alkali pretreatment of the waste textiles at these conditions and subsequent SSF resulted in 0.48 g ethanol/g pretreated textiles used.
Keywords: Cotton linter; Jeans waste textiles; Enzymatic hydrolysis; Ethanol; Alkaline pretreatment

Jason K. Norsworthy, Marilyn McClelland, Griff M. Griffith, Conyza canadensis (L.) Cronquist response to pre-plant application of residual herbicides in cotton (Gossypium hirsutum L.), Crop Protection, Volume 28, Issue 1, January 2009, Pages 62-67, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.08.012.
(http://www.sciencedirect.com/science/article/B6T5T-4TK2P5J-1/2/fe47673fe1b1521dff842600db9aab5d)
Abstract:
Glyphosate-resistant Conyza canadensis emerging in autumn and spring in the southern USA must be controlled prior to establishment of spring-seeded glyphosate-resistant crops. Research was conducted to evaluate C. canadensis control with residual herbicides labeled for pre-emergence use in cotton and to determine the length of residual activity of each herbicide. Additionally, glufosinate and dicamba-based pre-plant burndown programs were evaluated for control and reduction in C. canadensis emergence at three locations in 2007 in Arkansas, USA, with two of these sites containing glyphosate-resistant C. canadensis. Fluometuron, oxyfluorfen, and norflurazon were the most consistent and efficacious herbicides evaluated, providing at least 80% residual control of glyphosate-resistant C. canadensis through 8 weeks after treatment. Glufosinate alone applied in early and late March (8 and 10 weeks before cotton sowing) usually provided less than complete control, resulting in C. canadensis regrowth and subsequent seedling emergence. Addition of dicamba in a tank-mix with glufosinate generally improved C. canadensis control in addition to providing some residual suppression of further emergence. No C. canadensis emerged over a 10- to 12-week period in plots treated with glufosinate plus dicamba plus flumioxazin. Although dicamba does provide short-lived residual C. canadensis control, this research confirms that additional residual herbicides are needed with pre-plant burndown programs to prevent subsequent emergence when conditions are conducive for C. canadensis germination.
Keywords: Conyza canadensis; Dicamba; Glufosinate; Herbicide resistance; Horseweed; Residual weed control; Weed emergence

Y.H. Lu, K.M. Wu, K.A.G. Wyckhuys, Y.Y. Guo, Potential of mungbean, Vigna radiatus as a trap crop for managing Apolygus lucorum (Hemiptera: Miridae) on Bt cotton, Crop Protection, Volume 28, Issue 1, January 2009, Pages 77-81, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.08.018.
(http://www.sciencedirect.com/science/article/B6T5T-4TPF8W0-1/2/bb6e8690b3b8bc0d7c3a8751ee68c2dc)
Abstract:
In recent years, the mirid Apolygus lucorum has become the key insect pest of Bt cotton in China. Currently, insecticide use is the sole pest management option available for most Chinese cotton farmers. As irrational pesticide use may have several undesirable effects, environmentally sound

and sustainable management alternatives are urgently needed. In this paper, we evaluate the potential of mungbean, Vigna radiatus as a trap crop for A. lucorum in Bt cotton. Plant suitability trials showed that A. lucorum population densities on mungbean were significantly higher than those on cotton. Large-scale field experiments were conducted during 2006 and 2007 to determine the effectiveness of mungbean strips for managing A. lucorum in Bt cotton fields. In this experiment, 0.1 ha Bt cotton fields were established, and mungbean strips covered approximately 10% of the total area. With periodical insecticide applications in mungbean strips, average mirid population densities in cotton fields were 18.1 +/- 2.1 individuals per 100 plants, versus 36.0 +/- 3.4 in the fields without mungbean strips in 2006. However, A. lucorum population still surpassed economic threshold (i.e., 5, 10, and 20 individuals per 100 cotton plants at the seeding stage, the squaring and flowering stages, and the belling stage, respectively). In 2007, aside from the insecticide sprays within the mungbean strips, 2-3 insecticide applications were done in the cotton field. As a result, A. lucorum populations were kept below economic threshold, and the total amount of insecticides reduced about 70% of those used in the common chemical-controlled fields. Our work shows that mungbean has considerable potential as a trap crop in Bt cotton fields, and its adoption by Chinese farmers very likely will reduce current levels of pesticide use in this crop.
Keywords: Mungbean; Apolygus lucorum; Cotton; Host preference; Trap crop

Naqib Ullah Khan, Gul Hassan, Moula Bux Kumbhar, Khan Bahadar Marwat, Muhammad Azim Khan, Aisha Parveen, Umm-e-Aiman, Muhammad Saeed, Combining ability analysis to identify suitable parents for heterosis in seed cotton yield, its components and lint % in upland cotton, Industrial Crops and Products, Volume 29, Issue 1, January 2009, Pages 108-115, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2008.04.009.
(http://www.sciencedirect.com/science/article/B6T77-4SRM85K-1/2/117c35cfa5509506741a3c436a0a58cc)
Abstract:
Combining ability and heterosis were studied in a 6 x 6 diallel cross to see the nature of gene action in Upland cotton (Gossypium hirsutum L.) during 2002 to 2004. Analysis of variance revealed highly significant differences among all the F1 and F2 hybrid means and their respective six parental values for all the traits examined. In both generations, the mean squares due to general combining ability (GCA) and specific combining ability (SCA) were also highly significant. SCA genetic variances were greater than GCA and more important for the traits, i.e. boll weight, boll number and seed cotton yield per plant, showing the predominance of non-additive gene action. Lint % in both generations and boll weight in F2s only were controlled by additive type of gene action due to maximum GCA variances. Cultivar CIM-1100 was found to be the best general combiner and its utilization produced valuable hybrids with desirable SCA in both generations. F1 and F2 hybrids, viz., CIM-1100 x CRIS-9, CIM-1100 x FH-682, CIM-1100 x BH-36 and CIM-109 x CIM-1100 as high x low and low x high parents performed well in SCA determination, outstanding mean performance and heterosis. Better SCA effects associated with useful heterosis were more pronounced for yield traits. In F1 hybrids, maximum heterosis was observed for seed cotton yield followed by boll number, boll weight and lint %. The heterosis over better parent was +3.13 to +65.63% for bolls per plant, +0.75 to +24.40% for boll weight, +0.82 to +115.22% for seed cotton yield and +0.27 to +3.88% for lint %. Involvement of CIM-1100 in most of the F1 and F2 hybrids resulted in the synthesis of superior genotypes for most of the traits studied. Inbreeding depression was elevated in good performing hybrids and was the highest for seed cotton yield. Highest yielding F1 hybrids yielded lesser in the subsequent generation due to over-dominance and inbreeding depression, whereas moderate yielding F1 hybrids were found more stable even passing through process of segregation due to additive gene action. The combined performance of F1 and F2 hybrids could be a good indicator to identify the most promising populations to be utilized either as F2 hybrids or as a resource population for further selection.

Keywords: F1 and F2 hybrids; Gene action; General and specific combining Ability; Hybrid vigour; Inbreeding depression; Gossypium hirsutum

Zhudong Liu, Peiyu Gong, David G. Heckel, Wei Wei, Jianghua Sun, Dianmo Li, Effects of larval host plants on over-wintering physiological dynamics and survival of the cotton bollworm, Helicoverpa armigera (Hubner) (Lepidoptera: Noctuidae), Journal of Insect Physiology, Volume 55, Issue 1, January 2009, Pages 1-9, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2008.07.017.
(http://www.sciencedirect.com/science/article/B6T3F-4T5JJ3J-1/2/62388c6f110f8318103f8f24cdbb30a1)
Abstract:
Laboratory colonies of cotton bollworm larvae, Helicoverpa armigera, were kept at 20 [degree sign]C under a photoperiod of L:D = 10:14 and fed on three host plants (cotton, tobacco, kidney bean) and an artificial diet (control) to determine the dynamic effects of larval host quality on over-wintering physiology and mortality. Energy reserves (glycogen and lipid), super-cooling points (SCPs), low-molecular-weight sugars, temperature, and mortality were monitored from November 2002 to April 2003. Lipid content did not change much for each group during over-wintering, but differed according to larval host plants. Larval host plants obviously influence the amount of glycogen, as does time of year: glycogen was lowest in February and increased in early spring. During winter, the mean pupal SCPs increased the most in February, then decreased, and were also affected by larval host plant, i.e. over-wintering pupae reared on kidney bean had the highest SCPs. Levels of glycerol and inositol differed significantly among host plants and months, which peaked in February. Pupal mortality also varied according to larval host plants and time: pupae reached their highest mortality in March and showed host plant differences in January. Records show that February was the coldest month during the period we observed, which corresponded closely to changes in over-wintering characteristics.
Keywords: Helicoverpa armigera; Host plants; Reserve storage; Low-molecular-weight sugars and sugar-alcohols; Over-wintering dynamics; Pupal mortality

Steven W. Martin, James Hanks, Economic analysis of no tillage and minimum tillage cotton-corn rotations in the Mississippi Delta, Soil and Tillage Research, Volume 102, Issue 1, January 2009, Pages 135-137, ISSN 0167-1987, DOI: 10.1016/j.still.2008.08.009.
(http://www.sciencedirect.com/science/article/B6TC6-4TKXD46-1/2/9f88684fd257f792214c35c6c4ab39cb)
Abstract:
Crop rotations have been shown to have agronomic benefits. An increasingly common crop rotation in the Mid-South is cotton rotated with corn. Many previous studies have focused on tillage systems or crop rotations. Few have evaluated a combination of the two (crop rotations and tillage) especially from an economics perspective. Field studies were conducted at Stoneville, MS for the period 2001-2006. Treatments included no till continuous cotton, minimum till continuous cotton, one year corn followed by two years cotton no till, one year corn followed by two years cotton minimum till, one year corn-one year cotton no till and one year corn-one year cotton minimum till. Results revealed that cotton yields were increased in all four systems rotated with corn. Lower risk was associated with minimum till cotton. Gross returns were higher in a monoculture minimum till cotton system. Net returns were larger in a system that included minimum tillage and a corn rotation. The highest net returns and lowest risk were obtained from a minimum till system of cotton rotated with corn every other year. For those producers required to use a no till system, a one year corn-two year cotton rotation provided the highest net returns and least risk.
Keywords: No till; Minimum till; Rotations; Cotton; Corn; Net returns

Rong-Hui MA, Nai-Yin XU, Chuan-Xi ZHANG, Wen-Feng LI, Ying FENG, Lei QU, You-Hua WANG, Zhi-Guo ZHOU, Physiological Mechanism of Sucrose Metabolism in Cotton Fiber and

Fiber Strength Regulated by Nitrogen, Acta Agronomica Sinica, Volume 34, Issue 12, December 2008, Pages 2143-2151, ISSN 1875-2780, DOI: 10.1016/S1875-2780(09)60023-7.
(http://www.sciencedirect.com/science/article/B94TW-4WBT18W-6/2/99f57b8183652d487c3a928a3b2f6786)
Abstract:
Two cotton (Gossypium hirsutum L.) cultivars, KC-1 with average fiber strength of 35 cN tex -1 and AC-33B with average fiber strength of 32 cN tex-1 were used to study effectiveness of nitrogen on fiber strength. Three nitrogen application rates (0, 240, and 480 kg ha-1), standing for low, moderate, and high nitrogen levels, respectively, were applied in field experiments in Nanjing (118[degree sign]50'E, 32[degree sign]02'N, middle lower reaches of Yangtze River Valley) and Xuzhou (117[degree sign]11'E, 34[degree sign]15'N, Yellow River Valley). The changes of nitrogen concentration in the subtending leaf of cotton boll followed the equation YN = at-b, where YN is nitrogen concentration in the subtending leaf of cotton boll (%); t is boll age (d); a and b are parameters. Parameter awas the highest under the high-nitrogen level in both cultivars, explaining the decreases of sucrose inversion amount and enzymes (invertase, sucrose synthetase, and sucrose phosphate synthetase) activities before boll age of 24 d as well as the maximal speed of cellulose accumulation in cotton fiber and fiber strength since the boll age of 24 d. Parameter b was the highest under the low-nitrogen level in both cultivars, indicating negative effects on sucrose metabolism after boll age of 24 d, the shortened duration of cellulose rapid accumulation in cotton fiber, and the reduced increment of fiber strength from boll age of 24 d to boll opening. These changes were important physiological responses to nitrogen concentration in the subtending leaf of cotton boll during cotton fiber development, and ultimately resulted in lower final fiber strength under both high- and low-nitrogen level. In the subtending leaf of cotton boll, boll age of 24 d was a transition point of sucrose metabolism in cotton fiber and fiber strength regulated by nitrogen.
Keywords: cotton; subtending leaf of cotton boll; leaf nitrogen concentration; cotton fiber; sucrose metabolism; fiber strength

J. Colby Torbett, Roland K. Roberts, James A. Larson, Burton C. English, Perceived improvements in nitrogen fertilizer efficiency from cotton precision farming, Computers and Electronics in Agriculture, Volume 64, Issue 2, December 2008, Pages 140-148, ISSN 0168-1699, DOI: 10.1016/j.compag.2008.04.003.
(http://www.sciencedirect.com/science/article/B6T5M-4SPSH9N-2/2/ee26d29d0c16714fd4690433f0d1f0f2)
Abstract:
Site-specific information technologies help cotton farmers make decisions to improve nitrogen (N) fertilizer efficiency. Various information technologies, as well as farm and farmer characteristics, could affect fertilizer decisions differently. Knowing these differences could assist the targeting of specific groups of farmers for the adoption of various site-specific information technologies to improve N fertilizer efficiency and reduce negative environmental impacts. Ordered logit analysis was used to identify the information technologies and farm and farmer characteristics that influence the importance farmers place on precision farming (PF) technologies in improving the efficiency of N fertilization of cotton (Gossypium hirsutum L.). Data were obtained from a 2001 mail survey of cotton farmers in six southeastern states in the United States of America. Results indicated that yield monitoring, management zone and grid soil sampling, and on-the-go sensing increased farmers' perceptions of the importance of PF in improving N fertilizer efficiency. Farmers who used geospatial mapping were more likely than other farmers to find PF unimportant. Older cotton farmers who rented a larger portion of the land they farmed were more likely to place greater importance on PF for improving N efficiency.
Keywords: Site-specific information technologies; Precision farming; Nitrogen; Cotton; Efficiency; Order logit

Zhen Luo, Hezhong Dong, Weijiang Li, Zhao Ming, Yuqing Zhu, Individual and combined effects of salinity and waterlogging on Cry1Ac expression and insecticidal efficacy of Bt cotton, Crop Protection, Volume 27, Issue 12, December 2008, Pages 1485-1490, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.06.006.
(http://www.sciencedirect.com/science/article/B6T5T-4T9TBY5-1/2/a4c133427d43bc6f890a3121ab83204a)
Abstract:
Salinity, waterlogging and a combination of both stresses are severe threats to plant growth, development and yield of field-grown cotton (Gossypium hirsutum L.), but their individual or combined effects on insecticidal efficacy of Bacillus thuringiensis (Bt) transgenic cotton and the underlying mechanisms are not well understood. In the present study, two cotton cultivars (33B and SCRC17) containing the Cry1Ac insecticidal protein gene were planted in 10 L pots filled with soil and allowed to grow in a greenhouse. The potted plants were either treated with NaCl (5 mg/g, w/w), waterlogging, or a combination of both stresses at the three true-leaf stage, and levels of total soluble protein, Bt insecticidal protein, gossypol and the control efficacy as indicated by mortality of bollworm larvae were examined at 7-day intervals after stress. Waterlogging and a combination of salinity and waterlogging reduced total protein content by 40-46% and 45-65% and Bt protein content by 38-50% and 45-72% from 7 to 21 days after stress, relative to the non-stressed control, respectively. The control efficacy was significantly reduced by either waterlogging or the combined stress. Regression analysis indicated that Bt protein content was correlated to total soluble protein content (R2 = 0.7677*), while Bt cotton efficacy was correlated to Bt protein level (R2 = 0.7917**). Salinity reduced Bt protein by 11-22% and total soluble protein by 5.7-7.2% from 7 to 21 days after NaCl stress, but did not result in reduction in control efficacy. It is concluded that reduced bollworm control efficacy under waterlogging or the combined stress could be mainly attributed to the declined levels of Bt protein, which is closely associated with the inhibited nitrogen metabolism by stresses. As one of the secondary compounds that are toxic to pests, increases in gossypol may be involved in maintaining the efficacy when Bt protein level was reduced under salinity.
Keywords: Bt cotton; Gossypol; Insecticidal efficacy; Insecticidal protein; Salinity; Waterlogging

Jinggao Liu, Robert D. Stipanovic, Alois A. Bell, Lorraine S. Puckhaber, Clint W. Magill, Stereoselective coupling of hemigossypol to form (+)-gossypol in moco cotton is mediated by a dirigent protein, Phytochemistry, Volume 69, Issue 18, Tannin/Polyphenol Special Issue, December 2008, Pages 3038-3042, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2008.06.007.
(http://www.sciencedirect.com/science/article/B6TH7-4T118N6-2/2/acf9282958f1e23b7e04466d37253bfe)
Abstract:
The terpenoid gossypol, a secondary metabolite found in the cotton plant, is synthesized by a free radical dimerization of hemigossypol. Gossypol exists as an atropisomeric mixture because of restricted rotation around the central binaphthyl bond. The dimerization of hemigossypol is regiospecific in cotton. In the case of some moco cotton, the dimerization also exhibits a high level of stereoselectivity. The mechanism that controls this stereoselective dimerization is poorly understood. In this paper, we demonstrate that a dirigent protein controls this stereoselective dimerization process. A partially purified protein preparation from cotton flower petals, which by itself is unable to convert hemigossypol to gossypol, converts hemigossypol with a 30% atropisomeric excess into (+)-gossypol when combined with an exogenous laccase, which by itself produces racemic gossypol.
Keywords: Dirigent protein; Moco cotton; Gossypium hirsutum; Malvaceae; (+)-Gossypol; Gossypol biosynthesis; Hemigossypol; Oxidative coupling; Peroxidase; Stereoselectivity

Aiqin Hou, Xiaojun Wang, Lianghua Wu, Effect of microwave irradiation on the physical properties and morphological structures of cotton cellulose, Carbohydrate Polymers, Volume 74, Issue 4, 21 November 2008, Pages 934-937, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.05.011.
(http://www.sciencedirect.com/science/article/B6TFD-4SM1TDN-1/2/8b3286ac71a1b0390ef595a0a9c55bfe)
Abstract:
Microwave heating has been proved to be more rapid, uniform and efficient, and easily penetrate to particle inside. To investigate the effect of microwave irradiation on the physical property and morphological structure of cotton cellulose, cellulose fabric was treated with microwave irradiation at different conditions. The physical properties of the treated cellulose fabric were investigated. The morphological structures and thermal stabilities of the untreated and treated cellulose were investigated with differential scanning calorimetry (DSC) and X-ray diffraction. The results show that the physical properties of the treated cellulose fabrics were improved and the recoverability had not significant change. The thermal stability of the treated cellulose was changed. The crystallinity and preferred orientation of the treated cotton cellulose increased.
Keywords: Cotton fabric; Microwave; Crystallinity; Preferred orientation

LUAN Ming-bao, GUO Xiang-mo, ZHANG Yong-shan, YAO Jin-bo, Genetic Effect on Yield and Fiber Quality Traits of 16 Chromosome Substitution Lines in Upland Cotton, Agricultural Sciences in China, Volume 7, Issue 11, November 2008, Pages 1290-1297, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60177-7.
(http://www.sciencedirect.com/science/article/B82XG-4V0M7MN-2/2/9c995b9f0f87bf6748cf3b4ba21a0819)
Abstract:
Evaluation of the genetic effect on yield and fiber quality can provide useful information on cotton breeding. Sixteen CSB lines and TM-1 introduced from USDA/ARS were used as male and top-crossed with three elite cultivars and the 51 F1 hybrids, 16 CSB lines, TM-1, and 3 elite cultivars were planted at the Cotton Research Institute of CAAS, Anyang, Henan Province and Xiajin, Shandong Province, China. The yield traits and fiber quality data were obtained and additive and dominance effect on each trait were measured by AD model. Boll weight takes the largest additive proration, whereas boll number takes the least additive proration. The largest and the least dominant proration for lint yield and boll weight were measured, respectively. Fiber length has the additive and dominance effect, and dominance effect was slightly more than additive effect. Larger additive and no dominance effect on uniformity, micronaire, and fiber strength were measured. Significantly, positive additive effect on boll weight of CSB06 and CSB12Sh was observed. CSB14Sh and CSB01 have significantly positive additive effect on 4 and 3 traits of fiber quality, respectively. CSB01 has the greatest dominant effect on lint yield among CSB lines. The dominant effect on fiber length of CSB lines showed positive. It is beneficial to use CSB06 and CSB12Sh as parents to improve boll size, to use CSB14Sh and CSB01 as parents to improve fiber quality. As for hybrid cotton breeding, it is reasonable using CSB01 to improve lint yield traits, and using CSB01, CSB11Sh, and CSB06 to improve fiber length.
Keywords: chromosome substitution lines in upland cotton; additive genetic effect; dominance genetic effect; AD model

Rui-Xian Liu, Zhi-Guo Zhou, Wen-Qi Guo, Bing-Lin Chen, Derrick M. Oosterhuis, Effects of N fertilization on root development and activity of water-stressed cotton (Gossypium hirsutum L.) plants, Agricultural Water Management, Volume 95, Issue 11, November 2008, Pages 1261-1270, ISSN 0378-3774, DOI: 10.1016/j.agwat.2008.05.002.
(http://www.sciencedirect.com/science/article/B6T3X-4SV0STF-2/2/2c3a0004fb37269dd86eeb2cb8b073da)
Abstract:

The objective of this investigation was to study effects of nitrogen on drought resistance in terms of changes in cotton (Gossypium hirsutum L.) root dry matter accumulation, N concentration, antioxidant enzyme activities and root vigor during short-duration water stress (withholding water for 8 days and then permitting to 10 days recover by re-watering). Cotton plants were grown in pots with three N levels (0, 240, and 480 kg N ha-1). Soil-relative water content decreased with increasing N supply during the soil water stress period, while leaf area, dry matter production and N accumulation were enhanced. The root/shoot ratio and root-N/shoot-N ratio increased with water stress, and were smallest at 240 kg N ha-1. Application of N increased the activities of peroxidase (POD) and catalase (CAT) of cotton root, but decreased superoxide dismutase (SOD) activity during water stress as well as during recovery. Malondialdehyde (MDA) content was significantly ($p < 0.05$) increased, and was lowest in the 240 kg N ha-1 N treatment during water stress. At the 10th day after soil re-watering, MDA content of 240 kg N ha-1 was similar to that of 480 kg N ha-1, but less than that of 0 kg N ha-1. The root vigor, which was debased by water stress, was the highest at 240 kg N ha-1. After soil re-watering, N application promoted root vigor. The trends of net photosynthetic rate were the same as that of root vigor during water stress. These results suggest that appropriate N supply (240 kg N ha-1 in this investigation) may contribute to drought resistance of cotton plants by adjusting the antioxidant enzyme activities of root, debasing lipid peroxidation and boosting root vigor during short-duration water stress (withholding water for 8 days in this investigation), however, excessive N supply (480 kg N ha-1) had a deleterious effect on plant drought resistance.
Keywords: Nitrogen; Water stress; Cotton; Root development; Antioxidant enzyme activity; Root vigor

Breana L. Simmons, David C. Coleman, Microbial community response to transition from conventional to conservation tillage in cotton fields, Applied Soil Ecology, Volume 40, Issue 3, November 2008, Pages 518-528, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2008.08.003.
(http://www.sciencedirect.com/science/article/B6T4B-4TGGCNB-1/2/01bb94552bf0597e74bd6c1235ce510f)
Abstract:
In the southeastern United States, conservation tillage techniques are used to conserve soil nutrients and structure, providing habitat and substrate for biota, which are largely responsible for the mineralization of nutrients in the soil. A deterrent for growers considering the transition to conservation tillage is the delay in soil response (e.g. increased soil carbon, efficient nutrient cycling, impacts on yield) associated with the equilibration of the soil food web. The objective of this study was to determine if the microbial community composition and biomass changed with transition to conservation tillage. Soils sampled from five sites, representing a chronosequence of conservation tillage (from conventionally tilled to 30 year no-till), were collected for fatty acid analysis. Microbial communities were significantly different among sites. Fungi, characterized by 18:2[omega]6, 18:1[omega]9, and 18:3[omega]6c fatty acids, were typically lowest in the conventionally tilled soil, probably due to repeated disruption of the fungal hyphae associated with tillage. In all soils, soil nutrient concentrations, moisture and microarthropod abundance were correlated with microbial structure. Plots in conservation tillage were significantly different from the conventionally tilled plots, but did not exhibit a clear linear pattern across the chronosequence. This evidence that belowground food webs can respond quickly to a cessation in tillage suggests that the delay in soil response may be due more to the time required to build organic matter than to a slow response by the biota.
Keywords: Microbial community structure; Microbial biomass; EL-FAME; Conservation tillage

Styliani Kalantzi, Diomi Mamma, Paul Christakopoulos, Dimitris Kekos, Effect of pectate lyase bioscouring on physical, chemical and low-stress mechanical properties of cotton fabrics,

Bioresource Technology, Volume 99, Issue 17, November 2008, Pages 8185-8192, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.03.020.
(http://www.sciencedirect.com/science/article/B6V24-4SC5PJJ-1/2/ba244d58821e22c81be58b29eb3c0935)
Abstract:
The main objective of the present study was to meticulously investigate an inclusive set of physicochemical and handle properties (determined through Kawabata evaluation system) of bioscoured cotton fabrics. The application of a commercial pectinase preparation, Bioprep 3000L, for a range of concentrations and treatment times, could create a pectin-free textile with low wax content. Multiple regression analysis was used to describe the effect of enzymatic process variables on pectin and waxes removal.
Comparison of fabrics' properties such as wettability, whiteness, crystallinity index, and dyeing behaviour, confirmed that bioscouring could be as much effective as the conventional alkaline process. Uncovering the relationship between the composition of materials and their physicochemical properties was attempted. The application of higher enzyme concentrations generated fabrics with improved low-stress mechanical properties. Bending and shear rigidity, compressional resilience, as well as, extensibility of enzymatically treated cotton fabrics could be efficiently predicted by means of a single independent variable, the crystallinity index.
Keywords: Bioprep 3000L; Bioscouring; Cotton; Physicochemical properties; Kawabata evaluation system (KES)

Qingsong Wang, Jinhua Sun, Song Guo, Spontaneous combustion identification of stored wet cotton using a C80 calorimeter, Industrial Crops and Products, Volume 28, Issue 3, November 2008, Pages 268-272, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2008.02.014.
(http://www.sciencedirect.com/science/article/B6T77-4SC5PKP-1/2/4fcaa39fa96230064db81b87de0eb3a4)
Abstract:
Many cotton fires were caused by spontaneous combustion, to identify the possible cause of such fires, a C80 microcalorimeter was employed in this paper. The cotton samples, dry or wetted, were sealed and heated from ambient temperature to 300 [degree sign]C at a 0.2 [degree sign]C min-1 heating rate. The result indicated that the dry cotton may not be the self-heating materials, but once it is wetted, its thermal stability is decreased with lower onset temperature and with larger heat generation, which can result to spontaneous combustion. It is speculated that microbiological degradation of cotton fibers has the potential to evolve methane and/or oxygen that in vapor phase could lead to spontaneous combustion. And therefore, it is confirmed that C80 can be used as an effective instrument to identify the cause of cotton spontaneous combustion fire.
Keywords: Spontaneous combustion; Cotton; Thermal analysis; C80 calorimeter

Angela R. Piovesan, Fernanda Staniscuaski, Juliana Marco-Salvadori, Rafael Real-Guerra, Marina S. Defferrari, Celia R. Carlini, Stage-specific gut proteinases of the cotton stainer bug Dysdercus peruvianus: Role in the release of entomotoxic peptides from Canavalia ensiformis urease, Insect Biochemistry and Molecular Biology, Volume 38, Issue 11, November 2008, Pages 1023-1032, ISSN 0965-1748, DOI: 10.1016/j.ibmb.2008.09.004.
(http://www.sciencedirect.com/science/article/B6T79-4TMBPRN-1/2/c7ddbbd53c5b5a82f0a6b7d78911bed4)
Abstract:
Canavalia ensiformis ureases are toxic to insects of different orders. The entomotoxicity of urease is due to a 10 kDa internal peptide released by proteinases in the insect digestive tract. We previously observed that, given orally, urease is toxic to nymphs of Dysdercus peruvianus, but does not affect adults. Here we characterized the major proteolytic activities of D. peruvianus midgut homogenates and investigated their in vitro-catalyzed release of the 10 kDa entomotoxic

peptide from urease. Cysteine, aspartic and metalloproteinases are present in both homogenates. Variations in optimal pH and susceptibility to inhibitors indicated differences in the enzyme profiles in the two developmental stages. Only nymph homogenates released ~10 kDa fragment(s) from urease, recognized by antibodies against the entomotoxic peptide. Fluorogenic substrates containing urease partial sequences flanking the N-terminal or the C-terminal portion of the entomotoxic peptide were efficiently cleaved by homogenates from nymphs, but much more slowly by the adult homogenate. Different classes of enzymes in the homogenates cleaved both substrates suggesting that in vivo the release of the entomotoxic peptide results from the concerted action of at least two different proteinases. Our findings support the view that a differential processing of ingested urease by the insects explains at least in part the lack of toxicity in adults.
Keywords: Dysdercus peruvianus; Urease; Proteolytic enzyme; Insecticidal peptide; Enzyme inhibitor

Feng Zhang, Yuyue Chen, Hong Lin, Hao Wang, Bing Zhao, HBP-NH2 grafted cotton fiber: Preparation and salt-free dyeing properties, Carbohydrate Polymers, Volume 74, Issue 2, 16 October 2008, Pages 250-256, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.02.006.
(http://www.sciencedirect.com/science/article/B6TFD-4RY6WR3-5/2/f08fdfff037b6751727b09ee528b1c5e)
Abstract:
In order to achieve salt-free dyeing on cotton fiber with reactive dyes, an amino-terminated hyperbranched polymer (HBP-NH2) grafted cotton fiber (HGCF) was prepared by the oxidation of cotton fiber with sodium periodate in water and subsequent grafted with an aqueous solution of HBP-NH2. Fourier transform infrared spectrophotometry (FTIR) of the HGCF indicated that all aldehyde groups of the oxidized cotton fiber have reacted with amino groups of the HBP-NH2. As a result, the HGCF fabrics prepared under the optimum conditions displayed markedly enhanced colour strength when dyed with reactive dyes using salt-free dyeing. The washing fastness, rubbing fastness and levelling properties of the dyed HGCF fabrics were also good compared with those obtained by conventional dyeing. The zeta-potential of the HGCF in liquid phase was tested and found to be positive at pHs lower than 6.5. The dyeing behaviour of Reactive Brilliant Yellow A-4GLN on the HGCF was found to follow a Langmuir-type adsorption curve.
Keywords: Amino-terminated hyperbranched polymer; Salt-free dyeing; Oxidized cotton fiber; Graft

A. Hebeish, Moustafa M.G. Fouda, I.A. Hamdy, S.M. EL-Sawy, F.A. Abdel-Mohdy, Preparation of durable insect repellent cotton fabric: Limonene as insecticide, Carbohydrate Polymers, Volume 74, Issue 2, 16 October 2008, Pages 268-273, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.02.013.
(http://www.sciencedirect.com/science/article/B6TFD-4RY8SP3-2/2/a53fa83c8866facf9f5cffeaa074287b)
Abstract:
Limonene, an important insecticide, was applied to cotton fabrics as per the conventional impregnation and coating methods in addition to an innovative technology based on prior modification of the fabric via grafting with monochlorotriazinyl-[beta]-cyclodextrin (MCT-[beta]-CD). Emulsion of limonene and polymeric binder were used when the conventional methods were employed to place limonene in the fabric while inclusion of limonene fragrance in the cavities of [beta]-cyclodextrin molecules constitutes the means of limonene fixation onto the fabric in the innovative technology. Bioassay test results expressed as repellency, knockdown and mortality were taken as a measure of toxic activity. The effect of washing and storing on the biocidal activity of fabrics treated according to the three aforementioned technologies was studied.
Keywords: Cotton fabric; [beta]-cyclodextrin; Monochlorotriazinyl-[beta]-cyclodextrin; Polymeric binder; Coating; Limonene

Anagnostis Argiriou, Georgios Michailidis, Athanasios S. Tsaftaris, Characterization and expression analysis of TERMINAL FLOWER1 homologs from cultivated alloteraploid cotton (Gossypium hirsutum) and its diploid progenitors, Journal of Plant Physiology, Volume 165, Issue 15, 9 October 2008, Pages 1636-1646, ISSN 0176-1617, DOI: 10.1016/j.jplph.2007.10.013.
(http://www.sciencedirect.com/science/article/B7GJ7-4RGVWFC-4/2/8c8867f995f197ff4553eb93c33eca96)
Abstract: Summary
The seasonal cycle and persistence of a plant is governed by a combination of the determinate or indeterminate status of shoot and root apical meristems. A perennial plant is one in which the apical meristem of at least one of its shoot axes remains indeterminate beyond the first growth season.
TERMINAL FLOWER1 (TFL1) genes play important roles in regulating flowering time, the fate of inflorescence meristem and perenniality. To investigate the role of TFL1-like genes in the determination of the apical meristems in an industrially important crop cultivated for its fibers, we isolated and characterized two TFL1 homologs (TFL1a and TFL1b) from tetraploid cultivated cotton (Gossypium hirsutum) and its diploid progenitors (Gossypium arboreum and Gossypium raimondii). All isolated genes maintain the same exon-intron organization. Their phylogenetic analysis at the amino acid level confirmed that the isolated sequences are TFL1-like genes and collocate in the TFL1 clade of the PEBP protein family. Expression analysis revealed that the genes TFL1a and TFL1b have slightly different expression patterns, suggesting different functional roles in the determination of the meristems. Additionally, promoter analysis by computational methods revealed the presence of common binding motifs in TFL1-like promoters. These are the first reported TFL1-like genes isolated from cotton, the most important crop for the textile industry.
Keywords: Cotton; Gossypium; Flowering; Perenniality; TERMINAL FLOWER1

Jing ZHENG, Zheng-sheng ZHANG, Li CHEN, Qun WAN, Mei-chun HU, Wei WANG, Ke ZHANG, Da-jun LIU, Xiao CHEN, Xin-qi WEI, Intron-Targeted Intron-Exon Splice Conjunction (IT-ISJ) Marker and Its Application in Construction of Upland Cotton Linkage Map, Agricultural Sciences in China, Volume 7, Issue 10, October 2008, Pages 1172-1180, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60161-3.
(http://www.sciencedirect.com/science/article/B82XG-4TSKFY5-2/2/ed77574280b0b23baed04e4cd449d600)
Abstract:
To develop a new DNA maker, which could be used in genetic diversity analysis and genetic map construction in plants, IT-ISJ (intron targeted intron-exon splice junction) primer combinations, which were designed according to the intronexon splice junction conserved sequences, were used to construct cotton genetic linkage map in the present study. 49 out of 704 IT-ISJ primer combinations showed polymorphism between upland cotton high quality cultivar Yumian 1 and multiple dominant gene line T586, and the polymorphic primer combinations accounted for 7.0% of total primer combinations. 49 IT-ISJ primer combinations were used to genotype 270 F2:7 recombinant inbred lines developed from (Yumian 1 x T586) F2, and 58 IT-ISJ loci were obtained. 58 IT-ISJ, together with 150 SSR and 8 morphological loci, were used to conduct linkage analysis, and a linkage map including 22 linkage groups and 113 loci (49 IT-ISJ, 62 SSR, and 2 morphological loci) was constructed. The linkage map covered 714.5 cM with an average interval of 6.3 cM between two markers, accounting for 16.1% of cotton genome. The present study demonstrated that the polymorphism of IT-ISJ marker is high, and it could be effectively applied in plant genetic map construction.
Keywords: IT-ISJ (intron targeted intron-exon splice junction); linkage map; upland cotton (Gossypium hirsutum L.)

Maria A. Ibargutxi, Delia Munoz, Inigo Ruiz de Escudero, Primitivo Caballero, Interactions between Cry1Ac, Cry2Ab, and Cry1Fa Bacillus thuringiensis toxins in the cotton pests Helicoverpa armigera (Hubner) and Earias insulana (Boisduval), Biological Control, Volume 47, Issue 1, October 2008, Pages 89-96, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.07.003.
(http://www.sciencedirect.com/science/article/B6WBP-4T0MMHV-2/2/01eb5356dbec10152e4a9af93275c277)
Abstract:
One of the most effective strategies recommended to delay insect resistance to Bt-plants is concurrent expression of several toxins in the same plant. A new generation of Bt-cotton, including Bollgard II and WideStrike, has been developed to simultaneously express two different Cry toxins, Cry1Ac and Cry2Ab, and Cry1Ac and Cry1Fa, respectively. The aim of this study was to determine the individual and combined toxic effect of Cry1Ac, Cry2Ab, and Cry1Fa in the cotton pests Helicoverpa armigera and Earias insulana, as well as the nature of the interactions between these toxins, as determined by mean lethal concentration (LC50) values and larval growth inhibition studies. Singly, all three assayed toxins were more toxic against E. insulana than against H. armigera larvae. Toxin Cry1Ac was significantly more toxic than the other two on H. armigera, while toxin Cry1Fa was the least toxic and caused no significant mortality. When combined, Cry1Ac and Cry1Fa showed an additive interaction in all proportions analyzed for both pest species, whereas Cry1Ac and Cry2Ab interacted synergistically in mixtures comprising 1:1 or 1:4 of each toxin against H. armigera. In E. insulana, there was no synergism between Cry1Ac and Cry2Ab but both these toxins showed a high insecticidal activity when administered individually and in mixtures. This study suggest that each particular toxin or toxin combination expressed in transgenic Bt-cotton should be carefully selected depending on the most important pest species present in each geographical area.
Keywords: Earias insulana; Helicoverpa armigera; Bacillus thuringiensis; Bt cotton; Cry toxins; Interaction; Synergy; Pest control

O.G.G. Knox, D.B. Nehl, T. Mor, G.N. Roberts, V.V.S.R. Gupta, Genetically modified cotton has no effect on arbuscular mycorrhizal colonisation of roots, Field Crops Research, Volume 109, Issues 1-3, October-December 2008, Pages 57-60, ISSN 0378-4290, DOI: 10.1016/j.fcr.2008.06.005.
(http://www.sciencedirect.com/science/article/B6T6M-4T1X2G4-1/2/4bd0b2a21d9701c4512fc1de2fe5f5b5)
Abstract:
There is conjecture that genetically modified (GM) plants, expressing insecticidal or herbicide tolerance traits, do not form mycorrhizal symbioses. For cotton, Gossypium hirsutum, which is grown worldwide as a high and low input crop, such an issue would be of concern because it depends upon symbiosis with arbuscular mycorrhizal (AM) fungi for uptake of immobile elements, such as phosphorus and zinc, and GM cotton varieties are widely grown. We compared mycorrhizal development in commercial cultivars of cotton expressing genes for insect resistance (Cry1Ac and Cry2Ab), glyphosate tolerance (5-enolpyruvylshikimate-3-phosphate synthase gene (EPSPS)), or both, and their conventional parent line. AM development in cotton roots increased rapidly in the first three weeks after sowing, reaching a plateau level of around 70-80% root length. The observed pattern of colonisation was virtually identical among both conventional and GM cultivars of cotton at each assessment, clearly indicating that colonisation by AM fungi were not affected by the expressed transgenic traits.
Keywords: Gossypium hirsutum; GM; Transgenic; AM

L. Zhang, W. Van Der Werf, W. Cao, B. Li, X. Pan, J.H.J. Spiertz, Development and validation of SUCROS-Cotton: a potential crop growth simulation model for cotton, NJAS - Wageningen Journal of Life Sciences, Volume 56, Issues 1-2, October 2008, Pages 59-83, ISSN 1573-5214, DOI: 10.1016/S1573-5214(08)80017-6.

(http://www.sciencedirect.com/science/article/B94T2-4WJRNXP-6/2/33c5d5d569b50e4cc1f1d97543498639)
Abstract:
A model for the development, growth and potential production of cotton (SUCROS-Cotton) was developed. Particular attention was given to the phenological development of the plant and the plasticity of fruit growth in response to temperature, radiation, daylength, variety traits, and management. The model is characterized by a comparatively simple code and transparent algorithms. The model was parameterized for Chinese cotton varieties and validated with extensive independent datasets on cotton growth and production from the Yellow River region and Xinjiang Province. The model validation showed that the phenology, growth and yield were simulated satisfactorily. The root mean square error (RMSE) for date of emergence, date of flowering, date of open boll stage and duration from sowing to boll opening was less than four calendar days, both for cotton grown in monoculture and cotton grown in a relay intercropping system with wheat. The RMSE of predicted total dry matter compared with observations was at most 6.6%, of lint yield 6.6%, and for number of harvestable bolls 10.0%. SUCROS-Cotton provides a tool to (1) assess production opportunities of cotton in various ecological zones in response to temperature, incoming radiation and management, (2) identify optimal cotton ideotypes for different agro-ecological conditions and for guiding breeding efforts, and (3) explore resource-use-efficient cropping systems, including intercropping options, and crop management practices such as plastic film mulching and sowing date.
Keywords: development; development time; growth; intercropping; lint yield; physiological day

Peng Gao, Pi-Ming Zhao, Juan Wang, Hai-Yun Wang, Xiong-Ming Du, Gui-Ling Wang, Gui-Xian Xia, Co-expression and preferential interaction between two calcineurin B-like proteins and a CBL-interacting protein kinase from cotton, Plant Physiology and Biochemistry, Volume 46, Issue 10, October 2008, Pages 935-940, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2008.05.001.
(http://www.sciencedirect.com/science/article/B6VRD-4SK62T7-1/2/9437158e15029ac64778502ac2f12e4d)
Abstract:
The CBL/CIPK signaling system mediates a variety of responses to environmental stimuli in plants. In this work, we identified four CBL genes from Gossypium hirsutum, two of which (designated GhCBL2 and GhCBL3) showed preferential expression in the elongating fiber cells. Moreover, the expression patterns of these two CBL genes coincided with that of a putative CBL-interacting protein kinase gene (GhCIPK1) that we isolated in a previous study. Yeast two-hybrid assay indicated that among the four CBLs, GhCIPK1 interacted selectively with GhCBL2 and GhCBL3. The co-expression and interactions of these proteins suggest that they are components of the same signaling pathway. These findings strengthen our previous prediction that CBL/CIPK signaling plays a critical role in the regulation of cotton fiber elongation.
Keywords: Cotton fiber; Calcineurin B-Like protein; CBL-interacting protein kinase

Zi-hong YE, Yong-jun MEI, Ke-qin ZOU, Xian-shu FU, Lin-shu JIANG, Genetic Dissection of Net Effects Between Yield and Its Components in Sea Island Cotton (Gossypium barbadense L.), Agricultural Sciences in China, Volume 7, Issue 9, September 2008, Pages 1052-1060, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60146-7.
(http://www.sciencedirect.com/science/article/B82XG-4THKV6G-4/2/4ecd9a152b7f0dc67f09cb614da17871)
Abstract:
The number of bolls, individual boll weight, and lint percentage are three important yield components of lint yield of cotton. In the present study, nine parents, twenty F1, and twenty F2 crosses of intraspecific hybrids of sea island cotton (Gossypium barbadense L.) were grown at Tarim University, Alar, Xinjiang, China, in 2000 and 2001. Lint yield and its three component traits

were measured and analyzed by an extended conditional mixed linear model approach. Lint percentage made the largest contribution to additive, additive x environment, and dominance x environment variations for lint yield. The contribution ratios of number of bolls, individual boll weight, and combined contribution of these two traits to additive x environment and dominance x environment variations for lint yield were not statistically significant. Lint yield of different parents could be affected differently by lint percentage. Lint yield of some parents was closely correlated with lint percentage, whereas for other parents, the behavior of individual boll weight and number of bolls played much more important roles on lint yield than that of lint percentage. It was shown by the conditional and conventional predicted additive x environment interaction effects of parents that the environment condition could influence different parents with varied effects.
Keywords: yield; yield components; Gossypium barbadense L.; conditional analysis

Jian Shi, Mari S. Chinn, Ratna R. Sharma-Shivappa, Microbial pretreatment of cotton stalks by solid state cultivation of Phanerochaete chrysosporium, Bioresource Technology, Volume 99, Issue 14, September 2008, Pages 6556-6564, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.11.069.
(http://www.sciencedirect.com/science/article/B6V24-4RR20Y2-1/2/1d4cc297a40ec7e43883b9ee22eecfdd)
Abstract:
White rot fungi degrade lignin and have biotechnological applications in conversion of lignocellulose to valuable products. Pretreatment is an important processing step to increase the accessibility of cellulosic material in plant biomass, impacting efficiency of subsequent hydrolysis and fermentation. This study investigated microbial pretreatment of cotton stalks by solid state cultivation (SSC) using Phanerochaete chrysosporium to facilitate the conversion into ethanol. The effects of substrate moisture content (M.C.; 65%, 75% and 80% wet-basis), inorganic salt concentration (no salts, modified salts without Mn2+, modified salts with Mn2+) and culture time (0-14 days) on lignin degradation (LD), solids recovery (SR) and availability of carbohydrates (AOC) were examined. Moisture content significantly affected lignin degradation, with 75% and 80% M.C. degrading approximately 6% more lignin than 65% M.C. after 14 days. Within the same moisture content, treatments supplemented with salts were not statistically different than those without salts for LD and AOC. Within the 14 day pretreatment, additional time resulted in greater lignin degradation, but indicated a decrease in SR and AOC. Considering cost, solid state cultivation at 75% M.C. without salts was the most preferable pretreatment resulting in 27.6% lignin degradation, 71.1% solids recovery and 41.6% availability of carbohydrates over a period of 14 days. Microbial pretreatment by solid state cultivation has the potential to be a low cost, environmentally friendly alternative to chemical approaches. Moisture relationships will be significant to the design of an effective microbial pretreatment process using SSC technology.
Keywords: Cotton stalk; Pretreatment; Phanerochaete chrysosporium; Bioethanol; Lignin

Richard V. Sequeira, Steven E. Naranjo, Sampling and management of Bemisia tabaci (Genn.) biotype B in Australian cotton, Crop Protection, Volume 27, Issue 9, September 2008, Pages 1262-1268, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.04.002.
(http://www.sciencedirect.com/science/article/B6T5T-4SR6FM7-1/2/8708505dc542761b610cb8fce2160637)
Abstract:
Data on seasonal population abundance of Bemisia tabaci biotype B (silverleaf whitefly (SLW)) in Australian cotton fields collected over four consecutive growing seasons (2002/2003-2005/2006) were used to develop and validate a multiple-threshold-based management and sampling plan. Non-linear growth trajectories estimated from the field sampling data were used as benchmarks to classify adult SLW field populations into six density-based management zones with associated control recommendations in the context of peak flowering and open boll crop growth stages.

Control options based on application of insect growth regulators (IGRs) are recommended for high-density populations (>2 adults/leaf) whereas conventional (non-IGR) products are recommended for the control of low to moderate population densities. A computerised re-sampling program was used to develop and test a binomial sampling plan. Binomial models with thresholds of T=1, 2 and 3 adults/leaf were tested using the field abundance data. A binomial plan based on a tally threshold of T=2 adults/leaf and a minimum sample of 20 leaves at nodes 3, 4 or 5 below the terminal is recommended as the most parsimonious and practical sampling protocol for Australian cotton fields. A decision support guide with management zone boundaries expressed as binomial counts and control options appropriate for various SLW density situations is presented. Appropriate use of chemical insecticides and tactics for successful field control of whiteflies are discussed.
Keywords: Bemisia tabaci; Cotton; Management zones; Binomial sampling plan

Naiyin Xu, Michel Fok, Lixin Bai, Zhiguo Zhou, Effectiveness and chemical pest control of Bt-cotton in the Yangtze River Valley, China, Crop Protection, Volume 27, Issue 9, September 2008, Pages 1269-1276, ISSN 0261-2194, DOI: 10.1016/j.cropro.2008.04.003.
(http://www.sciencedirect.com/science/article/B6T5T-4SPSH95-1/2/0f225ce14852a82ecd2dbbe762a20d1a)
Abstract:
The paper determines what might be the factors beneath the limited or reduced effectiveness being observed in China. The analysis is based on the data collected for several years from many locations in the Yangtze River Valley Varietal Experiment Network. All varieties declared to be Bt-cotton were confirmed to have the Bt-gene, the expression of which was assessed in three ways: through the analysis of Bt-protein production and through indoor and outdoor bioassays. Gene expression varied substantially between varieties and between years for the few varieties which were tested in two subsequent years. The Bt-cotton varieties being sown cannot control bollworms totally and this led to spray chemicals regardless of the real infestation level. Farmers are hence paying high prices for varieties which are not totally resistant to bollworms and pest control costs are not reduced to the extent that they might expect, lowering the profitability of cotton production.
Keywords: China; Bt; Cotton; Variety; Hybrids; Gene expression; Chemical control; Effectiveness

W. Ray Edwards, Judy A. Hall, Alan R. Rowlan, Tama Schneider-Barfield, Tzeli Julia Sun, Mohini A. Patil, Margaret L. Pierce, R. Gary Fulcher, Alois A. Bell, Margaret Essenberg, Light filtering by epidermal flavonoids during the resistant response of cotton to Xanthomonas protects leaf tissue from light-dependent phytoalexin toxicity, Phytochemistry, Volume 69, Issue 12, September 2008, Pages 2320-2328, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2008.05.021.
(http://www.sciencedirect.com/science/article/B6TH7-4SY693F-2/2/27c09a5c67885c50070478556de12b2d)
Abstract:
2,7-Dihydroxycadalene and lacinilene C, sesquiterpenoid phytoalexins that accumulate at infection sites during the hypersensitive resistant response of cotton foliage to Xanthomonas campestris pv. malvacearum, have light-dependent toxicity toward host cells, as well as toward the bacterial pathogen. Adaxial epidermal cells surrounding and sometimes covering infection sites turn red. The red cells exhibited 3-4-fold higher absorption at the photoactivating wavelengths of sunlight than nearby colorless epidermal cells. Red epidermal cells protected underlying palisade mesophyll cells from the toxic effects of 2,7-dihydroxycadalene plus sunlight, indicating a role for epidermal pigments in protecting living cells that surround infection sites from toxic effects of the plant's own phytoalexins. A semi-quantitative survey of UV-absorbing substances extracted from epidermal strips from inoculated and mock-inoculated cotyledons indicated that the principal increase in capacity to absorb the photoactivating wavelengths was due to a red anthocyanin and

a yellow flavonol, which were identified as cyanidin-3-O-[beta]-glucoside and quercetin-3-O-[beta]-glucoside, respectively.
Keywords: Gossypium hirsutum L.; Malvaceae; Upland cotton; Xanthomonas campestris pv. malvacearum; Ecological biochemistry; Anthocyanin; Flavonol glycoside; Phytoalexin; Sesquiterpene; Cyanidin-3-O-[beta]-glucoside; Chrysanthemin; 2,7-Dihydroxycadalene; Isoquercitrin; Lacinilene C; Quercetin-3-O-[beta]-glucoside; UV damage; UV protection

Tian-Zi CHEN, Shen-Jie WU, Fei-Fei LI, Wang-Zhen GUO, Tian-Zhen ZHANG, In Vitro Regeneration of Four Commercial Cotton Cultivars (Gossypium hirsutum L.) Grown in Xinjiang, China, Acta Agronomica Sinica, Volume 34, Issue 8, August 2008, Pages 1374-1380, ISSN 1875-2780, DOI: 10.1016/S1875-2780(08)60047-4.
(http://www.sciencedirect.com/science/article/B94TW-4V2FYB4-4/2/2dc08dbdb195e3e09165de69c3443b5b)
Abstract:
Genetic improvement of cotton through biotechnology has been limited by lack of an efficient regeneration system. An efficient somatic embryo production and maturation procedure was thus developed to regenerate plantlets from hypocotyls of cotton cultivars Xinluzhong 20, Xinluzao 24, Xinluzao 33, and 03298 grown in Xinjiang. Calli were effectively produced by 0.01 to 0.10 mg L-1 kinetin (KT) and 0.10 mg L-1 2,4-dichlorophenoxyacetic acid (2,4-D), with a better result by 0.02 or 0.10 mg L-1 KT and 0.10 mg L-1 2,4-D. Split hypocotyl segments and double amounts of KNO3 during induction of calli were beneficial to the emerge of embryogenic calli. Embryogenic calli and globular-stage somatic embryos were effectively initiated with high concentration of KT and low concentration of 2,4-D in ECM media (0.05 or 0.10 mg L-1 KT and 0.01 mg L-1 2,4-D). Embryos were further developed into plantlets in MSBF medium under the conditions of dehydration and ventilation, which were achieved using filter paper on medium and cotton tampon sealing flask. Using this protocol, normal plantlets with strong roots were developed from these cotton cultivars in 6 to 8 months. The successful regeneration protocol established in this study can be used to improve cotton cultivars by genetic engineering.
Keywords: Gossypium hirsutum L.; regeneration; somatic embryogenesis

Xiao-Li TIAN, Gang-Wei WANG, Rui ZHU, Pei-Zhu YANG, Liu-Sheng DUAN, Zhao-Hu LI, Conditions and Indicators for Screening Cotton (Gossypium hirsutum L.) Varieties Tolerant to Low Potassium, Acta Agronomica Sinica, Volume 34, Issue 8, August 2008, Pages 1435-1443, ISSN 1875-2780, DOI: 10.1016/S1875-2780(08)60050-4.
(http://www.sciencedirect.com/science/article/B94TW-4V2FYB4-7/2/d6b8130f240ede966338b8fe284bcdcf)
Abstract:
To establish a screening system for evaluating the tolerance of cotton (Gossypium hirsutum L.) varieties to low potassium (K), 50 cotton varieties that covered more than 80% planting area in China in 2004 were used in a hydroponic sculture and a field experiment in 2006. The K concentrations were 0.02 (low K stress) and 2.50 mmol L-1 (high K), respectively, in the hydroponic culture, and the available K in soil was 59.88 mg kg-1 (K deficient). At 5-leaf stage, the total plant dry weight (DW) varied larger among cotton varieties than that at 3-leaf stage; thus, seedlings at 5-leaf stage were adapted in the comparison of tolerance to low K. Under the low K condition, DW was significantly correlated with the relative dry weight (RDW) ($r = 0.7690$, $P < 0.01$), K accumulation amount (KAA) ($r = 0.9522$, $P < 0.01$), and K utilization index (KUI) ($r = 0.9791$, $P < 0.01$). The KAA of whole plant that grew in low K solution significantly correlated with root length ($r = 0.5201$, $P < 0.01$) and root surface area ($r = 0.3325$, $P < 0.05$). The ratio of spotted area resulting from potassium deficiency to total cotyledon area (defined as S value) was determined as an indicator for screening low K tolerance due to its high variation among varieties with the coefficient of variation of 44.46% and significant correlation with DW ($r = -0.4455$, $P <$

0.01) in addition to its normal distribution characteristic. No significant correlations were observed between the K content in seeds and the S value, DW, KAA, and KUI. There was significant correlation between the DW of whole plant at 5-leaf stage under hydroponic culture and the dry weight of reproductive organs (RODW) in field ($r = 0.5091$, $P < 0.01$). Therefore, hydroponic culture is feasible for primary screening cotton varieties tolerant to low K stress, but some important varieties should be further identified in field experiment.
Keywords: cotton (Gossypium hirsutum L.); tolerance to low potassium; variety screening; hydroponic culture; indicator of tolerance

Muhammad Younas Khan Barozai, Muhammad Irfan, Rizwan Yousaf, Imran Ali, Uzma Qaisar, Asma Maqbool, Muzna Zahoor, Bushra Rashid, Tayyab Hussnain, Sheikh Riazuddin, Identification of micro-RNAs in cotton, Plant Physiology and Biochemistry, Volume 46, Issues 8-9, August-September 2008, Pages 739-751, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2008.05.009.
(http://www.sciencedirect.com/science/article/B6VRD-4SM62CN-1/2/bc3e45c44aa2606705a7cec6c3160f42)
Abstract:
The plant genome has conserved small non-coding microRNAs (miRNAs) genes about 20-24 nucleotides long. They play a vital role in the gene regulation at various stages of plant life. Their conserved nature among the various organisms not only suggests their early evolution in eukaryotes but also makes them a good source of new miRNA discovery by homology search using bioinformatics tools. A systematic search approach was used for interspecies orthologues of miRNA precursors, from known sequences of Gossypium in GenBank. The study resulted in 22 miRNAs belonging to 13 families. We found 7 miRNA families (miR160, 164, 827, 829, 836, 845 and 865) for the first time in cotton. All 22 miRNA precursors form stable minimum free energy (mfe) stem loop structure as their orthologues form in Arabidopsis and the mature miRNAs reside in the stem portion of the stem loop structure. Fifteen miRNAs belong to the world's most commercial fiber producing upland cotton (Gossypium hirsutum), five are from Gossypium raimondii and one each is from Gossypium herbaceum and Gossypium arboreum. Their targets consist of transcription factors, cell division regulating proteins and virus response gene. The discovery of 22 miRNAs will be helpful in future for detection of precise function of each miRNA at a particular stage in life cycle of cotton.
Keywords: Cotton; Micro RNAs; Post-transcriptional gene silencing; Homology search

Rickie B. Turley, Earl Taliercio, Cotton benzoquinone reductase: Up-regulation during early fiber development and heterologous expression and characterization in Pichia pastoris, Plant Physiology and Biochemistry, Volume 46, Issues 8-9, August-September 2008, Pages 780-785, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2008.04.016.
(http://www.sciencedirect.com/science/article/B6VRD-4SCD9YW-2/2/cd3b4dc5faa41d97db455846d647e629)
Abstract:
Benzoquinone reductase (BR; EC 1.6.5.7) is an enzyme which catalyzes the bivalent redox reactions of quinones without the production of free radical intermediates. Using 2D-PAGE comparisons, two proteins were found to be up-regulated in wild-type cotton ovules during the fiber initiation stage but not in the fiberless line SL 1-7-1. These proteins were excised from the gel, partially sequenced and identified to be BR isoforms. PCR was used to amplify both full length coding regions of 609 bp and once cloned, the restriction enzyme HindIII was used to distinguish the clones encoding the BR1 (one site) and BR2 (two sites) isoforms. Both deduced protein sequences had 203 residues which differed at 14 residues. The molecular mass and pIs were similar between the measured protein (2D-PAGE) and the theoretical protein (deduced). Heterologous proteins BR1 and BR2 were produced for further study by ligating the BR1 and BR2 clones in frame into the [alpha]-factor secretion sequence in pPICZ[alpha]A vector and expressed

with Pichia pastoris. Both BR1 and BR2 were approximately 26.5 kDa and did enzymatically reduce 2,6-dimethoxybenzoquinone similar to the fungal BR.
Keywords: Benzoquinone reductase; Fiber development; Gossypium hirsutum; Quinones; Pichia pastoris

H.L. Wang, Y.T. Gan, R.Y. Wang, J.Y. Niu, H. Zhao, Q.G. Yang, G.C. Li, Phenological trends in winter wheat and spring cotton in response to climate changes in northwest China, Agricultural and Forest Meteorology, Volume 148, Issues 8-9, 4 July 2008, Pages 1242-1251, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2008.03.003.
(http://www.sciencedirect.com/science/article/B6V8W-4SD1KHF-1/2/bdc29f6b539c6734b23909fd19226e6a)
Abstract:
Understanding of the effects of climatic change on phenological phases of a crop species may help optimize management schemes to increase productivity. This study determined the trend of climatic changes during the period of 1981-2004 in northwest China and assessed the impacts of climatic changes on phenological phases and productivity of winter wheat (Triticum aestivum L.) and spring cotton (Gossypium hirsutum L.) at two locations. There was a clear trend of climate warming during the study period, leading to the earliness of pseudo stem elongation, booting, anthesis, and ripening stages of winter wheat by 13.2, 9.8, 11.0, and 10.8 d during the 24-year period, respectively. The growth period from seedling emergence to stem elongation shortened 16.1 d, but the growth period from anthesis to milk prolonged 8.2 d during the 24-year period. In cotton, the dates of seedling emergence, budding, anthesis, and boll-opening stages became earlier by, respectively, 10.9, 9.0, 13.9, and 16.4 d during the period of 1983-2004. However, the growth periods from five-leaf stage to budding, budding to anthesis, and anthesis to boll-opening stages were prolonged by 2.4, 12.0, and 9.0 d, respectively, for every 1 [degree sign]C of rise in minimum temperature during their respective growth period. Increasing minimum temperatures during the vegetative period positively affected winter wheat growth but increases in maximum temperatures during the reproductive period negatively affected kernel weight and grain yield. Consequently, the grain yield of winter wheat had decreased, but the yield of cotton had increased during the study period. The trend of climate warming appeared to be favourable for cotton production but unfavourable for winter wheat in northwest China.
Keywords: Phenological phases; Growth stage; Climate warming; Gossypium hirsutum; Triticum aestivum

F.A. Abdel-Mohdy, Moustafa M.G. Fouda, M.F. Rehan, A.S. Aly, Repellency of controlled-release treated cotton fabrics based on cypermethrin and prallethrin, Carbohydrate Polymers, Volume 73, Issue 1, 4 July 2008, Pages 92-97, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.11.006.
(http://www.sciencedirect.com/science/article/B6TFD-4R466CP-6/2/37b20be01425f7ef0aadbf1eaa9590b7)
Abstract:
Monochlorotriazinyl-[beta]-cyclodextrin (MCT-[beta]-CD) was fixed permanently onto the surface of cotton fabrics. The fixed MCT-[beta]-CD forms inclusion complexes with insecticides (cypermethrin and prallethrin). MCT-[beta]-CD-finished cotton fabrics loaded with insecticides are effective in reducing malaria morbidity and mortality due to effective personal protection against mosquitoes. Bioassays show that the treated fabrics have fast action against mosquitoes at the range of concentrations studied. The toxic activity of the treated fabrics increased by increasing the insecticide concentration in the treated fabrics, and also increased by increasing the exposure times. The quantitative analysis results show that there are great losses in the amount of insecticides in blank samples by washing, while treated fabrics retain high amount of insecticides.
Keywords: Insecticide; Insect repellent; Cypermethrin; Prallethrin; Cyclodextrin; MCT-[beta]-CD

Q.D. Richards, M.P. Bange, S.B. Johnston, HydroLOGIC: An irrigation management system for Australian cotton, Agricultural Systems, Volume 98, Issue 1, July 2008, Pages 40-49, ISSN 0308-521X, DOI: 10.1016/j.agsy.2008.03.009.
(http://www.sciencedirect.com/science/article/B6T3W-4SM20BT-1/2/b299c6d26464b48f6cf4eed18d312d0a)
Abstract:
The worldwide need to improve water use efficiency within irrigated agriculture has been recognised in response to environmental concerns and conflicts in resource use. Within the Australian cotton industry, the imperative to reduce water use and optimise irrigation management through the understanding of risk, using information generated by computerised decision aids was identified and subsequently developed into the HydroLOGIC irrigation management software. This paper summarises the attributes of the HydroLOGIC irrigation management software, with particular emphasis on functionality and its application to irrigation decisions within the Australian cotton industry. The software development process is documented to provide direction for future software application initiatives, with particular emphasis on a process of user feedback, evaluation and support requirements providing direction to software development. On-farm experiments throughout the development period allowed the validation of internal software logic, irrigator decision processes, and the OZCOT cotton growth model. The software demonstrated the ability to improve yield and water use efficiency by optimising strategic and tactical irrigation decisions in the Australian furrow irrigation cotton production system. In 7 of the 11 on-farm experiments conducted, the use of HydroLOGIC helped improve overall field water use efficiency by optimising the timing of irrigation events or by indicating further irrigations would not provide yield or maturity benefits. The paper also presents useful insights into the development of software targeted for irrigation utilising in-field measurements of soil water, crop growth and a crop growth simulation model.
Keywords: Irrigation management; Cotton; Decision making; Risk; Crop management; Software development; Support

Yigen Chen, John R. Ruberson, Impact of variable nitrogen fertilisation on arthropods in cotton in Georgia, USA, Agriculture, Ecosystems & Environment, Volume 126, Issues 3-4, July 2008, Pages 281-288, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.02.011.
(http://www.sciencedirect.com/science/article/B6T3Y-4S9P2KS-3/2/2b797b1bc4a1c6c1cd1d9d4f3203fa89)
Abstract:
Reducing fertiliser applications can reduce production costs for cotton (Gossypium hirsutum L.) growers, as well as nitrogen (N) leaching into the soil and contamination of surface and ground water. But altered N fertilisation may also affect pests and their natural enemies. In this study, plots with four different levels of fertiliser input (0, 45, 90 and 135 kg ha-1 N) were used to investigate the influence of N on cotton pest and beneficial arthropod populations, and on cotton yield in Tifton, GA, USA. We predicted that (1) N fertilisation will correlate positively with cotton plant growth; (2) increased N fertilisation will increase pest populations because plants with more N will be more nutritious for and attractive to herbivores; (3) populations of beneficial arthropods and predation of pests will decline with increased N fertilisation because of reduced plant signaling; (4) increased N fertilisation will increase pest mortality due to parasitoids because of increased host quality. Cotton plant growth was enhanced by N fertilisation but yield was unaffected. N fertilisation significantly affected some pest arthropods but inconsistently. Mirids were most abundant in the high N treatment in 1 year of the study and cotton aphids were most abundant in the highest N treatment in the other year of the study. Arthropod predators were generally more abundant in the high N treatment but only spiders and Geocoris spp. were significantly affected by N treatment, with highest numbers present in the highest N treatment but the significant differences were each only in a single year. The greatest mortality of sentinel pest

eggs (Spodoptera exigua) due to predation occurred under low N conditions. N fertilisation had no significant effects on parasitism of feral or sentinel caterpillars.
Keywords: Resource availability; Nutrient; 'Bottom up' effects; 'Top down' effects; Tri-trophic interactions; Sustainable agriculture

Elodie Blanc, Philippe Quirion, Eric Strobl, The climatic determinants of cotton yields: Evidence from a plot in West Africa, Agricultural and Forest Meteorology, Volume 148, Issues 6-7, 30 June 2008, Pages 1093-1100, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2008.02.005.
(http://www.sciencedirect.com/science/article/B6V8W-4S9R82S-2/2/b950cf17682213892839d6285ed5bd29)
Abstract:
We conduct a multiple regression analysis of the main climatic determinants of rain fed cotton (Gossypium hirsutum L.) yields for an experimental plot located in Mali, West Africa. The use of daily climatic data allows us to explicitly examine the role of cumulative precipitation, the length of the rainy season, the number of dry spells, the flooding periods, temperature, and solar radiation in determining annual cotton production, and the results of our analysis confirms their importance. In general our findings are in line with the current agronomic literature.
Keywords: Cotton; Yields; Climate; West Africa

Celine Cuissinat, Patrick Navard, Thomas Heinze, Swelling and dissolution of cellulose. Part IV: Free floating cotton and wood fibres in ionic liquids, Carbohydrate Polymers, Volume 72, Issue 4, 10 June 2008, Pages 590-596, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.09.029.
(http://www.sciencedirect.com/science/article/B6TFD-4PTW4SD-2/2/ccbc5c7ba57128d72f50369faffe6d47)
Abstract:
The objective of this paper is to investigate if the swelling and dissolution mechanisms found for aqueous solvents are valid for non-aqueous ones. Three different ionic liquids were used and the swelling and dissolution mechanisms were investigated by optical methods. Native and enzymatically treated cellulose fibres (cotton and wood fibres) are dipped into three ionic liquids (1-N-butyl-3-methylimidazolium chloride ([C4mim]+Cl-)/DMSO, allylmethylimidazolium bromide ([Amim]+Br-) and butenylmethylimidazolium bromide ([Bmim]+Br-). ([C4mim]+Cl-)/DMSO shows a swelling of cellulose by ballooning and then dissolution. ([Amim]+Br-) and ([Bmim]+Br-) show a homogeneous swelling but no dissolution. The swelling and dissolution mechanisms of cellulose in ionic liquids are similar to those observed in aqueous solvents. It indicates that the swelling and dissolution mechanisms are entirely due to the way cellulose fibres are structured, not depending on the type of solvent. The quality of the solvent is giving the type of mechanism.
Keywords: Cellulose; Cotton; Ionic liquids; Dissolution; Swelling

He-zhong DONG, Wei TANG, Wei-jiang LI, Zhen-huai LI, Yue-hua NIU, Dong-mei ZHANG, Yield, Leaf Senescence, and Cry1Ac Expression in Response to Removal of Early Fruiting Branches in Transgenic Bt Cotton, Agricultural Sciences in China, Volume 7, Issue 6, June 2008, Pages 692-702, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60104-2.
(http://www.sciencedirect.com/science/article/B82XG-4SWFK1G-8/2/6aad70e2d066a6ca51dd7d3f0d6f24d7)
Abstract:
Two-year field experiments were conducted at Linqing, Yellow River valley of China, to study the plant response to the removal of early fruiting branches in transgenic Bt (Bacillus thuringiensis) cotton (Gossypium hirsutum L.) from 2003 to 2004. Plants were undamaged and treated by removing two basal fruiting branches (FB) at squaring to form the control and the removal treatment, respectively. The plant height, leaf area (LA), dry weight of fruiting forms (DWFF), the number of fruiting nodes (NFN), photosynthetic (Pn) rate, and levels of leaf chlorophyll (Chl), N, P,

K, and Cry1Ac protein in main-stem leaves were measured at a 10- or 20-d interval after FB removal, and the sink/source ratio as indicated by NFN/LA and DWFF/LA was determined. FB removal significantly increased the plant height, LA, and plant biomass in both years. Lint yields were increased 7.5 and 5.2% by removal compared with their controls in 2003 and 2004, respectively. Significant increases in boll size (5.7 and 5.1%) were also observed in removal than in control for both years. Either NFN/LA or DWFF/LA was significantly reduced by removal before 40 d after removal; however, both NFN/LA and DWFF/LA were significantly enhanced by FB removal at 80 d after removal compared to the untreated control. There was no significant difference in fiber quality in the first two harvests between removal and control, but fiber strength and micronarie in the third harvest were significantly improved by FB removal. In terms of leaf Chl, Pn rate, levels of total N, P, and K in late season, leaf senescence was considerably delayed by FB removal. Levels of Cry1Ac protein in the fully expanded young leaves were considerably higher in FB-excised plants than in control, indicating FB removal enhanced Cry1Ac expression. It is suggested that the yield and quality improvement with FB removal may be attributed to the increased NFN/LA or DWFF/LA in late season and delayed leaf senescence, respectively. FB removal can be a potential practice incorporated into the intensive cultivation system for enhancing transgenic Bt cotton production.
Keywords: branch removal; Bt cotton; Cry1Ac protein; leaf senescence; photosynthetic rate; sink/source ratio

Cun-cang JIANG, Fang CHEN, Xiang-zhao GAO, Jian-wei LU, Kai-yuan WAN, Fu-zhao NIAN, Yun-hua WANG, Study on the Nutrition Characteristics of Different K Use Efficiency Cotton Genotypes to K Deficiency Stress, Agricultural Sciences in China, Volume 7, Issue 6, June 2008, Pages 740-745, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60109-1.
(http://www.sciencedirect.com/science/article/B82XG-4SWFK1G-F/2/847e6061c5be6973439b4424cdbcc0cc)
Abstract:
To study the mechanism of plant K use efficiency, both K high and low use efficiency cotton genotypes, 103 and 122, respectively, were selected from 86 cotton cultivars (Gossypium hirsutum L.). The research was conducted using pot experiment for planting cotton on without K (0.0 g kg-1 soil) and with K (0.4 g kg-1 soil) treatments in 2005. Experimental result showed that, with K deficiency stress, genotype 103 grew much better than genotype 122 except that its lower leaves showed the symptoms of K deficiency, whereas all the leaves of genotype 122 showed the symptoms of K deficiency. Root dry matter weights of treatments for genotype 103 with and without K application were 1.07 and 1.25 times of genotype 122. It indicated that the root system of genotype 103 was well developed and has better nutrition uptake capability than that of genotype 122. The result also showed that the cotton shoots of genotype 103 were 1.07 and 1.13 times over genotype 122 on treatments of with and without K application. It indicated that genotype 103 has stronger transport organs. In genotype 103, plants, dry matter, and potassium were mainly transported to cotton bolls. The boll dry weight of genotype 103 was 2.58 times in without K treatment and 1.90 times in with K treatment over genotype 122. The potassium accumulation in bolls of genotype 122 was only 49.3% of that in genotype 103. Potassium accumulation in the other organs of genotype 103 was relatively low compared with in bolls. This indicated that the distribution of K and organic matter in genotype 103 was more efficient than genotype 122. The main differences between high K efficiency cotton genotype 103 and low K efficiency genotype 122 lie in their potassium nutrition and organic matter using efficiency on uptake, transportation, accumulation, distribution, and utilization.
Keywords: cotton (Gossypium hirsutum L.); potassium use efficiency; genotype; uptake capability; distribution ability

Jeong Jun Kim, Mark S. Goettel, David R. Gillespie, Evaluation of Lecanicillium longisporum, Vertalec(R) for simultaneous suppression of cotton aphid, Aphis gossypii, and cucumber powdery mildew, Sphaerotheca fuliginea, on potted cucumbers, Biological Control, Volume 45, Issue 3, June 2008, Pages 404-409, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.02.003.
(http://www.sciencedirect.com/science/article/B6WBP-4RSYC91-3/2/e6a144b950b031d081a5d013ecfe0d73)
Abstract:
The commercial preparation of Lecanicillium longisporum, Vertalec(R) was evaluated for simultaneous suppression of cotton aphid and cucumber powdery mildew on potted cucumber plants. Vertalec was applied onto cucumber plants that had been infested with either cotton aphid, spores of Sphaerotheca fuliginea or both. Irradiation-inactivated Vertalec (II Vertalec) was also applied to an identical series of cucumber plants as a control. The Vertalec was highly pathogenic against adult aphids with an LT50 of 6.9 days. II Vertalec did not affect aphid survival. Application of either active or II Vertalec significantly suppressed spore production of S. fuliginea compared to the water control. For dual control assays, Vertalec applications were made one day after infestation of both aphid and S. fuliginea onto potted cucumbers. Fifteen days after the Vertalec treatments, the numbers of surviving aphids and the production of powdery mildew spores were significantly reduced compared with the water control. The presence of aphids also suppressed S. fuliginea spore production. Our results suggest the potential of a dual role for Vertalec as a microbial control agent of aphids and powdery mildew in cucumber.
Keywords: Aphis gossypii; Cotton aphid; Entomopathogenic fungi; Lecanicillium longisporum; Microbial control; Powdery mildew; Simultaneous control; Sphaerotheca fuliginea; Verticillium lecanii

Swagata 'Ban' Banerjee, Steven W. Martin, An estimation of producer returns from Bt cotton with varying refuge sizes, Crop Protection, Volume 27, Issue 6, June 2008, Pages 1003-1008, ISSN 0261-2194, DOI: 10.1016/j.cropro.2007.12.008.
(http://www.sciencedirect.com/science/article/B6T5T-4RPD76Y-1/2/dbb69e241647aedeb86c6492240d17c9)
Abstract:
The US Environmental Protection Agency (EPA) has mandated an Insect Resistance Management (IRM) program that attempts to preserve the benefits of insect protection from Bacillus thuringiensis (Bt) cotton. According to that mandate, growers planting Bt cotton are required to follow the IRM practices designed to keep some lepidopteran populations from being exposed to the Bt protein. Thus, a refuge of non-Bt cotton must be planted. Currently, producers may select among different sprayed and unsprayed refuge percentages. Recently, EPA has been petitioned to remove all refuge requirements. In order to compare farm-level returns from various refuge requirements, returns for a cotton farm in the Mississippi Delta were calculated from observed and simulated yields. Results indicate higher mean returns above insecticide costs for Bt cotton than for non-Bt (refuge) cotton. For any given non-Bt cotton (refuge) percentage, returns are higher without increased risk when insecticide sprays are applied.
Keywords: Bt cotton; Refuge; Returns; Risk; Simulated yield

Bing CHEN, Shao-kun LI, Ke-ru WANG, Jing WANG, Fang-yong WANG, Chun-hua XIAO, Jun-chen LAI, Na WANG, Spectrum Characteristics of Cotton Canopy Infected with Verticillium Wilt and Applications, Agricultural Sciences in China, Volume 7, Issue 5, May 2008, Pages 561-569, ISSN 1671-2927, DOI: 10.1016/S1671-2927(08)60053-X.
(http://www.sciencedirect.com/science/article/B82XG-4SK60RT-7/2/5646b9cfd32e17cfb9a3e3f254b8400a)
Abstract:

Hyper spectrum remote sensing with fine spectrum information is an efficient method to estimate the verticillium wilt of cotton. The research was conducted in Xinjiang, the largest cotton plant region of China, by using the data which were collected both by canopy spectrum infected with verticillium wilt and severity level (SL) in the year 2005-2006. The quantitative correlation was analyzed between SL and canopy of reflectance spectrum or derivative spectrum reflectance. The results indicated that spectrum characteristics of cotton canopy infected with verticillium wilt changed regularly with the increase of SL in different periods and varieties. Spectrum reflectance increased in the visible light region (620-700 nm) with the increase of the SL, which inverted in near-infrared region and was extremely significant in the region of (780-1 300 nm). When SL attained b2 (DI = 25), cotton canopy infected with verticillium wilt was used as a watershed and diagnosed index in the beginning stages of the disease. The results also indicated that there were marked different characteristics of the first derivative spectrum in these SL, it changed significantly in the red edge ranges (680-760 nm) with different SL, i.e., red edge swing decreased, and red edge position equally moved to the blue. In this study 1 001-1 110 nm and 1 205-1 320 nm were selected out as sensitive bands for SL of canopy. Inversion models established for estimating cotton canopy infected with verticillium wilt reached the most significant level. Finally, the different spectrum characteristics of cotton canopy infected with verticillium wilt were marked, some inversion models were established, which could estimate SL of canopy infected with verticillium wilt. The best recognized model was the first derivative spectra at (FD 731 nm - FD 1 317 nm), and it might be used to forecast the position of cotton canopy infected with verticillium wilt quantitatively.
Keywords: cotton; verticillium wilt; canopy spectrum; SL; inversion models

Ioannis-Dimosthenis S. Adamakis, Eleftherios P. Eleftheriou, Thomas L. Rost, Effects of sodium tungstate on the ultrastructure and growth of pea (Pisum sativum) and cotton (Gossypium hirsutum) seedlings, Environmental and Experimental Botany, Volume 63, Issues 1-3, May 2008, Pages 416-425, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2007.12.003.
(http://www.sciencedirect.com/science/article/B6T66-4RDPYR2-1/2/be369914598c091684fade64661046e5)
Abstract:
Pea (Pisum sativum L. cv. Onmard) and cotton (Gossypium hirsutum L. cv. Campo) seedlings were treated with two concentrations (200 and 500 mg/l) of sodium tungstate (Na2WO4) and the developmental effects were investigated. Tungstate retarded seedling growth rate and stopped root elongation in both species. Seedling growth recovered when tungstate was removed, but primary roots continued to be stunted, while lateral root initiation and growth were stimulated. Tungstate induced premature vacuolation in cells of the root apical meristem, with vacuoles having an unusual semi-circular or cap-like shape around the nucleus. In control roots, the nuclei were spherical with prominent nucleoli bearing several randomly distributed fibrillar centres. In the tungstate-treated cells nuclei contained spherical nucleoli with a big nucleolar vacuole. Occasionally, cytoplasmic components, such as mitochondria, were entrapped in the nucleoplasm of interphasic cells of the treated roots. In these roots, most cell plates were fused to only one lateral parental wall suggesting a non-uniform centrifugal extension. The vesicles in these cell plates were dark and fused to each other at a much lower rate than in the dividing cells of the untreated seedlings. Phragmoplast and cortical microtubules were abundant in the untreated cells, but scarcely detected in the treated ones. All these observations are consistent with the view that tungstate causes considerable toxic effects to pea and cotton seedlings.
Keywords: Cell plates; Cell vacuolation; Gossypium hirsutum; Nucleolar vacuoles; Pisum sativum; Tungstate

Irina Lubeck, Walquiria Arruda, Barbara K. Souza, Fernanda Staniscuaski, Celia R. Carlini, Augusto Schrank, Marilene H. Vainstein, Evaluation of Metarhizium anisopliae strains as potential

biocontrol agents of the tick Rhipicephalus (Boophilus) microplus and the cotton stainer Dysdercus peruvianus, Fungal Ecology, Volume 1, Issues 2-3, May-August 2008, Pages 78-88, ISSN 1754-5048, DOI: 10.1016/j.funeco.2008.09.002.
(http://www.sciencedirect.com/science/article/B8JGS-4TY3Y6X-1/2/6e1cfccda3028e73b1019eedd6157f8e)
Abstract:
The negative aspects of traditional pest control have led to the investigation of alternative methods such as biological control. Metarhizium anisopliae, well known as an entomopathogenic fungus capable of actively invading and killing its hosts and thus a candidate biopesticide, is here tested against two agricultural pests of economic/social importance and also evaluated for its chitinolytic secretion and capacity to grow and sporulate at different temperatures. None of the isolates was able to grow below 4 [degree sign]C or above 37 [degree sign]C. Chitinolytic activity under artificial growth conditions revealed that Rhipicephalus (Boophilus) microplus cuticle induces N-acetyl-[beta]-d-glucosaminidase and endochitinase activities more efficiently than Dysdercus peruvianus cuticle and that glucose did not repress those activities. Bioassays were carried out with R. microplus females and fourth instar D. peruvianus. Six isolates of M. anisopliae were pathogenic to the engorged female cattle ticks. E6, GC47 and CG97 were the most virulent isolates for both arthropod models although differences were seen among them. M. anisopliae strains caused 90-100 % mortality on the fourth post-infection day in R. microplus. D. peruvianus females were more sensitive to fungal infection than males, and the most virulent strains caused 50 % mortality on the third to fourth day post-infection. Our studies suggest that M. anisopliae strain CG47 is a candidate for commercial pesticide formulations due to its capacity to kill both hosts and its ability to sporulate at higher temperatures.
Keywords: Biological control; Metarhizium anisopliae; Rhipicephalus (Boophilus) microplus; Dysdercus peruvianus; Chitinases

Padma S. Vankar, Rakhi Shanker, Shalini Dixit, Debajit Mahanta, S.C. Tiwari, Sonicator dyeing of modified cotton, wool and silk with Mahonia napaulensis DC. and identification of the colorant in Mahonia, Industrial Crops and Products, Volume 27, Issue 3, May 2008, Pages 371-379, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2007.12.009.
(http://www.sciencedirect.com/science/article/B6T77-4S0B2J6-1/2/e39129ea4bbdd57933140e1e1933bf3d)
Abstract:
Mahonia napaulensis DC. (local name--Taming) family Berberidaceae, produces natural dye from its stem which has been used for dyeing textiles by the Apatanis (a tribe of Arunachal Pradesh) since ancient times. Sonicator dyeing with Mahonia napaulensis showed marked improvement in dye uptake. It showed that pretreatment with metal mordant (2%, w/w with respect to the fabric) improved substantially the fastness properties for dyed cotton, silk fabrics and wool yarn. Five fractions were isolated from column chromatography of the stem extract of Mahonia. Attempts have been made to identify these fractions by matching the spectral data which indicated that they were from a well-known isoquinoline alkaloid family.
Keywords: Mahonia napaulensis DC. (family Berberidaceae) natural dye; Cotton; Wool; Silk; Natural dyeing

Mushtaq Ahmad, Potentiation between pyrethroid and organophosphate insecticides in resistant field populations of cotton bollworm Helicoverpa armigera (Lepidoptera: Noctuidae) in Pakistan, Pesticide Biochemistry and Physiology, Volume 91, Issue 1, May 2008, Pages 24-31, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2007.12.003.
(http://www.sciencedirect.com/science/article/B6WP8-4RDR18F-3/2/0d6cc8f735c5d0ce7aa98e346c9081d7)
Abstract:

The combined action of pyrethroids plus organophosphates was assessed on putatively resistant field populations of Helicoverpa armigera from Pakistan by using a leaf-dip bioassay. Ethion showed a good potentiation with bifenthrin, lambdacyhalothrin, cyfluthrin, betacyfluthrin, fenpropathrin, esfenvalerate, fluvalenate and tralomethrin. Profenofos was potentiating with bifenthrin but additive with lambdacyhalothrin. Methyl parathion also exhibited potentiation with bifenthrin. Contrarily, quinalphos produced an antagonism with bifenthrin. Chlorpyrifos potentiated lambdacyhalothrin in one population but had an additive effect in the other. A strong potentiation of pyrethroids by ethion in some populations indicates that esteratic detoxification is a key mechanism involved in imparting resistance to pyrethroids in Pakistani H. armigera.
Keywords: Helicoverpa armigera; Pakistan; Resistance; Potentiation; Antagonism; Pyrethroid; Organophosphate

L. Zhang, W. van der Werf, L. Bastiaans, S. Zhang, B. Li, J.H.J. Spiertz, Light interception and utilization in relay intercrops of wheat and cotton, Field Crops Research, Volume 107, Issue 1, 11 April 2008, Pages 29-42, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.12.014.
(http://www.sciencedirect.com/science/article/B6T6M-4RW4S09-2/2/2b5ad97d33c31c6e7a6304279e3f1fe3)
Abstract:
In China, a large acreage of cultivated land is devoted to relay intercropping of winter wheat and cotton. Wheat is sown in strips with interspersed bare soil in October and harvested in June of the next year, while cotton is sown in the interspersed paths in the wheat crop in April and harvested before the next wheat sowing in October. This paper addresses the question how strip width and number of plant rows per strip of wheat or cotton affect light interception (LI) and light use efficiency (LUE) of both component crops.
Field experiments were carried out in three consecutive years: 2002, 2003 and 2004. Light interception and productivity were estimated in monocultures of wheat and cotton and four intercropping designs differing in strip and path width as well as number of rows per strip. The intercrop systems were identified by the number of rows per strip of wheat and cotton, respectively, as 3:1, 3:2, 4:2 and 6:2. Total light interception over a season was calculated from LAI measurements, using a model for light interception in a row crop. The spatial distribution and diurnal course of light in intercrops were also measured with sensors.
Wheat monocrops intercepted 618 MJ m-2 photosynthetically active radiation (PAR) from 18 March to harvest in 2002, 337 MJ m-2 from 29 April to harvest in 2003, and 457 MJ m-2 from 13 April to harvest in 2004. Averaged over 3 years, wheat in the four intercrops (3:1, 3:2, 4:2 and 6:2, respectively) intercepted 83, 71, 73 and 75% as much PAR as the sole wheat. From sowing to harvest, cotton monocrops intercepted 491 MJ m-2 PAR in 2002, 426 MJ m-2 in 2003, and 415 MJ m-2 in 2004. Cotton in the four intercrops (3:1, 3:2, 4:2 and 6:2, respectively) intercepted 73, 93, 86 and 67% as much PAR as the sole cotton. LUE of wheat was 2.12 +/- 0.14 g total dry matter MJ-1 PAR during the reproductive period, while that of cotton was 1.33 +/- 0.02 g dry matter MJ-1 PAR over the whole growing period. No differences in LUE of wheat or cotton were found between systems.
The analysis indicates that the high productivity of intercrops, compared to monocultures, can be fully explained by an increase in accumulated light interception per unit cultivated area. The component crops are thus complementary in their interception of light over space and time. The model results indicate that light interception can be modified by choice of the number of crop rows per strip and strip width. The best distribution of light is attained in systems with narrow strips, a high proportion of border rows, and high planting densities of cotton. Suggestions for system improvement are given.
Keywords: Leaf are index (LAI); Light use efficiency (LUE); Photosynthetic active radiation (PAR); Intercropping; Competition

A. Aguado, B. De Los Santos, C. Blanco, F. Romero, Study of gene effects for cotton yield and Verticillium wilt tolerance in cotton plant (Gossypium hirsutum L.), Field Crops Research, Volume 107, Issue 1, 11 April 2008, Pages 78-86, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.12.018.
(http://www.sciencedirect.com/science/article/B6T6M-4RWB0W7-2/2/95bcb723cbdf5be80090835fde034995)
Abstract:
Verticillium wilt (VW), caused by Verticillium dahliae Kleb., is a destructive disease of cotton (Gossypium hirsutum L.). The use of resistant cultivars has long been considered the most practical and effective mean of control. The aim of this work was to study the quantitative genetic basis of Verticillium wilt resistance in Upland cotton by using five genotypes and their possible crosses without reciprocals selecting simultaneously for resistance and desirable agronomic characteristics. Five cotton cultivars and 10 F1s from half-diallel crosses were analyzed for VW resistance. The seed cotton yield, the number of bolls/ plant, and boll weight were measured and Verticillium wilt index (VWI) was estimated during two crop seasons in two different sites each year always on plots with naturally infested soil. Genetic components of variance were analyzed using the Hayman model. Analysis of variance for all characters showed significant differences between genotypes, without genotype-site interaction in most cases. Both, additive genetic variance component (D) and dominance genetic variance components (H1 and H2) were presented in all characters, except for VWI. D was the most important component for boll weight and VWI. Boll weight was the most correlated character with seed cotton yield and VWI. Broad sense heritability was high for boll weight and VWI, moderate for seed cotton yield and low for bolls per plant. Narrow sense heritability was moderate for boll weight, and high for VWI.
`Victoria', `Acala Prema', `Acala Germain 510' and `Deltapine 90' were identified as the best parents to increase boll weight. `Acala Prema', `Acala Germain 510' and `Deltapine 90' were the best parents to improve breeding to reduce symptoms disease.
Keywords: Breeding; Hayman analysis

Yaping Zhao, Xiuyan Li, Lu Liu, Fuhua Chen, Fluoride removal by Fe(III)-loaded ligand exchange cotton cellulose adsorbent from drinking water, Carbohydrate Polymers, Volume 72, Issue 1, 3 April 2008, Pages 144-150, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.07.038.
(http://www.sciencedirect.com/science/article/B6TFD-4PDSBND-1/2/94a6a883a07872d950a38219e6b649ef)
Abstract:
A novel bead adsorbent, Fe(III)-loaded ligand exchange cotton cellulose adsorbent [Fe(III)LECCA], was prepared, for fluoride removal from drinking water. The influence of pH, reaction time, temperature, foreign ions, flow rate, and regeneration were determined in batch and column systems. Adsorption-desorption-readsorption results indicated that Fe(III)LECCA has the potential to act as an adsorbent for the removal of fluoride because of its adsorption capacity and mechanical stability. The adsorption mechanism of fluoride removal was elucidated clearly by Fourier Transform Infra Red (FTIR) spectrum and chemical analysis. The results showed that Fe(III)LECCA would be a cost-effective and environmental benign adsorbent for fluoride removal from drinking water.
Keywords: Fluoride removal; Fe(III)LECCA; Drinking water; Ligand exchange mechanism

Ying Wang, Yulin Zhao, Yulin Deng, Effect of enzymatic treatment on cotton fiber dissolution in NaOH/urea solution at cold temperature, Carbohydrate Polymers, Volume 72, Issue 1, 3 April 2008, Pages 178-184, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.08.003.
(http://www.sciencedirect.com/science/article/B6TFD-4PFDDNP-2/2/4327416768db297d58b7383ade92022f)
Abstract:

In this communication, the dissolution behavior of enzyme pretreated cotton fibers in NaOH/urea solution is reported. The experimental results indicated that although the crystallinity of cotton linter almost did not change during the enzymatic pretreatment, the solubility of cellulose in cold NaOH/urea solution increased from 30% for original cotton fibers to 65% for enzymatic treated fibers, which was mainly attributed to the reduction of cellulose's molecular weight by the enzymatic treatment. Moreover, the dissolution time was also greatly shortened by the enzymatic pretreatment. The results suggest that the effect of crystallinity of the cellulose on the cellulose dissolution in NaOH/urea solution is much less than that of molecular weight. It was found that the temperature plays a dominating role to the cellulose fiber solubility in NaOH/urea solution.
Keywords: Cellulose; Crystallinity; Enzyme; Dissolution; Molecular weight

Wei-Bing Shi, Li-Li Zhang, Ming-Guang Feng, Field trials of four formulations of Beauveria bassiana and Metarhizium anisoplae for control of cotton spider mites (Acari: Tetranychidae) in the Tarim Basin of China, Biological Control, Volume 45, Issue 1, April 2008, Pages 48-55, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2007.11.006.
(http://www.sciencedirect.com/science/article/B6WBP-4R7NR55-1/2/1f0ca1e538a049f85499141dcfe3285f)
Abstract:
Aerial conidia of four isolates of Beauveria bassiana (Bb734 and Bb2860) and Metarhizium anisoplae (Ma456 and Ma759) produced on rice were formulated with an emulsifiable oil and sprayed in block-randomized triple plots (6 x 8 m each) of two irrigated cotton fields (Trials 1 and 2) for control of summer populations of cotton spider mites, mainly Tetranychus truncates and T. turkestani, in the Tarim Basin of northwestern China, where the weather is of typical continental desert with a paucity of summer rain. The formulations of B. bassiana and M. anisoplae were sprayed at the rates of 1.5 x 1013 and 1.05 x 1013 conidia/ha, respectively, yielding deposits of 808-1059 and 600-721 conidia/mm2 on the leaves of cotton plants (55-65 cm tall). In both trials, the spider mites were significantly controlled by all the fungal sprays despite some variation among the candidates. Pure sprays of Ma456 and Bb734 resulted in desirable control for 35 days in Trial 1 (sprayed twice at 15-day interval) or 30 days in Trial 2 (sprayed once). Overall means of relative efficacies during the periods of both trials were 85.8% (77.9-94.9%) and 88.0% (82.4-94.0%) for Ma456, and 77.9% (68.6-89.6%) and 85.7% (77.8-87.7%) for Bb734. However, inclusion of a low rate of chlorpyrifos (7.2 g AI/ha) in the fungal sprays in Trial 2 did not significantly enhance the field efficacies despite somewhat improved. An unusually hot week encountered during the trial caused dramatic decreases of the mite densities in blank control. Hourly field records of relative humidity and temperature under cotton canopy showed 349 and 298 h of [greater-or-equal, slanted]95% RH in the two trials and a daily mean temperature of 23.6 [degree sign]C for both. Our results highlight for the first time the potential of the emulsifiable formulations of Ma456 and Bb734 for practical control of the cotton spider mites in the desert area under routine irrigation.
Keywords: Beauveria bassiana; Metarhizium anisoplae; Emulsifiable formulation; Tetranychus spp.; Chlorpyrifos; Microbial control

Poorna P. Ravula, Robert D. Grisso, John S. Cundiff, Cotton logistics as a model for a biomass transportation system, Biomass and Bioenergy, Volume 32, Issue 4, April 2008, Pages 314-325, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2007.10.016.
(http://www.sciencedirect.com/science/article/B6V22-4RD44BP-2/2/fd155f17cad816d4a157e43a9050c4cf)
Abstract:
To reach the US Department of Energy's goal of replacing 30% of current petroleum consumption by biomass and its products by year 2030, various systems capable of harvesting, storing and transporting biomass efficiently, at a low cost, need to be designed. The transportation system of a

cotton gin, which shares several key components with a biomass transportation system, was simulated using a discrete event simulation procedure, to determine the operating parameters under various management practices.
The cotton module transportation system, when operating under a FIFO management plan, was found to operate at 77% utilization factor, while the actual ginning process operated at 69%. Two greedy algorithm-based management policies were simulated, which increased the gin operational factor to 100%, but doing so required an increase in gin inventory level. A knapsack model, with travel times, was constructed and solved to obtain the lower bound for the transportation system. The significance of these operating parameters and their links to a biomass transportation system are presented.
Using the new management strategies, the utilization factor for the transportation system was increased to 99%. To achieve this improvement, the transportation manager must know where all modules are located and have the ability to dispatch a hauler to any location.
Keywords: Cotton; Modules; Discrete event; Simulation; Optimization; Knapsack; Biomass logistics; Greedy algorithm; Inventory control

Mulan Liu, Hejuan Yu, Guoqing Li, Oviposition deterrents from eggs of the cotton bollworm, Helicoverpa armigera (Lepidoptera: Noctuidae): Chemical identification and analysis by electroantennogram, Journal of Insect Physiology, Volume 54, Issue 4, April 2008, Pages 656-662, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2008.01.002.
(http://www.sciencedirect.com/science/article/B6T3F-4RNJ8RS-1/2/1235e2ac7017e570ab2a47e88d496a7b)
Abstract:
Our previous results showed that an extract of the abdomens of mated females of the cotton bollworm, Helicoverpa armigera, deterred oviposition of conspecifics. In this paper, we found that the extract, in addition to reducing conspecifics' oviposition, could elicit strong electroantennogram responses from mated females. The EAG elicitors mainly came from mature chorionated eggs in the ovarioles. Laid eggs or their surface extract evoked similar EAG responses. The main chemical components of the EAG elicitors from mature chorionated and laid eggs were myristic, palmitic, stearic, and oleic acids. A blend of authentic fatty acids at the ratio found in the laid eggs and in an amount equivalent to 100 laid eggs mimicked the EAG response and deterring effect. Moreover, these four oviposition-deterring fatty acids and their corresponding methyl esters evoked significantly higher EAG responses from both mated females and males than hexane blank and background. The EAG values differed among the test chemicals and between sexes. These results demonstrate that the four fatty acids from eggs are at least partially responsible for the oviposition-deterring effect of the extract from the abdomens of mated female H. armigera and that the moths may detect these chemicals olfactorily by antennae.
Keywords: Helicoverpa armigera; Eggs; Oviposition deterrents; Fatty acids; EAG

S.K. Jalota, G.S. Buttar, Anil Sood, G.B.S. Chahal, S.S. Ray, S. Panigrahy, Effects of sowing date, tillage and residue management on productivity of cotton (Gossypium hirsutum L.)-wheat (Triticum aestivum L.) system in northwest India, Soil and Tillage Research, Volume 99, Issue 1, April 2008, Pages 76-83, ISSN 0167-1987, DOI: 10.1016/j.still.2008.01.005.
(http://www.sciencedirect.com/science/article/B6TC6-4S094V0-1/2/65ff9a0ba7c9332bb37b65042af23cde)
Abstract:
In southwestern region of Punjab in north India, sowing dates of cotton crop in cotton (Gossypium hirsutum L.)-wheat (Triticum aestivum L.) system are staggered from last week of April to mid of May depending upon the surface water supply from canal as ground water is not fit for irrigation. Further, farmers practice intensive cultivation for seedbed preparation and burning of wheat straw before sowing of cotton crop. With the present farmers' practices, yields have become static and

system has become non-profitable. Field experiments were conducted on Entisols for two rotations of cotton-wheat system during the years of 2004-2005 and 2005-2006 in split plot design to study the direct and interactive effects of date of sowing and tillage-plus-wheat residue management practices on growth and yield of cotton and wheat and to increase the profitability by reducing the tillage operations, which costs about 50% of the sowing cost. The pooled analysis showed that in cotton crop, there was a significant interaction between year x dates of sowing. Among different tillage-plus-wheat residue management practices yields were 23-39% higher in tillage treatments than minimum-tillage. In wheat, grain yield in tillage treatments were at par. Water productivity amongst the tillage treatments in cotton was 19-27% less in minimum tillage than others tillage treatments. Similar trend was found in wheat crop. Remunerability of the cotton-wheat system was more with a combination of reduced tillage in cotton and minimum tillage in wheat than conventional tillage.
Keywords: Cotton-wheat; Sowing time; Tillage; Crop residue; Entisols; Punjab

A. Mishra, S. Khare, P.K. Trivedi, P. Nath, Effect of ethylene, 1-MCP, ABA and IAA on break strength, cellulase and polygalacturonase activities during cotton leaf abscission, South African Journal of Botany, Volume 74, Issue 2, April 2008, Pages 282-287, ISSN 0254-6299, DOI: 10.1016/j.sajb.2007.12.001.
(http://www.sciencedirect.com/science/article/B7XN9-4RJSJ8G-1/2/4895f626f04fbf8cf0aef7cfed676a74)
Abstract:
Organ abscission in higher plants has invariably been characterized by higher activities of cell wall hydrolases in the abscission zone of the abscising organ, which facilitates degradation of middle lamella and loosening of cell wall of separation layers. The plant hormone ethylene has been implicated in the induction and progression of the abscission process. In the present study, we have measured activities of cellulase and polygalacturonase (PG) in the abscission zone of cotton (Gossypium hirusutum var RST-39) leaf explants in the presence of ethylene. The effects of abscisic acid (ABA) and indole acetic acid (IAA) were monitored to elucidate the role of other phytohormones in the process of abscission. A several fold increase in cellulase and PG activities and decrease in break strength were observed in the LAZ of ethylene-treated explants. The increase in enzyme activities and decrease in break strength were strongly suppressed in the presence of 1-methylcyclopropene (1-MCP) and IAA. ABA alone was found to stimulate enzyme activities and decrease the break strength though not to the extent of ethylene. 1-MCP pretreatment of ABA and ethylene-treated explants showed significant inhibition in enzyme activities. It is concluded that cotton leaf abscission is ethylene regulated and characterized by increased activities of cellulase and PG in its abscission zone. ABA can induce abscission. However, it appears that ABA induced abscission may be mediated through ethylene.
Keywords: 1-MCP; Breakstrength; Cell wall hydrolases; Ethylene; Gossypium hirusutumn; Leaf abscission

L. Zhang, W. van der Werf, S. Zhang, B. Li, J.H.J. Spiertz, Temperature-mediated developmental delay may limit yield of cotton in relay intercrops with wheat, Field Crops Research, Volume 106, Issue 3, 20 March 2008, Pages 258-268, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.12.010.
(http://www.sciencedirect.com/science/article/B6T6M-4RW4JMT-2/2/88df977da52c03e730762e5a93ff4270)
Abstract:
In the Yellow River valley of China, more then 1.4 million ha of cotton are grown as relay intercrops with wheat. Cotton is sown in April when winter wheat is already in the reproductive phase; thus, a wheat crop with a fully developed canopy will compete for resources with cotton plants in the seedling stage. Yields of cotton are lower in relay intercropping systems than in a monocrop, but the aggregate yield of the cotton-wheat system is greater than of monocultures of

the component crops. We study the hypothesis that the lower yield of intercropped cotton is a consequence of delayed development and fruit formation of the cotton as a result of a lowered temperature experienced by seedlings in the intercrop, compared to monoculture, due to shading by wheat.
Field experiments were conducted in 3 subsequent years in Anyang, Henan, China. Wheat and cotton were grown as monocrops and as strip intercrops. Four intercrop layouts were investigated, differing in number of wheat and cotton rows in a strip: 3:1, 3:2, 4:2 and 6:2. Developmental stage of the cotton was recorded at regular intervals during the growing cycle while air and soil temperatures were measured with thermocouples at several soil depths and cross-row positions in the canopy.
Temperatures at and near the soil surface were substantially (on average 3 [degree sign]C) lower in intercrops than in monoculture, especially on sunny days, thus lowering the rate of temperature accumulation of cotton seedlings in intercrops, compared to those in monocultures. Cotton in intercrops showed a pronounced delay in early development, e.g. attainment of the squaring stage, compared to monocrops. The period from planting to first square, expressed in thermal time (TT), lasted 531 [degree sign]C d in cotton monoculture and 638-670 [degree sign]C d in intercrops. There were no significant differences in developmental delay between different intercropping patterns. The formation of fruits in intercrops lagged behind by 9-15 d, compared to monoculture, while the number of fruit nodes per plant, averaged over 3 years, was reduced from 30.3 in monocrops to 19.9 in intercrops. The later formation of fruits thus results in a reduction in fruit number and also in a reduction in average age of the fruits, limiting their growth and the sink capacity of the plant as a whole.
A plastic film cover increased temperatures in a 3:2 intercrop at the soil surface by 1.9 [degree sign]C and at 5 cm soil depth by 2.7 [degree sign]C, thus restoring the thermal conditions to levels common in monoculture. A cover with straw, however, decreased the temperature at the soil surface by 2.9 [degree sign]C and at 5 cm depth by 1.3 [degree sign]C.
We conclude that the thermal climate in wheat-cotton intercrops is suboptimal for the cotton seedlings. The resulting delay in development of cotton culminates in a lower reproductive capacity and sink capacity. In combination with a reduced source strength, due to later and reduced canopy development in intercropped cotton, these effects result in a lint yield that is substantially lower than in monoculture cotton. This constraint can be ameliorated by measures that improve light capture and heat loading by the cotton, e.g. planting a semi-dwarf wheat or cultivation of cotton on ridges, or application of a plastic film mulch in the cotton seed bed. Early maturing cotton cultivars are at an advantage in intercropping systems.
Keywords: Air temperature; Soil temperature; Soil cover; Thermal time; Physiological time; Phenology

George B. Frisvold, Jeanne M. Reeves, The costs and benefits of refuge requirements: The case of Bt cotton, Ecological Economics, Volume 65, Issue 1, 15 March 2008, Pages 87-97, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2007.06.002.
(http://www.sciencedirect.com/science/article/B6VDY-4P3M27T-1/2/3647ad98d9e3c1b3ec84e20aa547844a)
Abstract:
Refuge requirements have been the primary regulatory tool to delay pest resistance to Bt crops. This paper presents a simple method to estimate the annual cost of refuges to producers, applying it to Bt cotton. It also examines broader welfare impacts, estimating how Bt cotton acreage restrictions affect producer surplus, consumer surplus, seed supplier profits, and commodity program outlays. The implications of grower adoption behavior -- partial adoption, aggregate adoption, and refuge choice -- for regulatory costs are examined. Empirical examples illustrate how providing multiple refuge options significantly reduces regulatory costs.
Keywords: Resistance management; Refuges; Technology adoption; Bt cotton

Ihsan Ullah, Mehboob-ur-Rahman, Muhammad Ashraf, Yusuf Zafar, Genotypic variation for drought tolerance in cotton (Gossypium hirsutum L.): Leaf gas exchange and productivity, Flora - Morphology, Distribution, Functional Ecology of Plants, Volume 203, Issue 2, 15 March 2008, Pages 105-115, ISSN 0367-2530, DOI: 10.1016/j.flora.2007.12.001.
(http://www.sciencedirect.com/science/article/B7GX0-4RSHR1T-1/2/0158cd5e40d037d6f5a8967578f34aed)
Abstract:
Although water-limited environments are detrimental to cotton growth and productivity worldwide, identification of cotton (Gossypium hirsutum L.) genotypes that are less sensitive to drought may improve productivity in drought prone areas. The objective of the study was to assess genotypic variation for drought tolerance in cotton varieties using physiological attributes as selection criteria, and to determine the relationship of physiological attributes with productivity traits. The association of target physiological traits for drought tolerance (photosynthetic rate (Pn), stomatal conductance (gs), and transpiration rate (E)) with productivity traits under well-watered (W1) and water-limited (W2) regimes was analyzed using 32 public cotton cultivars/bred lines in two field experiments conducted during the normal cotton growing seasons 2003 and 2004. Seed cotton yield (SCY) and biological yield (BY) were markedly affected under W2 regime in all cultivars except the outstanding performance of CIM-1100 and RH-510 proving their superiority to other cultivars in drought tolerance. Conversely, FH-901, FH-634, and FH-2000 were high yielding under W1 regime; however, exhibited a sharp decline in yield under W2 regime. A positive correlation between SCY and BY under water stress ($r=0.44$ in 2003; $r=0.69$ in 2004) indicates that BY is also a primary determinant of SCY under water stress and genetic improvement of BY under water-limited environment may also improve SCY. Pn, gs, and E were significantly reduced by water stress. Substantial genotypic variation for gas exchange attributes existed among the cotton cultivars. A positive association ($P<0.01$) was observed between gs and E under both regimes in both years indicating the prevalence of stomatal control of transpiration. The positive association ($P<0.01$) between Pn and gs in both years in W2 regime indicates also a major role of stomatal effects in regulating leaf photosynthesis under water-limited conditions. Pn was significantly correlated with SCY ($P<0.01$) and BY ($P<0.05$ in 2003; $P<0.01$ in 2004) in W2 regime; however, the level of these associations was not significant in W1 regime. These findings demonstrate that association of Pn with productivity is effective under water-limited environment and may be useful as a selection criterion in breeding programs with the objective of improving drought tolerance and SCY under water-limited environments. Moreover, association between SCY and BY under water stress suggests that genetic improvement of BY under water stress may also improve SCY.
Keywords: Drought tolerance; Photosynthetic rate; Stomatal conductance; Productivity

Zhixia Xie, Liusheng Duan, Xiaoli Tian, Baomin Wang, A. Egrinya Eneji, Zhaohu Li, Coronatine alleviates salinity stress in cotton by improving the antioxidative defense system and radical-scavenging activity, Journal of Plant Physiology, Volume 165, Issue 4, 13 March 2008, Pages 375-384, ISSN 0176-1617, DOI: 10.1016/j.jplph.2007.06.001.
(http://www.sciencedirect.com/science/article/B7GJ7-4PC90CT-1/2/03a079d43a7aea001ad5dd4c91c8b217)
Abstract: Summary
Coronatine (COR) is a chlorosis-inducing phytotoxin that mimics some biological activities of methyl jasmonate. This study investigated whether COR confers salinity tolerance to cotton and whether such tolerance is correlated with changes in the activity of antioxidant enzymes. COR at 0.01 [mu]M was applied hydroponically to cotton seedlings at the two-leaf stage for 24 h. A salinity stress of 150 mM NaCl was imposed after completion of COR treatment for 15 d. Salinity stress reduced biomass of seedlings and increased leaf superoxide radicals, hydrogen peroxide, lipid peroxidation, and electrolyte leakage. Activities of the antioxidant enzymes superoxide dismutase

(SOD), catalase (CAT), peroxidase (POD), and glutathione reductase (GR), and of the stable free radical, 1,1-diphenyl-2-picrylhydrazyl (DPPH), scavenging activity were altered by salinity to varying degrees. Pretreatment with COR increased the activities of CAT, POD, GR, and DPPH scavenging activity in leaf tissues of salinity-stressed seedlings. Thus, COR might reduce the production of reactive oxygen species by activating antioxidant enzymes and DPPH-radical scavenging, thereby preventing membrane peroxidation and denaturation of bio-molecules.
Keywords: Antioxidant enzymes; Coronatine; Free radicals scavenging; Gossypium hirsutum; Salt stress

Kyung Hwa Hong, Gang Sun, Antimicrobial and chemical detoxifying functions of cotton fabrics containing different benzophenone derivatives, Carbohydrate Polymers, Volume 71, Issue 4, 7 March 2008, Pages 598-605, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.07.004.
(http://www.sciencedirect.com/science/article/B6TFD-4P6M636-1/2/31ddfcf967aff8e1e820a4bd3087e549)
Abstract:
Several benzophenone chromophoric groups were incorporated onto cotton fabrics by using 4-hydroxybenzophenone, 4,4'-dihydroxybenzophenone, 4-chloro-4'-hydroxybenzophenone, and 4-benzoylbenzoic acid as reagents. The fabric treatment was conducted by a pad-dry-cure method, and the benzophenone chromophoric group incorporated cotton fabrics were characterized and confirmed by FTIR. Tensile strengths of benzophenone chromophoric groups modified cotton fabrics were also measured. 4-Hydroxybenzophenone treated cotton fabric showed the most powerful antibacterial activity among all samples, and 4-benzoylbenzoic acid treated cotton fabric demonstrated pesticide degradation ability, under UV irradiation.
Keywords: Protective clothing material; Radical; Cotton; Anti-bacterial fabrics; Pesticide degradation; Benzophenone

Yanmin Yang, Zhu Ouyang, Yonghui Yang, Xiaojing Liu, Simulation of the effect of pruning and topping on cotton growth using COTTON2K model, Field Crops Research, Volume 106, Issue 2, 5 March 2008, Pages 126-137, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.10.019.
(http://www.sciencedirect.com/science/article/B6T6M-4RPM45K-1/2/75d660e9b565b2e372090cc5b4016d5a)
Abstract:
COTTON2K, like most other cotton production models, does not always adequately represent local growth conditions owing to the fact that it fails to take into account some indigenous cultivation practices. For instance, pruning and topping, a common practice for cotton cultivation in China is not included in the model simulation of COTTON2K. The objective of this research therefore was to: (1) modify COTTON2K source code and slot pruning and topping simulation switch on to the model, and (2) calibrate and validate the modified COTTON2K model with field data from pruning and topping cultivation practice. First, field collected data in 2003 and 2004 were compared between the treatments, with and without pruning and topping, and the COTTON2K source code updated with the `pruning and topping' switch. This was followed by the calibration and validation of the updated model with field data and simulation of the effect of pruning and topping on cotton performance. It was noted from field observations that pruning and topping reduced total fruit sites, but at the same time, increased retained boll number, possibly due to significant reductions in abscised fruit sites. Though total dry matter production dropped, more dry matter allocation to reproductive organs, however, enhanced higher cotton lint yield in the pruning and topping treatment. Results of the modified model simulation showed that growth in the number of main-stem node ceased after topping. Furthermore, there was more biomass allocation to reproductive organs, such as green and open bolls under pruning and topping. Coefficient of determination above 0.8 for most of the growth factors was obtained in the calibration and

validation processes under pruning and topping, a strong indication of the level of success of the model modification.
Keywords: Cotton; COTTON2K; Pruning and topping; Model; Calibration; Validation

Hong-Mei SHU, You-Hua WANG, Wen-Jing ZHANG, ZHi-Guo ZHOU, Activity Changes of Enzymes Associated with Fiber Development and Relationship with Fiber Specific Strength in Two Cotton Cultivars, Acta Agronomica Sinica, Volume 34, Issue 3, March 2008, Pages 437-446, ISSN 1875-2780, DOI: 10.1016/S1875-2780(08)60018-8.
(http://www.sciencedirect.com/science/article/B94TW-4T5JDPF-5/2/b2d8b77cc1a836965561fd57223edc1e)
Abstract:
Sucrose synthase (SuSy) and [beta]-1,3-glucanase play very important roles in developing cotton (Gossypium hirsutum L.) fiber. To investigate the characteristics of Susy and [beta]-1,3-glucanase, as well as the expressions of related genes, 2 cotton cultivars, Kemian 1 with high strength fiber of 35 cN tex-1 and Dexiamian 1 with low strength fiber of 26 cN tex-1, were used. The differences of the cellulose deposition and fiber specific strength in the 2 cultivars were related to the levels of key enzyme activities and the gene expression. The activity and gene expression of sucrose synthase and [beta]-1,3-glucanase were higher in Kemian 1 than those in Dexiamian 1. The expression of SuSy gene was obviously higher in Kemian 1 than that in Dexiamian 1 at 25 days post anthesis (DPA), whereas the expression of [beta]-1,3-glucanase was obviously different at 10-25 DPA between the 2 cultivars. During the accumulation of cellulose, Kemian 1 had a longer period and a gentler speed accumulation than Dexiamian 1. The position of fruiting branch also affected the accumulation of cellulose. Genes for Expansin, [beta]-1,4-glucanase expressed lower when the boll age increased, and showed significant decrease at 20 DPA. This was in agreement with the dynamic change during the cotton fiber development that is the fiber length elongated rapidly before 25 DPA, and slowed down until it almost stopped thereafter. From the results, it is suggested that the different characteristics of key enzymes activity in fibers may cause the differences in the cellulose accumulation and fiber-specific strength.
Keywords: cotton cultivar; enzyme activity; gene expression; cellulose accumulation; fiber specific strength

Francesca Mancini, Aad J. Termorshuizen, Janice L.S. Jiggins, Ariena H.C. van Bruggen, Increasing the environmental and social sustainability of cotton farming through farmer education in Andhra Pradesh, India, Agricultural Systems, Volume 96, Issues 1-3, March 2008, Pages 16-25, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.05.001.
(http://www.sciencedirect.com/science/article/B6T3W-4P4822C-1/2/d458ca9cd3bed73b32613546e298d3fc)
Abstract:
Integrated pest management (IPM) has been introduced in India to reduce the serious impact of the use of highly toxic pesticides on people's health and the environment. However, IPM diffusion has been slow, in part because of the inherent complexity of the approach based on decisions requiring knowledge of ecological principles and local ecological dynamics. Farmer field schools (FFSs) on IPM, conducted for cotton growers in Andhra Pradesh, India, is shown to be an effective educational approach for building the essential knowledge and decision-making skills among farmers for IPM adoption. FFS farmers (73) drastically reduced the use of highly toxic pesticides as a result of increased knowledge on biological control principles. Yield levels were not affected by this reduction, showing that part of the current use of pesticides in cotton cultivation is superfluous. IPM labour demand has been suggested also as limiting IPM diffusion. However, an analysis of the physical labour use, carried out on a sub-sample (43 FFS and 52 control farms), showed that the adoption of IPM in the studied farms did not lead to an increase in the overall physical labour requirement, nor in the total time spent on plant protection.

Keywords: Integrated pest management; Farmer field schools; Cotton; Pesticides; Farmers' education; Physical labour; Gender; India

Jeffrey L. Willers, George A. Milliken, Johnie N. Jenkins, Charles G. O'Hara, Patrick D. Gerard, Daniel B. Reynolds, Debbie L. Boykin, Paul V. Good, Kenneth B. Hood, Defining the experimental unit for the design and analysis of site-specific experiments in commercial cotton fields, Agricultural Systems, Volume 96, Issues 1-3, March 2008, Pages 237-249, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.09.003.
(http://www.sciencedirect.com/science/article/B6T3W-4R5G8G6-1/2/3aeff5e4c2a03b4b72aa792fbad88d01)
Abstract:
Designing experiments involves several processes. The first process identifies the experimental units generated by conducting the experiment. The second process is the application of planned treatments to the experimental units. Other processes are the analysis of the experiment and interpretation of results. While traditional experimental small plot designs are useful for investigating many aspects of cotton production, on a large scale, like an entire commercial field, they are difficult to implement because of routine farming operations and topographical variability. As an alternative, by using the capabilities of a variable-rate controller, it is possible to intersect the swath width of the largest farm implement's boom (or tool bar) along its geo-referenced paths of travel with one or more geo-registered field zones to create experimental units having different shapes and sizes. Defining the experimental units in this manner establishes a site-specific experiment throughout the entire field. Spatial information recovered by Geographic Information System (GIS) processing from these asymmetrical experimental units, when coupled with general linear mixed model methodology, permits the assessment of effects on geo-referenced yield points due to topography, the site-specific and/or traditional farm management practices, and various interactions among them. In this paper, a general methodological approach for analyzing field-sized site-specific experiments is developed and described. An application is demonstrated by analyzing an unreplicated cotton variety trial that included a single site-specific application of a plant growth regulator.
Keywords: General linear mixed models; Geographic information systems; Precision agriculture; Site-specific management; On-farm research; Remote sensing; LiDAR

Y.H. Lu, F. Qiu, H.Q. Feng, H.B. Li, Z.C. Yang, K.A.G. Wyckhuys, K.M. Wu, Species composition and seasonal abundance of pestiferous plant bugs (Hemiptera: Miridae) on Bt Cotton in China, Crop Protection, Volume 27, Issues 3-5, March-May 2008, Pages 465-472, ISSN 0261-2194, DOI: 10.1016/j.cropro.2007.07.017.
(http://www.sciencedirect.com/science/article/B6T5T-4PKG5MW-1/2/197da629eda9513d7539ce0840bfad46)
Abstract:
Only recently, due to a major reduction of broad-spectrum insecticide use in transgenic (Bt) cotton in China, plant bugs (Heteroptera: Miridae) have emerged as key pests of this crop. To determine their species composition and seasonal activity at various locations nationwide, field surveys were carried out between 2002 and 2006, using sweep-net samples and visual observation. Surveys were conducted in three major cotton-growing regions: Changjiang River, Yellow River, and Northwestern Region. The mirid complex on Bt cotton basically consisted of five different species, with Lygus lucorum, Lygus pratensis, and Adelphocoris suturalis most commonly encountered. L. lucorum and A. suturalis were the dominant species in the Changjiang River and Yellow River Region, while L. pratensis was the most common species in the Northwestern Region. The various mirid species were found in cotton fields throughout the cotton-growing season, usually with great population densities during the squaring and flowering stages. Peak mirid abundance ranged from 50 to 200 per hundred plants. Given the comparatively low economic thresholds for mirids (approx.

10 individuals/100 plants), these insects constitute serious pests in all cotton-growing regions of China. This paper suggests that L. lucorum, L. pratensis, and A. suturalis should be treated as the main targets for developing pestiferous mirid forecasting and management strategies, which would be defined at or prior to the flowering and squaring stages of cotton in China.
Keywords: Transgenic Bt cotton; Mirid; Species composition; Seasonal abundance; China

Mushtaq Ahmad, M. Iqbal Arif, Susceptibility of Pakistani populations of cotton aphid Aphis gossypii (Homoptera: Aphididae) to endosulfan, organophosphorus and carbamate insecticides, Crop Protection, Volume 27, Issues 3-5, March-May 2008, Pages 523-531, ISSN 0261-2194, DOI: 10.1016/j.cropro.2007.08.006.
(http://www.sciencedirect.com/science/article/B6T5T-4PPFT0T-1/2/0a28c5518e6e580253b542078a430f9c)
Abstract:
The Pakistani field populations of Aphis gossypii were assessed from 1996 to 2004 for their susceptibility to endosulfan, organophosphates (monocrotophos, dimethoate, profenofos, chlorpyrifos, quinalphos, parathion-methyl, pirimiphos-methyl and ethion) and carbamates (carbaryl, methomyl, thiodicarb, furathiocarb and carbosulfan) using a leaf-dip bioassay method. Generally, there was a very low resistance to endosulfan, monocrotophos, profenofos, chlorpyrifos, quinalphos, pirimiphos-methyl, carbaryl and methomyl, and a low to moderate resistance to dimethoate, parathion-methyl and thiodicarb. Some of the populations had a very high resistance to parathion-methyl, ethion and thiodicarb. However, no resistance was found to the carbamate aphidicides furathiocarb and carbosulfan. Correlation analysis demonstrated positive correlation of LC50s within but not between the two insecticide groups (1) endosulfan, profenofos, chlorpyrifos and parathion-methyl and (2) monocrotophos, dimethoate, pirimiphos-methyl, ethion, carbaryl, methomyl and thiodicarb. This pattern of cross-resistance among organophosphates and carbamates, which are normally considered to have the same mode of action, is very useful for devising an insecticide resistance management strategy to mitigate resistance problems in A. gossypii and deserve further investigation at the resistance mechanism level.
Keywords: Aphis gossypii; Insecticide resistance; Endosulfan; Organophosphates; Carbamates; Pakistan

G.T. Gujar, R. Nair, B.P. Singh, A. Kumari, V. Kalia, Toxicity to the cotton bollworm, Helicoverpa armigera, of some Cry1Ac toxins expressed in cotton in India, Crop Protection, Volume 27, Issues 3-5, March-May 2008, Pages 537-544, ISSN 0261-2194, DOI: 10.1016/j.cropro.2007.08.008.
(http://www.sciencedirect.com/science/article/B6T5T-4PYYFWR-1/2/54ab8cd17897e81160d1a1cdd0c06bcc)
Abstract:
Bacillus thuringiensis (Bt) transgenic cotton, grown over about 3.8 million hectare in 2006 in India, is essentially a mosaic of different cry1 genes, predominantly based on Monsanto's 531 event carrying the cry1Ac gene, and to some extent JK AgriGenetics's event 1 with native modified cry1Ac, Nath Seeds's GFM event with fusion genes of cry1Ab and cry1Ac, and cry1Ab and cry1C in single-stacked hybrids, and the Monsanto's 15985 event with two cry1Ac and cry2Ab genes. In view of different cry1Ac genes used for transformation, toxicity (96 h LC50) of some Cry1Ac proteins to the neonates of the cotton bollworm, Helicoverpa armigera, varied, with a range of 0.158-5.42 [mu]g/g for BGSC Cry1Ac (23 populations), 0.076-5.76 [mu]g/g for JK Cry1Ac (24 populations) and 0.0085-0.822 [mu]g/g for MVP Cry1Ac (21 populations). There are significant differences in the toxicity of these Cry1Ac proteins; despite the use of genetically diverse insect populations, suggesting a need of evolving a consensus on Cry1Ac resistance monitoring of the larvae of H. armigera.
Keywords: Toxicity; Bacillus thuringiensis; Cry1Ac; The cotton bollworm; Helicoverpa armigera

Jeong Jun Kim, Kyu Chin Kim, Selection of a highly virulent isolate of Lecanicillium attenuatum against cotton aphid, Journal of Asia-Pacific Entomology, Volume 11, Issue 1, March 2008, Pages 1-4, ISSN 1226-8615, DOI: 10.1016/j.aspen.2008.02.001.
(http://www.sciencedirect.com/science/article/B8JJN-4SMNV9V-5/2/4a4d7411a69ac9a1da1e7291e75e96c1)
Abstract:
Pathogenicity tests of six isolates of entomogenous fungi collected in Korea, including two isolates of Beauveria bassiana, three isolates of Paecilomyces spp. and one isolate of Lecanicillium attenuatum, were conducted to select for highly virulent isolates against the cotton aphid, Aphis gossypii. An isolate of L. attenuatum CS625, had the highest virulence against A. gossypii when the host was treated with either conidia or blastospores of the fungus. The median lethal time (LT50) with either conidial or blastospore treatments of L. attenuatum CS625 to A. gossypii was 2.7 and 3.3 days, respectively and this was shorter than treatments with the other isolates. Mortality caused by L. attenuatum CS625 was dependent on temperature, relative humidity and conidial concentration. Mortality 5 days after treatment with 108 conidia/ml was 100% at 25 and 30 [degree sign]C. Infection required over 97% RH for 100% mortality, and this isolate was unable to infect cotton aphid at a relative humidity below 75%. This isolate shows promise for development as an alternative control agent for use against the cotton aphid in Korea.
Keywords: Aphis gossypii; Biological control; Cotton aphid; Entomopathogenic fungi; Lecanicillium attenuaum; Verticillium lecanii

Chuan-Wang Cao, Jing Zhang, Xi-Wu Gao, Pei Liang, Hui-Lin Guo, Overexpression of carboxylesterase gene associated with organophosphorous insecticide resistance in cotton aphids, Aphis gossypii (Glover), Pesticide Biochemistry and Physiology, Volume 90, Issue 3, March 2008, Pages 175-180, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2007.11.004.
(http://www.sciencedirect.com/science/article/B6WP8-4R8MDKM-4/2/5fd0f5513366e5d5186b05bdf8875f5c)
Abstract:
Levels of insecticide resistance, carboxylesterase activity, and carboxylesterase expression were investigated in both omethoate-selected resistant and susceptible strains of cotton aphids, Aphis gossypii (Glover). The resistant strain exhibited 21.72-fold resistance to omethoate based on comparison LC50 values with the susceptible strain in cotton aphids. Five substrates, [alpha]-naphthyl acetate ([alpha]-NA), [beta]-naphthyl acetate ([beta]-NA), [alpha]-naphthyl butyrate ([alpha]-NB), [alpha]-Naphthyl propionate ([alpha]-NPr), and [alpha]-naphthyl phosphate ([alpha]-NP) were used to determine carboxylesterase activity in both resistant and susceptible strains of cotton aphids. Carboxylesterase activity was significantly higher in resistant strain than in susceptible strain, 11-fold for [alpha]-NA and [beta]-NA, 12-fold for [alpha]-NB and 10-fold for [alpha]-NPr and [alpha]-NP. The levels of gene expression for carboxylesterase of both resistant and susceptible strains were determined by real-time quantitative PCRs. Compared with the susceptible strain, the relative transcription levels and gene copy numbers of the carboxylesterase were 4.54- and 0.97-fold in the resistant strain, respectively. These results indicated that the increased expression of the carboxylesterase resulted from the increased transcription levels of carboxylesterase mRNA was related to omethoate resistance in cotton aphids.
Keywords: Carboxylesterase; Overexpression; Omethoate; Insecticide resistance; Aphis gossypii (Glover)

Dong FANG, Jun-Hong LU, Wang-Zhen GUO, Tian-Zhen ZHANG, Cloning and Mapping of a New MYB Transcription Factor (GhTF1) in Cotton, Acta Agronomica Sinica, Volume 34, Issue 2, February 2008, Pages 207-211, ISSN 1875-2780, DOI: 10.1016/S1875-2780(08)60009-7.

(http://www.sciencedirect.com/science/article/B94TW-4T5JDPK-4/2/43bd69de2ef68d8e9072acda1b83c7fe)
Abstract:
Plant MYB transcription factors are characterized by the presence of a structurally conserved MYB domain, with important roles in regulation of plant development and metabolism. To clone new MYB genes and furthermore put a foundation to illustrate the function of these genes in cotton (Gossypium spp.) fiber developmental stages, a MYB transcription factor gene, GhTF1 (GenBank No. EF651783) was isolated from developmentally different cotton fiber pools of elite material '7235'. The gene has a 771 bp open reading frame and encodes a polypeptide containing 256 amino acids. Gene GhTF1 showed different expression levels in all tissues, e.g., with higher levels in fiber cells at initiation and elongation stages. The gene had conserved coding region in A and D diploid cotton species, G. herbaceum and G. raimondii. However, there existed a large DNA fragment insertion/deletion and base substitutions in their corresponding intron regions. Southern blotting analysis showed that there were 2 copies of GhTF1 in the genome of upland cotton, deducing with each copy in the sub-genome At and sub-genome Dt. GhTF1 was located on chromosome 10 by the BC1 mapping population derived from the hybridization between an upland cotton standard line TM-1 (recurrent parent) and G. barbadense cultivar Hai 7124.
Keywords: Gossypium spp.; MYB gene; cloning; expression; gene tagging

Jing-Lin CAO, Xian-Long ZHANG, Shuang-Xia JIN, Xi-Yan YANG, Hua-Guo ZHU, Li-Li FU, An Efficient Culture System for Synchronization Control of Somatic Embryogenesis in Cotton (Gossypium hirsutum L.), Acta Agronomica Sinica, Volume 34, Issue 2, February 2008, Pages 224-231, ISSN 1875-2780, DOI: 10.1016/S1875-2780(08)60010-3.
(http://www.sciencedirect.com/science/article/B94TW-4T5JDPK-5/2/e1b684821290ef231c5c089039a4ef4e)
Abstract:
Low efficiency of somatic embryogenesis and asynchronous embryo development results in a lot of difficulties to physiological, biochemical, and molecular biological studies of the embryogenesis processes in cotton (Gossypium hirsutum L.). A simple and efficient method was developed to improve somatic embryogenesis frequency and synchronous development of mass somatic embryos from cultured cells of the cotton cultivar Coker 201. The embryonic calli obtained after several rounds of subculture were scattered in a liquid medium by shaking for 2 d and then resuspended in the same liquid medium after discarding the larger callus aggregates over a 30 mesh-size-sieve. The suspensions cultured for 14 d were filtered through a 50 mesh-size-sieve and the aggregates over the sieve were incubated for 21 d onto the surface of a Whatman filter paper that was placed on the solid medium containing 2.46 [mu]mol L-1 indole-3-butyric acid (IBA) and 0.70 [mu]mol L-1 kinetin. The amount of somatic embryos obtained by this system was 15.5-fold and 3-fold higher than that of suspension culture and solid culture without filter papers, respectively. About 70.2% for globular, 52.3% for torpedo-shaped, and 73.0% for cotyledonary embryos were obtained during the culture. The method combining suspension culture and solid culture (with filter paper) proved to be efficient for synchrony of somatic embryogenesis and mass embryo development.
Keywords: cotton; somatic embryogenesis; synchronization control; culture system

Hong-Biao HU, Wen-Jing ZHANG, Bing-Lin CHEN, You-Hua WANG, Hong-Mei SHU, Zhi-Guo ZHOU, Changes in C/N Ratio of Subtending Leaf of Cotton Boll and Its Relationship with Cotton Boll Dry Matter Accumulation and Distribution, Acta Agronomica Sinica, Volume 34, Issue 2, February 2008, Pages 254-260, ISSN 1875-2780, DOI: 10.1016/S1875-2780(08)60012-7.
(http://www.sciencedirect.com/science/article/B94TW-4T5JDPK-7/2/2b95b0e3f3ad9de1686d9f7784dc863a)
Abstract:

Fourteen cotton (Gossypium hirsutum L.) cultivars differing in yield were used to study the C/N ratio in the subtending leaf of cotton boll and its effect on boll dry matter accumulation and distribution. The 14 cultivars were clustered into 3 groups according to different changing patterns of C/N ratio in the subtending leaf of cotton boll. There were significant differences in dynamic changes of the C/N ratio and dry weight per boll among the 3 groups. Group III show much higher C/N ratio than Groups I and II from 10 to 17 d of boll age, and it maintained the C/N ratio of approximately 2.5 after 24 d of boll age. Group III also showed the widest changing range and the highest average values during the whole boll development. The boll dry matter accumulation of Group III took the longest time period and the lowest accumulating rate, which resulted in the highest final dry weight per boll and boll weight. The distributions of dry matter in cotton boll (percentages of boll-shell, seed, and lint) were not significantly different among the 3 groups. The C/N ratio in the subtending leaf of boll had no correlation to lint percentage and lint yield. The results indicated that the dynamics of the C/N ratio in the subtending leaf of cotton boll are significantly different among genotypes. A favorable pattern for dry matter accumulation in cotton boll is the sharp decrease in C/N ratio from 10 to 17 d of boll age, which is maintained at a relatively higher level after 24 d of boll age.
Keywords: subtending leaf of cotton boll; C/N ratio; dry matter accumulation and distribution

Alan L. Wright, Frank M. Hons, Robert G. Lemon, Mark L. McFarland, Robert L. Nichols, Microbial activity and soil C sequestration for reduced and conventional tillage cotton, Applied Soil Ecology, Volume 38, Issue 2, February 2008, Pages 168-173, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2007.10.006.
(http://www.sciencedirect.com/science/article/B6T4B-4R8KT1N-1/2/0b2f0233272db32ed47626f66e88b50c)
Abstract:
Crop management practices, such as tillage and diversified crop rotations, impact microbial activity, organic matter turnover, and ultimately soil C and N sequestration. The objectives of this study were to determine the impacts of tillage on soil microbial biomass, mineralized C and N, and soil organic C (SOC) and N (SON) contents for different cotton (Gossypium hirsutum L.) cropping systems in a south-central Texas silt loam soil. Tillage influenced SOC and SON, but most effects were observed at 0-5 cm rather than 5-15 cm. Reduced tillage (RT) in a continuous cotton monoculture increased SOC by 24% and SON by 27% compared to conventional tillage (CT) at 0-5 cm, but tillage had no effect at 5-15 cm. Crop rotation increased soil C and N contents compared to continuous cotton, as a cotton-corn (Zea mays L.) rotation under CT increased SOC by 28% and SON by 26% at 0-5 cm compared to CT continuous cotton. Soil organic C and SON were both 18% greater for cotton-corn than continuous cotton at 5-15 cm. For the 0-15 cm depth interval, the CT cotton-corn rotation increased SOC by an average of 518 kg C ha-1 year-1 and SON by 57 kg N ha-1 year-1 compared to CT continuous cotton. Cotton under RT sequestered 254 kg C ha-1 year-1 and 33 kg N ha-1 year-1 more than cotton under CT. Reduced tillage increased soil microbial biomass C (MBC) by an average of 11 and 18% compared to CT continuous cotton and the cotton-corn rotation, respectively, while microbial biomass N (MBN) for RT was 62% greater than for CT. Tillage decreased mineralized C and N at both depth intervals, while cotton-corn showed higher mineralized C than continuous cotton. Soils for cropping systems that sequestered the most C and N also had the highest microbial biomass and mineralized C and N, indicating close relationships between microbial activity and soil C and N sequestration. Beneficial effects of RT and intensive cropping were enhanced soil C and N sequestration rates and potentially lower N fertilizer requirements for crops.
Keywords: Carbon sequestration; Cotton; Microbial biomass; Mineralized C; Mineralized N; Nitrogen sequestration

S.K. Jha, Amar Singh, Adarsh Kumar, Physical characteristics of compressed cotton stalks, Biosystems Engineering, Volume 99, Issue 2, February 2008, Pages 205-210, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2007.09.020.
(http://www.sciencedirect.com/science/article/B6WXV-4R718KH-1/2/7988cf26f7a0bf29c2e98f8b44fd4bbf)
Abstract:
A study was carried out to evaluate the physical characteristics of chopped cotton stalks and to establish correlations of physical characteristics with moisture content and compression pressure. Chopped cotton stalks having a moisture content varying from 8.5% to 21.45% (w.b.) were densified into square blocks (80 mm by 80 mm) at compression pressures ranging between 13.79 and 34.47 MPa and a dwell time of 1 min, using a vertical compaction machine. Physical characteristics of blocks, namely bulk density, compression ratio, resiliency and hardness, were evaluated. The bulk density of blocks varied from 542 to 794 kg m-3, resiliency from 11% to 47%, hardness from 15 to 134 kg and compression ratio from 5.2 to 8.6. Analysis of variance indicated significant effects of moisture content and compression pressure on bulk density, resiliency and hardness of compressed cotton stalk blocks. A second-order polynomial was found to be adequate to correlate the physical characteristics of blocks with moisture content and compression pressure. A compression pressure of 34 MPa and a moisture content of 15% (w.b.) were found to be the most appropriate for high stability compressed blocks. Savings in transportation costs in block form could be up to 76% whereas maximum savings in storage cost of blocks could be as much as 88%.

Bo Huang, Longguo Jin, Jin-Yuan Liu, Identification and characterization of the novel gene GhDBP2 encoding a DRE-binding protein from cotton (Gossypium hirsutum), Journal of Plant Physiology, Volume 165, Issue 2, 1 February 2008, Pages 214-223, ISSN 0176-1617, DOI: 10.1016/j.jplph.2006.11.003.
(http://www.sciencedirect.com/science/article/B7GJ7-4MV1GNW-1/2/0cd38dff335ca2374fb9a1c8dc2443b6)
Abstract: Summary
A cDNA encoding one novel DRE-binding protein, GhDBP2, was isolated from cotton seedlings. It is classified into the A-6 group of DREB subfamily based on multiple sequence alignment and phylogenetic characterization. Using semi-quantitative RT-PCR, we found that the GhDBP2 transcripts were greatly induced by drought, NaCl, low temperature and ABA treatments in cotton cotyledons. The DNA-binding properties of GhDBP2 were analyzed by electrophoretic mobility shift assay (EMSA), showing that GhDBP2 successfully binds to the previously characterized DRE cis-element as well as the promoter region of the LEA D113 gene. Consistent with its role as a DNA-binding protein, GhDBP2 is preferentially localized to the nucleus of onion epidermal cells. In addition, when GhDBP2 is transiently expressed in tobacco cells, it activates reporter gene expression driven by the LEA D113 promoter. Taken together, our results indicate that GhDBP2 is a DRE-binding transcriptional activator involved in activation of down-stream genes such as LEA D113 expression through interaction with the DRE element, in response to environmental stresses as well as ABA treatment.
Keywords: ABA; DRE-binding protein; Gossypium hirsutum; LEA D113; Transcriptional activator

G. NABI, C.E. MULLINS, Soil Temperature Dependent Growth of Cotton Seedlings Before Emergence, Pedosphere, Volume 18, Issue 1, February 2008, Pages 54-59, ISSN 1002-0160, DOI: 10.1016/S1002-0160(07)60102-7.
(http://www.sciencedirect.com/science/article/B82XV-4RGFFJ5-6/2/cd38103b1a387474d12764ce1225bff5)
Abstract:

Soil temperature is an important variable governing plant growth and development. Studies were conducted under laboratory conditions to determine the effect of soil temperature on root and shoot growth of cotton during emergence. Cotton seedlings were grown for 192 h at 20, 32 and 38 [degree sign]C in soil packed in 300 mm long and 50 mm diameter cylinders. The data indicated that the longest roots (173 mm) as well as shoots (152 mm) were recorded at 32 [degree sign]C followed by 20 (130 mm root and 82 mm shoot) and 38 [degree sign]C (86 mm root and 50 mm shoot). Roots grown at 20 and 38 [degree sign]C were 20% and 50% shorter, respectively, than those grown at 32 [degree sign]C after 192 h. Roots and shoots exhibited the lowest length and dry biomass at 38 [degree sign]C. Shoot lengths grown at 20 (74 mm) and 38 [degree sign]C (51 mm) were 44% and 61% shorter than those grown at 32 [degree sign]C (131 mm) after 180 h growth period, respectively. Growth at all three temperatures followed a similar pattern. Initially there was a linear growth phase followed by the reduction or cessation of growth. Time to cessation of growth varied with temperature and decreased faster at higher temperatures. Sowing of cotton should be accomplished before seedbed reaches a soil temperature (>= 38 [degree sign]C) detrimental for emergence. Further, the seedbeds should be capable of providing sufficient moisture and essential nutrients for emerging seedling before its seed reserves are exhausted to enhance seedling establishment in soil.
Keywords: linear growth; root/shoot elongation; soil temperature

A. Massacci, S.M. Nabiev, L. Pietrosanti, S.K. Nematov, T.N. Chernikova, K. Thor, J. Leipner, Response of the photosynthetic apparatus of cotton (Gossypium hirsutum) to the onset of drought stress under field conditions studied by gas-exchange analysis and chlorophyll fluorescence imaging, Plant Physiology and Biochemistry, Volume 46, Issue 2, February 2008, Pages 189-195, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2007.10.006.
(http://www.sciencedirect.com/science/article/B6VRD-4PWF0HX-4/2/e1cd8d6e76ae57e5338159eeee9ea319)
Abstract:
The functioning of the photosynthetic apparatus of cotton (Gossypium hirsutum) grown during the onset of water limitation was studied by gas-exchange and chlorophyll fluorescence to better understand the adaptation mechanisms of the photosynthetic apparatus to drought conditions. For this, cotton was grown in the field in Central Asia under well-irrigated and moderately drought-stressed conditions. The light and CO2 responses of photosynthesis (AG), stomatal conductance (gs) and various chlorophyll fluorescence parameters were determined simultaneously. Furthermore, chlorophyll fluorescence images were taken from leaves to study the spatial pattern of photosystem II (PSII) efficiency and non-photochemical quenching parameters. Under low and moderate light intensity, the onset of drought stress caused an increase in the operating quantum efficiency of PSII photochemistry ([phi]PSII) which indicated increased photorespiration since photosynthesis was hardly affected by water limitation. The increase in [phi]PSII was caused by an increase of the efficiency of open PSII reaction centers (Fv'/Fm') and by a decrease of the basal non-photochemical quenching ([phi]NO). Using a chlorophyll fluorescence imaging system a low spatial heterogeneity of [phi]PSII was revealed under both irrigation treatments. The increased rate of photorespiration in plants during the onset of drought stress can be seen as an acclimation process to avoid an over-excitation of PSII under more severe drought conditions.
Keywords: Chlorophyll fluorescence imaging; Drought acclimation; Gossypium hirsutum; Photorespiration; Photosynthesis; Stomatal conductance

Clemens Scheer, Reiner Wassmann, Kirsten Kienzler, Nazar Ibragimov, Ruzimboy Eschanov, Nitrous oxide emissions from fertilized, irrigated cotton (Gossypium hirsutum L.) in the Aral Sea Basin, Uzbekistan: Influence of nitrogen applications and irrigation practices, Soil Biology and Biochemistry, Volume 40, Issue 2, February 2008, Pages 290-301, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2007.08.007.

(http://www.sciencedirect.com/science/article/B6TC7-4PP1XCP-1/2/13293811136b962e674cd4e2beb32f9a)
Abstract:
Nitrous oxide emissions were monitored at three sites over a 2-year period in irrigated cotton fields in Khorezm, Uzbekistan, a region located in the arid deserts of the Aral Sea Basin. The fields were managed using different fertilizer management strategies and irrigation water regimes. N2O emissions varied widely between years, within 1 year throughout the vegetation season, and between the sites. The amount of irrigation water applied, the amount and type of N fertilizer used, and topsoil temperature had the greatest effect on these emissions.
Very high N2O emissions of up to 3000 [mu]g N2O-N m-2 h-1 were measured in periods following N-fertilizer application in combination with irrigation events. These 'emission pulses' accounted for 80-95% of the total N2O emissions between April and September and varied from 0.9 to 6.5 kg N2O-N ha-1.. Emission factors (EF), uncorrected for background emission, ranged from 0.4% to 2.6% of total N applied, corresponding to an average EF of 1.48% of applied N fertilizer lost as N2O-N. This is in line with the default global average value of 1.25% of applied N used in calculations of N2O emissions by the Intergovernmental Panel on Climate Change.
During the emission pulses, which were triggered by high soil moisture and high availability of mineral N, a clear diurnal pattern of N2O emissions was observed, driven by daily changes in topsoil temperature. For these periods, air sampling from 8:00 to 10:00 and from 18:00 to 20:00 was found to best represent the mean daily N2O flux rates. The wet topsoil conditions caused by irrigation favored the production of N2O from NO3- fertilizers, but not from NH4+ fertilizers, thus indicating that denitrification was the main process causing N2O emissions. It is therefore argued that there is scope for reducing N2O emission from irrigated cotton production; i.e. through the exclusive use of NH4+ fertilizers. Advanced application and irrigation techniques such as subsurface fertilizer application, drip irrigation and fertigation may also minimize N2O emission from this regionally dominant agro-ecosystem.
Keywords: Denitrification; Irrigation; Nitrogen; Soil moisture; Arid climate; Greenhouse gases; Climate change; Emission pulse

John F. Kennedy, Zaheera Parveen, S. Gordon, Y.-L. Hsieh (Eds.), Cotton: Science and Technology, Woodhead Publishing Ltd., Cambridge, 2007 (xx + 548 pp., [pound sign]150.00, ISBN: 1-84569-026-5)., Carbohydrate Polymers, Volume 71, Issue 2, 24 January 2008, Page 330, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.07.021.
(http://www.sciencedirect.com/science/article/B6TFD-4P96227-4/2/fa56bfa8fd97553896bbffeb683c85f8)

Roxana Badulescu, Vera Vivod, Darja Jausovec, Bojana Voncina, Grafting of ethylcellulose microcapsules onto cotton fibers, Carbohydrate Polymers, Volume 71, Issue 1, 5 January 2008, Pages 85-91, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.05.028.
(http://www.sciencedirect.com/science/article/B6TFD-4NVH7WB-2/2/48127dbfc6ee8fc97f91c66b76fb0d29)
Abstract:
In this paper a treatment of cotton with ethylcellulose (EC) microcapsules was investigated. EC microcapsules containing Rosemary oil were obtained by phase separation method. The surface and morphology of microcapsules were characterized by scanning electron microscopy (SEM). Microcapsules with a regular spherical shape in the 10-90 [mu]m size range were prepared and grafted onto cotton using the crosslinking reagent 1,2,3,4-butanetetracarboxylic acid (BTCA) in the presence of catalysts. The influence of the two catalysts, cyanamide (CA) and N,N'-dicyclohexylcarbodiimide (DCC) on curing efficiency (grafting) was investigated. SEM and Fourier transform infrared spectroscopy (FT-IR) were used to study the formation of ester bonds between BTCA and hydroxyl groups of cotton and/or hydroxyl groups of EC. When DCC was used as a

catalyst, the esterification took place slowly at room temperature. In the case of CA, the cotton was cured at 110 [degree sign]C for several minutes. After 2 min curing, the microcapsules, which kept their original shape, were bonded to the cotton fibers. Increasing the curing time altered the microcapsule shell. Grafting and crosslinking reactions of the thermofixed EC microcapsules onto cotton were proposed.
Keywords: Ethylcellulose; Grafting; BTCA; SEM; FT-IR; Microcapsule

H.S. Thind, M.S. Aujla, G.S. Buttar, Response of cotton to various levels of nitrogen and water applied to normal and paired sown cotton under drip irrigation in relation to check-basin, Agricultural Water Management, Volume 95, Issue 1, January 2008, Pages 25-34, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.08.008.
(http://www.sciencedirect.com/science/article/B6T3X-4PYMWRW-1/2/d71be4f6d809f352e5571d6a0ce5ea6c)
Abstract:
Field experiments were conducted for 2 years to investigate the effects of various levels of nitrogen (N) and methods of cotton planting on yield, agronomic efficiency of N (AEN) and water use efficiency (WUE) in cotton irrigated through surface drip irrigation at Bathinda situated in semi-arid region of northwest India. Three levels of N (100, 75 and 50% of recommended N, 75 kg ha-1) were tested under drip irrigation in comparison to 75 kg of N ha-1 in check-basin. The three methods of planting tried were; normal sowing of cotton with row to row spacing of 67.5 cm (NS), normal paired row sowing with row to row spacing of 35 and 100 cm alternately (NP) and dense paired row sowing with row to row spacing of 35 and 55 cm alternately resulting in total number rows and plants to be 1.5 times (DP) than NS and NP. In NS there was one lateral along each row, but in paired sowings there was one lateral between each pair of rows. Consequently the number of laterals and quantity of water applied was 50 and 75% in NP and DP, respectively, as compared with NS in which irrigation water applied was equivalent to check-basin.
Drip irrigation under NS resulted in an increase of 258 and 453 kg ha-1 seed cotton yield than check-basin during first and second year, respectively, when same quantity of water and N was applied. Drip irrigation under dense paired sowing (DP) in which the quantity of irrigation water applied was 75% as compared with NS, further increased the yield by 84 and 101 kg ha-1 than NS during first and second year, respectively. Drip irrigation under NP, in which the quantity of water applied and number of laterals used were 50% as compared with drip under NS, resulted in a reduction in seed cotton yield of 257 and 112 kg ha-1 than NS during first and second year, respectively. However, the yield obtained in NP under drip irrigation was equivalent to yield obtained in NS under check-basin during first year but 341 kg ha-1 higher yield was obtained during second year. The decrease in N applied, irrespective of methods of planting, caused a significant decline in seed cotton yield during both the years. Water use efficiency (WUE) under drip irrigation increased from 1.648 to 1.847 and from 0.983 to 1.615 kg ha-1 mm-1 during first and second year, respectively, when the same quantity of N and water was applied. The WUE further increased to 2.125 and 1.788 kg ha-1 mm-1 under DP during first and second year, respectively. The agronomic efficiency of nitrogen was higher in drip than check-basin during both the years when equal N was applied. The WUE decreased with decrease in the rate of N applied under fertigation but reverse was true for AEN. It is evident that DP under drip irrigation resulted in higher seed cotton yield, WUE and AEN than NS and also saved 25% irrigation water as well as cost of laterals.
Keywords: Agronomic efficiency of nitrogen; Cotton; Drip irrigation; Nitrogen; Paired sowing; Water use efficiency

M.P. Gonzalez-Dugo, L. Mateos, Spectral vegetation indices for benchmarking water productivity of irrigated cotton and sugarbeet crops, Agricultural Water Management, Volume 95, Issue 1, January 2008, Pages 48-58, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.09.001.

(http://www.sciencedirect.com/science/article/B6T3X-4R2HKNT-1/2/10576f000890c06d2170fc6ad38052e0)
Abstract:
Irrigation performance and water productivity can be benchmarked if estimates of spatially distributed yield and crop water use are available. A commonly used method to estimate crop evapotranspiration in irrigated areas is to multiply reference evapotranspiration values by appropriate crop coefficients. This study evaluated convenient ways to derive such coefficients using multispectral vegetation indices obtained by remote sensing. Detailed ground radiometric measurements were taken in small plots perpendicular to the crop rows to obtain canopy reflectance values. Ancillary measurements of green ground cover, plant height, leaf area index and biomass were taken in the cropped strip covered by the radiometer field-of-view. The results were up-scaled using 10 Landsat-5 and 1 Landsat-7 images. Crop measurements and ground radiometry were made at the time of Landsat overpass on two commercial fields, one grown with sugarbeet and the other with cotton. Crop height and ground cover were determined weekly in these two fields, three additional sugarbeet fields and one additional cotton field. The ground and satellite observations of canopy reflectance yielded similar results. Two vegetation indices, the normalized difference vegetation index (NDVI) and the soil adjusted vegetation index (SAVI) were evaluated. Both indices described the crop growth well, but SAVI was used in further evaluations because it could be conveniently related to both ground cover and the basal crop coefficient using a simple model. Based on these findings, crop water use variability was analyzed in a large sample of sugarbeet and cotton fields, within a homogeneous irrigation scheme in Southern Spain. The yield versus evapotranspiration data points were highly scattered for both cotton and sugarbeet. The yield values obtained from the sugarbeet fields and cotton fields were substantially lower than values predicted by a linear yield function, and close to a curvilinear yield function, respectively. Evapotranspired water productivity varied in the cotton fields from 0.3 to 0.78 kg m-3, and in the sugarbeet fields from 7.15 to 14.8 kg m-3.
Keywords: Crop coefficients; Vegetation indices; Remote sensing; Water productivity; Sugarbeet; Cotton

W.R. DeTar, Yield and growth characteristics for cotton under various irrigation regimes on sandy soil, Agricultural Water Management, Volume 95, Issue 1, January 2008, Pages 69-76, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.08.009.
(http://www.sciencedirect.com/science/article/B6T3X-4PXP0ST-1/2/a32e13722b756707292456bc7002bf83)
Abstract:
Over-watering cotton wastes a valuable and scarce resource; it can also lead to rank growth, nutrient leaching, and contaminated groundwater. Since under-watering can decrease yields, the question becomes one of finding the optimum application regime. An irrigation experiment was set up to apply water at six different application rates, ranging from 33% to 144% of normal, with hopes of identifying the regime that produces maximum yield. Two cultivars, Acala Maxxa and Acala PhytoGen-72 (Gossypium hirsutum L.), were planted on sandy soil and irrigated daily with a highly efficient subsurface drip irrigation system for four seasons. The results showed that on the average there was no significant difference in the yield of the two cultivars and there was no significant difference in the yield for the three wettest treatments. The driest of the three wettest treatments, treatment 4, was a critical point on the water production function curve. It represented the least amount of water applied that still produced essentially maximum yield, and it had the highest water use efficiency. This critical level of water application during mid-season was found to be, on the average, 95% of Class A pan evaporation; it corresponded to a total seasonal application of 654 mm of water. Any application less than this critical level decreased yields. Reducing the water application by 5% below the critical level caused about a 4.6% reduction in yield. The critical level produced a soil moisture level that remained nearly constant throughout the

season. The final plant height was closely related to the depth of water applied, with the wettest treatment producing plant heights of 2.0 m, and the driest treatment producing plant heights of 0.6 m. At the extremes of the water application rates there were some small differences in the early-season growth rate of the plants, but the main cause of differences in final plant height was the date of cutout (cessation of main stem node production). The length of season for the driest treatment was about 4 weeks shorter than for the wettest treatment on both cultivars. Results showed that deficit irrigation of cotton on sandy soil can greatly reduce yield, and the practice should probably be avoided.
Keywords: Cotton; Water production functions; Drip irrigation; Optimum application rates; Growth characteristics; Length of season; Evapotranspiration

David O. Simelane, Donald C. Steinkraus, Timothy J. Kring, Predation rate and development of Coccinella septempunctata L. influenced by Neozygites fresenii-infected cotton aphid prey, Biological Control, Volume 44, Issue 1, January 2008, Pages 128-135, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2007.10.004.
(http://www.sciencedirect.com/science/article/B6WBP-4PWF0MJ-2/2/7387c9264edc0727ebe58be19b5e53a1)
Abstract:
Laboratory studies were conducted to determine the effect of cotton aphids [Aphis gossypii Glover (Homoptera: Aphididae)] infected with Neozygites fresenii (Nowakowski) Batko (Entomophthorales: Neozygitaceae), on the number of prey attacked by and development of Coccinella septempunctata L. (Coleoptera: Coccinellidae). A diet of N. fresenii-infected aphids (in early stages of infection) did not have a significant effect on predation rate by either the fourth-stage larvae or adults of C. septempunctata. Second-, third- and fourth-stage larvae of C. septempunctata reared on fungus-infected aphids had significantly longer stadia than those reared on uninfected aphids. Mortality of C. septempunctata larvae reared on fungus-infected aphids increased between the second and the fourth instars, whereas mortality for those reared on uninfected aphids was significantly lower than those reared on infected aphids. Feeding on N. fresenii-infected aphids resulted in significantly smaller body size of C. septempunctata adults and a corresponding reduction in the number of eggs oviposited during a 29-day period relative to those fed a diet of uninfected aphids. Although our findings suggest that a diet of N. fresenii-infected aphids had no effect on the number of prey consumed by C. septempunctata, it had a significant effect on the development of the predator and its capacity to reproduce. These fitness costs could alter the capacity of the predator population to reduce subsequent pest populations in cotton or adjacent crops.
Keywords: Coccinella septempunctata; Neozygites fresenii; Entomopathogenic fungus; Cotton aphid; Fungus; Entomophthoralean fungus; Intraguild predation; Interaction; Development

Ruixiu Sui, J. Alex Thomasson, James Hanks, James Wooten, Ground-based sensing system for weed mapping in cotton, Computers and Electronics in Agriculture, Volume 60, Issue 1, January 2008, Pages 31-38, ISSN 0168-1699, DOI: 10.1016/j.compag.2007.06.002.
(http://www.sciencedirect.com/science/article/B6T5M-4P8R7BS-1/2/9df7b6ceeb785309c23a3e9c7855829b)
Abstract:
A ground-based weed mapping system was developed to measure weed intensity and distribution in a cotton field. The weed mapping system includes WeedSeeker(R) PhD600 sensor modules to indicate the presence of weeds between rows, a GPS receiver to provide spatial information, and a data acquisition and processing unit to collect and process the weed data and spatial information. The PhD600 sensor module is a commercial product used as a component in this weed mapping system. A prototype of the weed mapping system was field evaluated for 2 years. The system performed well during the field evaluation. Weed intensity in the field was also

estimated based on remotely sensed imagery, and these estimates were used to create weed maps. Development of the weed mapping system and its evaluation results are reported in this article.
Keywords: Precision agriculture; Weed mapping; Optical sensor; Remote sensing; Cotton

Shantel A. Vital, Rocky W. Fowler, Alvarro Virgen, Dalton R. Gossett, Stephen W. Banks, Juan Rodriguez, Opposing roles for superoxide and nitric oxide in the NaCl stress-induced upregulation of antioxidant enzyme activity in cotton callus tissue, Environmental and Experimental Botany, Volume 62, Issue 1, January 2008, Pages 60-68, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2007.07.006.
(http://www.sciencedirect.com/science/article/B6T66-4PB6VXH-2/2/e7a8c6fba17161e2e042dc63e0820562)
Abstract:
The roles of superoxide and NO in the NaCl-induced upregulation on antioxidant enzyme activity were investigated in NaCl-tolerant cotton calli. Both NaCl and paraquat treatments resulted in significant increases in superoxide production. The activities of ascorbate peroxidase (APX), catalase, glutathione reductase (GR), and peroxidase also increased significantly within 2 h after applying the stress. Pre-treatment with the superoxide scavenger, N-acetyl l-cysteine (NAC), completely removed the superoxide and inhibited the upregulation of antioxidant enzyme activity in the tissue treated with either NaCl or paraquat. NaCl stress also resulted in a significant increase in the NO level. Experiments were also carried out to measure antioxidant enzyme activity in cotton calli exposed to NO, the NO producer sodium nitroprusside (SNP), and the NO scavenger 2-phenyl-4,4,5,5-tetramethyl-imidazoline-1-oxyl-3-oxide (PTIO) under different salt stress conditions. The direct addition of NO gas produced no change in the activities of catalase and GR and caused a significant decrease in APX activity when compared to the controls. When the calli was treated with SNP in the absence of NaCl stress, APX and GR activities decreased significantly and catalase activity was only slightly higher than the control. Treatment with SNP in the presence of NaCl stress resulted in a significant decrease in APX activity, and GR and APX activities were not significantly different from those observed in the NaCl treatment alone. In the presence of PTIO, the activities of all three enzymes increased in the presence or absence of NaCl stress. These results suggest that reactive oxygen species (ROS) such as superoxide radicals may serve as signal transduction molecules to switch 'on' the early NaCl-induced up-regulation of antioxidant enzyme activity, while NO may play a role in switching 'off' the response after other mechanisms in the cascade of events responsible for NaCl tolerance have been activated.
Keywords: Antioxidants; Nitric oxide; Oxidative stress; Salt stress; Signal transduction

Long-Guo Jin, Jin-Yuan Liu, Molecular cloning, expression profile and promoter analysis of a novel ethylene responsive transcription factor gene GhERF4 from cotton (Gossypium hirstum), Plant Physiology and Biochemistry, Volume 46, Issue 1, January 2008, Pages 46-53, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2007.10.004.
(http://www.sciencedirect.com/science/article/B6VRD-4PVPVMJ-3/2/55c8112a91f584e94c56a4a386a63991)
Abstract:
Ethylene-responsive element binding factors (ERFs) are plant-specific transcription factors, many of which have been linked to stress responses. A novel ERF gene, designated GhERF4, was isolated by RACE-PCR from Gossypium hirstum. The GhERF4 cDNA has a total length of 1061 bp with an open reading frame of 669 bp, encoding a protein of 222 amino acids with a molecular weight of 23.5 kDa and a calculated pI of 9.03. Sequence alignment shows that GhERF4 contains a 58 amino acid long AP2/ERF domain and a RKRP nuclear localization signal, and belongs to a group II protein in the ERF subfamily as typified by the C-terminal ERF-associated Amphiphilic

Repression (EAR) motif. Southern blot analysis indicates that GhERF4 is a single copy gene in cotton genome. Using green fluorescent protein fusion, we demonstrate that GhERF4 accumulates specifically in the nucleus of onion epidermis cells. Semi-quantitative RT-PCR reveals that GhERF4 is constitutively expressed in true leaves, roots, seeds and stems. The transcripts of GhERF4 accumulate highly and rapidly when plants are treated with exogenous ethylene, salt, cold, drought stresses and exogenous abscisic acid (ABA) treatment, suggesting that GhERF4 is regulated by certain components of the stress signaling pathway. Promoter analysis indicates that the 5' upstream region of GhERF4 possesses some elements induced by physiological and environmental factors. These results indicate that GhERF4 may play an important role in response to ethylene, ABA and environmental stresses.
Keywords: Abiotic stress; Cotton; EAR motif; Ethylene responsive element binding factor; Nuclear localization; Promoter analysis

Amita Mishra, Smriti Khare, Prabodh Kumar Trivedi, Pravendra Nath, Ethylene induced cotton leaf abscission is associated with higher expression of cellulase (GhCel1) and increased activities of ethylene biosynthesis enzymes in abscission zone, Plant Physiology and Biochemistry, Volume 46, Issue 1, January 2008, Pages 54-63, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2007.09.002.
(http://www.sciencedirect.com/science/article/B6VRD-4PPMXM7-1/2/dd3f1bc04e00b45302196782c1585056)
Abstract:
Ethylene induced cotton (Gossypium hirusutum var RST-39) leaf abscission has been characterized by measuring the activities of ACC synthase (ACS, E.C. 4.4.1.14), ACC oxidase (ACO, E.C. 1.14.17.4) and cellulase (E.C. 3.2.1.4). In addition, a leaf abscission specific cDNA (GhCel1) has been cloned from cotton, which belongs to the [alpha]2 subgroup of cellulases that possess a C-terminus carbohydrate-binding domain. Measurement of enzyme activity in the abscission zones of cotton leaf explants exposed to ethylene for 48 h compared to non-treated controls indicated a more than 5-fold increase in the activity of ACS, 1.2-fold increase in the activity of ACO and about 2.7-fold increase in the activity of cellulase in the ethylene treated explants. This increase was accompanied by a substantial decrease in the force required to separate the petiole from the stem (break strength) and an increased accumulation of cellulase transcript in the abscission zone. Treatment of explants with 1-Methylcyclopropene (1-MCP) prior to ethylene resulted in significant inhibition of enzyme activities and transcript accumulation. It is concluded that ethylene response of cotton leaf abscission leads to higher cellulase expression and increased activities of ethylene biosynthesis enzymes in the abscission zone.
Keywords: 1-Methylcyclopropene; ACC oxidase; ACC synthase; Cellulase; Ethylene; Gossypium hirusutum; Leaf abscission

D. Pemsl, H. Waibel, Assessing the profitability of different crop protection strategies in cotton: Case study results from Shandong Province, China, Agricultural Systems, Volume 95, Issues 1-3, December 2007, Pages 28-36, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.02.013.
(http://www.sciencedirect.com/science/article/B6T3W-4NT255H-1/2/b399deaaabb5994cd2272fb99e9b03a1)
Abstract:
The paper compares the economic performance of different crop protection strategies in cotton including the use of transgenic varieties in Shandong Province, China. By means of a Monte Carlo simulation model a comparison was made between conventional insecticide strategies, planting of bollworm-resistant Bt varieties and a strategy of combining both technologies. To account for the observed variation in the toxin content of the Bt varieties in China, two different quality levels of Bt seed are included in the model.
The data for the model are season-long records of input use and yield of 150 small-scale cotton producers in five villages in Shandong Province, which are complemented with a survey of

Chinese cotton experts. Results show that the high cost pest control strategy based on expensive, good quality Bt seeds is economically inferior to low cost strategies. Scenarios for different pest population levels were included and while the use of low quality Bt seed with need-based applications of insecticides is the dominant control strategy for the normal and high pest pressure scenarios, the use of non-Bt varieties performs well under low pest pressure conditions. These results imply the need to include agro-ecosystem aspects such as pest pressure conditions and the impact of control interventions on both pests and natural enemies in the assessment of pest control strategies.
Keywords: Bt cotton profitability; Uncertainty; Simulation model; China

Luis Jimenez, Antonio Perez, Maria Jesus de la Torre, Ana Moral, Luis Serrano, Characterization of vine shoots, cotton stalks, Leucaena leucocephala and Chamaecytisus proliferus, and of their ethyleneglycol pulps, Bioresource Technology, Volume 98, Issue 18, December 2007, Pages 3487-3490, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.11.009.
(http://www.sciencedirect.com/science/article/B6V24-4MR7D69-2/2/e2d94084aa76edf00de2b381747ca6e1)
Abstract:
We characterized vine shoots, cotton stalks, Leucaena leucocephala and Chamaecytisus proliferus as pulping raw materials and found C. proliferus and cotton stalks to be the best for the intended purpose on the grounds of their increased contents in holocellulose (79.73% and 72.86%) and [alpha]-cellulose (45.37% and 58.48%), and their decreased contents in ethanol-benzene extractables (2.64% and 1.42%), hot water solubles (2.79% and 3.33%) and 1% soda solubles (16.67% and 20.34%). These properties resulted in increased pulp yields and hence in efficient use of these two types of raw material.
The previous raw materials were pulped by using an ethyleneglycol concentration of 65% at 180 [degree sign]C for 75 min, followed by beating at 1500 revolutions in a PFI refiner. The paper sheets obtained were characterized and those from C. proliferus found to be the best overall as they exhibited an increased breaking length (4644 m), stretch (2.87%), burst index (2.46 kN/g) tear index (0.33 m Nm2/g) and brightness (49.92% ISO); in addition C. proliferus pulp was obtained with a high-yield (62.88%). On the other hand, vine shoots provided the poorest results among the studied raw materials.
Keywords: Non-wood; Pulping; Ethyleneglycol; Pulp; Paper

T. Brevault, S. Bikay, J.M. Maldes, K. Naudin, Impact of a no-till with mulch soil management strategy on soil macrofauna communities in a cotton cropping system, Soil and Tillage Research, Volume 97, Issue 2, December 2007, Pages 140-149, ISSN 0167-1987, DOI: 10.1016/j.still.2007.09.006.
(http://www.sciencedirect.com/science/article/B6TC6-4R34DR3-1/2/fec1318c3a0015a7e28667b4fd972051)
Abstract:
Systematic exportation, burning of crop residues and decreases in fallow periods have led to a large-scale depletion of soil organic matter and degradation of soil fertility in the cotton (Gossypium hirsutum L.) cropping systems of Cameroon. The present study tested whether soil management systems based on a no-till with mulch approach intercropped with cereals, which has been shown to restore cotton production, could boost the biological activity of soil macrofauna. The impacts of no tillage with grass mulch (Brachiaria ruziziensis Germain and Eward) (NTG) and no tillage with legume mulch (Crotalaria retusa L. or Mucuna pruriens Bak.) (NTL) on the abundance, diversity and functional role of soil invertebrates were evaluated during the third year of implementation in northern Cameroon (Winde and Zouana), compared to conventional tillage (CT) and no tillage (NT) without mulch. Macrofauna were sampled from two 30 cm x 30 cm soil cubes (including litter) at the seeding stage of cotton, and 30 days later. The collected organisms

were grouped into detritivores, herbivores and predators. Examination of the soil macrofauna patterns revealed that the abundance and diversity of soil arthropods were significantly higher in NTG and NTL than in CT plots (+103 and +79%, respectively), while that of NT plots was in-between the no tillage groups and CT (+37%). Regarding major ecological functions, herbivores and predators were significantly more abundant in NTG and NTL plots than in CT plots at Winde (+168 and +180%, respectively), while detritivores, predators and herbivores were significantly more abundant in the NTG plots than in CT plots at Zouana (+92, +517 and +116%, respectively). Formicidae (53.6%), Termitidae (24.7%) and Lumbricidae (9.4%) were the most abundant detritivores while Julidae (46.1%), Coleoptera larvae (22.1%) and Pyrrhocoridae or Reduviidae (11.8%) were the dominant herbivores. The major constituents of the predatory group were Araneae (33.8%), Carabidae (24.6%), Staphylinidae (15.7%) and Scolopendridae (10.3%). Direct seeding mulch-based systems, NTG and NTL, favoured the establishment of diverse macrofaunal communities in the studied cotton cropping system.
Keywords: Soil; Macrofauna; Conservation agriculture; No tillage; Cover crop; Cotton; Africa

N.R. Hulugalle, B.E. McCorkell, T.B. Weaver, L.A. Finlay, J. Gleeson, Soil properties in furrows of an irrigated Vertisol sown with continuous cotton (Gossypium hirsutum L.), Soil and Tillage Research, Volume 97, Issue 2, December 2007, Pages 162-171, ISSN 0167-1987, DOI: 10.1016/j.still.2007.09.012.
(http://www.sciencedirect.com/science/article/B6TC6-4R5G7X8-2/2/b9691c7998a93ff525dfa46fcbacc54e)
Abstract:
Average in-field water application efficiency in furrow-irrigated cotton (Gossypium hirsutum L.) in Australia is less than optimal, and The underlying reasons may include surface sealing, exposure of sodic soil by laser levelling, and soil compaction due to wheel-trafficking. The objective of this study was to quantify the effects of reducing traffic and tillage intensity on furrow soil properties in an irrigated Vertisol. Soil was sampled during the growing seasons of 2001-02, 2003-04 and 2005-06 from the surface 50-mm of adjacent wheel-tracked and non-wheel-tracked furrows in an experiment in north-western New South Wales, Australia. The treatments were: cotton sown either after conventional tillage (disc-ploughing and incorporating cotton stalks to 0.2 m, chisel ploughing to 0.3 m followed by bed construction) or on 'permanent beds' (slashing cotton plants after harvest, followed by root cutting and bed renovation with a disc-hiller). Irrigation water was alkaline but had low salinity and sodium adsorption ratio. Soil properties measured were pH, EC1:5, geometric mean diameter (GMD) and specific volume (SV) of dry soil aggregates, exchangeable cations and plastic limit. Permanent bed systems had generally lower pH and higher SOC than conventionally tilled furrows, although differences were small. Soil pH and SOC averaged over the three growing seasons was 6.9 and 0.89 g/100 g, respectively, in permanent bed furrows, and 7.1 and 0.84 g/100 g, respectively, in conventionally tilled furrows. Compared to non-wheel-tracked furrows, plastic limit was lower (0.24 vs. 0.25 g/g), and EC1:5 (0.24 vs. 0.20 dS/m) and GMD (2.6 vs. 2.1 mm) higher in wheel-tracked furrows. Intra-seasonal changes in soil properties of furrows were also small, and are unlikely to significantly affect any hydrological processes. Inter-seasonal differences were, however, significant, and could affect hydrological processes in this soil.
Keywords: Cracking clay; Haplustert; Permanent beds; Trafficking; Tillage system; Vertisol

Ming LUO, Zhong-yi XIAO, Yue-hua XIAO, Xian-bi LI, Lei HOU, Jian-ping ZHOU, Ming-yu HU, Yan PEI, Cloning and Expression Analysis of a Brassinosteroid Biosynthetic Enzyme Gene, GhDWF1, from Cotton (Gossypium hirsuturm L.), Agricultural Sciences in China, Volume 6, Issue 11, November 2007, Pages 1297-1305, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60176-X.
(http://www.sciencedirect.com/science/article/B82XG-4R9B4F5-3/2/fb3bb5808d373b70b2e65e233c3ca825)
Abstract:

Brassinosteroids (BRs) are an important class of plant steroidal hormones that are essential in a wide variety of physiological processes. To determine the effects of BRs on the development of cotton fibers, through screening cotton fiber EST database and contigging the candidate ESTs, a key gene (GhDWF1) involved in the upstream biosynthetic pathway of BRs was cloned from developing fibers of upland cotton (Gossypium hirsutum L.) cv. Xuzhou 142. The full length of the cloned cDNA is 1849 bp, including a 37 bp 5'-untranslated region, an ORF of 1692 bp, and a 120 bp 3'-untranslated region. The cDNA encodes a polypeptide of 563 amino acid residues with a predicted molecular mass of 65 kD. The deduced amino acid sequence has high homology with the BR biosynthetic enzyme, DWARF1/DIMINUTO, from rice, maize, pea, tomato, and Arabidopsis. Furthermore, the typical conserved structures, such as the transmembrane domain, the FAD-dependent oxidase domain, and the FAD-binding site, are present in the GhDWF1 protein. The Southern blot indicated that the GhDWF1 gene is a single copy in upland cotton genome. RT-PCR analysis revealed that the highest level of GhDWF1 expression was detected in 0 DPA (day post anthesis) ovule (with fibers) while the lowest level was observed in cotyledon. The GhDWF1 gene presents high expression levels in root, young stem, and fiber, especially, at the fiber developmental stage of secondary cell wall accumulation. Moreover, the expression level was higher in ovules (with fibers) of wildtype (Xuzhou 142) than in ovules of fuzzless-lintless mutant at the same developmental stages (0 and 4 DPA). The results suggest that the GhDWF1 gene plays a crucial role in fiber development.
Keywords: cotton; DWARF1 gene; fiber; brassinosteroids; phytosterol

Rebecca A. Silverstein, Ye Chen, Ratna R. Sharma-Shivappa, Michael D. Boyette, Jason Osborne, A comparison of chemical pretreatment methods for improving saccharification of cotton stalks, Bioresource Technology, Volume 98, Issue 16, November 2007, Pages 3000-3011, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.10.022.
(http://www.sciencedirect.com/science/article/B6V24-4MHPHGX-1/2/d9433c07d45ad8e8b701fbc62094b550)
Abstract:
The effectiveness of sulfuric acid (H2SO4), sodium hydroxide (NaOH), hydrogen peroxide (H2O2), and ozone pretreatments for conversion of cotton stalks to ethanol was investigated. Ground cotton stalks at a solid loading of 10% (w/v) were pretreated with H2SO4, NaOH, and H2O2 at concentrations of 0.5%, 1%, and 2% (w/v). Treatment temperatures of 90 [degree sign]C and 121 [degree sign]C at 15 psi were investigated for residence times of 30, 60, and 90 min. Ozone pretreatment was performed at 4 [degree sign]C with constant sparging of stalks in water. Solids from H2SO4, NaOH, and H2O2 pretreatments (at 2%, 60 min, 121 [degree sign]C/15 psi) showed significant lignin degradation and/or high sugar availability and hence were hydrolyzed by Celluclast 1.5 L and Novozym 188 at 50 [degree sign]C. Sulfuric acid pretreatment resulted in the highest xylan reduction (95.23% for 2% acid, 90 min, 121 [degree sign]C/15 psi) but the lowest cellulose to glucose conversion during hydrolysis (23.85%). Sodium hydroxide pretreatment resulted in the highest level of delignification (65.63% for 2% NaOH, 90 min, 121 [degree sign]C/15 psi) and cellulose conversion (60.8%). Hydrogen peroxide pretreatment resulted in significantly lower (p [less-than-or-equals, slant] 0.05) delignification (maximum of 29.51% for 2%, 30 min, 121 [degree sign]C/15 psi) and cellulose conversion (49.8%) than sodium hydroxide pretreatment, but had a higher (p [less-than-or-equals, slant] 0.05) cellulose conversion than sulfuric acid pretreatment. Ozone did not cause any significant changes in lignin, xylan, or glucan contents over time. Quadratic models using time, temperature, and concentration as continuous variables were developed to predict xylan and lignin reduction, respectively for sulfuric acid and sodium hydroxide pretreatments. In addition, a modified severity parameter (log M0) was constructed and explained most of the variation in xylan or lignin reduction through simple linear regressions.
Keywords: Delignification; Bioethanol; Modeling; Lignocellulose; Enzymatic hydrolysis

Xiang Zhang, Li Zhang, Guoyou Ye, Yonghui Wang, Yuan Chen, Dehua Chen, The impact of introducing the Bacillus thuringiensis gene into cotton on boll nitrogen metabolism, Environmental and Experimental Botany, Volume 61, Issue 2, November 2007, Pages 175-180, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2007.05.008.
(http://www.sciencedirect.com/science/article/B6T66-4NTJH21-1/2/77a80cbfadc2818b94617abfe97db282)
Abstract:
Changes in vegetative and reproductive growth have been widely observed in Bacillus thuringiensis (Bt) transgenic cotton. The objective of this study was to investigate the characteristics of boll nitrogen metabolism of Bt cotton cultivars to gain a better physiological understanding of the observed phenomenon. The study was undertaken on two Bt transgenic cotton cultivars and their parents, one conventional (GK22) and its recurrent parent (Simian no. 3), the other a hybrid (Sikang no. 3) and its female parent (Simian no. 4), during the 2003 and 2004 growing seasons at the Yangzhou University Farm, Yangzhou, China.
In the 2003 study, the boll total nitrogen, free amino acid and soluble protein contents were investigated from flowering to 50 days after flowering (DAF). In 2004, the same Bt cotton cultivars and their parents were measured for enzyme activities of GPT, GOT and Protease, which are the key enzymes involved in nitrogen metabolism. The results showed that during the boll developing period, the conventional Bt cotton cultivar (GK22) was lower than its parent (Simian no. 3) in the contents of total nitrogen, free amino acid, and soluble protein, and the activities of GPT and GOT, but higher in protease activity. The results for the hybrid Bt cotton cultivar (Sikang no. 3) were totally in opposite to the conventional cultivar (GK22). The biggest difference in total nitrogen was a 14.8% decrease for GK22 at 50 DAF, while for Sikang no. 3, it was an 8.1% increase at 30 DAF. Similar results were obtained for free amino acid content, soluble protein content, GPT and GOT activities. However, the changes of protease activity were in opposite direction, with GK22 being 30.6% higher than its parent at 30 DAF, and Sikang no. 3 being more than 18.0% lower than its parent (Simian no. 4) before 40 DAF. Moreover, the boll total nitrogen content for GK22 reduced sharply. The results suggested that the conventional Bt cotton cultivar had lower intensity of boll nitrogen metabolism than its parent during the boll development period, which reduced boll size and boll weight. Therefore, cultural practices should aim at increasing boll nitrogen metabolic strength to keep the balance of nitrogen and carbohydrate metabolism.
Keywords: Cotton; Bacillus thuringiensis gene; Nitrogen metabolism; Boll development

Anne Barrabe, Bruno Rapidel, Fagaye Sissoko, Bouba Traore, Jacques Wery, Elaboration and test of a decision rule for the application of mepiquat chloride on cotton in Mali, European Journal of Agronomy, Volume 27, Issues 2-4, October 2007, Pages 197-204, ISSN 1161-0301, DOI: 10.1016/j.eja.2007.04.001.
(http://www.sciencedirect.com/science/article/B6T67-4NSV18V-1/2/7e604470947ceb392de301f67d9896b0)
Abstract:
Farmers often make complex management decisions during a cropping cycle. To design new cropping systems that go beyond standard setups and are better adapted to local constraints, agronomists must formalize these farmer's decisions into decision rules that can be tested and disseminated. In Mali, there has been a marked decrease in cotton productivity over the last 10 years, whereas the area planted with cotton has doubled. However, cropping recommendations remain almost the same throughout the country. Cotton researchers have been asked to put forward new technical proposals suited to a wider range of socio-economic and biophysical cropping conditions.
The aim of this study was to develop a methodology to build a decision rule (DR) to help Malian farmers in making decisions on the use of growth regulators in cotton fields.

In the first phase, a 2-year experiment was conducted in two experimental stations, under a wide range of cotton vegetative growth conditions, along with different stand densities and fertilization rates. Mepiquat chloride (MC) was applied to half of the plots, and its effects were then computed against selected vegetative growth indicators measured before the date of MC application. A DR was proposed on this basis. In the second phase, the DR was tested in a six-village experiment. MC was applied in plots on 15 farms in each village and its effects on yield were recorded.
The results showed that is possible to build a DR for MC application based on LAI or aerial biomass indicators. The usual indicators, such as the five-node length technique, were not found to be useful. The response of cotton plots to MC for a given level of vegetative growth remained scattered, as other factors probably interfered, such as the length of the rainy season. Testing the DR in farmers' fields showed that it was useful in determining appropriate MC applications. The usefulness of the DR is discussed on the basis of its accuracy and on the complexity of the selected indicator.
Keywords: Decision rule; Cropping system; Growth regulator; Cotton; Mali

Hezhong Dong, Weijiang Li, Wei Tang, Zhenhuai Li, Dongmei Zhang, Enhanced plant growth, development and fiber yield of Bt transgenic cotton by an integration of plastic mulching and seedling transplanting, Industrial Crops and Products, Volume 26, Issue 3, October 2007, Pages 298-306, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2007.03.008.
(http://www.sciencedirect.com/science/article/B6T77-4NP9KCM-2/2/4c56a5efdab63aea5136feb5f0756db3)
Abstract:
Plastic mulching and seedling transplanting are widely adopted intensive planting systems for cotton production in China. Previous studies have demonstrated considerable yield increases by individual use of mulching or transplanting compared with conventional planting. In the present study, two experiments were conducted to test if an integration of transplanting and plastic mulching is more beneficial than individual use of transplanting for enhancing cotton production, in northern Shandong, Yellow River Valley of China from 2003 to 2005. In the first experiment in 2003 and 2004, a hybrid Bt cotton cultivar SCRC 15 was planted in a greenhouse-like hut in early April, and the raised seedlings were transplanted to mulched or non-mulched field plots in early May. Plant growth and development, yield and yield components, and earliness of cotton were evaluated. In the second experiment in 2004 and 2005, three hybrid and three non-hybrid Bt cotton cultivars were managed with the integrated system or with transplanting alone, and yields of each cultivar were examined. Results from the first experiment showed that plant growth and development, yield and yield components, and earliness of cotton were significantly enhanced by an integration of mulching and transplanting compared with individual use of transplanting in either 2003 or 2004. Lint yields and the number of bolls per unit ground area were increased by 17.4% and 14.6% in 2003, and 17.1% and 15.3% in 2004 with plastic mulching in comparison with non-mulching, respectively. Such enhancement was mainly attributed to significantly increased soil temperature during early season after transplanting. The size of soil blocks for seedling nursing had significant and non-significant enhancement on final lint yield in 2003 and 2004, respectively. In the second experiment, average lint yields of hybrid cotton were increased by 17.8% in 2003 and 16.9% in 2004, and those of non-hybrid cotton were 13.3% in 2003 and 13.5% in 2004 with mulching in comparison with non-mulching (individual use of transplanting). It was concluded that an integration of plastic mulching and seedling transplanting can be more effective than individual use of transplanting to enhance cotton production in northern Shandong and other heat-limited areas.
Keywords: Bt transgenic cotton; Fiber yield; Plant growth; Plastic mulching; Seedling transplanting

Zhudong Liu, Peiyu Gong, Kujun Wu, Wei Wei, Jianghua Sun, Dianmo Li, Effects of larval host plants on over-wintering preparedness and survival of the cotton bollworm, Helicoverpa armigera

(Hubner) (Lepidoptera: Noctuidae), Journal of Insect Physiology, Volume 53, Issue 10, October 2007, Pages 1016-1026, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2007.05.005.
(http://www.sciencedirect.com/science/article/B6T3F-4NS2J7D-1/2/1c93a0a129583f4eade838a00a3c4a35)
Abstract:
Laboratory colonies of cotton bollworm larvae, Helicoverpa armigera, kept at 20 [degree sign]C under a photoperiod of L:D=10:14 were fed on five host plants (cotton, corn, kidney bean, tobacco and tomato) and an artificial diet (control) to determine the effects of larval host quality on survival and pupal over-wintering preparedness. A separate experiment showed that diapausing pupae weighed more and contained greater nutrient stores than did non-diapausing pupae. Diapausing pupae reared on different host plants showed significant differences in terms of over-wintering reserve storage, and degree of cold-hardiness (extent of low-molecular-weight substances and SCPs), and survivorship. The more nutrients the host plant had, the more the pupae weighed and the higher the levels of total lipids and glycogen. Body water content was also significantly affected by larval food quality. The mean pupal super-cooling capacities varied significantly from -16.7 to -18.9 [degree sign]C according to host plants the larvae feed on, and these significantly related to water content, pupal weight, lipid and glycogen content, and the levels of glycerol. Levels of trehalose, glycerol, and inositol, which were mainly low-molecular-weight substances, showed no significant differences among different host plants, except for trehalose. Pupal mortality varied from 39.7% on corn to 3.3% on the artificial diet, which was significantly related to pupal weight, total lipid content, trehalose levels, and super-cooling points. These results suggest that larval food quality can affect survival and influence the over-wintering preparedness of the cotton bollworm.
Keywords: Helicoverpa armigera; Host plants; Reserve storage; Low molecular sugars and sugar-alcohols; Over-wintering preparedness; Survival

Alan L. Wright, Frank M. Hons, Robert G. Lemon, Mark L. McFarland, Robert L. Nichols, Stratification of nutrients in soil for different tillage regimes and cotton rotations, Soil and Tillage Research, Volume 96, Issues 1-2, October 2007, Pages 19-27, ISSN 0167-1987, DOI: 10.1016/j.still.2007.02.005.
(http://www.sciencedirect.com/science/article/B6TC6-4ND7094-3/2/e3ebcb783679c34b59ef08cf2ed36bfb)
Abstract:
Crop management practices, especially tillage and rotation, can impact soil nutrient stratification, crop growth, and yield. The objectives of this study were to determine the soil-profile distribution of plant-available nutrients in four depth intervals from 0 to 90 cm for different cotton (Gossypium hirsutum L.) cropping systems, tillage regimes, and N fertilization rates in a south-central Texas silty clay loam soil after 5 years of treatment imposition. Distribution of nutrients in the soil profile varied between cropping systems (continuous cotton monoculture and cotton-corn (Zea mays L.) rotation), conventional (CT) and reduced tillage (RT), and N fertilization rates (0, 80, and 160 kg N ha-1). Plant-available P showed the greatest stratification and was 426% higher at 0-15 cm than at 60-90 cm, while SO4 had the greatest increase (42%) with depth. The percentage decrease from 0-15 to 60-90 cm was 47% and 147% for NO3 and K, and 76%, 12%, 43%, and 232% for Mn, Fe, Cu, and Zn, respectively. In contrast, Ca and Mg concentrations increased 22% and 15%, respectively, from 0-15 to 60-90 cm. Increasing the N fertilization rate increased plant-available NO3 and SO4 but decreased K, Fe, Cu, and Zn concentrations. Inclusion of corn in rotation with cotton decreased plant-available Mn, Fe, and Cu from 15 to 90 cm relative to continuous cotton at 160 kg N ha-1. For unfertilized soil, rotation increased micronutrient concentrations at 15-60 cm compared to continuous cotton. On average, CT cotton-corn had significantly lower K, Ca, Mg, Na, and SO4 concentrations than CT continuous cotton. Reduced tillage and diversified cropping systems altered the distribution of plant-available nutrients in soil relative to CT and continuous

cotton. In fact, RT increased plant-available P and NO3 in surface soil, which may have contributed to higher lint yields than CT continuous cotton.
Keywords: Cotton; Macronutrients; Micronutrients; Nutrient stratification; Plant-available nutrients; Reduced tillage; Soil-profile distribution

R.L. Raper, D.W. Reeves, J.N. Shaw, E. van Santen, P.L. Mask, Benefits of site-specific subsoiling for cotton production in Coastal Plain soils, Soil and Tillage Research, Volume 96, Issues 1-2, October 2007, Pages 174-181, ISSN 0167-1987, DOI: 10.1016/j.still.2007.05.004.
(http://www.sciencedirect.com/science/article/B6TC6-4P3M81D-1/2/971381443a385ccab34ea6a62433db40)
Abstract:
The negative impacts of soil compaction on crop yields can often be alleviated by subsoiling. However, this subsoiling operation is often conducted at unnecessarily deep depths wasting energy and excessively disturbing surface residue necessary for erosion control and improved soil quality. A corn (Zea mays L.)-cotton (Gossypium hirsutum L.) rotation experiment was conducted over 4 years on a Coastal Plain soil with a hardpan in east-central Alabama to evaluate the potential for site-specific subsoiling (tilling just deep enough to eliminate the hardpan layer) to improve crop yields while conserving energy. Seed cotton yield showed benefits of subsoiling (2342 kg/ha) compared to the no-subsoiling treatment (2059 kg/ha). Averaging over all years of the study, site-specific subsoiling produced cotton yields (2274 kg/ha) statistically equivalent to uniform deep subsoiling at a 45 cm depth (2410 kg/ha) while not excessively disturbing surface soil and residues. Significant reductions in draft force were found for site-specific subsoiling (59% and 35%) as compared to uniform deep subsoiling at a 45 cm depth in shallow depth hardpan plots (25 cm) and medium depth hardpan plots (35 cm), respectively. Calculated fuel use for site-specific subsoiling was found to be reduced by 43% and 27% in the shallow and medium depth hardpan plots, respectively, as compared to uniform deep subsoiling in these same plots. Producers in the Coastal Plains who can determine (or who know) the depth of their root-impeding layer and perform site-specific subsoiling can have comparable cotton yields to traditional uniform depth subsoiling with reduced energy requirements.
Keywords: Site-specific; Precision agriculture; Subsoiling; Soil compaction; Draft; Drawbar power

Upendra M. Sainju, Harry H. Schomberg, Bharat P. Singh, Wayne F. Whitehead, P. Glynn Tillman, Sharon L. Lachnicht-Weyers, Cover crop effect on soil carbon fractions under conservation tillage cotton, Soil and Tillage Research, Volume 96, Issues 1-2, October 2007, Pages 205-218, ISSN 0167-1987, DOI: 10.1016/j.still.2007.06.006.
(http://www.sciencedirect.com/science/article/B6TC6-4P6MBS5-1/2/5e5ca7f5a9b0bc9d68eaf6a96d3dc9f7)
Abstract:
Cover crops may influence soil carbon (C) sequestration and microbial biomass and activities by providing additional residue C to soil. We examined the influence of legume [crimson clover (Trifolium incarnatum L.)], nonlegume [rye (Secale cereale L.)], blend [a mixture of legumes containing balansa clover (Trifolium michelianum Savi), hairy vetch (Vicia villosa Roth), and crimson clover], and rye + blend mixture cover crops on soil C fractions at the 0-150 mm depth from 2001 to 2003. Active fractions of soil C included potential C mineralization (PCM) and microbial biomass C (MBC) and slow fraction as soil organic C (SOC). Experiments were conducted in Dothan sandy loam (fine-loamy, kaolinitic, thermic, Plinthic Kandiudults) under dryland cotton (Gossypium hirsutum L.) in central Georgia and in Tifton loamy sand (fine-loamy, siliceous, thermic, Plinthic Kandiudults) under irrigated cotton in southern Georgia, USA. Both dryland and irrigated cotton were planted in strip tillage system where planting rows were tilled, thereby leaving the areas between rows untilled. Total aboveground cover crop and cotton C in dryland and irrigated conditions were 0.72-2.90 Mg C ha-1 greater in rye + blend than in other

cover crops in 2001 but was 1.15-2.24 Mg C ha-1 greater in rye than in blend and rye + blend in 2002. In dryland cotton, PCM at 50-150 mm was greater in June 2001 and 2002 than in January 2003 but MBC at 0-150 mm was greater in January 2003 than in June 2001. In irrigated cotton, SOC at 0-150 mm was greater with rye + blend than with crimson clover and at 0-50 mm was greater in March than in December 2002. The PCM at 0-50 and 0-150 mm was greater with blend and crimson clover than with rye in April 2001 and was greater with crimson clover than with rye and rye + blend in March 2002. The MBC at 0-50 mm was greater with rye than with blend and crimson clover in April 2001 and was greater with rye, blend, and rye + blend than with crimson clover in March 2002. As a result, PCM decreased by 21-24 g CO2-C ha-1 d-1 but MBC increased by 90-224 g CO2-C ha-1 d-1 from June 2001 to January 2003 in dryland cotton. In irrigated cotton, SOC decreased by 0.1-1.1 kg C ha-1 d-1, and PCM decreased by 10 g CO2-C ha-1 d-1 with rye to 79 g CO2-C ha-1 d-1 with blend, but MBC increased by 13 g CO2-C ha-1 d-1 with blend to 120 g CO2-C ha-1 d-1 with crimson clover from April 2001 to December 2002. Soil active C fractions varied between seasons due to differences in temperature, water content, and substrate availability in dryland cotton, regardless of cover crops. In irrigated cotton, increase in crop C input with legume + nonlegume treatment increased soil C storage and microbial biomass but lower C/N ratio of legume cover crops increased C mineralization and microbial activities in the spring.
Keywords: Cover crop; Organic carbon; Microbial carbon; Carbon mineralization; On-farm study; Soil quality; Cropping system

Guillermo Siri-Prieto, D. Wayne Reeves, Randy L. Raper, Tillage systems for a cotton-peanut rotation with winter-annual grazing: Impacts on soil carbon, nitrogen and physical properties, Soil and Tillage Research, Volume 96, Issues 1-2, October 2007, Pages 260-268, ISSN 0167-1987, DOI: 10.1016/j.still.2007.06.010.
(http://www.sciencedirect.com/science/article/B6TC6-4PB15Y5-1/2/78d1edd52485be274903ba3eceecf531)
Abstract:
Integrating livestock with cotton (Gossypium hirsutum L.) and peanut (Arachis hypogaea L.) production systems by grazing winter-annuals can offer additional income for producers provided it does not result in yield-limiting soil compaction. We conducted a 3-year field study on a Dothan loamy sand (fine-loamy, kaolinitic, thermic plinthic kandiudults) in southern Alabama, USA to determine the influence of tillage system prior to cotton-peanut planting on soil properties following winter-annual grazing. Two winter-annual forages [oat (Avena sativa L.) and annual ryegrass (Lolium mutiflorum L.)] and four tillage practices [chisel + disk, non-inversion deep tillage (paratill) with and without disking and no-till] were evaluated in a strip-plot design of four replications. We evaluated cone index, bulk density, infiltration, soil organic carbon (SOC), and total nitrogen (N). Paratilling prior to cotton or peanut planting, especially without surface soil tillage, reduced compaction initially to 40 cm and residually to 30 cm through the grazing period in winter. There were no significant differences in cone index, bulk density, or infiltration between forage species. No-tillage resulted in the greatest bulk density (1.65 Mg m-3) and lowest infiltration (36% of water applied), while paratilling increased infiltration in no-tillage to 83%. After 3 years, paratilling increased SOC 38% and N 56% near the soil surface (0-5 cm), as compared to concentrations at the beginning of the experiment, suggesting an improvement in soil quality. For coastal plain soils, integrating winter-annual grazing in a cotton-peanut rotation using a conservation tillage system of non-inversion deep tillage (paratill) with no surface tillage can improve soil quality by reducing cone index, increasing infiltration, and increasing SOC in the soil surface.
Keywords: Annual grazing; Soil compaction; No-till; Soil quality; Soil organic carbon

L. Zhang, W. van der Werf, S. Zhang, B. Li, J.H.J. Spiertz, Growth, yield and quality of wheat and cotton in relay strip intercropping systems, Field Crops Research, Volume 103, Issue 3, 13 September 2007, Pages 178-188, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.06.002.

(http://www.sciencedirect.com/science/article/B6T6M-4P903BM-1/2/41c10e86963207c7aa4cc9e0c7ea8a4b)

Abstract:
Intercropping of wheat and cotton is practiced at a large scale in northern China, but the productivity of intercrops, compared to monoculture, and the productivity and growth patterns of different alternative intercropping patterns have not been quantitatively documented. In this study, four typical wheat-cotton intercropping patterns were examined as to their growth and productivity in field experiments over three growing seasons in Anyang, Henan Province, China. The systems varied in the number of wheat and cotton rows in the alternating strips of either crop, and were labeled accordingly as 3:1, 3:2, 4:2 and 6:2. Dry matter accumulation, yield, land equivalence ratio (LER) and lint quality were determined.
Grain yield of wheat, averaged over three seasons, ranged from 4600 to 5200 kg ha-1 in intercropping, corresponding to 70-79% of the yield in the monoculture (6550 kg ha-1). The 3:1 system gave the highest wheat yield (79% of monoculture), followed by the 6:2 (73%), 3:2 (70%) and 4:2 (70%) systems. Cotton lint yield, averaged over three seasons, ranged from 590 to 740 kg ha-1 in intercropping, corresponding to 54-69% of the yield in cotton monoculture (1085 kg ha-1). The 3:2 and 4:2 systems gave the highest lint yields (69% and 68% of monoculture, respectively), which was significantly lower than in monoculture but significantly higher than in the 3:1 (58%) and 6:2 (54%) systems. The land equivalent ratio was 1.39 in the 3:1, 3:2 and 4:2 systems, and significantly lower, 1.28, in the 6:2 system. All systems provide a substantial land use advantage.
Cotton growth patterns in monocultures and intercrops were characterized by fitting expolinear growth equations to periodic harvest data. Fitted parameters indicate a growth delay, compared to cotton monoculture, of 11.8 d in the 3:1 system, 6.3 d in the 3:2 system, 6.9 d in the 4:2 system and 5.6 d in the 6:2 system. Estimated growth rate during the linear growth phase was lowest in the 6:2 system (5.9 g m-2 d-1), significantly greater in the 3:1 (7.0 g m-2 d-1), 4:2 (7.7 g m-2 d-1) and 3:2 (8.4 g m-2 d-1) systems, and greatest, but not significantly different from 3:2 and 4:2 systems, in the monoculture (8.9 g m-2 d-1). These results are interpreted in terms of the competitive effect of wheat during the seedling phase of cotton, which is strongest in the 3:1 system, causing a comparatively long growth delay, and the ability of the cotton leaf canopy to intercept radiation after wheat harvest, which is diminished in the 6:2 system due to the large distance between cotton rows, resulting in a comparatively low rate of linear growth.
Effects of intercropping on the quality of cotton were minor and mostly below detection threshold.
Keywords: Crop growth analysis; Grain yield; Lint yield; Land equivalence ratio (LER); Fiber quality; Expolinear growth equation; Competition; Growth delay

Min-Ki Kim, Hak-Yong Kim, Dong-Kyu Seo, Changmann Yoon, Gil-Hah Kim, Insecticidal Properties of Bistrifluron, Benzoylphenylurea Insecticide, against Cotton Caterpillar, Palpita indica (Lepidoptera: Pyralidae), Journal of Asia-Pacific Entomology, Volume 10, Issue 3, September 2007, Pages 269-274, ISSN 1226-8615, DOI: 10.1016/S1226-8615(08)60362-3.
(http://www.sciencedirect.com/science/article/B8JJN-4V6TFF1-D/2/344c88d059cc57aad18aaf04b8e1710b)

Abstract:
In this study, we assessed the insecticidal properties of bistrifluron on the insect life stages of the cotton caterpillar, Palpita indicaa, with the primary emphasis on hatching rate, mortality, and susceptibility to chemicals, in addition to the preoviposition period, longevity, and fecundity. Bistrifluron exerted no effects on the egg. However, the larvae hatching from the eggs evidenced 100% mortality within 24 hrs. The susceptibility of P. indica to bistrifluron evidenced similar results at each larval stage. When bistrifluron was applied to the pupal stage, the chemicals significantly affected the longevity and fecundity of the normally emerging adults. The application of high concentrations of bistrifluron (50 ppm) to young adults delayed their pre-oviposition periods. In addition, the longevity, fecundity and hatching rate were attenuated.

Keywords: Bistrifluron; Chlorfluazuron; Benzoylphenylurea (BPU); Palpita indica; IGR

Liliana Brankova, Sergei Ivanov, Vera Alexieva, The induction of microsomal NADPH:cytochrome P450 and NADH:cytochrome b5 reductases by long-term salt treatment of cotton (Gossypium hirsutum L.) and bean (Phaseolus vulgaris L.) plants, Plant Physiology and Biochemistry, Volume 45, Issue 9, September 2007, Pages 691-695, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2007.07.005.
(http://www.sciencedirect.com/science/article/B6VRD-4P7X4N5-2/2/4edcf3919e2c45e3290fb7ef7526642d)
Abstract:
We studied the effect of salinity on the activity of microsomal NADPH:cytochrome P450 reductase (CPR, EC 1.6.2.4) and NADH:ferricytochrome b5 oxidoreductase (B5R, EC 1.6.2.2) in two dicotyledonous plant species differing in their sensitivity to salt, cotton (Gossypium hirsutum L. cv Ogosta) and common bean (Phaseolus vulgaris L. cv Dobrujanski 7). A significant inhibition of fresh weight of salt-treated bean plants was observed, while cotton was affected to a much lesser degree. NaCl application resulted in a significant increase in the activity of both reductases, but was more pronounced in salt-tolerant cotton. We suppose that alterations in B5R and CPR activities may be targeted to the maintenance of membrane lipids. Most probably, plants use both enzymes (B5R and CPR) and their respective electron donors (NADH and NADPH) to reduce cytochrome b5, which can donate reducing equivalents to a series of lipid-modification reactions such as desaturation and hydroxylation.
Keywords: Common bean; Cotton; NADH:ferricytochrome b5 reductase; NADPH:cytochrome P450 reductase; Salt stress

K. Ouattara, B. Ouattara, G. Nyberg, M.P. Sedogo, A. Malmer, Ploughing frequency and compost application effects on soil infiltrability in a cotton-maize (Gossypium hirsutum-Zea mays L.) rotation system on a Ferric Luvisol and a Ferric Lixisol in Burkina Faso, Soil and Tillage Research, Volume 95, Issues 1-2, September 2007, Pages 288-297, ISSN 0167-1987, DOI: 10.1016/j.still.2007.01.008.
(http://www.sciencedirect.com/science/article/B6TC6-4N6Y5DN-1/2/fccd018102c5a98adc70910bdecc1929)
Abstract:
One of the key issues to increase soil productivity in the Sahel is to ensure water infiltration and storage in the soil. We hypothesised that reducing tillage from annual to biennial ploughing and the use of organic matter, like compost, would better sustain soil hydraulic properties. The study had the objective to propose sustainable soil fertility management techniques in the cotton-maize cropping systems. The effects of reduced tillage (RT) and annual ploughing (AP) combined with compost application (Co) on soil infiltration parameters were assessed on two soil types. Topsoil mean saturated hydraulic conductivities (Ks) were between 9 and 48 mm h-1 in the Luvisol, while in the Lixisol they were between 18 and 275 mm h-1. In the two soil types compost additions with reduced tillage or with annual ploughing had the largest effect on Ks. Soil hydraulic behaviour was in reasonable agreement with soil pore size distribution (mean values varied from 19.5 to 237 [mu]m) modified by tillage frequency and organo-mineral fertilization. Already the first 3 years of this study showed that use of organic matter, improved soil infiltration characteristics when annual ploughing was used. Also biennial ploughing showed promising results and may be a useful strategy for smallholders to manage these soils.
Keywords: Ploughing frequency; Compost; Hydraulic conductivity; Cotton-maize; Burkina Faso

Chun-yan WANG, Akihiro Isoda, Mao-song LI, Dao-long WANG, Growth and Eco-Physiological Performance of Cotton Under Water Stress Conditions, Agricultural Sciences in China, Volume 6, Issue 8, August 2007, Pages 949-955, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60133-3.

(http://www.sciencedirect.com/science/article/B82XG-4PM8WN0-6/2/2358cb6dd2bb7ed618c1e344b31db78a)
Abstract: Abstract
A cotton cultivar Xinluzao 8 was grown under four levels of water stress treatments (normal irrigation, slight, mild and severe water stress) from the initial reproductive growth stage in Shihezi, Xinjiang, China, in 2002, to evaluate the growth and eco-physiological performances. Under water stress conditions, the transpiration ability decreased while the leaf temperature increased. Although the relative leaf water content decreased as water stress increased, the differences among the treatments were small, indicating that cotton has high ability in maintaining water in leaf. The stomatal density increased as water stress increased, while the maximum stomatal aperture reduced only in the severest stressed plants. The time of the maximum stomatal aperture was delayed in the mild and severe stressed plants. When severe stress occurred, the stomata were kept open until the transpiration decreased to nearly zero, suggesting that the stomata might not be the main factor in adjusting transpiration in cotton. Cotton plant has high adaptation ability to water stress conditions because of decrease in both stomatal conductance and hydraulic conductance from soil-to-leaf pathway. The actual quantum yield of photosystem II (PS II) decreased under water stress conditions, while the maximum quantum yield of PS II did not vary among treatments, suggesting that PS II would not be damaged by water stress. The total dry weight reduced as water stress increased.
Keywords: cotton; eco-physiological performance; water stress; transpiration; stomatal aperture

Danny Llewellyn, Chris Tyson, Greg Constable, Brian Duggan, Stephen Beale, Phil Steel, Containment of regulated genetically modified cotton in the field, Agriculture, Ecosystems & Environment, Volume 121, Issue 4, August 2007, Pages 419-429, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.11.019.
(http://www.sciencedirect.com/science/article/B6T3Y-4MSR8GS-1/2/571d9604d328846e41303677a1ba058c)
Abstract:
Genetically modified (GM) insect and herbicide resistant cottons are now the mainstay of the cotton industry based in the eastern States of Australia. However, during the early years of breeding and seed increase, there was some uncertainty among regulators about containment measures needed to prevent the movement of regulated GM traits into adjacent fields of conventional cotton and possibly into the human or animal food chain. This was particularly relevant in the more tropical north of Australia that was being used as a winter nursery. Field experiments on GM cottons in eastern Australia were commonplace, but even there, regulators required confirmation that the containment practices already in place (buffer zones and isolation distances) were effective. A series of experiments in a range of environments, designed to monitor the movement of GM pollen into adjacent cotton buffers, adjacent fields, across bare ground and over long distances are reported here. Gene flow from GM plots into adjacent conventional cotton was found to be much higher in northern Australia than in eastern Australia, most likely due to higher honey bee (Apis mellifera) numbers, often deliberately enhanced to aid the surrounding horticultural industries. Movement of pollen over bare ground to nearby crops was observed at a number of locations indicating that small isolation zones should not be used for containment of regulated GM cotton. In general, buffers of 20 m of conventional cotton surrounding GM plots proved to be highly effective unless bee numbers were artificially high. Based on insect observations and rates of pollen flow, it was concluded that pollen beetles (Carpophilus spp.), another potential pollen vector normally highly abundant in cotton, were not associated with movement of pollen more than 1 m away from crops.
Keywords: Bioconfinement; Biosafety; Gene flow; Honeybees; Insect vectors; Pollen dispersal; Pollen traps

Philippe Marmey, Aida Jalloul, Majd Alhamdia, Komi Assigbetse, Jean-Luc Cacas, Andreas E. Voloudakis, Antony Champion, Alain Clerivet, Jean-Luc Montillet, Michel Nicole, The 9-lipoxygenase GhLOX1 gene is associated with the hypersensitive reaction of cotton Gossypium hirsutum to Xanthomonas campestris pv malvacearum, Plant Physiology and Biochemistry, Volume 45, Issue 8, August 2007, Pages 596-606, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2007.05.002.
(http://www.sciencedirect.com/science/article/B6VRD-4NS2GDM-1/2/d24030f96e1ec1cfa4c341b94c87e337)
Abstract:
Hypersensitive reaction (HR) cell death of cotton to the incompatible race 18 from Xanthomonas campestris pathovar malvacearum (Xcm) is associated with 9S-lipoxygenase activity (LOX) responsible for lipid peroxidation. Here, we report the cloning of cotton (Gossypium hirsutum L.) LOX gene (GhLOX1) and the sequencing of its promoter. GhLOX1 was found to be highly expressed during Xcm induced HR. Sequence analysis showed that GhLOX1 is a putative 9-LOX, and GhLOX1 promoter contains SA and JA responsive elements. Investigation on LOX signalisation on cotyledons infiltrated with salicylic acid (SA), or incubated with methyl-jasmonate (MeJA) revealed that both treatments induced LOX activity and GhLOX1 gene expression. HR-like symptoms were observed when LOX substrates were then injected in treated (MeJA and SA) cotyledons or when Xcm compatible race 20 was inoculated on MeJA treated cotyledons. Together these results support the fact that GhLOX1 encodes a 9 LOX whose activity would be involved in cell death during cotton HR.
Keywords: Lipoxygenase; Hypersensitive reaction; Xanthomonas campestris; Gossypium hirsutum; Methyl jasmonate; Salicylic acid

Yuan Chen, Guoyou Ye, Li Zhang, Yonghui Wang, Xiang Zhang, Dehua Chen, Effect of trans-Bacillus thuringiensis gene on gibberellic acid and zeatin contents and boll development in cotton, Field Crops Research, Volume 103, Issue 1, 25 July 2007, Pages 5-10, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.04.003.
(http://www.sciencedirect.com/science/article/B6T6M-4NS36BM-1/2/31137b6eae4e599ee78444b9388a24eb)
Abstract:
Two experiments were conducted to investigate the effect of the Bacillus thuringiensis (Bt) transgene on gibberellic acid and zeatin contents and boll development in cotton using two types of Bt-transformed cultivars. In the 2003 study, boll size and weight, gibberellic acid 3 (GA3) and zeatin (ZR) contents were investigated from 3 to 45 days after flowering (DAF). In 2004, the flowers were sprayed with GA3, 6-benzyl adenine (6-BA) or a combination of both, and responses in boll size and weight, and endogenous GA3 and ZR contents were determined. In comparison to the common parent, Simian 4, overall boll size and weight were lower for the conventional Bt cultivar, Sikang 1, but higher for the hybrid Bt cultivar, Sikang 3. Similarly, the boll GA3 and ZR contents of Sikang 1 were lower than those of Simian 4, while those of Sikang 3 were higher than Simian 4. The largest difference between Sikang 1 and Simian 4 for boll GA3 and ZR contents were 18.5 and 25.5%, respectively, observed at 17 DAF. The largest difference between Sikang 3 and Simian 4 for boll GA3 and ZR contents were 25.5 and 85.7% at 31 DAF respectively. Application of GA3, 6-BA or a combination significantly increased boll size and weight for the conventional Bt cultivar and Simian 4, but did not have a significant effect on these characteristics of the hybrid cultivar Sikang 3. GA3 and ZR contents of the conventional Bt cultivar Sikang 1 were also significantly increased by application of these treatments. The combined application of GA3 and 6-BA tended to have a larger effect than the application of either of them separately, but the differences were statistically not significant. These results suggested that the lower boll GA3 and ZR contents, which could reduce boll nitrogen metabolism intensity, were responsible for the reduced boll development of the conventional Bt cultivar Sikang 1.

Keywords: Bt cotton; Boll development; Endogenous hormone; Gibberellic acid; Zeatin

Ayman A. Suleiman, Cecilia M. Tojo Soler, Gerrit Hoogenboom, Evaluation of FAO-56 crop coefficient procedures for deficit irrigation management of cotton in a humid climate, Agricultural Water Management, Volume 91, Issues 1-3, 16 July 2007, Pages 33-42, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.03.006.
(http://www.sciencedirect.com/science/article/B6T3X-4NS36BH-1/2/7496920f4b0424ff4c0ebf765daec1b1)
Abstract:
The use of the FAO-56 reference evapotranspiration (ETo) approach for irrigation scheduling has been recommended worldwide because it provides reasonable results under a wide range of climatic conditions. The crop ET (ETc) can be obtained from ETo using a stage-dependent crop coefficient (Kc). The latter depends on canopy height and crop-soil surface resistance and albedo. The objective of this study was to evaluate the FAO-56 Kc procedure under different deficit drip irrigation treatments for cotton grown in a humid climate. A cotton experiment was conducted in 2005 in three automated rainout shelters located at the University of Georgia Campus in Griffin, GA, USA. When the modeled soil water content in the effective root zone dropped below a specific threshold of the available water content (AWC), irrigation was applied until the soil water reached 100% of AWC. The irrigation treatments were 40, 60, and 90% irrigation thresholds (IT). For instance, for the 40% IT treatment irrigation was applied when the modeled soil water content dropped to permanent wilting point plus 40% of the total available soil water. Thus, the least irrigated treatment corresponded to the 40% IT and the most irrigated corresponded to the 90% IT. The observed daily ETc was estimated from daily soil moisture readings. The length of the initial, development, and mid-stages were the same among the different treatments. However, the length of the late-stage for the 40 and 60% IT was 5 and 3 days less than that for the 90% IT, respectively. The observed Kc for the initial stage was 0.51, 0.9, and 0.99 for the 40, 60, and 90% IT, respectively. The FAO-56 Kc for this stage was within a few percent from the observed Kc. For the mid-stage, the 60 and 90% IT had a similar value for Kc (about 1.2) which was higher than the 40% IT (0.92). The end of season Kc for the 40% IT (0.1) was lower than for the 60% IT (0.38), which in turn was lower than the 90% IT (0.58). The FAO-56 proved to be an accurate method for estimating cotton ETc under deficit irrigation. The values for the initial, mid, and end Kc and the length of the different developmental stages for the 90% IT can be used in humid climates for fully irrigated cotton. The use of such information will help in effective irrigation planning and more precise water management.
Keywords: Drip irrigation; DSSAT; Irrigation efficiency; Irrigation scheduling; Penman-Monteith; Southeastern USA

Andrew S. Walsh, Thomas A. Louis, Gregory E. Glass, Detecting multiple levels of effect during survey sampling using a Bayesian approach: Point prevalence estimates of a hantavirus in hispid cotton rats (Sigmodon hispidus), Ecological Modelling, Volume 205, Issues 1-2, 10 July 2007, Pages 29-38, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2007.01.016.
(http://www.sciencedirect.com/science/article/B6VBS-4NNPCP9-1/2/4c81c043a32d49ac8efa49dd8eec0ebc)
Abstract:
Interpreting the results of survey samples of animals for zoonotic agents can be confounded by factors acting at various levels of scale. It is difficult to control for the numbers or characteristics of individuals surveyed even with standardized sampling. The survey results at any site may reflect the impact of individual level (e.g. age, gender) factors, local environmental conditions, and landscape structure. Incorporating these different scales to characterize more accurately prevalence estimates from survey results is problematic.

We propose an empirical Bayesian format to deal with these factors and demonstrate the approach by modeling estimates of Black Creek Canal Virus infection prevalence (as determined by prevalence of antibodies) among local populations of hispid cotton rats (Sigmodon hispidus) trapped in Dade County, Florida. Trapping was conducted at 110 sites for three nights using a standard protocol. A total of 1042 hispid cotton rats were captured (range 0-51 per site). A succession of Bayesian models was fit to identify variables that improved estimates of site-specific prevalences. At the individual level, both weight and sex were significant predictors of infection. Features of the local landscape, inferred from a LANDSAT image of the region, such as vegetation type and thermal indices, were also associated with increased likelihood of infection. Isolation of a trap site from suitable hispid cotton rat habitat was correlated with decreased prevalence. Finally, a spatially distributed intercept term showed regions of higher or lower than normal risk not explained by other variables. This suggests the rat populations near those sites may have been geographically connected to each other and/or disconnected from other sites.
Keywords: Bayesian modeling; Hantavirus; Conditional autoregressive model; Black Creek Canal Virus; Cotton rat; Sigmodon hispidus

Wei-wei FAN, Li-an WANG, Chun-hong MA, Wen-qi DONG, Yun-chao LI, Zi-hui LIU, Yin-suo JIA, Jun-yi GENG, Xiang-yun ZHANG, The Influence of the Verticillium dahliae Kleb Infection on the Anti-Enzyme Inside the Body of the Cotton with Different Root Injured Degree, Agricultural Sciences in China, Volume 6, Issue 7, July 2007, Pages 816-824, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60117-5.
(http://www.sciencedirect.com/science/article/B82XG-4P9F020-7/2/9c140db3073ca24227328832e46c5a71)
Abstract: Abstract
This study was to explore the influence of the Verticillium dahliae Kleb inflection on the anti-enzyme inside the body of the cotton with a different root injured degree. When the cotton seedling was long, with four leaves, it was flushed with water carefully, and then the following were obtained: (1) complete root seedling; (2) cut root seedling - by cutting off the lower part, 3-5 cm of the root, with a disinfected knife; (3) injured root seedling - by cutting off most of the side roots, but keeping the main root. Three kinds of cotton seedlings with different roots were immersed separately in different concentrations of the germ liquid (V. dahliae) of 20 mL each. Through 0-48 h, the wilt degree of the seedling was recorded, and the related anti-enzyme of the variety was measured. After being immersed in the germ liquid, there was a significant difference in the wilt degree of the three kinds of injured root. When the germ liquid was in the ratio of 1:10, the complete root seedling was the lightest with no wilt; the injured root seedling was the second with a 2-degree wilt; but the cut root seedling was the most serious with a 3-degree wilt. At the same time, the changes in the peroxidase and malondialdehvde activities were determined. Peroxidase (POD) activities in the cut root seedling were 38.2 U mg-1 min-1, in the injured root seedling were 42.96 U mg-1 min-1, and in the complete root seedling were the highest at 49.2 U mg-1 min-1. The malondialdenvde (MDA) content in cut root seedling was 39.483 mmol g-1, injured root seedling was 27.12 mmol g-1, and the complete root seedling was only 3.845 mmol g-1. The activity of the related anti-enzymes, such as POD was high or low, the quantity of the MDA was more or less, which they met the order of the harm of the seedlings. The change of SOD activities in cut root seedling was the most obvious as well. After injuring and inflecting the young roots, the exterior pathological reaction of the seedling and the dynamic state biochemical reaction of the related enzymes inside the plant body were studied. It showed that the plant exterior pathology responded to the test, with the internal biochemical reaction fitting together mutually.
Keywords: cotton; Verticillium dahliae Kleb; injury of root; POD; SOD; MDA

Sharon Downes, Rod Mahon, Karen Olsen, Monitoring and adaptive resistance management in Australia for Bt-cotton: Current status and future challenges, Journal of Invertebrate Pathology,

Volume 95, Issue 3, Special Issue for SIP 2007, SIP 2007, July 2007, Pages 208-213, ISSN 0022-2011, DOI: 10.1016/j.jip.2007.03.010.
(http://www.sciencedirect.com/science/article/B6WJV-4NBH239-3/2/888c46b11ed586ed4b7b61607042ede1)
Abstract:
In the mid-1990s the Australian Cotton industry adopted an insect-resistant variety of cotton (Ingard(R)) which expresses the Bt toxin Cry1Ac that is specific to a group of insects including the target Helicoverpa armigera. A conservative resistance management plan (RMP), that restricted the area planted to Ingard(R), was implemented to preserve the efficacy of Cry1Ac until two-gene transgenic cotton was available. In 2004/05 Bollgard II(R) replaced Ingard(R) as the transgenic cotton available in Australia. It improves on Ingard(R) by incorporating an additional insecticidal protein (Cry2Ab). If an appropriate refuge is grown, there is no restriction on the area planted to Bollgard II(R). In 2004/05 and 2005/06 the Bollgard II(R) acreage represented approximately 80 of the total area planted to cotton in Australia. The sensitivity of field-collected populations of H. armigera to Bt products was assayed before and subsequent to the widespread deployment of Ingard(R) cotton. In 2002 screens against Cry2Ab were developed in preparation for replacement of Ingard(R) with Bollgard II(R). There have been no reported field failures of Bollgard II(R) due to resistance. However, while alleles that confer resistance to H. armigera in the field are rare for Cry1Ac, they are surprisingly common for Cry2Ab. We present an overview of the current approach adopted in Australia to monitor and adaptively manage resistance to Bt-cotton in field populations of H. armigera and discuss the implications of our findings to date. We also highlight future challenges for resistance management in Australia, many of which extend to other Bt-crop and pest systems.
Keywords: Bacillus thuringiensis; Cotton; Resistance; Helicoverpa armigera; Australia

G.T. Gujar, V. Kalia, A. Kumari, B.P. Singh, A. Mittal, R. Nair, M. Mohan, Helicoverpa armigera baseline susceptibility to Bacillus thuringiensis Cry toxins and resistance management for Bt cotton in India, Journal of Invertebrate Pathology, Volume 95, Issue 3, Special Issue for SIP 2007, SIP 2007, July 2007, Pages 214-219, ISSN 0022-2011, DOI: 10.1016/j.jip.2007.03.011.
(http://www.sciencedirect.com/science/article/B6WJV-4NBH239-4/2/42f4babcdae7e2e76afb7a75cd081332)
Abstract:
Transgenic cotton that produces insecticidal proteins from Bacillus thuringiensis (Bt), often referred to as Bt cotton, is widely grown in many countries. Bt cotton with a single cry1A gene and stacked also with cry2A gene has provided satisfactory protection against the damage by the lepidopteran bollworms, especially the cotton bollworm, Helicoverpa armigera (Hubner) which is considered as a key pest. The baseline susceptibility of the larvae of H. armigera to Cry1Ac and other toxins carried out in many countries has provided a basis for monitoring resistance. There is no evidence of development of field-level resistance in H. armigera leading to the failure of Bt cotton crop anywhere in the world, despite the fact that Bt cotton was grown on the largest ever area of 12.1 million hectares in 2006 and its cumulative cultivation over the last 11 years has surpassed the annual cotton area in the world. Nevertheless, the Bt resistance management has become a necessity to sustain Bt cotton and other transgenic crops in view of potential of the target insects to evolve Cry toxin resistance.
Keywords: Cotton bollworm; Helicoverpa armigera; Bacillus thuringiensis Cry toxins; Bt cotton; Bt resistance management

Kongming Wu, Monitoring and management strategy for Helicoverpa armigera resistance to Bt cotton in China, Journal of Invertebrate Pathology, Volume 95, Issue 3, Special Issue for SIP 2007, SIP 2007, July 2007, Pages 220-223, ISSN 0022-2011, DOI: 10.1016/j.jip.2007.03.012.

(http://www.sciencedirect.com/science/article/B6WJV-4NBH239-6/2/055dd4e639efe9611ed06429cd033e3c)
Abstract:
The cotton bollworm, Helicoverpa armigera, is one of the most important insect pests in cotton growing regions of China. Transgenic cotton that expresses a gene derived from the bacterium Bacillus thuringiensis (Bt) has been deployed for combating cotton bollworm since 1997. Natural refuges derived from the mixed planting system consisting of cotton, corn, soybean, vegetables, peanut and others on single-family farms of a small scale were used for delaying the evolution of resistance to Bt cotton. Susceptibility of H. armigera field populations to the Bt insecticidal protein Cry1Ac was monitored from 1997 to 2006. The results indicate that the field populations are still susceptible to Cry1Ac, and monitoring indication no apparent shifts in susceptibility in field populations of this important pest.
Keywords: Bt cotton; Helicoverpa armigera; Resistance management; Natural refugia

Ryan W. Kurtz, Alan McCaffery, David O'Reilly, Insect resistance management for Syngenta's VipCot(TM) transgenic cotton, Journal of Invertebrate Pathology, Volume 95, Issue 3, Special Issue for SIP 2007, SIP 2007, July 2007, Pages 227-230, ISSN 0022-2011, DOI: 10.1016/j.jip.2007.03.014.
(http://www.sciencedirect.com/science/article/B6WJV-4NBH239-7/2/465bfcbf13e05b53e62857481f5d02d1)
Abstract:
Syngenta is seeking commercial registration for VipCot(TM) cotton, a pyramided transgenic cotton trait that expresses two insecticidal proteins derived from Bacillus thuringiensis Vip3A and Cry1Ab. Both proteins are highly effective against two key cotton pests, Helicoverpa zea cotton bollworm; and Heliothis virescens, tobacco budworm. To investigate the role of VipCot(TM) cotton in delaying the development of resistance in these pests to transgenic Bt traits, Syngenta has performed studies to determine the dose of proteins expressed in VipCot(TM) and evaluate the potential for cross-resistance between the component proteins. Following United States Environmental Protection Agency (US EPA) high dose methods 1 and 4, VipCot(TM) was shown to express a high dose of proteins for H. zea and H. virescens. VipCot(TM) was also confirmed to express a high dose of proteins for H. zea through US EPA Method 5. Additionally, all the data collected to date verify a lack of cross-resistance between Vip3A and Cry proteins. These two key pieces of information indicate that VipCot(TM) cotton should be very durable under the currently mandated high dose plus refuge insect resistance management strategy.
Keywords: Bacillus thuringiensis; Insect resistance management; Vip3A; Helicoverpa zea; Heliothis virescens

Walter E. Thomas, Wesley J. Everman, James R. Collins, Clifford H. Koger, John W. Wilcut, Rain-free requirement and physiological properties of cotton plant growth regulators, Pesticide Biochemistry and Physiology, Volume 88, Issue 3, July 2007, Pages 247-251, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2006.12.002.
(http://www.sciencedirect.com/science/article/B6WP8-4MJSCG3-2/2/3bc472a69379a5fc4648aa360f596c10)
Abstract:
Greenhouse studies were conducted to (1) evaluate the rain-free requirement for mepiquat chloride and mepiquat chloride plus cyclanilide with and without surfactant and to (2) evaluate absorption and translocation of cyclanilide, a component of a new cotton plant growth regulator. No significant differences in the number of nodes, leaf area, and plant organ fresh and dry weight were observed with any PGR treatment and rainfall simulation combination. Both plant growth regulators responded similarly to rainfall interval. As rain-free period increased, cotton height was reduced. Based on these data, a rain-free period of 8 h is needed to maximize efficacy, regardless

of the use of surfactant. Absorption of cyclanilide ranged from 11 to 15% at 3 and 48 h after treatment, respectively. Averaged over harvest intervals, 18% of the applied cyclanilide remained in the treated leaf while 1.7 and 6.5% of the applied cyclanilide was found in the above and below treated leaf tissue, respectively.
Keywords: Plant height; Absorption; Translocation; Rain-free period; Leaf area

Peng Gao, Pi-Ming Zhao, Juan Wang, Hai-Yun Wang, Xiao-Min Wu, Gui-Xian Xia, Identification of genes preferentially expressed in cotton fibers: A possible role of calcium signaling in cotton fiber elongation, Plant Science, Volume 173, Issue 1, July 2007, Pages 61-69, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2007.04.008.
(http://www.sciencedirect.com/science/article/B6TBH-4NK4G15-1/2/552b3f475a759177ebef05659b26d78f)
Abstract:
Cotton fiber is an extremely elongated single cell that is considered as an ideal system for studying the mechanisms controlling plant cell elongation. In this study, suppression subtractive hybridization (SSH) between RNA from leaves and fibers of cotton plant was conducted to identify genes that are specifically or preferentially expressed in fiber cells. Screening the resulting SSH library by reverse Northern analysis identified a total of 180 differentially expressed cDNA fragments. Sequencing determination and database analysis revealed 64 non-redundant cDNA clones, of which, 25 code for unknown-function proteins. Among these cDNAs, four were found to encode for proteins that showed high homology to calcium signaling components including calmodulin (CaM), glutamate decarboxylase (GAD) and calcineurin B-like (CBL) protein-interacting protein kinases (CIPKs). RT-PCR analysis indicated that the transcripts of these genes were accumulated predominantly in elongating fiber cells. Moreover, the expression level of these genes was significantly reduced in the li (ligon-lintless) mutant fibers as compared to the wild-type control. One of the two CIPKs, designated as GhCIPK1, was further characterized in this study. Structural analysis showed that GhCIPK1 contained the characteristic domains of CIPK proteins and was highly expressed in the elongating phase in developing fiber, and in vitro assay demonstrated that the gene product was a functional protein kinase. Our results suggest that calcium-mediated signal transduction may play an important role in cotton fiber elongation.
Keywords: Cotton fiber; Elongation; Suppression subtractive hybridization; CIPK

Gang Wu, Fa Jun Chen, Feng Ge, Impacts of early-season square abscission on the growth and yield of transgenic Bt cotton under elevated CO2, Field Crops Research, Volume 102, Issue 3, 20 June 2007, Pages 239-243, ISSN 0378-4290, DOI: 10.1016/j.fcr.2007.03.007.
(http://www.sciencedirect.com/science/article/B6T6M-4NN1TJD-1/2/5b38876b9cacb39529e4fa838378d592)
Abstract:
A field study was carried out to quantify the compensation capacity of Bacillus thuringiensis (Bt)-transgenic cotton to simulated damage by manually removing squares during the early growing season in 2004 and 2005 in combination with CO2 levels (ambient CO2 and elevated CO2). Treatments included: initial squares were wholly (100%) removed manually for 1 week (i.e., SR1 treatment) and for 2 consecutive weeks (i.e., SR2 treatment). Plant leaf area was measured every 2 weeks, and plant root, stem, leaf, shatters, boll dry weight and lint yield and maturity were measured at harvest. Significantly higher leaf area per plant was observed on each sampling date for SR1 and SR2 treatments compared with control (SR0) treatment in 2004 and 2005 under elevated CO2. Significantly higher lint yield and maturity were observed for SR0, SR1 and SR2 treatments under elevated CO2 in 2004 and 2005. CO2 concentration and square removal significantly affected plant lint yield and maturity. Moreover, the interaction between CO2 concentration x square removal had a significant effect on plant leaf dry weight, lint yield and

maturity. Our results indicated that transgenic cotton plants can compensate for the manual removal of 100% of the initial squares for 1 and 2 weeks under ambient and elevated CO2.
Keywords: Elevated CO2; Transgenic Bt cotton; Square removal; Maturity; Lint yield

Samuel Nibouche, Natacha Guerard, Pierre Martin, Maurice Vaissayre, Modelling the role of refuges for sustainable management of dual-gene Bt Cotton in West African smallholder farming systems, Crop Protection, Volume 26, Issue 6, June 2007, Pages 828-836, ISSN 0261-2194, DOI: 10.1016/j.cropro.2006.05.018.
(http://www.sciencedirect.com/science/article/B6T5T-4M33VPN-1/2/5053df7d3c54c7940ea0d992ecfb7aa5)
Abstract:
Modelling is a common tool for evaluating the sustainability of Bt crops. We previously used modelling to show that, under the agro-ecological conditions of West Africa, non-Bt cotton could be used as a refuge to delay the development of resistance to Bt toxins in Helicoverpa armigera. We concluded that Cry1Ac Bt Cotton should be limited to 20% of the total cotton acreage [Nibouche, S., Martin, P., Vaissayre, M., 2003. A modelling approach of the sustainability of Bt cotton grown by small farmers in West Africa. Res. Pest Manag. Newsl. 13, 55-58]. Here we present results obtained with a cotton cultivar expressing two Bt genes (dual-gene Bt Cotton). Our conclusions are the same as those drawn on the basis of results obtained with one-gene Bt Cotton, i.e. non-Bt cotton refuges are essential for effective prevention of resistance, since wild host plants of the bollworm have not been found to serve as a refuge for this pest during the rainy season. The optimal size of non-Bt cotton refuges depends on bollworm mortality levels on Bt cotton, and on gene flow between rainfed crops and irrigated vegetable crops. Although there is very little data available regarding pest movements and/or migration and crop-pest interactions in the agro-ecological conditions of West Africa, our simulations indicate that Bt cotton should not be grown on more than 20-25% of the total cotton cropping area in order to prevent resistance from developing in the long term.
Keywords: Transgenic crop; Resistance; Model; Helicoverpa armigera; Cotton

H. Cheng, W. Jin, H. Wu, F. Wang, C. You, Y. Peng, S. Jia, Isolation and PCR Detection of Foreign DNA Sequences in Bee Honey Raised on Genetically Modified Bt (Cry 1 Ac) Cotton, Food and Bioproducts Processing, Volume 85, Issue 2, June 2007, Pages 141-145, ISSN 0960-3085, DOI: 10.1205/fbp06056.
(http://www.sciencedirect.com/science/article/B8JGD-4S1T0R1-8/2/acef58f7eda3a71c972433fff23102ca)
Abstract:
Genetically modified Bt cotton has been planted in large scale in China since 1997. Its acreage reached 3.7 million ha, accounting for 66% of the total cotton cultivation area in 2004. Since cotton is one of the major honey-source plants, it raises a concern in the international trade whether there are any alien DNA sequences contained in honey. Therefore, development of detection methods for bee honey associated with Bt cotton has become urgently needed. We have developed a DNA extraction procedure and a PCR protocol for the detection of foreign DNA sequences in bee honey. A detailed step-by-step procedure for the extraction of DNA from honey was described. A key step for purifying DNA from bee honey is to separate out high amount of sugars by using phosphate buffered saline (PBS) with stronger buffering capacity. With PCR protocol, alien and cotton endogenous DNA sequences with a length of 125-550 bp can be specifically amplified.
Keywords: genetically modified organism; Bt cotton; honey; DNA extraction; PCR method

Wayne E. Marshall, Danny E. Akin, Lynda H. Wartelle, Patricia A. Annis, Citric acid treatment of flax, cotton and blended nonwoven mats for copper ion absorption, Industrial Crops and Products,

Volume 26, Issue 1, June 2007, Pages 8-13, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2006.12.011.
(http://www.sciencedirect.com/science/article/B6T77-4N3GNTC-1/2/c2856d5738aa6ca248d08315e09cbdc1)
Abstract:
The removal of metal ions from polluted water and wastewater with biodegradable, natural products is an area of current interest in the environmental arena. The objective of this study is to determine whether nonwoven mats made of biodegradable, natural fibers of flax and cotton can be used for remediation of a ubiquitous pollutant of water and wastewater, namely, copper ion. Nonwoven mats manufactured with flax or cotton fiber and flax/cotton fiber blends were treated with citric acid in order to enhance the amount of negative charge on the mats and improve their ability to sequester copper ion. The treated mats were monitored for changes in copper ion adsorption and fabric strength and compared to non-treated mats and process control mats. The results show that mats made from 100% flax and 75%/25% flax/cotton blends were similar to each other and significantly better at copper ion absorption than 100% cotton or 50%/50% flax/cotton blended nonwoven mats. Citric acid treatment, however, diminished mat strength compared to untreated mats for all samples; strength was similar for all treated nonwoven mats after correction for variable mat thickness. Treated flax fiber mats and flax/cotton fiber mats represent a potentially fast and convenient method for removal of metal ions from water and wastewater streams at an approximate cost of $1.40/m2 of mat.
Keywords: Flax; Flax/cotton blends; Cotton; Citric acid treatment; Nonwoven mats

Wei-Dong YAN, Wei-Ming SHI, Bao-Hai LI, Min ZHANG, Overexpression of a Foreign Bt Gene in Cotton Affects the Low-Molecular-Weight Components in Root Exudates, Pedosphere, Volume 17, Issue 3, June 2007, Pages 324-330, ISSN 1002-0160, DOI: 10.1016/S1002-0160(07)60039-3.
(http://www.sciencedirect.com/science/article/B82XV-4NX345M-6/2/bb0ef90cca633cacae114b44658eb52f)
Abstract:
Most research in the past using genetically modified crops (GM crops) has focused on the ecological safety of foreign gene (i.e., the gene flow), gene products (for example, Bt (Bacillus thuringiensis) protein), and the safety of transgenic food for humans. In this study, changes in both the species and amounts of low-molecular-weight components in cotton (Gossypium hirsutum L.) root exudates after foreign Bt gene overexpression were investigated under different nutritional conditions. Transgenic cotton containing Bt (Bt-cotton), supplemented with all the mineral nutrients, secreted more organic acids than the wild-type cotton (WT). When nitrogen was removed from the full-nutrient solution, the amount of organic acids secretion of Bt-cotton was lesser than that of WT. The roots of the transgenic cotton secreted lesser amounts of amino acids and soluble sugars than the WT roots in the full-nutrient solution. Deficiencies of P and K caused a large increase in the total amino acid and soluble sugar secretions of both Bt-cotton and WT, with larger increases observed in Bt-cotton. Because transferring the foreign Bt gene into cotton can result in alterations in the components of the root exudates, with the effect varying depending on the nutritional status, the cultivation of genetically modified crops, such as Bt-cotton, in soil environments should be more carefully assessed, and the possible effects as a result of the alterations in the root exudate components should be considered.
Keywords: gene overexpression; low-molecular-weight components; nutritional status; root exudates; transgenic cotton

Nazirbay Ibragimov, Steven R. Evett, Yusupbek Esanbekov, Bakhtiyor S. Kamilov, Lutfullo Mirzaev, John P.A. Lamers, Water use efficiency of irrigated cotton in Uzbekistan under drip and furrow irrigation, Agricultural Water Management, Volume 90, Issues 1-2, 24 May 2007, Pages 112-120, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.01.016.

(http://www.sciencedirect.com/science/article/B6T3X-4NBRYG0-1/2/53bd616167bdcc535de298e92d01bac5)
Abstract:
The main goal of this research was to measure cotton water use, and to determine irrigation water scheduling parameters associated with optimal seed-lint yield and irrigation water use efficiency, which are poorly understood in the Central Asian Republic of Uzbekistan. A cotton (Gossypium hirsutum L.) field experiment with drip irrigation in comparison to furrow (conventional) irrigation was conducted on a deep silt loam soil (Calcic Xerosol) at the Central Experiment Station of the Uzbekistan National Cotton Growing Research Institute at Tashkent in 2003, 2004 and 2005. To investigate irrigation scheduling, the field capacity (FC) index was adopted, which was 0.30 m3 m-3 in this soil. Irrigations were scheduled when soil water in the root zone was depleted to specific fractions of FC, e.g., 70% of FC, for each of three main plant growth periods (germination-squaring; squaring-flowering; beginning of maturation-maturation). Crop water use, which we here define as the sum of transpiration and evaporation, was established using the soil water balance approach on a weekly basis. Soil profile water content was determined using a neutron moisture meter (NMM), which was calibrated in polyvinyl chloride (PVC) access tubes for each differing soil layer. Under drip irrigation and the optimal mode (70-70-60% of FC) of irrigation scheduling, 18-42% of the irrigation water was saved in comparison with furrow irrigated cotton grown under the same condition; and irrigation water use efficiency increased by 35-103% compared with that of furrow irrigation. Seed-lint cotton yield was increased 10-19% relative to that for furrow irrigated cotton. The irrigation scheduling rule developed here should be considered an improved practice for drip irrigated cotton that is applicable to irrigated Calcic Xerosols of Uzbekistan.
Keywords: Cotton; Drip irrigation; Furrow irrigation; Irrigation scheduling; Water use efficiency; Neutron moisture meter

G.S. Buttar, M.S. Aujla, H.S. Thind, C.J. Singh, K.S. Saini, Effect of timing of first and last irrigation on the yield and water use efficiency in cotton, Agricultural Water Management, Volume 89, Issue 3, 10 May 2007, Pages 236-242, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.01.011.
(http://www.sciencedirect.com/science/article/B6T3X-4N74J2S-1/2/65a94a1e3700b47c1b674d3ee89eec54)
Abstract:
With increasing concern about declining water resources, there is increasing thrust in improving water management in farming systems to improve water use efficiency. The present investigation was undertaken to determine the optimum timing for the first and last irrigation of cotton on the basis of meteorological approach for scheduling irrigations. The experiment was conducted in a split plot design with three timings of first irrigation as main-plots and three timing of last irrigation as sub-plots. Delay of first irrigation from 28 days after sowing (DAS) to 42 DAS, irrespective of last irrigation, resulted in an increase of 8, 14 and 17% in seed cotton yield during first, second and third year, respectively. The corresponding increases due to delay in the last irrigation from 130 to 170 DAS were 14, 32 and 8%, respectively. On the basis of 3 years average, application of first and last irrigation at optimum time (after 42 and 170 days after sowing) resulted in an increase of 36% in seed cotton yield without involving any additional cost. Water expense efficiency (WEE) increased by 54%.
Keywords: Cotton; First irrigation; Last irrigation; Seed cotton yield; Water expense efficiency

Gen-hai HU, Shu-xun YU, Shu-li FAN, Mei-zhen SONG, Cloning and Expressing of a Gene Encoding Cytosolic CopperEinc Superoxide Dismutase in the Upland Cotton, Agricultural Sciences in China, Volume 6, Issue 5, May 2007, Pages 536-544, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60080-7.
(http://www.sciencedirect.com/science/article/B82XG-4NX345H-4/2/81b544ef1e7eac3cb79c9a530f2f9170)

Abstract:
In this study, a gene encoding a superoxide dismutase (SOD) was cloned from senescent leaves of cotton (Gossypium hirsutum), and its expressing profile was analyzed. The gene was cloned by rapid amplification of cDNA ends (RACE) method. Northern blotting was used to show the profile of the gene expression, and the enzyme activity was mensurated by NBT deoxidization method in different growth periods. The full length of a gene of cytosolic copper/zinc superoxide dismutase (CulZn-SOD) was isolated from cotton (GenBank Accession Number: DQ445093). The sequence of cDNA contained 682 bp, the opening reading frame 456 bp, and encoded polypeptide 152 amino acids with the predicted molecular mass of 15.03 kD and theoretical PI of 6.09. The amino acid sequence was similar with the other plants from 82 to 87%. Southern blotting showed that the gene had different number of copies in different cotton species. Northern blotting suggested that the gene had different expression in different tissues and development stages. The enzyme activity was the highest in peak flowering stage. The cotton cytosolic (CuIZn-SOD) had lower copies in the upland cotton. The copper/zinc superoxide dismutase mRNA expressing level showed regular changing in the whole development stages; it was lower in the former stages, higher in latter stages and the highest at the peak flowering stage. The curve of the copper/zinc superoxide dismutase mRNA expressing level was consistent with that of the Cu/Zn-SOD enzyme activity. The copperlzinc superoxide dismutase mRNA expressing levels of different organs showed that the gene was higher in the root, leaf, and lower in the flower.
Keywords: cotton; copperlzinc superoxide dismutase; gene; cloning

Deepti Gupta, Adane Haile, Multifunctional properties of cotton fabric treated with chitosan and carboxymethyl chitosan, Carbohydrate Polymers, Volume 69, Issue 1, 1 May 2007, Pages 164-171, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.09.023.
(http://www.sciencedirect.com/science/article/B6TFD-4MFCW2T-1/2/fef2904b7faa25bd5aa903b110e1013d)
Abstract:
A water soluble carboxymethyl derivative of chitosan was prepared with a view to develop a multifunctional finish on cotton. Results show that treated cotton has better dyeability with direct and reactive dyes. Treatment with modified chitosan makes it possible to dye cotton in bright shades with cationic dyes having high wash fastness. Treated samples showed good antimicrobial activity against Escherichia coli and Staphylococcus aureus at 0.1% concentration as well as improved wrinkle recovery. The effect was found to be durable for five laundering cycles.
Keywords: Antibacterial activity; Chitosan; Basic dyeable cotton; Multifunctional finish

James R. Fuxa, Arthur R. Richter, Maynard L. Milks, Threshold distances and depths of nucleopolyhedrovirus in soil for transport to cotton plants by wind and rain, Journal of Invertebrate Pathology, Volume 95, Issue 1, May 2007, Pages 60-70, ISSN 0022-2011, DOI: 10.1016/j.jip.2006.11.011.
(http://www.sciencedirect.com/science/article/B6WJV-4MSXTBD-2/2/9108bf3b10d92726c005b76e698fde23)
Abstract:
Two aspects of abiotic transport of nucleopolyhedrovirus from soil to cotton plants were examined in greenhouse experiments: the distance from the plants and depth in soil from which the virus could be transported under controlled conditions of soil type and moisture, wind, and precipitation. Transport distance and depth were tested separately under relatively conducive (precipitation/sandy soil and wind/clay soil) and non-conducive (precipitation/clay soil and wind/sandy soil) conditions, as determined in previous research. The amount of virus transported by precipitation generally decreased as distance from the plant increased, but in wind the amounts of virus transported were best described by polynomial models, with transport efficiency usually peaking at a distance of 60 cm. Depending on plant height and tissue, the farthest distances that

virus was transported ranged from 30 to 60 cm by precipitation from clay soil, 60-75 cm in precipitation/sand, 60-80 cm in wind/clay, and 60-80 cm in wind/sand. In the depth experiments, transport by precipitation and wind generally decreased as the depth of virus in soil increased. The greatest depth from which NPV was transported ranged from 0 to 0.5 cm by precipitation from clay soil, 0.5-1.0 cm in precipitation/sand, 1.0-2.0 cm in wind/clay, and 0.5-1.0 cm in wind/sand. All of the experimental parameters (distance or depth, soil type, plant height, plant tissue) and all two-way interactions significantly ($P < 0.05$) affected transport in all four experiments, except for the 'soil x plant tissue' interaction in the depth/wind experiment. In all of the experiments, transport was significantly greater ($P < 0.05$) to lower than to upper portions of plants and to leaves than to buds and squares. Transport was significantly greater from sandy soil than from clay in precipitation, and it was greater from clay than from sandy soil in wind. The results will contribute to NPV epizootiology, microbial control, and risk assessment.
Keywords: Baculoviridae; Heliothis virescens; Nucleopolyhedrovirus, transport; Nucleopolyhedrovirus, epizootiology; Transport, soil-plant; Transport, wind; Transport, rain

Jun-hua BAI, Shao-kun LI, Ke-ru WANG, Xue-yan SUI, Bing CHEN, Fang-yong WANG, Estimating Aboveground Fresh Biomass of Different Cotton Canopy Types with Homogeneity Models Based on Hyper Spectrum Parameters, Agricultural Sciences in China, Volume 6, Issue 4, April 2007, Pages 437-445, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60067-4.
(http://www.sciencedirect.com/science/article/B82XG-4NKBGKG-8/2/a073473ccd6e4dea2c7c1df8cd357378)
Abstract:
AGB (aboveground fresh biomass) is one of the most important parameters of the crop condition monitored with remote sensing. Hyper spectrum remote sensing with the fine spectrum information becomes the efficient method estimating the vegetation AGB. The research was conducted in Xinjiang, the largest cotton planting region of China. The paper analyzed the correlation between the cotton AGB and reflective spectrum and the first derivative spectrum, and the variation coefficient of the waveband reflectance. According to the analysis above, all of 23 parameters, including the hyper spectrum reflectance, the first derivative spectrum parameters and normalization vegetation indexes, were established. And then the estimation models on cotton AGB of relaxing and compact canopy type were established and tested respectively. The tested results showed that F901, [901, 502], [901, 629], [901, 672] among the reflective spectral parameters and D525, D956, D1019, D1751 among the first derivative spectral parameters had the homogenous effect on different cotton canopy types, and the determination coefficients of the models above all arrive at the significant level of 0.99 confidence interval. At last, the tested results of the homogeneity models for different canopy types indicated the parameters of [901, 502], [901, 629], [901, 672] have more satisfying veracity than others, and the relative errors are as low as 17.0, 16.3 and 16.7% correspondingly; in contrast, the estimation veracity of the first derivative spectrum parameters of single waveband is low.
Keywords: canopy types of cotton; AGB; hyperspectrum parameters; homogeneity estimation models

K.S. Thangamani, M. Sathishkumar, Y. Sameena, N. Vennilamani, K. Kadirvelu, S. Pattabhi, S.E. Yun, Utilization of modified silk cotton hull waste as an adsorbent for the removal of textile dye (reactive blue MR) from aqueous solution, Bioresource Technology, Volume 98, Issue 6, April 2007, Pages 1265-1269, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.05.010.
(http://www.sciencedirect.com/science/article/B6V24-4KCHD2M-1/2/221e218a94c0b5f03f3922f43ed82755)
Abstract:
Carbon prepared from silk cotton hull was used to remove a textile dye (reactive blue MR) from aqueous solution by an adsorption technique under varying conditions of agitation time, dye

concentration, adsorbent dose and pH. Adsorption depended on solution pH, dye concentration, carbon concentration and contact time. Equilibrium was attained with in 60 min. Adsorption followed both Langmuir and Freundlich isotherm models. The adsorption capacity was found to be 12.9 mg/g at an initial pH of 2 +/- 0.2 for the particle size of 125-250 [mu]m at room temperature (30 +/- 2 [degree sign]C).
Keywords: Silk cotton hull; Carbon; Dye; Adsorption; Isotherms

Duli Zhao, K. Raja Reddy, V. Gopal Kakani, John J. Read, Sailaja Koti, Canopy reflectance in cotton for growth assessment and lint yield prediction, European Journal of Agronomy, Volume 26, Issue 3, April 2007, Pages 335-344, ISSN 1161-0301, DOI: 10.1016/j.eja.2006.12.001.
(http://www.sciencedirect.com/science/article/B6T67-4MY118S-2/2/7167812be23608282876191fd2b6ec6d)
Abstract:
A field experiment was conducted in 2001-2002 to investigate relationships between canopy spectral reflectance and leaf area index (LAI), aboveground biomass (ABM), and lint yield of irrigated cotton across four N fertilizer rates of 0, 56, 112, and 168 kg N ha-1. These N rates were used to generate a wide range of difference in canopy structure and lint yield. Measurements of canopy reflectance were made throughout the growing season using a hand-held spectroradiometer. Samples for LAI and ABM were obtained four (2001) or five (2002) times during squaring and fruiting. Mean reflectance values in red (Rred) and near infrared (RNIR) regions were obtained from canopy reflectance data based on the Landsat Thematic Mapper bands. The reflectance ratio vegetation index (RVI), normalized difference vegetation index (NDVI), enhanced vegetation index (EVI), wide dynamic range vegetation index (WDRVI) as well as several hyperspectral reflectance indices were calculated. Most reflectance indices had exponential relationships with both LAI and ABM and reached saturation at high LAI and ABM, but were linearly correlated with log(LAI) and log(ABM). Relative lint yield was linearly correlated to the reflectance indices measured any time after the first square stage and the strongest correlation was obtained at the early flower stage with r2 of 0.56-0.89 ($P < 0.01$). Therefore, the canopy reflectance indices measured at early flower stage of cotton growth could serve as input to a crop growth model for predicting potential yield loss. These results indicate that the early flower stage is an appropriate time to collect canopy reflectance data for cotton yield estimation.
Keywords: Cotton (Gossypium hirsutum L.); Leaf area index; Aboveground biomass; N fertilizer rate; Lint yield; Canopy reflectance; Remote sensing

Manuela Schmidt, Nadja Schilling, Fiber type distribution in the shoulder muscles of the tree shrew, the cotton-top tamarin, and the squirrel monkey related to shoulder movements and forelimb loading, Journal of Human Evolution, Volume 52, Issue 4, April 2007, Pages 401-419, ISSN 0047-2484, DOI: 10.1016/j.jhevol.2006.11.005.
(http://www.sciencedirect.com/science/article/B6WJS-4MJ3J4X-1/2/82410253dad082a2b0d9074a98502ee6)
Abstract:
Muscle fiber type composition of intrinsic shoulder muscles was examined in tree shrews, cotton-top tamarins, and squirrel monkeys with respect to their shoulder kinematics and forelimb loading during locomotion. Enzyme- and immunohistochemical techniques were applied to differentiate muscle fiber types on serial cross-sections of the shoulder. In the majority of the shoulder muscles, the proportions of fatigue resistant slow-twitch fibers (SO) and fatigable fast-twitch fibers (FG) were inversely related to each other, whereas the percentage of intermediate FOG-fibers varied independently. A segregation of fatigue resistant SO-fibers into deep muscle regions is indicative of differential activation of histochemically distinct muscle regions in which deep regions stabilize the joint against gravitational loading. In all three species, this antigravity function was demonstrated for both the supraspinatus and the cranial subscapularis muscle, which prevent

passive joint flexion during the support phase of the limb. The infraspinatus muscle showed a high content of SO-fibers in the primate species but not in the tree shrew, which demonstrates the 'new' role of the infraspinatus muscle in joint stabilization related to the higher degree of humeral protraction in primates. In the tree shrew and the cotton-top tamarin, a greater proportion of the body weight is carried on the forelimb, but the squirrel monkey exhibits a weight shift to the hind limbs. The lower amount of forelimb loading is reflected by an overall lower proportion of fatigue resistant muscle fibers in the shoulder muscles of the squirrel monkey. Several muscles such as the deltoid no longer function as joint stabilizers and allow the humerus to move beyond the scapular plane. These differences among species demonstrate the high plasticity of the internal muscle architecture and physiology which is suggested to be the underlying reason for different muscle activity patterns in homologous muscles. Implications for the evolution of new locomotor modes in primates are discussed.
Keywords: Muscle fiber types; Glenohumeral joint; Joint stabilization; Tupaia belangeri; Saguinus oedipus; Saimiri sciureus

Zhiquan Zhang, Margaret L. Pierce, Andrew J. Mort, Changes in homogalacturonans and enzymes degrading them during cotton cotyledon expansion, Phytochemistry, Volume 68, Issue 8, April 2007, Pages 1094-1103, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2007.02.005.
(http://www.sciencedirect.com/science/article/B6TH7-4NC50RC-1/2/71b6b4dc729784acef9e2483460892c0)
Abstract:
Changes in homogalacturonans (HGs) and enzymes degrading them have been investigated during cotton (Gossypium hirsutum L.) cotyledon expansion. Using an in vivo assay for pectin-degrading enzymes that involves fluorescent labeled oligomers of GalA as substrate and capillary electrophoresis for product analysis, we found that endo- and exo-polygalacturonases are present in the cotyledon extracellular spaces, and there are dramatic changes in the levels of both activities as the cotyledons change their rate of expansion. Capacity for endo-polygalacturonase activity was highest during the initial stages of cotyledon expansion. However, for exo-polygalacturonase activity it was highest in the later stages of expansion. Cell walls were prepared from 3-, 5-, and 7-day-old cotton cotyledons and treated with liquid HF at -23 [degree sign]C. This treatment cleaves the glycosidic linkages of most neutral sugars in the walls without degrading HGs. HGs with a relatively high degree of esterification can then be solubilized with water, and those with low esterification can be solubilized with concentrated imidazole buffer. The majority of HGs were obtained in the water extracts. The degrees of esterification were 57%, 47%, and 47% in water extracts and 34%, 25%, and 27% in imidazole extracts, in 3-, 5-, and 7-day-old cotton cotyledons, respectively. Using a PA100 ion-exchange column, the members of a GalA homologous series up to approximately 70 residues can be separated. The results from HG molecular length distribution analysis indicated that the HG at 3 days was on average shorter than that in the older cotyledons, perhaps reflecting the higher level of endo-polygalacturonase activity at this stage of more rapid growth.
Keywords: Cell walls; Endo-polygalacturonase; Exo-polygalacturonase; Gossypium; Malvaceae; Growth; Pectin

N.R. Hulugalle, T.B. Weaver, L.A. Finlay, J. Hare, P.C. Entwistle, Soil properties and crop yields in a dryland Vertisol sown with cotton-based crop rotations, Soil and Tillage Research, Volume 93, Issue 2, April 2007, Pages 356-369, ISSN 0167-1987, DOI: 10.1016/j.still.2006.05.008.
(http://www.sciencedirect.com/science/article/B6TC6-4K8S5GN-2/2/d2be2a62545e002a6c70d2dc23dff2b4)
Abstract:
Information on the effects of growing cotton (Gossypium hirsutum L.)-based crop rotations on soil quality of dryland Vertisols is sparse. The objective of this study was to quantify the effects of

growing cereal and leguminous crops in rotation with dryland cotton on physical and chemical properties of a grey Vertisol near Warra, SE Queensland, Australia. The experimental treatments, selected after consultations with local cotton growers, were continuous cotton (T1), cotton-sorghum (Sorghum bicolor (L.) Moench.) (T2), cotton-wheat (Triticum aestivum L.) double cropped (T3), cotton-chickpea (Cicer arietinum L.) double cropped followed by wheat (T4) and cotton-wheat (T5). From 1993 to 1996 land preparation was by chisel ploughing to about 0.2 m followed by two to four cultivations with a Gyral tyne cultivator. Thereafter all crops were sown with zero tillage except for cultivation with a chisel plough to about 0.07-0.1 m after cotton picking to control heliothis moth pupae. Soil was sampled from 1996 to 2004 and physical (air-filled porosity of oven-dried soil, an indicator of soil compaction; plastic limit; linear shrinkage; dispersion index) and chemical (pH in 0.01 M CaCl2, organic carbon, exchangeable Ca, Mg, K and Na contents) properties measured. Crop rotation affected soil properties only with respect to exchangeable Na content and air-filled porosity. In the surface 0.15 m during 2000 and 2001 lowest air-filled porosity occurred with T1 (average of 34.6 m3/100 m3) and the highest with T3 (average of 38.9 m3/100 m3). Air-filled porosity decreased in the same depth between 1997 and 1998 from 45.0 to 36.1 m3/100 m3, presumably due to smearing and compaction caused by shallow cultivation in wet soil. In the subsoil, T1 and T2 frequently had lower air-filled porosity values in comparison with T3, T4 and T5, particularly during the early stages of the experiment, although values under T1 increased subsequently. In general, compaction was less under rotations which included a wheat crop (T3, T4, T5). For example, average air-filled porosity (in m3/100 m3) in the 0.15-0.30 m depth from 1996 to 1999 was 19.8 with both T1 and T2, and 21.2 with T3, 21.1 with T4 and 21.5 with T5. From 2000 to 2004, average air-filled porosity (in m3/100 m3) in the same depth was 21.3 with T1, 19.0 with T2, 19.8 with T3, 20.0 with T4 and 20.5 with T5. The rotation which included chickpea (T4) resulted in the lowest exchangeable Na content, although differences among rotations were small. Where only a cereal crop with a fibrous root system was sown in rotation with cotton (T2, T3, T5) linear shrinkage in the 0.45-0.60 m depth was lower than in rotations, which included tap-rooted crops such as chickpea (T4) or continuous cotton (T1). Dispersion index and organic carbon decreased, and plastic limit increased with time. Soil organic carbon stocks decreased at a rate of 1.2 Mg/ha/year. Lowest average cotton lint yield occurred with T2 (0.54 Mg/ha) and highest wheat yield with T3 (2.8 Mg/ha). Rotations which include a wheat crop are more likely to result in better soil structure and cotton lint yield than cotton-sorghum or continuous cotton.
Keywords: Farming system; Cropping system; Soil quality; Clay; Dryland; Wheat; Sorghum; Chickpea; Halpustert; Compaction

Yuksel Bolek, Mustafa Oglakci, Kamil Ozdin, Genetic variation among cotton (G. hirsutum L.) cultivars for motes, seed-coat fragments and loading force, Field Crops Research, Volume 101, Issue 2, 5 March 2007, Pages 155-159, ISSN 0378-4290, DOI: 10.1016/j.fcr.2006.11.001.
(http://www.sciencedirect.com/science/article/B6T6M-4MG6P80-2/2/126752e6f03bb9e9db8903a323993bec)
Abstract:
Seed quality is one of the important objectives in cotton production and breeding. Seed-coat fragments (SCFs) and motes are the main impurities in lint cotton and are major concerns in the textile industry. A 2-year study was conducted to compare 10 cotton (Gossypium hirsutum L.) cultivars for the number of SCFs, motes, and resistance to loading force (RL).
Although cultivars were not significantly different for the number of SCFs in both years, mean values changed among cultivars and between years. Heritability for the number of SCFs was 0.52 indicating almost equal genotypic and environmental effects on phenotype. There was no correlation between the number of SCFs and RL. Cultivars were different for number of motes. Genotypic and environmental effects on the number of motes were 0.71 and 0.29, respectively. No significant correlation was detected between number of SCFs and RL.
Keywords: Cotton; Mote; Resistance; Seed coat; Seed quality

Pei-dong JIANG, Yun-guo ZHU, Xiao-ling WANG, Wei ZHU, Xiao-quan ZHANG, XIE Hai-yan, Xue-de WANG, Metabolism of Reactive Oxygen Species in the Cytoplasmic Male-Sterile Cotton Anther, Agricultural Sciences in China, Volume 6, Issue 3, March 2007, Pages 275-280, ISSN 1671-2927, DOI: 10.1016/S1671-2927(07)60045-5.
(http://www.sciencedirect.com/science/article/B82XG-4NNP3JJ-3/2/41ba03653953c9ee425b97796ab48031)
Abstract:
Reactive oxygen species (ROS) in plant cell, including superoxide (O2), hydrogen peroxide (H2O2), and malondialdehyde (MDA), are thought to be important inducible factors of cell apoptosis if excessively accumulated in cells. To elucidate the metabolic mechanism of ROS production and scavenging in anthers of the cytoplasmic male-sterile (CMS) cotton. CMS line, maintainer, and hybrid F1 anthers, were employed for studying the relationship between CMS and metabolism of ROS, by comparing ROS changes in the sterile and fertile anthers at different developmental stages. The results showed that during the abortion preliminary stage (sporogenous cell division stage), anthers of CMS line had higher contents of O2, H2O2, and MDA than those of maintainer or hybrid F1. Simultaneously, the higher activities of superoxide dismutase (SOD), catalase (CAT), and peroxidase (POD) in scavenging ROS were measured in the anthers of the CMS line, indicating that an increase of ROS in anthers of abortion preliminary stage had an inducible effect on the antioxidant enzymes. But during the abortion peak of CMS anther (pollen mother cell meiosis stage), on the one hand, contents of O2. H2O2, and MDA were extraordinarily high in CMS anthers, on the other hand, the activities of SOD, CAT, and POD were excessively low, which disrupted the balance between the production and elimination of ROS and led to pollen mother cells apoptosis at this stage. In the following two stages (uninucleate microspore stage and mature pollen stage), the contents of O2 and H2O2 in the aborted anthers were approximated to contents in the fertile anthers of the maintainer and hybrid F1. However, MDA contents were continuously raised and enzymic activities of SOD, CAT, and POD were consistently decreased in sterile anthers, which indicated that ROS still had harmful effects on the anthers after the apoptosis of the male cells. Excessive accumulation of O2, H2O2, and MDA and significant reduction of ROS scavenging-enzyme activities were coinstantaneous with male cells apoptosis in the anthers of the cotton CMS line. But when the restorer gene was transferred into the CMS line, excessive production of ROS could be eliminated in the anthers of hybrid F1.
Keywords: cotton; cytoplasmic male sterility; reactive oxygen species

J.A. Alburquerque, J. Gonzalvez, D. Garcia, J. Cegarra, Effects of a compost made from the solid by-product ('alperujo') of the two-phase centrifugation system for olive oil extraction and cotton gin waste on growth and nutrient content of ryegrass (Lolium perenne L.), Bioresource Technology, Volume 98, Issue 4, March 2007, Pages 940-945, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.04.014.
(http://www.sciencedirect.com/science/article/B6V24-4K4WH0N-1/2/0059f3b2a820c76908decb4973ef3276)
Abstract:
A pot experiment was conducted on a low-fertility calcareous soil in order to evaluate the effect on ryegrass growth and nutrient uptake of an organic fertiliser obtained by composting 'alperujo' and cotton gin waste. Compost, alone and combined with nitrogen fertilisation, was added to the soil at three rates and three harvests were obtained.
The compost application enhanced plant growth in the first and third harvest. However, the additional nitrogen fertilisation clearly improved soil productivity due to the scarce availability of this nutrient in the compost. Also, a general increase in the plant contents of phosphorus and potassium in the first two harvests was recorded, whereas treatments with the maximum compost rate showed the highest plant content of copper in the last two harvests. Decreases in calcium in

the last two harvests, in magnesium in all of them and in iron and manganese in the last harvest were also observed.
Keywords: Olive-mill by-product 'alperujo'; Compost application; Ryegrass; Plant growth; Plant nutrient content

Hagai Yasuor, Joseph Riov, Baruch Rubin, Glyphosate-induced male sterility in glyphosate-resistant cotton (Gossypium hirsutum L.) is associated with inhibition of anther dehiscence and reduced pollen viability, Crop Protection, Volume 26, Issue 3, Weed Science in Time of Transition, March 2007, Pages 363-369, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.06.015.
(http://www.sciencedirect.com/science/article/B6T5T-4MBJXVV-1/2/d7143f7aa0bcc6269946fae818ff0a09)
Abstract:
Glyphosate-resistant cotton (GRC) was introduced experimentally to Israel in 1998. Field and laboratory studies were conducted in 1998-2000 to evaluate the effect of the timing and rates of glyphosate application on cotton development and fruit set. No damage to the vegetative parts of cotton plants was observed when glyphosate was applied over-the-top (OTT) at all growth stages examined. However, glyphosate applied OTT, at the 8-10 leaf stage (late OTT), caused severe damage to the reproductive parts. Cotton grown in different climatic regions responded differently to late OTT application of glyphosate, indicating a strong interaction with environmental conditions. Late OTT application resulted in a development of abnormal flowers, non-dehiscent anthers containing irregularly shaped and less viable pollen grains. In contrast, the stigma and other female organs of treated plants were functional and did not show any injury symptoms. Male-sterile flowers usually produced deformed bolls with one or more degenerated compartments leading to a 'moon' or 'beak' shape bolls. Bolls developed on the early fruiting branches (5th-10th) of late OTT-treated plants were smaller as compared to those developed at the same position on untreated plants. In general, the cotton plants succeeded to compensate for the early damage caused by glyphosate by producing additional bolls on the upper internodes. These additional bolls did not reach maturity until harvest time. In spite of the visible injury to flowers and bolls, late OTT application did not cause significant yield reduction. Combined late and very late (12-13 leaf stage, before cotton canopy closes) glyphosate application resulted in a significant yield reduction. Further studies are in progress to elucidate the mechanism involved in the glyphosate-induced male sterility in transgenic cotton.
Keywords: Glyphosate; Cotton; Gossypium hirsutum L.; Roundup Ready(R); Square; Flower; Stigma; Anther; Pollen grain; Bolls

Fakrudin Bashasab, Vijaykumar Krishnareddy Bayyareddy Kambalapally, Mahaling Shrishailappa Kuruvinashetti, Basavaraj Veeranagouda Patil, Morphometric Variation in Geographic Populations of Cotton Bollworm, Helicoverpa armigera (Hubner) Occurring in South Indian Cotton Ecosystems, Journal of Asia-Pacific Entomology, Volume 10, Issue 1, March 2007, Pages 39-44, ISSN 1226-8615, DOI: 10.1016/S1226-8615(08)60329-5.
(http://www.sciencedirect.com/science/article/B8JJN-4V6TFFF-8/2/8751a98df83b82ee4288280cc3d70018)
Abstract:
Morphometric characterization of twelve geographic populations of cotton bollworm, Helicoverpa armigera occurring in south Indian cotton ecosystems was done at larval, pupal and adult stages over three cropping seasons. Traits such as length and weight of larvae, pupa and length and width of the wing, length of fore-, mid- and hind femur, male reproductive organ-length of genital capsule, valves, and ejaculatory duct, female reproductive organ-length of appendix bursae and ductus bursae at adult stage were measured across three years. Populations significantly differed for most of the traits studied. It was evident that populations from northern parts recorded higher phenotypic attributes compared to those from southern parts of south Indian cotton ecosystem.

Besides larval, pupal and adult external phenotypic traits, attributes of male reproductive organ viz., length of genital capsule, valves, and ejaculatory duct and female reproductive organ viz., length of appendix bursae and ductus bursae differed significantly among populations. Information on population structure and differences based on morphometry would be useful in better understanding of population dynamics and management of this pest in cotton and other crops in south India.
Keywords: Phenotype; Helicoverpa armigera; Cotton bollworm; Population structure; Morphometric variation; Geographic population

R.F. Cullum, G.V. Wilson, K.C. McGregor, J.R. Johnson, Runoff and soil loss from ultra-narrow row cotton plots with and without stiff-grass hedges, Soil and Tillage Research, Volume 93, Issue 1, March 2007, Pages 56-63, ISSN 0167-1987, DOI: 10.1016/j.still.2006.03.010.
(http://www.sciencedirect.com/science/article/B6TC6-4JWFGPF-1/2/09f92ec333bf48b429afaf91ac36b241)
Abstract:
Grass hedges and no-till cropping systems reduced soil losses on standard erosion plots in ultra-narrow row (20 cm) cotton during a 4-year study (1999-2002). No-till cotton with grass hedges, no-till cotton without grass hedges, conventional-till cotton with grass hedges, and conventional-till cotton without grass hedges produced 4-year average annual soil losses of 1.8, 2.9, 4.0, and 30.8 t ha-1, respectively, and produced 4-year average runoff amounts of 267, 245, 353, and 585 mm, respectively. The annual ratio of soil loss for no-till ultra-narrow row cotton plots with grass hedges to those without hedges averaged 0.62. The annual ratio of soil loss for conventional-till plots with grass hedges to without hedges was 0.13. Averaged over all plots (with and without grass hedges), no-till plots had 86% less soil loss than conventional-till plots. No-till plots without grass hedges had 90% less soil loss than conventional-till plots without grass hedges. Grass hedges effectively reduced soil loss on erosion plots with similar cropping practices as compared to plots without hedges. Along with the reduced soil losses from no-till system as compared to conventional-till system, the no-till ultra-narrow row cotton system resulted in an average 0.2 t ha-1 yield increase as compared to the conventional-till system. Reduced soil loss and increased crop yield are both positive factors that the user should consider when adopting this cotton system. Other studies of contoured grass hedges on field-sized areas are being conducted to determine their applicability on larger areas with greater concentrations of runoff.
Keywords: Runoff; Soil loss; Ultra-narrow row cotton; Soil loss ratios; Cropping and management factor (C-factor); Erosion control practice factor (P-factor)

Qiang Wan+g, Xuerong Fan, Zhaozhe Hua, Weidong Gao, Jian Chen, Degradation kinetics of pectins by an alkaline pectinase in bioscouring of cotton fabrics, Carbohydrate Polymers, Volume 67, Issue 4, 19 February 2007, Pages 572-575, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.06.031.
(http://www.sciencedirect.com/science/article/B6TFD-4KJV359-3/2/c88e0b6cd08d45d90e4b34df91ab5e6d)
Abstract:
Alkaline pectinases have been proven to be effective as bioscouring agents of cotton fabrics. In order to monitor the scouring degree of cotton fabrics quantificationally, a kinetic study of the degradation of pectins in cotton by an alkaline pectinase `Bioprep 3000L' was performed and the influences of initial pectinase concentration and treatment time on bioscouring were evaluated quantitatively. The results showed that although the degradation products increased as pectinase concentration grew higher at same incubation time, the growth multiples of the maximum degradation rate which was used as the starting degradation rate were less than those of initial enzyme concentration. The degradation kinetics of pectins in cotton fibers with a pectinase could

be described by modified Ghose-Walseth kinetic empirical equations which had been previously applied to the degradation reaction of cellulose.
Keywords: Degradation; Kinetics; Pectin; Pectinase; Bioscouring; Cotton

D. John Rogers, Robert E. Reid, Janet J. Rogers, Stewart J. Addison, Prediction of the naturalisation potential and weediness risk of transgenic cotton in Australia, Agriculture, Ecosystems & Environment, Volume 119, Issues 1-2, February 2007, Pages 177-189, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.07.007.
(http://www.sciencedirect.com/science/article/B6T3Y-4KV2R88-3/2/cf9f72087697dfd8fdaf0d662310f621)
Abstract:
Climex(R) climate-matching and inferential-modelling was used to examine the naturalisation potential of genetically modified and non-transgenic Upland Cotton (Gossypium hirsutum variety hirsutum) in Australia north of latitude 22[degree sign]S. The Climate-Match (CM) function was used to identify locations in north-east Australia where climate matches (CM Index > 0.7) the experimental sites of Eastick [Eastick, R., 2002. The Potential Weediness of Transgenic Cotton in Northern Australia. Northern Territory Department of Business, Industry and Resource Development Technical Bulletin No. 305 (Internet resource: http://cotton.pi.csiro.au/Assets/PDFFiles/TB3051.pdf)] in north-west Australia. Most of Australia north of 22[degree sign]S had climate matching one or more of the sites of Eastick (2002), locations where cotton is highly unlikely to naturalise. Climex inferential models were developed using parameter values derived from the GOSSYM and OZCOT simulation models and validated against the documented distributions of (a) Indigenous G. hirsutum in Central America, (b) where it is naturalised in West Africa, and (c) Upland Cotton in West Africa. The climate-based predictions of potential distribution in Australia indicated that cotton has naturalisation potential only in the coastal regions of north-east Australia. The rest of Australia was either too cold, too dry, or both. These predictions were further refined through overlay of soil-nutrient and existing land-use data. The overlay of soil nutrient data further restricted the most suitable areas to coastal north-east Australia primarily in the wet tropics between latitudes 16[degree sign]S and 19[degree sign]S. Consideration of existing land-use patterns indicated that the probability of naturalisation in these potentially suitable areas was very low because these areas currently have either existing forests, or are used for managed agricultural systems, principally sugarcane. Competition from a suite of aggressive tropical weeds further reduced naturalisation potential. In less intensively managed and seasonally dry areas, fire was considered a major limitation to naturalisation of cotton. The Weed Risk Assessment (WRA) protocol, used by Biosecurity Australia to evaluate new plant importations into Australia, was used to produce an overall assessment of the weediness risk for non-transgenic, Bollgard II(R) and Roundup Ready(R) Flex cottons in north-east Australia. Because neither the Bollgard II(R) nor the Roundup Ready(R) characters conferred any advantage in the north-east Australia environment, the transgenic status of the plant did not alter the naturalisation potential or weediness risk. The WRA score of cotton in north-east Australia (-5) indicates that it has essentially zero risk of establishing as a weed in this area, especially when compared to WRA scores of other major crop plants and the competing weed species.
Keywords: Bollgard II(R); Roundup Ready(R) Flex; Climex; Inferential modelling; Climate matching; Familiarity; Substantial equivalence

D. Royon, M. Daz, G. Ellenrieder, S. Locatelli, Enzymatic production of biodiesel from cotton seed oil using t-butanol as a solvent, Bioresource Technology, Volume 98, Issue 3, February 2007, Pages 648-653, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.02.021.
(http://www.sciencedirect.com/science/article/B6V24-4JSFV9V-1/2/a3c94947dfcb6d8a1e0c62e11b19324c)
Abstract:

The enzymatic production of biodiesel by methanolysis of cottonseed oil was studied using immobilized Candida antarctica lipase as catalyst in t-butanol solvent. Methyl ester production and triacylglycerol disappearance were followed by HPLC chromatography. It was found, using a batch system, that enzyme inhibition caused by undissolved methanol was eliminated by adding t-butanol to the reaction medium, which also gave a noticeable increase of reaction rate and ester yield. The effect of t-butanol, methanol concentration and temperature on this system was determined. A methanolysis yield of 97% was observed after 24 h at 50 [degree sign]C with a reaction mixture containing 32.5% t-butanol, 13.5% methanol, 54% oil and 0.017 g enzyme (g oil)-1. With the same mixture, a 95% ester yield was obtained using a one step fixed bed continuous reactor with a flow rate of 9.6 ml h-1 (g enzyme)-1. Experiments with the continuous reactor over 500 h did not show any appreciable decrease in ester yields.
Keywords: Biodiesel; Lipase; t-Butanol; Novozym 435; Methanol; Cotton seed oil

S. Mondal, J.L. Hu, Water vapor permeability of cotton fabrics coated with shape memory polyurethane, Carbohydrate Polymers, Volume 67, Issue 3, 1 February 2007, Pages 282-287, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.05.030.
(http://www.sciencedirect.com/science/article/B6TFD-4KPP4BH-1/2/3936402d5f69a9b5aaadba42ee6a25d3)
Abstract:
In this paper, we have investigated the water vapor permeability of shape memory polyurethane (SMPU) coated cotton fabrics. The SMPUs were tailor made in order to obtain the phase transition temperature (soft segment crystal melting temperature) in the room temperature range. SEM studies were carried out in order to investigate the surface structure of coated and uncoated fabrics. The temperature sensitive water vapor permeability at soft segment crystal melting point was observed for SMPU coated fabrics. When the experimental temperature reached the soft segment crystal temperature of SMPU, an abrupt change of water vapor permeability of SMPU coated fabrics were observed. The significant change of water vapor permeability of SMPU coated fabrics is due to the phase change of SMPU which causes density changes inside the membranes due to micro-Brownian motion of soft segment, therefore, enhanced the water vapor permeability through the coated fabrics. The water vapor permeability of coated fabrics was also dependent on the primary structure of SMPU. When polycaprolactone glycol (PCL, Mn 3000 g mol-1) was introduced in the polytetramethylene glycol (PTMG, Mn 2900 g mol-1) based SMPU, the water vapor permeability decreases due to the increased interaction between the polymer chains due to presence of ester groups. In contrast increase of polyethylene glycol (Mn 3400 g mol-1) in the SMPU backbone, the WVP increases due to the increasing hydrophilicity of the SMPU.
Keywords: Shape memory polyurethanes; Water vapor permeability; Soft segment crystal melting temperature; Phase transition

Atsuko Kawabata, John A. Taylor, The effect of reactive dyes upon the uptake and antibacterial efficacy of poly(hexamethylene biguanide) on cotton. Part 3: Reduction in the antibacterial efficacy of poly(hexamethylene biguanide) on cotton, dyed with bis(monochlorotriazinyl) reactive dyes, Carbohydrate Polymers, Volume 67, Issue 3, 1 February 2007, Pages 375-389, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.06.022.
(http://www.sciencedirect.com/science/article/B6TFD-4KGX880-1/2/6867bea26c6d9997ea4ab2d39b22866d)
Abstract:
The antibacterial efficiency of poly(hexamethylene biguanide), PHMB, on un-dyed cotton has been compared with that of PHMB on cotton coloured with a range of reactive dyes. In each case, the presence of covalently bound dye resulted in a reduction in antibacterial efficiency. In the absence of dye, the cationic PHMB binds to the cotton via weak ion-ion linkages with the carboxylate groups present on cotton; these dissociate readily allowing release of free PHMB, the active

antibacterial agent. In the presence of reactive dye, the cationic PHMB forms stronger ion-ion linkages with the strong sulphonic acid groups of the dyes; thus release of free PHMB, the active agent, is less facile and antibacterial efficiency reduced accordingly.
Keywords: Poly(hexamethylene biguanide); Antibacterial; Reactive dyes; Cellulose

Benjamin P. DeRidder, Michael E. Salvucci, Modulation of Rubisco activase gene expression during heat stress in cotton (Gossypium hirsutum L.) involves post-transcriptional mechanisms, Plant Science, Volume 172, Issue 2, February 2007, Pages 246-254, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2006.08.014.
(http://www.sciencedirect.com/science/article/B6TBH-4KXWG77-1/2/b4b6bd4c837a0a859c6213a6d525cdc5)
Abstract:
Inhibition of photosynthesis by heat stress involves deactivation of Rubisco and is exacerbated by the low thermal stability of Rubisco's chaperone, activase. Activase structure, activity and protein expression have been the focus of previous work examining the effect of heat stress on this enzyme. Relatively little is known about the response of activase gene expression to moderate heat stress or the extent to which transcriptional mechanisms control acclimation of photosynthesis to heat stress. In the current study, the effect of moderate heat stress on the diurnal expression of three activase genes in cotton (Gossypium hirsutum L.), including a newly identified member of the gene family, was examined. All three activase genes displayed a diurnal pattern of expression under optimal growth conditions, as determined by real-time RT-PCR. Although steady-state mRNA levels were reduced in the short-term by heat stress, transcript levels appeared to recover by the next diurnal cycle. Nuclear run-on assays utilizing real-time RT-PCR suggested mRNA stability, not synthesis, was responsible for the observed acclimatization. Identification of activase transcripts with alternative 3'-untranslated regions suggests a possible means for increasing transcript stability and hastening recovery of steady-state mRNA levels during heat stress. Together the results indicate activase gene expression is influenced by post-transcriptional mechanisms that may contribute to acclimation of photosynthesis during extended periods of heat stress.
Keywords: Rubisco activase; Heat stress; Photosynthesis; Cotton; Gene expression; Nuclear run-on

M.G. Horst, S.S. Shamutalov, J.M. Goncalves, L.S. Pereira, Assessing impacts of surge-flow irrigation on water saving and productivity of cotton, Agricultural Water Management, Volume 87, Issue 2, 24 January 2007, Pages 115-127, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.06.014.
(http://www.sciencedirect.com/science/article/B6T3X-4KNKBVF-1/2/a1f11ae8e629d7e155c24de9994206ea)
Abstract:
To improve water saving and conservation in irrigated agriculture, a range of field evaluation experiments was carried out with various furrow irrigation treatments in cotton fields to estimate the possibilities of improving furrow irrigation performances under conditions of Central Fergana Valley, Uzbekistan. The research consisted in comparing surge and continuous-flow in long furrows and adopting alternate-furrow irrigation. The best results were achieved with surge-flow irrigation applied to alternate furrows. Field data allowed the calibration of a surface irrigation model that was used to identify alternative management issues. Results identified the need to better adjust inflow rates to soil infiltration conditions, cut-off times to the soil water deficits and improving irrigation scheduling. The best irrigation water productivity (0.61 kg m-3) was achieved with surge-flow on alternate furrows, which reduced irrigation water use by 44% (390 mm) and led to high application efficiency, near 85%. Results demonstrated the possibility for applying deficit irrigation in this region.

Keywords: Water productivity; Application efficiency; Distribution uniformity; Furrow irrigation; Alternate furrow irrigation; Aral Sea Basin

Cuiyu Yin, Jianbo Li, Qun Xu, Qi Peng, Yabei Liu, Xinyuan Shen, Chemical modification of cotton cellulose in supercritical carbon dioxide: Synthesis and characterization of cellulose carbamate, Carbohydrate Polymers, Volume 67, Issue 2, 22 January 2007, Pages 147-154, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.05.010.
(http://www.sciencedirect.com/science/article/B6TFD-4K8SBXY-2/2/98657256e87769ee8854e4e2bb5278dc)
Abstract:
Chemical modification of cotton cellulose in supercritical carbon dioxide has been studied and cellulose carbamate has been successfully synthesized. Compared with the conventional carbamate process, the supercritical method had remarkably increased the nitrogen content of the modified cellulose. The effects of impregnating pressure, esterification temperature and esterification time on the nitrogen content of the products were discussed. The modified cellulose was characterized by Fourier transform infrared spectroscopy (FTIR), NMR spectrometer, X-ray diffraction (XRD), and thermogravimetry (TG). In addition, the surface morphology of modified cellulose fibers was investigated using scanning electron micrographs (SEM).
Keywords: Supercritical CO2; Cellulose; Esterification; Cellulose carbamate; Nitrogen content

Nyland R. Falkenberg, Giovanni Piccinni, J. Tom Cothren, Daniel I. Leskovar, Charlie M. Rush, Remote sensing of biotic and abiotic stress for irrigation management of cotton, Agricultural Water Management, Volume 87, Issue 1, 10 January 2007, Pages 23-31, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.05.021.
(http://www.sciencedirect.com/science/article/B6T3X-4KMYM57-1/2/292a9f55944ee0c8f2495e4430355df7)
Abstract:
The applicability of commercially available remote sensing instrumentation was evaluated for site-specific management of abiotic and biotic stress on cotton (Gossypium hirsutum L.) grown under a center pivot low energy precision application (LEPA) irrigation system. This study was conducted in a field where three irrigation regimes (100%, 75%, and 50% ETc) were imposed on areas of Phymatotrichum (root rot) with the specific objectives to (1) examine commercial remote sensing instrumentation for locating areas showing biotic and abiotic stress symptomology in a cotton field, (2) compare data obtained from commercial aerial infrared photography to that collected by infrared transducers (IRTs) mounted on a center pivot, (3) evaluate canopy temperature changes between irrigation regimes and their relationship to lint yield with IRTs and/or IR photography, and (4) explore the use of deficit irrigation and the use of crop coefficients for irrigation scheduling. Pivot-mounted IRTs and an IR camera were able to differentiate water stress among irrigation regimes. The IR camera distinguished between biotic (root rot) and abiotic (drought) stress with the assistance of groundtruthing. The 50% ETc regime had significantly higher canopy temperatures than the other two regimes, which was reflected in significantly lower lint yields when compared to the 75% and 100% ETc regimes. Deficit irrigation down to 75% ETc had no impact on lint yield, indicating that water savings were possible without reducing yield.
Keywords: Crop evapotranspiration; Infrared transducer; Infrared camera; Site-specific management; LEPA irrigation; Remote sensing; Canopy temperature

Erica Soares Martins, Lilian Botelho Praca, Vinicius Fiuza Dumas, Joseilde O. Silva-Werneck, Eduardo Hideki Sone, Isabel C. Waga, Colin Berry, Rose Gomes Monnerat, Characterization of Bacillus thuringiensis isolates toxic to cotton boll weevil (Anthonomus grandis), Biological Control, Volume 40, Issue 1, January 2007, Pages 65-68, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2006.09.009.

(http://www.sciencedirect.com/science/article/B6WBP-4M0B2J5-1/2/4e911df625b1e3db982a0a8ac6f84e44)
Abstract:
The cotton boll weevil (Anthonomus grandis) is the major cotton pest in the Americas. One of the alternatives for its control is the utilization of Bacillus thuringiensis (Bt), an entomopathogenic bacterium characterized by its production of insecticidal crystal proteins. Embrapa Genetic Resources and Biotechnology has a collection of Bacilli in which different isolates of Bt are stored. A method for rearing and maintenance of Anthonomus grandis on artificial diet in the laboratory was developed, and a robust larval bioassay protocol was established for the selection of B. thuringiensis isolates toxic to boll weevil. After preliminary bioassays performed with 215 isolates, 5 were selected that demonstrated a good level of toxicity and these were analyzed in more detail. The most toxic were S601 and S1806 presenting LC50 (lethal concentration to kill 50% if the larvae) of 0.14 mg/ml and 0.30 mg/ml, respectively. S601 showed an LC50 value that was half that of the standard B. thuringiensis subspecies tenebrionis and S1806 demonstrated similar values of LC50 to the standard. S601 contained the cry1B gene and S1806 had the cry4A, cry4B, cry10, cry11, cyt1 and cyt2 genes like B. thuringiensis subspecies israelensis.
Keywords: Bacillus thuringiensis; Anthonomus grandis; Biological control; Toxicity; cry genes

Jonn A. Foulk, Roy B. Dodd, David McAlister, David Chun, Danny E. Akin, Herb Morrison, Flax-cotton fiber blends: Miniature spinning, gin processing, and dust potential, Industrial Crops and Products, Volume 25, Issue 1, January 2007, Pages 8-16, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2006.05.001.
(http://www.sciencedirect.com/science/article/B6T77-4KWTFC5-1/2/1f3d3731a032abb640ec393362afc6fd)
Abstract:
Development of a flax (Linum usitatissimum L.) industry in North America is desired to supply a domestic source of clean, consistent quality textile fiber for blending with cotton. The objective of this work was to evaluate portions of traditional cotton gin equipment (extractor feeder and lint cleaner) and the '50-g cotton-spinning test (CST)' for flax. Dust was collected on an area sampler in an isolated card room to evaluate dust potential during textile pilot plant processing. Fibers retted by diverse means were cleaned on two separate portions of Continental Eagle's pilot plant cotton gin stand, the Super 96 Feeder and the 24D lint cleaner. Fibers separated and removed from flax stalks by these gin sections were compared against the standard `unified line' processing technique of the USDA Flax Pilot Plant. Test yarns were then made in a CST with cotton and flax blends to provide an indirect measurement of fiber properties that can be related to the retting and gin cleaning processes. The yarns were tested for strength and evenness. Flax fibers that displayed the most favorable properties in the CST were then spun in 23 kg lots in the pilot plant at the following cotton/flax blend ratios: 100/0, 75/25, 50/50, 25/75, and 20/80. With modifications, it appears that portions of a cotton gin stand are able to process adequately small samples of properly retted flax stalks. The CST with minor adjustments provides useful data for ranking and further large-scale flax processing. As expected, it appears that flax fiber can be successfully cleaned on a cotton processing line and that increasing the amount of flax generates additional dust.
Keywords: Cotton; Blends; Dust; Strength; Flax; Ginning

Sami Ullah, Stephen P. Faulkner, Use of cotton gin trash to enhance denitrification in restored forested wetlands, Forest Ecology and Management, Volume 237, Issues 1-3, 15 December 2006, Pages 557-563, ISSN 0378-1127, DOI: 10.1016/j.foreco.2006.09.075.
(http://www.sciencedirect.com/science/article/B6T6X-4M93P7T-5/2/65f584cae7e3d363737e013ae045b5bc)
Abstract:

Lower Mississippi Valley (LMV) has lost about 80% bottomland hardwood forests, mainly to agriculture. This landscape scale alteration of the LMV resulted in the loss of nitrate (NO3) removal capacity of the valley, contributing to nitrogen (N)-enhanced eutrophication and potentially hypoxia in the northern Gulf of Mexico. Restoration of hardwood forests in the LMV is a highly recommended practice to reduce NO3 load of the Mississippi River. However, restored bottomland forests take decades to develop characteristic ecological functions including denitrifier activity. One way to enhance denitrifier activity in restored wetland forests is to amend the soils with an available carbon (C) source. This research investigated the effects of cotton gin trash (CGT) amendment on denitrification rate and N2O:N2 emission ratio from a restored bottomland forest soils and compared it to those from an adjacent unamended natural forest soils. CGT amendment increased denitrification rates in the restored forest soils to the level of the natural forest soils. N2O:N2 emission ratios from the restored and natural forest soils were highly variable and were not significantly different from each other. These findings suggest that restoration of bottomland hardwood forests in the LMV will require organic carbon amendment to achieve enhanced denitrifier activity for NO3 removal while the restored forest is developing into a mature state over time.
Keywords: Bottomland hardwood forests; Cotton gin trash; Denitrification; Lower Mississippi Alluvial Valley; N2O:N2 emission ratio; Water quality; Wetland restoration

Stephen Morse, Richard Bennett, Yousouf Ismael, Environmental impact of genetically modified cotton in South Africa, Agriculture, Ecosystems & Environment, Volume 117, Issue 4, December 2006, Pages 277-289, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.04.009.
(http://www.sciencedirect.com/science/article/B6T3Y-4K4WMJB-2/2/0713b4c3159e57206ba0bd57ed6ed07c)
Abstract:
This paper presents the results of a large-scale study designed to monitor the impact arising from the introduction of insect-resistant Bt cotton in the Makhathini Flats, Republic of South Africa. Bt cotton provides a degree of resistance to cotton bollworm complex (Lepidoptera). Data were collected on the use of insecticides (type and quantity) as well as the farm-level economics of production from over 2200 farmers in three growing seasons (1998/1999, 1999/2000 and 2000/2001), and the results are discussed within the context of environmental impact brought about by insecticide. Over the three seasons of the study it was clear that Bt cotton provided benefits in terms of higher yield and gross margin relative to farmers growing conventional (non-Bt) cotton, and the benefits were particularly apparent for the smallest producers. Bt growers also used significantly less insecticide than growers of non-Bt cotton. Once quantities of insecticide applied to Bt and non-Bt cotton were converted into a Biocide Index and an Environmental Impact Quotient (EIQ) in order to allow for differences in terms of toxicity and persistence in the environment, it was apparent that the growing of Bt had a less negative impact on the environment. While this points to beneficial impacts on agricultural sustainability there are wider concerns regarding the vulnerability of resource-poor farmers in an area with limited (as yet) marketing options for their product and options for livelihood diversification both within and outside agriculture. Cotton producers in Makhathini are vulnerable as they rely on just one company for inputs (including credit) and for their market. While Bt cotton provides benefits it does not in itself address some of the structural limitations that farmers face.
Keywords: Insecticides; Environmental impact; Cotton; Genetic modification; South Africa

Suiyun Chen, Hezhong Dong, Yuqin Fan, Weijiang Li, Yigal Cohen, Dry mycelium of Penicillium chrysogenum induces expression of pathogenesis-related protein genes and resistance against wilt diseases in Bt transgenic cotton, Biological Control, Volume 39, Issue 3, December 2006, Pages 460-464, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2006.07.014.

(http://www.sciencedirect.com/science/article/B6WBP-4KM43C5-1/2/d18bfb0708effc511a4b97032ab268a2)

Abstract:
Dry mycelium (DM) of Penicillium chrysogenum (PEN), a waste product of the pharmaceutical industry, is used as an organic fertilizer for agricultural production. Our previous studies have indicated that DM of PEN is effective in controlling a number of soil born fungal diseases, but the mode of action is unclear. In the present study, DM of PEN was extracted with water and applied to the roots of the Bt (Bacillus thuringiensis) transgenic cotton (Gossypium hirsutum) cultivar SCRC 21. The efficacy in controlling Fusarium oxysporum f.sp vasinfectum (Fov) and Verticillium dahliae Kleb (Vd), as well as the accumulation of pathogenesis-related (PR) protein transcripts in the plants were examined. The results showed that soil drench with PEN provided significant protection against Fov and Vd. The controlling efficacy of PEN was dose-dependent, and the highest efficacy was obtained with 5-7% PEN. Soil drench with 5% induced the accumulation of six PR protein transcripts, PR-1a, PR-1b, PR-2, PR-3, A-C and B-C in cotyledons of cotton seedlings, suggesting that these PR proteins may be involved in induced resistance against wilt diseases in cotton by PEN. It seems that DM of PEN represents a new agent capable of inducing both resistance and the accumulation of PR protein transcripts.
Keywords: Pathogenesis-related proteins; Cotton; Penicillium chrysogenum; Fusarium oxysporum f.sp vasinfectum (Fov); Verticillium dahliae Kleb (Vd)

A. Kilickan, M. Guner, Pneumatic Conveying Characteristics of Cotton Seeds, Biosystems Engineering, Volume 95, Issue 4, December 2006, Pages 537-546, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2006.08.015.
(http://www.sciencedirect.com/science/article/B6WXV-4M7CDK6-1/2/10ce8c6fc92dd90b5d48aa4eee8d2e8d)

Abstract:
The pneumatic conveying characteristics of delinted and fuzzy cotton seeds (Gossypium hisutum L.) of Gulerbey and Nazilli 84 S varieties were determined. The length, width, thickness, arithmetic mean diameter, geometric mean diameter, sphericity, volume, 1000 seed mass, bulk density, true density, porosity, projected area, terminal velocity, drag coefficient, pressure drop, power consumption, and seed damage, namely mechanical damage, germination test, and seed vigour were investigated experimentally. The positive low-pressure system was used for conveying of cotton seeds. The length, width, thickness, arithmetic mean diameter, geometric mean diameter, sphericity, volume, 1000 seed mass, bulk density, true density, porosity, projected area, terminal velocity, and drag coefficient ranged from 9[middle dot]06 to 10[middle dot]89 mm, 4[middle dot]73 to 5[middle dot]88 mm, 4[middle dot]23 to 5[middle dot]15 mm, 5[middle dot]74 to 7[middle dot]31 mm, 5[middle dot]82 to 6[middle dot]89 mm, 61[middle dot]37 to 64[middle dot]03%, 95[middle dot]11 to 121[middle dot]40 mm3, 106[middle dot]50 to 126[middle dot]50 g, 296 to 632[middle dot]10 kg m-3, 1000 to 1075 kg m-3, 41[middle dot]20% to 71[middle dot]59%, 31[middle dot]90 to 52[middle dot]70 mm2, 8[middle dot]12 to 11[middle dot]31 m s-1, and 0[middle dot]462 to 0[middle dot]684, respectively. The power requirement and pressure drop increased with increase in air velocity and decreased with increase in pipe diameter. As the conveying capacity increased, the power requirement and pressure drop increased. The highest pressure drop and power requirement were obtained for Gurelbey (delinted) and Nazilli 84 S (delinted) varieties, while the lowest pressure drop was found for Nazilli 84 S (fuzzy) and Gurelbey (fuzzy). The mechanical damage to the cotton seed for all varieties increased as the air velocity increased. The average values of germination and vigour index for all varieties at the inside pipe diameters of 43[middle dot]1 mm and 70[middle dot]3 mm decreased after pneumatic conveying. After conveying the germination and vigour index of Nazilli 84 S (delinted) decreased from 92% and 2[middle dot]32 cm to 28% and 1[middle dot]10 cm for 44[middle dot]43 m s-1 at the inside pipe diameters of 43[middle dot]1 mm.

W.J. Busscher, P.J. Bauer, C.R. Camp, Cotton management in a compacted subsurface microirrigated coastal plain soil of the southeastern US, Soil and Tillage Research, Volume 91, Issues 1-2, December 2006, Pages 157-163, ISSN 0167-1987, DOI: 10.1016/j.still.2005.12.001.
(http://www.sciencedirect.com/science/article/B6TC6-4J43YXR-2/2/3e4769f6b43bab7307c3c4aaf8a25c2b)
Abstract:
A loamy sand Acrisol (Aquic Hapludult) that had been microirrigated for 6 years became so severely compacted that it had root limiting values of soil cone index in the Ap horizon and a genetic hardpan below it. Deep and surface tillage systems were evaluated for their ability to alleviate compaction. Deep tillage included subsoiling or none. Both deep tillage treatments were also surface tilled by disking, chiseling, or not tilling. Subsoiling was located in row or between rows to avoid microirrigation tubes (laterals) that were buried under every other mid row or every row. Cotton (Gossypium hirsutum) was planted in 0.96-m wide rows. Cotton yield was improved by irrigation from 485 to 1022 kg ha-1 because both 2001 and 2002 were dry years. Tillage loosened the soil by an average of 0.5-1.3 MPa; but compacted zones remained outside tilled areas. Subsoiling improved yield by 131 kg ha-1 when performed in row where laterals were placed in the mid rows; but subsoiling did not improve yield when it was performed in mid rows. For subsurface irrigation management in these soils, the treatment with laterals buried under every other mid row was able to accommodate in-row subsoiling which improved yield; and this treatment was just as productive as and had been shown to be less expensive to install than burying laterals under every row.
Keywords: Microirrigation; Compaction; Deep tillage; Chisel; Hard layer; Disk; Acrisol

D. Blaise, Effect of tillage systems on weed control, yield and fibre quality of upland (Gossypium hirsutum L.) and Asiatic tree cotton (G. arboreum L.), Soil and Tillage Research, Volume 91, Issues 1-2, December 2006, Pages 207-216, ISSN 0167-1987, DOI: 10.1016/j.still.2005.12.005.
(http://www.sciencedirect.com/science/article/B6TC6-4J2W081-1/2/d48035ee8604a9bd602e0f809f327c52)
Abstract:
Asiatic diploid (n = 13) cotton (Gossypium arboreum L.) is grown on Vertisols of central India with limited amounts of fertilizers and pesticides under rainfed conditions. In an earlier study it was established that reduced tillage (RT) systems improved productivity of tetraploid (n = 26) upland cotton (G. hirsutum L.). Such information is currently not available for the Asiatic cotton. Field studies were continued from 2002-2003 through 2004-2005, to determine the effect of tillage systems on weed control, yield and fibre quality. Tillage treatments continued for 6 years before this phase of the study. The experiment was conducted in a split plot design, with three tillage systems as main plots and combination of species (G. arboreum and G. hirsutum) and N rates (60 and 75 kg N ha-1) as subplots. Conventional tillage (CT) involved mouldboard ploughing + four to five inter-row cultivations and was compared with two levels of RT. RT1 being pre-emergence herbicide application with two inter-row cultivations by a bullock drawn hoe and RT2 was only herbicide application with no inter-row cultivation. Weed density (monocot and dicot weeds) was significantly lower on the RT than on the CT plots. Consequently, the RT plots had accumulated less weed dry matter. Seed cotton yield was affected by tillage systems in 1 out of 3 years. In 2002-2003, the yield trend was: RT1 > CT > RT2. The tillage x species interaction was significant in 2002-2003 and 2004-2005 and combined-across-years. Averaged over years, Asiatic G. arboreum produced 8% less seed cotton with treatment RT2 than with CT. Upland, G. hirsutum produced 118-134 kg ha-1 additional seed cotton on the RT than with CT. Differences in maturity and rooting habit probably contributed to the two species differing in their tillage requirement. The Asiatic cottons were early maturing and are known to possess a deeper root system than the upland cotton. The tillage x N and species x N interactions were not significant. Average seed

cotton yield with the 75 kg N was 15.7% more than the 60 kg N ha-1 plots. Among fibre properties, fibre length was significantly better with treatment RT1 than with the CT in 2 out of 3 years. In summary, seed cotton yield of upland G. hirsutum cotton was higher with RT system, whereas converse occurred with G. arboreum. There were no adverse effects of RT on fibre quality.
Keywords: Conservation tillage; Fibre length; Fibre strength; Nitrogen; Vertisols; Weed biomass

Junli Huang, Honglian Li, Hongxia Yuan, Effect of organic amendments on Verticillium wilt of cotton, Crop Protection, Volume 25, Issue 11, November 2006, Pages 1167-1173, ISSN 0261-2194, DOI: 10.1016/j.cropro.2006.02.014.
(http://www.sciencedirect.com/science/article/B6T5T-4JRM011-2/2/b6f8d3b1a3fae9f33827a1333fb97ae6)
Abstract:
Verticillium wilt is the most devastating disease of cotton in China and a challenge for producers to find effective means of control. Here, we report the effects of different organic amendments on the incidence of this disease and on the rhizosphere microflora of cotton plants. Seven organic amendments were evaluated for their suppressive effect on cotton Verticillium wilt caused by Verticillium dahliae Kleb. The results showed that organic amendments applied to soil reduced disease severity in both inoculated pots and naturally infested cotton field plots. The most effective control was achieved with crab shell (chitin), soybean stalk and alfalfa, and in pots the efficacy was 72%, 60% and 56% for vascular tissues, respectively. Rice chaff gave moderate control, while poultry manure, peanut cake and wheat straw showed a weak suppressive effect with efficacy of 21%, 28% and 11% for vascular tissues, respectively. Organic amendments increased the population size of rhizosphere microbes (including fungi, bacteria and actinomycetes), which varied at the different ages of the cotton plants. The organic materials with the best biocontrol capacity strongly stimulated the proliferation of antagonists to V. dahliae in the rhizosphere. However, poultry manure, peanut cake and wheat straw caused only small changes in the total numbers of microflora and the percentage of antagonists was lower. Extracts from organic amendments were highly inhibitory to V. dahliae. The changes undergone by rhizosphere microbes after the addition of organic amendments may contribute to suppression of cotton wilt and help to explain the protective effect of the amendments. The results indicate that application of organic amendments is an effective control measure against cotton Verticillium wilt.
Keywords: Organic amendments; Cotton; Verticillium dahliae; Control efficacy; Rhizosphere microbes

A.K. Chapagain, A.Y. Hoekstra, H.H.G. Savenije, R. Gautam, The water footprint of cotton consumption: An assessment of the impact of worldwide consumption of cotton products on the water resources in the cotton producing countries, Ecological Economics, Volume 60, Issue 1, 1 November 2006, Pages 186-203, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2005.11.027.
(http://www.sciencedirect.com/science/article/B6VDY-4JF97MF-1/2/44d23f839e72dcc39d6a28734163f9c4)
Abstract:
The consumption of a cotton product is connected to a chain of impacts on the water resources in the countries where cotton is grown and processed. The aim of this paper is to assess the `water footprint' of worldwide cotton consumption, identifying both the location and the character of the impacts. The study distinguishes between three types of impact: evaporation of infiltrated rainwater for cotton growth (green water use), withdrawal of ground- or surface water for irrigation or processing (blue water use) and water pollution during growth or processing. The latter impact is quantified in terms of the dilution volume necessary to assimilate the pollution. For the period 1997-2001 the study shows that the worldwide consumption of cotton products requires 256 Gm3 of water per year, out of which about 42% is blue water, 39% green water and 19% dilution water. Impacts are typically cross-border. About 84% of the water footprint of cotton consumption in the

EU25 region is located outside Europe, with major impacts particularly in India and Uzbekistan. Given the general lack of proper water pricing mechanisms or other ways of transmitting production-information, cotton consumers have little incentive to take responsibility for the impacts on remote water systems.
Keywords: Cotton consumption; Water footprint; Green water; Blue water; Virtual water; Water pollution

Upendra M. Sainju, Wayne F. Whitehead, Bharat P. Singh, Shirley Wang, Tillage, cover crops, and nitrogen fertilization effects on soil nitrogen and cotton and sorghum yields, European Journal of Agronomy, Volume 25, Issue 4, November 2006, Pages 372-382, ISSN 1161-0301, DOI: 10.1016/j.eja.2006.07.005.
(http://www.sciencedirect.com/science/article/B6T67-4KSVGC0-2/2/1415c9b4f0c36c0415a3eaa1a21fe82f)
Abstract:
Sustainable soil and crop management practices that reduce soil erosion and nitrogen (N) leaching, conserve soil organic matter, and optimize cotton and sorghum yields still remain a challenge. We examined the influence of three tillage practices (no-till, strip till and chisel till), four cover crops {legume [hairy vetch (Vicia villosa Roth)], nonlegume [rye (Secaele cereale L.)], vetch/rye biculture and winter weeds or no cover crop}, and three N fertilization rates (0, 60-65 and 120-130 kg N ha-1) on soil inorganic N content at the 0-30 cm depth and yields and N uptake of cotton (Gossypium hirsutum L.) and sorghum [Sorghum bicolor (L.) Moench]. A field experiment was conducted on Dothan sandy loam (fine-loamy, siliceous, thermic, Plinthic Paleudults) from 1999 to 2002 in Georgia, USA. Nitrogen supplied by cover crops was greater with vetch and vetch/rye biculture than with rye and weeds. Soil inorganic N at the 0-10 and 10-30 cm depths increased with increasing N rate and were greater with vetch than with rye and weeds in April 2000 and 2002. Inorganic N at 0-10 cm was also greater with vetch than with rye in no-till, greater with vetch/rye than with rye and weeds in strip till, and greater with vetch than with rye and weeds in chisel till. In 2000, cotton lint yield and N uptake were greater in no-till with rye or 60 kg N ha-1 than in other treatments, but biomass (stems + leaves) yield and N uptake were greater with vetch and vetch/rye than with rye or weeds, and greater with 60 and 120 than with 0 kg N ha-1. In 2001, sorghum grain yield, biomass yield, and N uptake were greater in strip till and chisel till than in no-till, and greater in vetch and vetch/rye with or without N than in rye and weeds with 0 or 65 kg N ha-1. In 2002, cotton lint yield and N uptake were greater in chisel till, rye and weeds with 0 or 60 kg N ha-1 than in other treatments, but biomass N uptake was greater in vetch/rye with 60 kg N ha-1 than in rye and weeds with 0 or 60 kg N ha-1. Increased N supplied by hairy vetch or 120-130 kg N ha-1 increased soil N availability, sorghum grain yield, cotton and sorghum biomass yields, and N uptake but decreased cotton lint yield and lint N uptake compared with rye, weeds or 0 kg N ha-1. Cotton and sorghum yields and N uptake can be optimized and potentials for soil erosion and N leaching can be reduced by using conservation tillage, such as no-till or strip till, with vetch/rye biculture cover crop and 60-65 kg N ha-1. The results can be applied in regions where cover crops can be grown in the winter to reduce soil erosion and N leaching and where tillage intensity and N fertilization rates can be minimized to reduce the costs of energy requirement for tillage and N fertilization while optimizing crop production.
Keywords: Tillage; Cover crop; Nitrogen fertilization; Inorganic nitrogen; Cotton yield; Sorghum yield

G.A. Holt, T.L. Blodgett, F.S. Nakayama, Physical and combustion characteristics of pellet fuel from cotton gin by-products produced by select processing treatments, Industrial Crops and Products, Volume 24, Issue 3, 2005 Annual Meeting of the Association for the Advancement of Industrial Crops: The International Conference on Industrial Crops and Rural Development, November 2006, Pages 204-213, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2006.06.005.

(http://www.sciencedirect.com/science/article/B6T77-4KPP473-3/2/f19849808caa4e7197c18c42d4379663)

Abstract:
Agricultural plant wastes when properly processed into useful commodities can become an economic asset. It has been estimated that over 2.04 million Mg of cotton by-products are generated each year in the United States. On average, disposal of these by-products costs the cotton gin approximately $ 1.65 (U.S.) per Mg. One means of changing a financial liability into a potential revenue generator is to process the by-products into renewable, compact pellet-type fuel that can be used at the site or transported to the consumer. Furnace and water heaters that can burn pelletized plant materials have become popular and their safety, low pollution, and reasonable operational costs have been demonstrated. Also, the drastic increases in the price of liquified fuel and its uncertain supply place a premium for finding and using alternate, low-cost, cellulose-based fuels.
The objectives of our study were to fabricate pellet fuel from cotton gin by-products using select processing techniques, determine its physical properties, and measure the emissions when fired in a commercial pellet stove used for residential heating.
By-products from two cotton gins were collected and processed into fuel pellets. A total of seven different pellet fuels were evaluated, six from cotton gin by-products and one from wood. The treatments resulted from using different material streams from the ginning process as well as varying quantities of starch and/or crude cottonseed oil during the fuel pellet manufacturing process. The fuel pellet density from the various treatments ranged from 488 to 678 kg/m3. The various treatments were burned in a conventional pellet stove (four replications) and the gaseous and particulate emissions measured.
The average calorific value of the pellets ranged from 17.9 to 20.9 MJ/kg (HHV). The ash content for the various treatments ranged from a low of 4.88% to a high of 9.75%. The sodium content indicated concentration ranges from 91 to 282 ppm depending on the treatment.
The emissions from the cotton gin by-product pellets were higher than for a premium grade wood pellet. The emissions measured during testing were CO, NO, NO2, SO2, and particulates. The pellet stove was setup following the manufacturer's recommendation to burn wood pellets, but was not adjusted for the cotton gin fuel pellets.
By utilizing various additives and processing techniques, cotton gin by-products could be used to manufacture a pellet fuel that has commercial potential. However, work remains to minimize the ash content and determine the optimal settings for maximizing combustion.
Keywords: Pellet fuel; Cotton waste; Gin trash; By-products; Value-added processing; Pellet stove

Muhammad Yaseen, Muhammad Arshad, Azeem Khalid, Effect of acetylene and ethylene gases released from encapsulated calcium carbide on growth and yield of wheat and cotton, Pedobiologia, Volume 50, Issue 5, 30 October 2006, Pages 405-411, ISSN 0031-4056, DOI: 10.1016/j.pedobi.2006.08.002.
(http://www.sciencedirect.com/science/article/B7CW5-4KTN8VG-2/2/a46a6f45cd9b0ef4cc1e8d71c50ff970)

Abstract: Summary
Calcium carbide (CaC2) is a rich source of the nitrification inhibitor acetylene (C2H2) and plant hormone ethylene (C2H4). C2H4 formed from biotic reduction of C2H2 released from CaC2 may accumulate in soil at physiologically active concentrations. Laboratory studies were conducted to evaluate the potential of encapsulated CaC2 for gradually releasing C2H2 and its product C2H4 in soil. The GC-FID analysis revealed that encapsulated CaC2 released a copious amount of C2H2 (up to 23700 nmol kg-1 soil), which was gradually reduced to C2H4 over a period of time via a strictly biotic reaction as no C2H4 was detected in CaC2-amended sterilized soil. Ammonium oxidation was suppressed by the encapsulated CaC2 indicating that C2H2 acted as a nitrification inhibitor. Results of pot trials conducted in the net house indicated that encapsulated CaC2 applied

at 30 mg kg-1 soil significantly increased the number of tillers (up to 45.5%), root weight (up to 14.9%), straw (up to 32.8%) and grain yield (up to 37.3%) of wheat over the fertilizer application alone. In the case of cotton, the number of bolls, root, shoot and seed weight were also significantly increased in response to the application of encapsulated CaC2. Moreover, application of encapsulated CaC2 resulted in greater N-use efficiency (NUE) (up to 61.1%) by both wheat and cotton crops than that observed at the same rates of N fertilizer alone. These findings imply that CaC2 affects plant growth through hormonal action of C2H4 as well as improved NUE; however, the latter factor might be a relatively more contributing. It is desirable that CaC2 is formulated for gradually slow release of C2H2 and C2H4 in soil air.
Keywords: Calcium carbide; Acetylene; Ethylene; Plant hormone; Nitrification inhibitor; Plant growth

Fadi Karam, Rafic Lahoud, Randa Masaad, Andre Daccache, Oussama Mounzer, Youssef Rouphael, Water use and lint yield response of drip irrigated cotton to the length of irrigation season, Agricultural Water Management, Volume 85, Issue 3, 16 October 2006, Pages 287-295, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.05.003.
(http://www.sciencedirect.com/science/article/B6T3X-4K7F9P2-2/2/424d98c41d16812a0763615ee12956d3)
Abstract:
A 2-year experiment was conducted at Tal Amara Research Station in the Bekaa Valley of Lebanon to determine water use and lint yield response to the length of irrigation season of drip irrigated cotton (Gossypium hirsutum L.). Crop evapotranspiration (ETcrop) and reference evapotranspiration (ETrye-grass) were directly measured at weekly basis during the 2001 growing period using crop and rye-grass drainage lysimeters. Crop coefficients (Kc) in the different growth stages were calculated as ETcrop/ETrye-grass. Then, the calculated Kc values were used in the 2002 growing period to estimate evapotranspiration of cotton using the FAO method by multiplying the calculated Kc values by ETrye-grass measured in 2002. The length of irrigation season was determined by terminating irrigation permanently at first open boll (S1), at early boll loading (S2), and at mid boll loading (S3). The three treatments were compared to a well-watered control (C) throughout the growing period. Lint yield was defined as a function of components including plant height at harvest, number of bolls per plant, and percentage of opened bolls per plant.
Lysimeter-measured crop evapotranspiration (ETcrop) totaled 642 mm in 2001 for a total growing period of 134 days, while when estimated with the FAO method in 2002 it averaged 669 mm for a total growing period of 141 days from sowing to mature bolls. Average Kc values varied from 0.58 at initial growth stages (sowing to squaring), to 1.10 at mid growth stages (first bloom to first open boll), and 0.83 at late growth stages (early boll loading to mature bolls).
Results showed that cotton lint yields were reduced as irrigation amounts increased. Average across years, the S1 treatment produced the highest yield of 639 kg ha-1 from total irrigations of 549 mm, compared to the S2 and S3 treatments, which yielded 577 and 547 kg ha-1 from total irrigations of 633 and 692 mm, respectively, while the control resulted in 457 kg ha-1 of lint yield from 738 mm of irrigation water. Water use efficiency (WUE) was found to be higher in S1 treatment and averaged 1.3 kg ha-1 mm-1, followed by S2 (1.1 kg ha-1 mm-1), and S3 (1.0 kg ha-1 mm-1), while in the control WUE was 0.80 kg ha-1 mm-1. Lint yield was negatively correlated with plant height and the number of bolls per plant and positively correlated with the percentage of opened bolls. This study suggests that terminating irrigation at first open boll stage has been found to provide the highest cotton yield with maximum WUE under the semi-arid conditions of the Bekaa Valley of Lebanon.
Keywords: Gossypium hirsutum L.; Irrigation; Crop evapotranspiration; Crop coefficient; Reference evapotranspiration; Water use efficiency

Xiulian Sun, Wopke van der Werf, Felix J.J.A. Bianchi, Zhihong Hu, Just M. Vlak, Modelling biological control with wild-type and genetically modified baculoviruses in the Helicoverpa armigera-cotton system, Ecological Modelling, Volume 198, Issues 3-4, 15 October 2006, Pages 387-398, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2006.05.011.
(http://www.sciencedirect.com/science/article/B6VBS-4KGX8F7-1/2/1294510ccab2c5351bdfc661397a8a96)
Abstract:
A comprehensive model was developed to simulate virus epizootics in a stage structured insect population and analyse scenarios for the biological control of cotton bollworm (CBW), Helicoverpa armigera, in cotton, using wild-type or genetically modified baculoviruses. In simulations on dosage and timing of a wild-type strain and a genetic recombinant of H. armigera single nucleocapsid nucleopolyhedrovirus (HaSNPV), the economic injury level was not exceeded against a prevailing population of 12 larvae m-2 when virus was applied 10 times during the season. An early start of virus applications in each of three successive CBW generations, with sprays starting soon after egg deposition, and a short, 3-day spray interval were necessary for effective control. A recombinant virus with a lower mean time to kill provided better short-term protection than the wild-type virus. However, the number of pupae entering diapause at the end of the growing season was higher due to reduced horizontal transmission. These pupae are founders of H. armigera populations in the next season indicating that the use of fast acting genetically modified viruses in one year may enhance CBW populations in the following year. Hence, simulations indicate that there is a trade-off between short-term and long-term objectives in the biocontrol with insect viruses: fast acting recombinant viruses provide better control in the short-term at the expense of potentially inferior population suppression in the long-term. The model may be used as a decision tool for evaluating virus application strategies in interaction with virus genotype and climatic conditions that affect the phenology and population dynamics of CBW.
Keywords: Cotton bollworm; Helicoverpa armigera; Nucleopolyhedrovirus; Baculovirus; Genetic modification; Cotton; Biological control; Persistence; Population dynamics; Epizootiology; Modelling

Ada Wossink, Zulal S. Denaux, Environmental and cost efficiency of pesticide use in transgenic and conventional cotton production, Agricultural Systems, Volume 90, Issues 1-3, October 2006, Pages 312-328, ISSN 0308-521X, DOI: 10.1016/j.agsy.2006.01.004.
(http://www.sciencedirect.com/science/article/B6T3W-4JCBPJ7-1/2/a63817b410a4e7678d2719d0a69ebfd5)
Abstract:
This study focuses on the quantification of pesticide use efficiency for producers of transgenic cotton versus conventional cotton in order to test for the improvement promised by the genetically engineered crop. The environmental and cost efficiency of pesticide use is assessed by means of data envelopment analysis (DEA) and the external effects of pesticide are quantified by means of the pesticide leaching potential. To account for the fact that conditions other than the `treatment' (seed type) are not equal in farm surveys the study employs a second step Tobit regression. The data are from a survey of cotton growers in North Carolina, USA. Differences in environmental efficiency are found to be significant between herbicide tolerant and stacked gene (herbicide tolerant and insect resistant) cotton and between stacked gene and conventional cotton. In contrast, no statistically significant differences are found for efficiency of pest control cost. In the follow-up Tobit regression, differences in production environment and in farm, farmer and field characteristics are accounted for so that the contribution of seed type to efficiency can be observed. The regression results confirm the importance of stacked gene cotton for improving the environmental efficiency of pesticide use in cotton. In contrast, seed type was not significant in explaining differences in cost efficiency among North Carolina cotton growers. The new

technology reduces pesticide application but these benefits are curbed by the high price of cotton seed (technology fee).
Keywords: Cotton; Biotechnology; Data envelopment analysis; Pesticide leaching potential; Environmental efficiency; Tobit analysis

Jorge B. Torres, John R. Ruberson, Interactions of Bt-cotton and the omnivorous big-eyed bug Geocoris punctipes (Say), a key predator in cotton fields, Biological Control, Volume 39, Issue 1, October 2006, Pages 47-57, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2006.03.006.
(http://www.sciencedirect.com/science/article/B6WBP-4JKR6CG-1/2/e8c33d7157975ebe8aad8539906bbff3)
Abstract:
The continuous expression of the Bt (=Bacillus thuringiensis) toxin in plants during the growing season may bring Bt toxin into contact with the omnivorous big-eyed bug Geocoris punctipes (Say) (Hemiptera: Geocoridae), an important predator in cotton fields, through prey fed Bt-cotton or through plant feeding. Therefore, an experiment was set up during two seasons (2003 and 2004) in the field to assess host plant- and prey-mediated effects on development and reproduction of the predator. We used a combination of Bt and non-Bt cotton plants, and of prey, with one treatment conveying Bt Cry1Ac toxin to the upper trophic level [Spodoptera exigua (Hubner) larvae (BAW)] and the other prey item free of toxin [Helicoverpa zea (Boddie) eggs (CEW)]. This design allowed us to differentiate direct and indirect effects of the toxin in the host plant from effects attributable to prey quality under field conditions. The experiment began with newly hatched big-eyed bug nymphs and ending when the last female died. The combination of prey and Bt-cotton plants did not exert interactive effects on development and reproduction of the omnivorous predator. The prey effect was independent of either host plant type. Nymphs fed BAW larvae developed slower and produced smaller adults with no difference between cotton genotypes. Reproductive output and longevity were similar between cottons for both prey types, and were consistently lower for predators fed BAW larvae. Cry1Ac was detected in Bt-cotton and in BAW larvae fed Bt-cotton and offered to the predators, but not in the predators' bodies. The results do not indicate any lethal or sublethal effect of transgenic Bt-cotton or of Cry1Ac conveyed through prey on development and reproduction of G. punctipes in our field experiments.
Keywords: Predatory Heteropteran; Transgenic Bt plants; Non-target impact; Cry1Ac; Phytophagy; Trophic interactions

Reginald S. Fletcher, Allan T. Showler, Surveying kaolin-treated cotton plots with airborne multispectral digital video imagery, Computers and Electronics in Agriculture, Volume 54, Issue 1, October 2006, Pages 1-7, ISSN 0168-1699, DOI: 10.1016/j.compag.2006.06.004.
(http://www.sciencedirect.com/science/article/B6T5M-4KR3J45-1/2/7fedfc6dc7b3ba9142c49252f64868e9)
Abstract:
Airborne multispectral digital video imagery was evaluated as tool for surveying kaolin-treated cotton (Gossypium hirsutum L.) plots, with emphasis on decision support. Images of experimental plots were obtained on 12 June 2002 and 16 June 2004 with an electronic digital video imaging system acquiring blue (447-455 nm), green (555-565 nm), red (625-635 nm), near-infrared (814-826 nm), and mid-infrared (1631-1676 nm) imagery. We qualitatively and quantitatively evaluated the single band images and color and false color composite images to compare the image responses of treated plots with the image responses of untreated plots. Blue, green, and red imagery separated the treated plots from the untreated plots (Dunnett's test and t-test; P = 0.05), with the blue imagery being the most responsive to the treatment. Treated plots were readily differentiated from untreated plots with natural color and false color composite imagery. This separation was attributed to the images that were sensitive to some portion of the visible spectrum (i.e., blue, green, and red light). These results indicate that airborne electronic imaging systems

have great potential as tools for surveying cotton fields treated with kaolin particle film, supporting application of the imagery as a decision support tool.
Keywords: Remote sensing; Surround wettable powder; Electronic digital video imagery; Multispectral

Zhudong Liu, Peiyu Gong, Kunjun Wu, Jianghua Sun, Dianmo Li, A true summer diapause induced by high temperatures in the cotton bollworm, Helicoverpa armigera (Lepidoptera: Noctuidae), Journal of Insect Physiology, Volume 52, Issue 10, October 2006, Pages 1012-1020, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2006.06.008.
(http://www.sciencedirect.com/science/article/B6T3F-4KDJVT8-2/2/d00b38d0b6101999f9a923538dd7b09e)
Abstract:
Summer diapause in the cotton bollworm, Helicoverpa armigera (Hubner), which prolongs the pupal stage, particularly in males, is induced by high temperatures. In the laboratory, summer-diapausing pupae of H. armigera were induced at high temperatures (33-39 [degree sign]C) with a photoperiod of LD8:16; winter-diapausing and non-diapausing pupae, cultured at 20 [degree sign]C with a photoperiod of LD8:16 and at 27 [degree sign]C, LD16:8, respectively, acted as a control. Retention time of eye spots, weight, and lipid and glycogen levels were compared. At high temperatures, both body weight and energy storage capacity were much higher in summer-diapausing pupae than in non-diapausing pupae reared at 33-39 [degree sign]C. At temperatures (>33 [degree sign]C) high enough to maintain summer diapause, the eye spots of summer-diapausing pupae did not move during the 30-day experiment. However, eye spots of summer-diapausing pupae placed at 30 [degree sign]C began to move about 10 days after they were transferred, significantly later than in non-diapausing pupae reared at 33-39 [degree sign]C or non-diapausing pupae reared at 27 [degree sign]C, which initiated eye spot movement 2 days after pupation. The differences in retention time of eye spots between summer- and winter-diapausing pupae shows that winter diapause is more intense than summer diapause in this insect. The weight loss, and lipid and glycogen metabolism curves indicate that the summer-diapausing pupae's metabolism is very low. We conclude that summer diapause in the cotton bollworm is a true diapause and that the summer diapause enables the cotton bollworm to withstand the high temperatures of summer.
Keywords: Helicoverpa armigera; Summer diapause; Winter diapause; High temperatures; Pupal characteristics; Metabolism

Y.-X. Li, S.M. Greenberg, T.-X. Liu, Effects of Bt cotton expressing Cry1Ac and Cry2Ab and non-Bt cotton on behavior, survival and development of Trichoplusia ni (Lepidoptera: Noctuidae), Crop Protection, Volume 25, Issue 9, September 2006, Pages 940-948, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.12.007.
(http://www.sciencedirect.com/science/article/B6T5T-4J6W6VP-1/2/1e4b1cda31d85c63d02609050f5ab225)
Abstract:
With an assumption that the larvae of cabbage looper, Trichoplusia ni (Hubner), a secondary pest of cotton, Gossypium hirsutum (L.), could move between cotton plants in the field, we conducted a series of laboratory experiments to determine the larval movement, food choice, consumption, survival, and development on Bt (Bollgard II expressing Cry1Ac and Cry2Ab) and non-Bt cotton. On non-Bt cotton, all T. ni larvae fed and stayed on the leaves. In choice tests between a non-Bt and Bt cotton leaves, 73.3%, 86.7% and 93.3% of first instar larvae moved to non-Bt cotton leaves after 1, 8 and 48 h, respectively, indicating that larvae were able to detect and avoid Bt cotton leaves. On the non-Bt cotton leaves, 90% of larvae initiated detectable feeding damage, compared with only 16.7% on the Bt cotton leaves. The larvae feeding on non-Bt cotton leaves consumed an average of 0.226 cm2 leaf per larva in 48 h, whereas the larvae feeding on Bt cotton leaves

consumed an average of 0.018 cm2 leaf per larva. The developmental times of each of the five larval stages or pupal stage were generally not significantly different with a few exceptions when they fed either on non-Bt leaves or a mixture of non-Bt and Bt leaves. The pupae that developed from the larvae that fed on non-Bt were 21.6-24.7% heavier than those that developed from the larvae that fed on a mixture of non-Bt and Bt cotton leaves. The total developmental time of larvae in the mixed-leaf treatment was significantly longer than that of larvae on non-Bt leaves. No T. ni larvae survived when they fed exclusively on Bt cotton leaves. Starved larvae died significantly sooner than those on Bt leaves. High percentages of larvae survived when they fed either on non-Bt leaves (92.7%) or on the mixture of non-Bt and Bt cotton leaves (91.7%) for 5 days. The recognition and migration of the first instar T. ni larvae from Bt cotton leaves to non-Bt cotton leaves imply that the merit of Bt and non Bt cotton seed mixture at planting should be further evaluated as a strategy for Bt cotton resistance management of lepidopteran pests.
Keywords: Trichoplusia ni; Bacillus thuringensis; Bt cotton; Behavior; Development; Survival

Jean-Luc Hofs, Michel Fok, Maurice Vaissayre, Impact of Bt cotton adoption on pesticide use by smallholders: A 2-year survey in Makhatini Flats (South Africa), Crop Protection, Volume 25, Issue 9, September 2006, Pages 984-988, ISSN 0261-2194, DOI: 10.1016/j.cropro.2006.01.006.
(http://www.sciencedirect.com/science/article/B6T5T-4JHMHHR-2/2/fba644716c86565bc5e790a3d770b14a)
Abstract:
This paper explores insecticide use in fields cropped with conventional or Bt cotton varieties in a smallholder farming area (Makhathini Flats, KwaZulu Natal, South Africa). The study was carried out during the 2002-2003 and 2003-2004 growing seasons as part of a broader survey based on daily monitoring of a sample of smallholdings. The adoption of Bt cotton led to a decrease in pyrethroid use, but the level of insect resistance of this cultivar was not sufficient to completely drop this pesticide from the spraying programme. On the other hand, organophosphates were still being applied in substantial amounts, thus raising questions as to the impact of Bt cotton adoption on farmers' health. The overall economic results obtained with Bt cotton were slightly positive despite the low cotton yields obtained in the Flats during our survey. Bt cotton adoption did lead to labour savings, but the extent of this gain was not as high as expected. In conclusion, cropping Bt cotton in Makhathini Flats did not generate sufficient income to expect a tangible and sustainable socioeconomic improvement due to the way the crop is currently managed. Adoption of an innovation like Bt cotton seems to pay only in an agro-system with a sufficient level of intensification.
Keywords: Bt cotton; Insecticide use; Safety; Cost-effectiveness; Integrated crop management; Small-scale farming; South Africa

Alf Hornborg, Footprints in the cotton fields: The Industrial Revolution as time-space appropriation and environmental load displacement, Ecological Economics, Volume 59, Issue 1, 5 August 2006, Pages 74-81, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2005.10.009.
(http://www.sciencedirect.com/science/article/B6VDY-4HP6GB7-1/2/bb2c6e016ec8697fe9d2c1bb2771d6f5)
Abstract:
This paper offers a method for quantifying the global exchange of (natural) space and (labor) time underlying the economic success of the British textile industry in the late 18th and early 19th century. Using historical statistics on inputs of land and labor embodied in cotton and wool production, respectively, estimates are made of the amount of British land and labor that were `saved' by displacing fibre production to North America. By comparing inputs of land and labor in the textile exports of England with those in some commodities imported from its colonial periphery, and juxtaposing these data with exchange rates, estimates are also made of unequal exchange.

Using such methods, it is possible to bring together the Marxist concern with unequal exchanges of labor time, on one hand, with the more recent concern with ecological footprints, on the other.
Keywords: Industrial Revolution; Unequal exchange; Environmental load displacement; Time-space appropriation; Technology; Textile industry; Capital accumulation; Embodied land; Embodied labor; Ecological footprints

H.C. Sharma, G. Pampapathy, Influence of transgenic cotton on the relative abundance and damage by target and non-target insect pests under different protection regimes in India, Crop Protection, Volume 25, Issue 8, August 2006, Pages 800-813, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.11.002.
(http://www.sciencedirect.com/science/article/B6T5T-4JF975B-1/2/bc323f509421c37c755bf496bcf8ae0f)
Abstract:
Effectiveness of transgenic cottons with Bacillus thuringiensis (Bt) cry1Ac gene along with non-transgenic commercial cultivars of Gossypium hirsutum and G. arboreum for the management of cotton bollworm, Helicoverpa armigera was evaluated at the research farm, International Crops Research Institute for the Semi-Arid Tropics, Patancheru, Andhra Pradesh, India. In general, there were no significant differences in oviposition between the transgenic and the non-transgenic cultivars under protected and unprotected conditions. The larval numbers were significantly lower on the transgenic hybrids during the 2004 rainy season under high infestation, but the differences in larval density between the transgenic and non-transgenic hybrids during 2002 and 2003 seasons under low levels of infestation were quite small. Bollworm damage in squares and bolls was significantly lower in the transgenic hybrids than in the non-transgenic ones, although there were a few exceptions. Differences in seed cotton yield between the transgenic and the non-transgenic hybrids were not significant under unprotected conditions at moderate levels of infestation during the 2002 and 2003 cropping seasons (except in the case of Mech 184). However, significant differences in seed cotton yield were observed during the 2004 cropping season under heavy bollworm infestation. Seed cotton yield of the first picking in transgenic hybrids was significantly greater than that of the non-transgenic counterparts. Transgenic hybrids suffered low shoot damage by spotted bollworm, Earias vittella. However, there were no differences between the transgenic and non-transgenic hybrids in their relative susceptibility to cotton jassid, Amrasca biguttula biguttula and serpentine leaf miner, Liriomyza trifolii, white fly, Bemisia tabaci, green bug, Nezara viridula, ash weevil, Myllocerus undecimpustulatus, and red cotton bug, Dysdercus koenigii. With a few exceptions, the bollworm damage and seed cotton yield of the G. arboreum varieties Aravinda and MDL 2450, and the G. hirsutum variety L 604 was not significantly different than that of the transgenic hybrids, and these varieties were also resistant to cotton jassid. The results suggested that it would be useful to combine transgenic resistance to H. armigera with plant characteristics conferring resistance to the target or non-target insect pests in the region in order to realize the full potential of transgenic plants for sustainable crop production.
Keywords: Cotton; Gossypium; Helicoverpa armigera; Non-target pests; Pest management

M. Madhaiyan, S. Poonguzhali, S.P. Sundaram, Tongmin Sa, A new insight into foliar applied methanol influencing phylloplane methylotrophic dynamics and growth promotion of cotton (Gossypium hirsutum L.) and sugarcane (Saccharum officinarum L.), Environmental and Experimental Botany, Volume 57, Issues 1-2, August 2006, Pages 168-176, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2005.05.010.
(http://www.sciencedirect.com/science/article/B6T66-4H3Y9T8-2/2/a938bb4abc4563df1655847ac83320e1)
Abstract:

Foliar applied methanol has been purported to enhance growth and yield of cotton and sugarcane possibly by stimulation of plant hormone production mediated by pink-pigmented facultative methylotrophic (PPFMs) bacteria. In vitro studies were performed on the relations between leaf methanol and pectin methylesterase (PME: EC 3.1.1.11) in young and old leaves of cotton and sugarcane. Results of field trials and pot culture studies of cotton showed that application of 30% methanol or PPFMs as foliar spray significantly increased plant height, plant dry weight, leaf area, boll number, and boll dry weight, leading to an increase of seed cotton yield (SCY) over control. Foliar application of PPFMs increased plant height and specific leaf area of sugarcane and led to a cane yield increase of 9.8% over control. The overall PPFMs population in the phyllosphere of cotton remained higher than sugarcane. Applications of methanol or PPFMs increased the total cytokinins in cotton and sugarcane. The methanol emission process, regulated by PME activity that catalyzes demethoxylation of pectins, could trigger PPFMs population on the leaf surface and subsequent cytokinin production in plants, and might play a role in plant growth promotion. In our study, the foliar applications of methanol or PPFMs increased the PPFM populations and cytokinin production resulting in increased yield in cotton and sugarcane.
Keywords: Leaf methanol; Pectin; Pectin methylesterase; Methylobacterium; PPFMs; Cytokinins

Hezhong Dong, Weijiang Li, Wei Tang, Zhenhuai Li, Dongmei Zhang, Yuehua Niu, Yield, quality and leaf senescence of cotton grown at varying planting dates and plant densities in the Yellow River Valley of China, Field Crops Research, Volume 98, Issues 2-3, August-September 2006, Pages 106-115, ISSN 0378-4290, DOI: 10.1016/j.fcr.2005.12.008.
(http://www.sciencedirect.com/science/article/B6T6M-4J32JFY-1/2/b1aadd0786db7c8e54b9e1e660bc7eeb)
Abstract:
Cotton is usually managed with a normal planting production system (NPPS) that involves planting in mid-April at a moderate plant density (4.5 plants/m2) in the Yellow River Valley of China, but drought or cold stress in spring often delays cotton planting, and results in reduced yield and maturity at this plant density. Two experiments were conducted for 4 consecutive years, to test if yield and fiber quality can be maintained or improved by increased plant density for relatively late-planted cotton. Results in the first experiment in 2001 and 2002 showed that average lint yields were not significantly affected by plant density (3.0, 4.5, 6.0 or 7.5 plants/m2) or by planting date (mid-April or early May), but significant interactions between planting date and plant density on lint yield were detected in both years. Normal planted cotton at a plant density of 3.0-4.5 plants/m2, and late-planted cotton at 7.5 plants/m2 produced higher lint yield than other planting date and density combinations. Experiment 2 compared NPPS with a late planting production system (LPPS) which involves planting in early May at 7.5 plants/m2 over 2 years. The NPPS and LPPS had similar lint yields in both years. Cotton plants in both systems produced approximately 75% of total lint in the first two harvests, indicating no significantly delayed earliness in LPPS relative to NPPS. Fiber from late-season bolls exhibited reduced strength and micronaire in both systems, but there were no significant differences in fiber properties for early- and mid-season fiber between the two systems. In terms of green leaf area index and leaf chlorophyll content, leaf senescence or premature senescence of cotton plants was considerably alleviated by either altered source to sink balance or the uptake of K in LPPS compared to NPPS. It was concluded that the LPPS, a relatively late-planted cotton production system with increased plant density under intensive field management, might be a potential alternative for growing cotton.
Keywords: Cotton; Late planting; Plant density; Yield; Fiber quality; Leaf senescence; Boll load

J.L. Hofs, B. Hau, D. Marais, Boll distribution patterns in Bt and non-Bt cotton cultivars: I. Study on commercial irrigated farming systems in South Africa, Field Crops Research, Volume 98, Issues 2-3, August-September 2006, Pages 203-209, ISSN 0378-4290, DOI: 10.1016/j.fcr.2006.01.006.

(http://www.sciencedirect.com/science/article/B6T6M-4JBGJ3P-2/2/3858093f4360767fff095bfa26fbbd3b)
Abstract:
Cotton (Gossypium hirsutum L.) cultivars containing the cryIAc gene accounted for 81% of South Africa's cotton production in 2004. Current research on Bt cotton in developed countries has revealed that this transgenic crop provides a key means for enhancing yields and boosting profits. Our study was designed to assess the agronomic efficiency of Bt cotton particularly in South African commercial (Paper 1) and small-scale (Paper 2) farming systems. Over several consecutive years, we compared yield boll distribution patterns (using a plant mapping analysis) of a Bt cultivar (NuOpal) with a conventional nearly isogenic line (DeltaOpal). Compared with the non-Bt cultivar, Bt cotton had better early boll retention rates at the first and second positions on the fruiting branches. Beyond the third position this trend was reversed, indicating that non-Bt cotton varieties offset losses occurring at the first two positions by producing fruits at further positions. Bt cotton thus had a higher average boll weight, shorter vegetative cycle, earlier boll opening, and 13% higher yield potential on average than the conventional control. These results indicate that using the transgenic variety provided better protection against bollworm as compared to chemical treatments--which are likely not effective at the onset of bollworm infestation and do not protect the first bolls. These observations demonstrate the advantage of transgenic Bt cotton when grown under near optimal conditions.
Keywords: Cotton; South Africa; Bt cotton; Plant mapping; Earliness; Transgenic varieties

J.L. Hofs, B. Hau, D. Marais, M. Fok, Boll distribution patterns in Bt and non-Bt cotton cultivars: II. Study on small-scale farming systems in South Africa, Field Crops Research, Volume 98, Issues 2-3, August-September 2006, Pages 210-215, ISSN 0378-4290, DOI: 10.1016/j.fcr.2006.01.007.
(http://www.sciencedirect.com/science/article/B6T6M-4JD0H3M-2/2/ff25bbe76f180830242fa2a5133ce4bd)
Abstract:
The introduction of Bt cotton in small-scale African farming systems raises the question of the technological efficacy of such cultivars in low-input rainfed agriculture conditions. Current surveys on Bt cotton in small-scale farming systems in South Africa suggest this transgenic crop is a key factor for increasing yields and farm income. This study was designed to assess the efficacy of the Bt cultivar under non-optimal conditions that prevail on small-scale farms. We thus carried out a 2-year comparative study on yield performances and boll distribution patterns of Bt and non-Bt cotton in 20 small-scale fields around Makhathini Flats (KwaZulu Natal, South Africa). A survey was also conducted on 86 farms to obtain yield results in a broader sample. In small-scale, low-input rainfed farming systems, productivity is extremely variable and the advantage of transgenic cotton over conventional varieties is not as easy to demonstrate as it is in large-scale, high-input irrigated farming systems. Given the high technological cost, adoption of transgenic crops may sometimes have a negative economic impact for farmers. Nevertheless, the use of transgenic varieties may be effective within the framework of an overall cropping intensification strategy, i.e. as an integrated pest management component and accompanied by fertilizer application and weed management recommendations.
Keywords: Cotton; South Africa; Bt cotton; Plant mapping; Earliness; Transgenic varieties

M. Zwiegelaar, I.A. Dubery, Early activation of cell wall strengthening-related gene transcription in cotton by a Verticillium dahliae elicitor, South African Journal of Botany, Volume 72, Issue 3, August 2006, Pages 467-472, ISSN 0254-6299, DOI: 10.1016/j.sajb.2005.12.012.
(http://www.sciencedirect.com/science/article/B7XN9-4JS1TN9-7/2/9a4a76fc6a92a392370edb9141f7b1cc)
Abstract:

Differential expression of genes in cultured cotton cells and leaf disks that have been challenged with a purified elicitor from Verticillium dahliae, was investigated in order to identify genes involved in the early defense response of cotton. The mRNA differential display reverse transcriptase polymerase chain reaction was used to identify differentially expressed genes 5 h after application of 50 [mu]g mL- 1 Verticillium dahliae elicitor. Sequence analysis of selected amplicons revealed homologies with genes involved in metabolism of carbohydrate precursors for cell wall synthesis. cDNAs identified that were up-regulated after elicitor treatment coded for homologs to a UDP-N-acetylglucosamine pyrophosphorylase-like protein, a glucosyltransferase-like protein, a beta-1,4-N-acetylglucosaminyltransferase, a cellulose synthase-like protein, a 3-deoxy-d-manno-octulosonic acid transferase-like protein and a hydroxyproline-rich glycoprotein. In addition, one cell wall-related cDNA that was down-regulated after elicitor treatment, coded for a proline-rich protein family member homolog. The differential expression of the cDNAs up-regulated after the Verticillium dahliae elicitor treatment was confirmed with reverse Northern dot blots. These results indicate that metabolic reprogramming through the enhanced synthesis of carbohydrate precursors accompanies the activation of de novo cell wall synthesis. As such it is important for the understanding of early defense related responses in cotton and for their biotechnological manipulation.
Keywords: Cell wall; Cotton; Differential display; Elicitor; Gene expression; Verticillium

Taisheng Du, Shaozhong Kang, Jianhua Zhang, Fusheng Li, Xiaotao Hu, Yield and physiological responses of cotton to partial root-zone irrigation in the oasis field of northwest China, Agricultural Water Management, Volume 84, Issues 1-2, 16 July 2006, Pages 41-52, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.01.010.
(http://www.sciencedirect.com/science/article/B6T3X-4JHMY12-1/2/562c6bd22aab95ac8bfcb547cc876b55)
Abstract:
Field experiment was carried out to investigate the effects of alternate partial root-zone irrigation on the yield and physiological responses of cotton (Gossypium hirsutum) and the soil moisture variations in an oasis of northwest China in 2004-2005. Plants with mulching and in furrows were applied with three partial root-zone irrigation methods, i.e. conventional furrow irrigation (CFI, all furrows watered), fixed partial root-zone furrow irrigation (FFI, fixed one of every two furrows watered) and alternate partial root-zone furrow irrigation (AFI, neighboring two furrows alternatively watered), and under three irrigation levels, i.e. 22.5, 30 and 45 mm for each method. Monitoring of soil water contents in the AFI treatment proved that it was alternately changed in different root-zones in response to the irrigation method, although there existed some lateral infiltration from wetting side to drying side after each watering. Stomatal conductance and leaf transpiration of both AFI and FFI were lower than that of the conventional furrow irrigation if compared under the same irrigation amount but leaf water potentials of the three treatments showed no significant difference. In both years, AFI always achieved the highest seed cotton yield under the three irrigation levels. Higher yield and reduced water loss resulted in a higher water use efficiency (WUE) for the AFI treatment in both years. Our results suggest that AFI should be a useful water-saving irrigation method in arid region where cotton production is heavily dependent on irrigation and water resources are scarce.
Keywords: Alternate partial root-zone irrigation; Water use efficiency; Partial root-zone drying; Arid region; Cotton (Gossypium hirsutum)

S.K. Jalota, Anil Sood, G.B.S. Chahal, B.U. Choudhury, Crop water productivity of cotton (Gossypium hirsutum L.)-wheat (Triticum aestivum L.) system as influenced by deficit irrigation, soil texture and precipitation, Agricultural Water Management, Volume 84, Issues 1-2, 16 July 2006, Pages 137-146, ISSN 0378-3774, DOI: 10.1016/j.agwat.2006.02.003.

(http://www.sciencedirect.com/science/article/B6T3X-4JRM086-1/2/63c6fef02388c6e3c118e65fbe4d9b73)

Abstract:
In the agricultural sector there is an urgent need to use dwindling water resources efficiently and enhancing crop water productivity (CWP). At the farm level, reducing evapotranspiration (ET) through deficit irrigation (lesser number of irrigations) and identification of the most sensitive crop growth stage to water stress has been reported as one of the ways to enhance CWP. Although information on CWP in relation to irrigation water of some cereal crops based on the field experimental data is available in the literature. However, the influence of soil texture, precipitation and deficit irrigation regime and their interactions on CWP is not well-documented. We explored these components in cotton (Gossypium hirsutum L.)-wheat (Triticum aestivum L.) cropping system through simulation analysis, which otherwise are difficult to be explained through field experimentation. The simulated results showed that by reducing the amount of irrigation water input below economic optima, both the yield and ET of cotton and wheat crops were reduced and consequently CWP to varying magnitudes depending upon soil texture, precipitation and irrigation regimes. With reducing post-sowing irrigation water from 300 to 75 mm, the decrease in CWP in silt loam, sandy loam and loamy sand soils were 15, 4 and 1% for cotton and 8, 36 and 55% for wheat, respectively, indicating higher decrease in CWP for wheat than for cotton, and in coarse-textured than fine-textured soils. Precipitation increased the CWP. The increase was more in wheat crop on coarse-textured soil with less number of irrigations. Averaged over soil texture and irrigation regimes, real CWP (RCWP) (yield/ET) was 47 and 9 and 60% of apparent CWP (ACWP) (yield/irrigation water) in cotton, wheat and cotton-wheat system, respectively. The crop growth stages found to be most sensitive to water stress were from flowering to boll formation in cotton and grain development stage in wheat.

Keywords: Crop water productivity; Cotton-wheat system; Soil texture; Irrigation water; Precipitation

M. Tejada, J.L. Gonzalez, Crushed cotton gin compost on soil biological properties and rice yield, European Journal of Agronomy, Volume 25, Issue 1, July 2006, Pages 22-29, ISSN 1161-0301, DOI: 10.1016/j.eja.2006.01.007.

(http://www.sciencedirect.com/science/article/B6T67-4JN2KN5-1/2/abf4cf2179c3f1998f01e7f6865670a7)

Abstract:
This study presents an account of soil quality parameters and rice (Oriza sativa cv. Puntal) yields as influenced by applying an organic waste (crushed cotton gin compost, CC). Such information is desirable for determining the suitability of renewable energy resources such as organic wastes as replacements for synthetic fertilizers. However, CC has low N levels. For this reason, some authors suggest co-applying mineral fertilizers to provide the nutrients plant requires in the early stages of development. The main objective of this work was to study the effect of incorporating CC at rates of 10, 15 and 20 t ha-1 with and without inorganic fertilizers on soil biological properties (soil microbial biomass, soil respiration and soil enzymatic activities), nutrition (pigments and leaf soluble carbohydrate concentrations) and yield parameters of rice (O. sativa cv. Puntal) crop for three years on an Aquic Xerofluvent located near Sevilla (Spain). Soil biological properties increased when CC was applied with inorganic fertilizers. Since soil enzymatic activities measured are responsible for important cycles such as C, N, P and S, an increase of leaf soluble carbohydrate contents and pigments were observed, and better rice yield parameters were obtained for soils treated with CC + inorganic fertilizers. Yield parameters of the third experimental season were better than those of the second and first experimental season, due to the residual effect of the organic matter after their application in the first season. The application of CC + inorganic fertilizers in soils increased the grain protein concentration (18%), the grain starch

concentration (7%), the percentage of full grains (3%) and the rice yield (5%) with respect to the application of CC without inorganic fertilizers in soils.
Keywords: Crushed cotton gin compost; Soil enzymatic activity; Leaf pigment concentration; Oriza sativa

Shuai-Ying Cui, Wen-Qing Zhang, Wei-Hua Xu, Spatial and temporal expression of N-ethylmaleimide-sensitive factor gene in the nervous system of the cotton bollworm, Helicoverpa armigera, Insect Biochemistry and Molecular Biology, Volume 36, Issue 7, July 2006, Pages 603-609, ISSN 0965-1748, DOI: 10.1016/j.ibmb.2006.05.004.
(http://www.sciencedirect.com/science/article/B6T79-4K0D7WJ-2/2/bb6a0ab71f87c54a99107acecеba496c)
Abstract:
N-ethylmaleimide-sensitive factor (NSF) is a component required for vesicular transport and release of neurotransmitters or neurohormones in the constitutive secretory pathways. Here, the spatial and temporal expression of NSF gene was investigated in Helicoverpa armigera (Helar). Reverse transcription-polymerase chain reaction analysis reveals that Helar-NSF is transcribed preferentially in the nervous system of H. armigera. Using in situ hybridization, the Helar-NSF mRNA is further localized in the superficial layer or deep layer cells of the brain, subesophageal ganglion (SG) and other ganglia. The developmental profiles of Helar-NSF show that both mRNA and protein in pupal brain-SG complexes are significantly higher in nondiapause-destined individuals than in diapause-destined individuals. The expression patterns are consistent with those of two neurohormones, prothoracicotropic hormone (PTTH) and diapause hormone (DH). These data suggest a central function of Helar-NSF in developmental process through regulating neurohormone release.
Keywords: N-ethylmaleimide-sensitive factor; Neurosecretory cell; Neurohormone release; In situ hybridization; Diapause; Development

E. Gulsah Kirali, Oral Lacin, Statistical modelling of acid activation on cotton oil bleaching by Turkish bentonite, Journal of Food Engineering, Volume 75, Issue 1, July 2006, Pages 137-141, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.06.010.
(http://www.sciencedirect.com/science/article/B6T8J-4GTW8HV-2/2/6563c1996e1de254ce4554fa1ea47af5)
Abstract:
The aim of the study was to determine the highest bleaching capacity and derive a model for acid activation of a Turkish bentonite using a full factorial design. The selected factors were contact time, solid to liquid ratio, acid concentration and moisture of bentonite. A first-order model is obtained by using 24 full factorial design. Auxiliary experiments for the second-order model were conducted according to an orthogonal central composite design. An experimental test carried out using a factorial design 24 indicated that contact time, solid to liquid ratio and moisture of bentonite have a positive effect, whereas acid concentration has a negative effect. Furthermore, the highest bleaching capacity was found to be 74.2%.
Keywords: Bleaching; Activated bentonite; Factorial design; Neutralized cotton oil

Sayed M.S. Khalil, Douglas D. Anspaugh, R. Michael Roe, Role of juvenile hormone esterase and epoxide hydrolase in reproduction of the cotton bollworm, Helicoverpa zea, Journal of Insect Physiology, Volume 52, Issue 7, July 2006, Pages 669-678, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2006.03.004.
(http://www.sciencedirect.com/science/article/B6T3F-4JH6C7S-1/2/7d930fc3f36b61ded8871a2efa18df71)
Abstract:

The role of juvenile hormone (JH) esterase (JHE) and epoxide hydrolase (EH) in reproduction of the cotton bollworm, Helicoverpa zea, was investigated. Peak emergence of male and female bollworm adults occurred early in the scotophase. Female adults were added to males in a 1:2 ratio, respectively, at the beginning of the first photophase after emergence (d0). The highest oviposition rates for mated females were noted on d 2-4. The in vitro JH III esterase and JH III EH activity was measured in whole body homogenates of virgin and mated females from d0 to d8 post-emergence. Maximal JHE activity for virgin females occurred on d2 (1.09+/-0.14(+/-1 SEM) nmol of JH III degraded/min/mg protein), which was approximately twice that of mated females on the same day. The same results were observed for EH where the activity peaked on d2 at 0.053+/-0.003 as compared to 0.033+/-0.003 nmol of JH III degraded/min/mg protein, respectively. By d4, both JHE and JH EH activities declined significantly in virgin and mated females and were the same through d7. The developmental changes and effects of mating on JH degradation were similar when measured per insect. The highest levels of JHE and JH EH activity/min/mg protein in d2 virgin and mated females was found in ovaries followed by the carcass and then haemolymph; no EH activity was found in haemolymph as expected. For ovary, the JHE and JH EH activity was highest in virgin compared to mated females. The role of both enzymes in the regulation of reproduction is discussed.
Keywords: Juvenile harmone; Juvenile harmone esterase; Juvenile harmone epoxide hydrolase; Cotton bollworm; Helicoverpa zea

S.J. Castle, Concentration and management of Bemisia tabaci in cantaloupe as a trap crop for cotton, Crop Protection, Volume 25, Issue 6, June 2006, Pages 574-584, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.08.013.
(http://www.sciencedirect.com/science/article/B6T5T-4H99JB1-3/2/cdda04d16796977d88e2a892d63225ee)
Abstract:
A greater settling and retention of Bemisia tabaci adults on cantaloupes over cotton was the basis for examining the potential of cantaloupes to serve as a trap crop and reduce infestations of B. tabaci in cotton. The preference of adults for leaves of cantaloupe compared to cotton in caged cylindrical arenas in the greenhouse was greater than 67% on average. However, when adults had access to whole plants rather than individual leaves in uncaged bench-top experiments, the preference for cantaloupe was greater than 90%. In field trials conducted in central Arizona over two seasons, much higher numbers of B. tabaci adults infested cantaloupes compared to cotton with egg and small nymph densities more than 10-fold greater on 9 of 12 sampling dates in 1998. The difference between trap crop-protected cotton and unprotected cotton was relatively small, although lower densities consistently occurred in protected cotton through the season. An improved field design in 1999 that provided greater separation between protected and unprotected cotton and completely surrounded the protected cotton with the trap crop yielded larger differences in B. tabaci densities that favored the protected cotton. Although densities in the protected cotton were reduced relative to unprotected cotton, the managed trap crop was unable to prevent economic thresholds from being exceeded in the protected cotton.
Keywords: Polyphagy; B-biotype Bemisia tabaci; Host preference; Pest management

Shudong Luo, Guirong Wang, Gemei Liang, Kong Ming Wu, Lianyang Bai, Xinguo Ren, Yuyuan Guo, Binding of three Cry1A toxins in resistant and susceptible strains of cotton bollworm (Helicoverpa armigera), Pesticide Biochemistry and Physiology, Volume 85, Issue 2, June 2006, Pages 104-109, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2005.11.003.
(http://www.sciencedirect.com/science/article/B6WP8-4J0XG10-1/2/f1f85c0e2e63b62d5204c3e6698f665f)
Abstract:

Evolution of resistance by pests is the greatest threat to the continuous success of theBacillus thuringiensis (Bt) toxins used in conventional sprays or in transgenic plants. The most common mechanism of insect resistance to Bt is reduced binding of toxins to target sites in the brush border membrane of the larval mid-gut. In this paper, binding experiments were performed with three 125I-Cry1A toxins and the brush border membrane vesicles from Cry1Ac resistant or susceptible strains of Helicoverpa armigera. The homologous competition test showed that there was no significant difference in Cry1Ac-binding affinity, but the concentration of Cry1Ac-binding sites dramatically decreased in the resistant strain (Rt decreased from 5.87 +/- 1.40 to 2.23 +/- 0.80). The heterologous competition test showed that there were three Cry1Ac-binding sites in the susceptible strain. Among them, site 1 bound with all three Cry1A toxins, site 2 bound with both Cry1Ab and Cry1Ac, and site 3 only bound with Cry1Ac. In the Cry1Ac resistant strain, the binding capability of site 1 with Cry1Ab decreased and site 2 did not bind with Cry1Ac. It is suggested that the absence of one binding site is responsible for H. armigera resistance to Cry1Ac. This result also showed that the resistance fitted the 'mode 1' pattern of Bt resistance described previously.
Keywords: Helicoverpa armigera; Cry1A toxins; Binding site; Binding model; Resistance

Theodoros D. Stathakos, Theofanis A. Gemtos, Constantinos A. Tsatsarelis, Stella Galanopoulou, Evaluation of three cultivation practices for early cotton establishment and improving crop profitability, Soil and Tillage Research, Volume 87, Issue 2, June 2006, Pages 135-145, ISSN 0167-1987, DOI: 10.1016/j.still.2005.03.007.
(http://www.sciencedirect.com/science/article/B6TC6-4G361B5-1/2/8b67e6355a4d4f65994145457b64f9c5)
Abstract:
Cultivation practices permitting earlier sowing of cotton (Gossypium hirsutum L.) in Greece are required to maximize yields and facilitate harvesting. An experiment was conducted for 2 years in Central Greece to evaluate two alternative systems. The experiment was carried out in a Vertic Cambisol and a Typic Regosol field. Cultivation practices tested were: (1) conventional tillage (CT) and sowing in a flat field, (2) ridge tillage (RT), using autumn ridging and (3) sowing in a flat field under clear plastic film (PF). Early and normal sowings were compared. The effects of the treatment on the crop establishment, growth and yield, as well as on the soil physical properties, were studied. Performance evaluation of the machinery was carried out. The cost of cultivation practices was estimated. Results of soil physical properties were similar for both years. Soil water contents from sowing to plastic removal in 2000 were 14.2, 13.5 and 18.0 g/100 g and temperatures for the same period at 0.04 m depth were 17.7, 18.1 and 19.8 [degree sign]C for CT, RT and PF, respectively. PF resulted in higher emergence and higher plants with smaller roots. Average yields of seed-cotton in early sowing were 4936, 4591 and 4033 kg/ha for PF, RT and CT, respectively. In late sowing, yields in RT and in CT did not differ significantly. Ridge tillage machinery saved 13.6 kWh/ha (20.9%) compared to conventional tillage machinery. The higher yields under plastic film compensated for the higher cost of the practice at the present prices of seed-cotton.
Keywords: Cotton; Tillage; Plastic film; Energy requirements; Greece

Daleshwar Rajak, M.V. Manjunatha, G.R. Rajkumar, M. Hebbara, P.S. Minhas, Comparative effects of drip and furrow irrigation on the yield and water productivity of cotton (Gossypium hirsutum L.) in a saline and waterlogged vertisol, Agricultural Water Management, Volume 83, Issues 1-2, 16 May 2006, Pages 30-36, ISSN 0378-3774, DOI: 10.1016/j.agwat.2005.11.005.
(http://www.sciencedirect.com/science/article/B6T3X-4JCBNC4-1/2/aad37b8ecd51ef81670eb4fe682d3af3)
Abstract:
Field experiments were conducted on a saline vertisols during 2000-2002 for evaluating the response of cotton (Gossypium hirsutum L.) to applied irrigation water (IW, 0.8, 1.0, 1.2 and 1.4

times the evapotranspiration, ET) with drip and furrow irrigation method in four different blocks varying in soil salinity (ECe, surface 0.6 m) and water table depths (WT). The initial ECe and average WT for the blocks I, II, II and IV were 8.0 +/- 0.4, 1.25 +/- 0.08; 9.1 +/- 0.7, 1.15 +/- 0.08; 10.4 +/- 0.5, 1.05 +/- 0.09 and 15.1 +/- 0.8 dS m-1, 0.95 +/- 0.07 m, respectively. The growth and yield performance of cotton irrigated through furrows, even though with good quality canal water (ECw 0.25 dS m-1), was poor when compared with drip irrigation with marginally saline water (ECw 2.2 dS m-1). The crop responded to applied water and the maximum cotton yield (1.78 Mg ha-1--average for two years) was obtained from block I under drip irrigation applied at 1.2 ET while the lowest yield (0.18 Mg ha-1) was from block IV when applied water equaled 0.8 ET with furrow irrigation. Due to creation of better salt and moisture regimes, water productivity also considerably improved with drip irrigation. Production functions developed could be represented as: Y (Mg ha-1) = 0.2070 AW - 0.0012 AW2 + 0.0807 ECe - 0.0049 ECe2 - 0.0014 AW x ECe - 6.5945 (R2 = 0.974**) for drip irrigation and Y = 0.3853 AW - 0.0021 AW2 + 0.0253 ECe - 0.0005 ECe2 - 0.0016 AW x ECe - 14.9117 (R2 = 0.877**) for furrow irrigation where AW and ECe represent applied water and time weighted mean soil salinity, respectively. Though the gross income (US$ 223-690 ha-1) was more with drip than furrow (US$ 67-545 ha-1) irrigation, the net profit per unit of applied water was higher with furrow irrigation. It was concluded that the drip system provide for opportunities to enhance the use of saline waters in water scarcity areas especially those existing at the tail end of canal commands.
Keywords: Cotton; Saline-waterlogged soils; Drip irrigation; Saline irrigation; Water productivity; Marginal quality waters

Ji-yang ZHANG, Ai-wang DUAN, Zhao-jiang MENG, Zu-gui LIU, Suitability of Stem Diameter Variations as an Indicator of Water Stress of Cotton, Agricultural Sciences in China, Volume 5, Issue 5, May 2006, Pages 356-362, ISSN 1671-2927, DOI: 10.1016/S1671-2927(06)60061-8.
(http://www.sciencedirect.com/science/article/B82XG-4K30SB2-5/2/81acce12cd1b83f890cf2529039d7147)
Abstract:
Water stress effects on stem diameter variations (SDV) were studied in a pot experiment on cotton (Gossypium hirustum L. Meimian99B). Water restriction was imposed at the flowering stage and were compared with a well-watered control treatment. The volumetric soil water content ([theta]v) and SDV were monitored continuously. The objective was to determine the feasibility of using the parameters derived from stem diameter measurements, including maximum daily stem shrinkage (MDS), maximum daily stem diameter (MXSD), and minimum daily stem diameter (MNSD) as indicators of plant water stress. The different behavior of SDV was founded at different growth stages. At stem-maturing stage, MDS increased and MNSD decreased in deficit-irrigated plants compared with the control plants, therefore, it appeared that MDS and MNSD ccould be used as available indicators of plant water status. At stem growth stage, there were no significant differences in MDS values between treatments but MXSD and MNSD responded sharply to soil water deficits. Thus, for rapidly growing cotton, the course of MXSD or MNSD with time offered a consistent stress indicator. SDV was also closely related to atmospheric factors, solar radiation (Rs) and vapor pressure deficit (VPD) were found to be the predominant factors affecting MDS, followed by the relative humidity (RH), while air temperature (Ta) and wind velocity had the least effect. A good linear relationship was founded (r2 = 0.921) between MDS and environmental variables (Rs, VPD, RH, and [theta]v), which can be used to establish a reference value for detecting plant water stress based on the MDS patterns.
Keywords: stem diameter variations; water stress; atmospheric factors; cotton

Abdul Khaliq, M. Kaleem Abbasi, Tahir Hussain, Effects of integrated use of organic and inorganic nutrient sources with effective microorganisms (EM) on seed cotton yield in Pakistan, Bioresource

Technology, Volume 97, Issue 8, May 2006, Pages 967-972, ISSN 0960-8524, DOI: 10.1016/j.biortech.2005.05.002.
(http://www.sciencedirect.com/science/article/B6V24-4GMGW7R-1/2/e7e7635c280c90ff03d6cbd3272b813a)
Abstract:
A field experiment was conducted to determine the effects of integrated use of organic and inorganic nutrient sources with effective microorganisms on growth and yield of cotton. Treatments included: control; organic materials (OM); effective microorganisms (EM); OM + EM; mineral NPK (170:85:60 kg); 1/2 mineral NPK + EM; 1/2 mineral NPK + OM + EM and mineral NPK + OM + EM. OM and EM alone did not increase the yield and yield attributing components significantly but integrated use of both resulted in a 44% increase over control. Application of NPK in combination with OM and EM resulted in the highest seed cotton yield (2470 kg ha-1). Integrated use of OM + EM with 1/2 mineral NPK yielded 2091 kg ha-1, similar to the yield (2165 kg ha-1) obtained from full recommended NPK, indicating that this combination can substitute for 85 kg N ha-1. Combination of both N sources with EM also increased the concentrations of NPK in plants. Economic analysis suggested the use of 1/2 mineral NPK with EM + OM saves the mineral N fertilizer by almost 50% compared to a system with only mineral NPK application. This study indicated that application of EM increased the efficiency of both organic and mineral nutrient sources but alone was ineffective in increasing yield.
Keywords: Cotton; Effective microorganisms; Gossypium hirsutum L.; Mineral fertilizer; Nutrient uptake; Organic materials

Bruno Rapidel, Cecile Defeche, Bouba Traore, Jacques Lancon, Jacques Wery, In-field development of a conceptual crop functioning and management model: A case study on cotton in southern Mali, European Journal of Agronomy, Volume 24, Issue 4, May 2006, Pages 304-315, ISSN 1161-0301, DOI: 10.1016/j.eja.2005.10.012.
(http://www.sciencedirect.com/science/article/B6T67-4JCCM76-1/2/51a77a1891b1aafc5735ec79654e4408)
Abstract:
West African cotton production has increased rapidly in recent years. Cotton is being cropped under new ecological conditions by new cotton-producing farmers, but the cropping techniques recommended by developers have essentially remained the same. Methodologies are needed to generate a broad scope of recommendations on cropping techniques to deal with the increasing diversity concerning farmers and cropping conditions.
A conceptual model of a cotton field was developed that approaches a crop field as a biophysical system under the influence of a 'technical system' (i.e. the combination of farmers' practices implemented in the field). The system outputs were restricted to yield and the main yield components. A theoretical model was first designed on the basis of published data and expert knowledge on cotton physiology, local soil-climate conditions and farmers' practices. It was based on five specific hypotheses on links between technical and biophysical systems. The hypotheses were tested in a local farmers' network. Thirty 'cropping situations' (soil-crop-technique combinations) were selected in farmers' fields around Katogo village (Mali), a village that had been previously selected for a cotton crop management prototyping program. Homogeneous groups of situations were drawn up on the basis of the dynamics of crop aerial biomass accumulation. They were compared for their management and environment features. The initial conceptual model was then simplified, while taking the measured variability in its components and the sensitivity of the outputs to these components into account. This conceptual model is being evaluated in other villages, where we have partnerships with farmers, in order to develop a version adapted to a broad range of situations.
Keywords: West Africa; Cotton; Crop management; Yield; Conceptual model

Vijaya Singh, Charles K Pallaghy, Dhananjay Singh, Phosphorus nutrition and tolerance of cotton to water stress: I. Seed cotton yield and leaf morphology, Field Crops Research, Volume 96, Issues 2-3, 30 April 2006, Pages 191-198, ISSN 0378-4290, DOI: 10.1016/j.fcr.2005.06.009.
(http://www.sciencedirect.com/science/article/B6T6M-4H0BSXP-1/2/a345c3f0fc8aec58d98df799388d890a)
Abstract:
Seed cotton yield and morphological changes in leaf growth were examined under drying soil with different phosphorus (P) concentrations in a tropical climate. Frequent soil drying is likely to induce a decrease in nutrients particularly P due to reduced diffusion and poor uptake, in addition to restrictions in available water, with strong interactive effects on plant growth and functioning. Increased soil P in field and in-ground soil core studies increased the seed cotton yield and related morphological growth parameters in a drying soil, with hot (daily maximum temperature >33 [degree sign]C) and dry conditions (relative humidity, 25% to 35%), particularly during peak boll formation and filling stage. The soil water content in the effective rooting zone (top 0.4 m) decreased to -1.5 MPa by day 5 of the soil drying cycle. However, the increased seed cotton yield for the high-P plants was closely related to increasing leaf area with increased P supply. Plant height, leaf fresh mass and leaf area per plant were positively related to the leaf P%, which increased with increasing P supply. Low P plants were lower in plant height, leaf area, and leaf tissue water in the drying soil. Individual leaf area and the water content of the fresh leaf (ratio of dry mass to fresh mass) were significantly dependent on leaf P%.
Keywords: Cotton; Phosphorus; Water stress; Leaf expansion; Leaf water

Vijaya Singh, Charles K. Pallaghy, Dhananjay Singh, Phosphorus nutrition and tolerance of cotton to water stress: II. Water relations, free and bound water and leaf expansion rate, Field Crops Research, Volume 96, Issues 2-3, 30 April 2006, Pages 199-206, ISSN 0378-4290, DOI: 10.1016/j.fcr.2005.06.011.
(http://www.sciencedirect.com/science/article/B6T6M-4GWC0W0-7/2/87a27969a61b154d9eb065fcc5ea2639)
Abstract:
In previous experiments, increased leaf-Phosphorus (P) content with increasing P supply enhanced the individual leaf expansion and water content of fresh cotton leaves in a severely drying soil. In this paper, we report on the bulk water content of leaves and its components, free and bound water, along with other measures of plant water status, in expanding cotton leaves of various ages in a drying soil with different P concentrations. The bound water in living tissue is more likely to play a major role in tolerance to abiotic stresses by maintaining the structural integrity and/or cell wall extensibility of the leaves, whilst an increased amount of free water might be able to enhance solute accumulation, leading to better osmotic adjustment and tolerance to water stress, and maintenance of the volumes of sub-cellular compartments for expansive leaf growth. There were strong correlations between leaf-P%, leaf water (total, free and bound water) and leaf expansion rate (LER) under water stress conditions in a severely drying soil. Increased soil-P enhanced the uptake of P from a drying soil, leading to increased supply of osmotically active inorganic solutes to the cells in growing leaves. This appears to have led to the accumulation of free water and more bound water, ultimately leading to increased leaf expansion rates as compared to plants in low P soil under similar water stress conditions. The greater amount of bound and free water in the high-P plants was not necessarily associated with changes in cell turgor, and appears to have maintained the cell-wall properties and extensibility under water stressed conditions in soils that are nutritionally P-deficient.
Keywords: Water content; Free and bound water; Leaf expansion rate; Cotton; Phosphorus; Water stress; Cell turgor

Necdet Dagdelen, Ersel Yilmaz, Fuat Sezgin, Talih Gurbuz, Water-yield relation and water use efficiency of cotton (Gossypium hirsutum L.) and second crop corn (Zea mays L.) in western Turkey, Agricultural Water Management, Volume 82, Issues 1-2, 10 April 2006, Pages 63-85, ISSN 0378-3774, DOI: 10.1016/j.agwat.2005.05.006.
(http://www.sciencedirect.com/science/article/B6T3X-4GHBPBP-1/2/bd26ae22e0611e7cbe4b8a99a49bc306)
Abstract:
A field study was carried out during the 2003 and 2004 cropping season in the western Turkey. The effect of water deficit or water stress on crop yield, yield response, water use efficiencies, dry matter yield (DM) and leaf area index (LAI) were evaluated. Cotton (named as S letter for cotton) and corn (named as T letter for corn) were grown under five irrigation treatments. Treatments were designated as S-100 and T-100 full irrigation; S-70, T-70; S-50, T-50; S-30, T-30; and S-00, T-00, received 70, 50, 30 and 0% times the soil water depletion in the treatment S-100 and T-100 on the same day. The average seasonal water use values ranged from 174 to 558 mm in corn treatments and 257 to 867 mm in cotton treatment. Water deficit significantly affected both crop yields. The average corn grain yield varied from 2880 to 11,340 kg ha-1 and average seed cotton yield varied from 1780 to 5490 kg ha-1. Highest average corn and cotton yield were obtained from the full irrigation treatments (S-100; T-100). The average water use efficiency (WUE) ranged from 1.65 to 2.15 kg m-3 for corn and 0.61 to 0.72 kg m-3 for cotton, respectively, while average irrigation water use efficiency (IWUE) were between 2.30 and 3.52 kg m-3 for corn and between 0.77 and 1.40 kg m-3 for cotton. Yield response factors (ky), 1.04 for corn and 0.92 for cotton, were determined based on averages of 2 years. Leaf area index (LAI) and dry matter yields (DM) increased with increasing water use for both treatments. This study demonstrated that well irrigated treatments (S-100 and T-100) could be used for the semiarid climatic conditions under no water shortage.
Keywords: Cotton; Second crop corn; Water-yield relation; Water deficit; Yield response factor (ky); Aegean region

S. Mansfield, M.L. Dillon, M.E.A. Whitehouse, Are arthropod communities in cotton really disrupted? An assessment of insecticide regimes and evaluation of the beneficial disruption index, Agriculture, Ecosystems & Environment, Volume 113, Issues 1-4, April 2006, Pages 326-335, ISSN 0167-8809, DOI: 10.1016/j.agee.2005.10.012.
(http://www.sciencedirect.com/science/article/B6T3Y-4HR75HX-2/2/a4037c5a2ab1bed7b316dd09309a7ff2)
Abstract:
Non-selective chemical control of crop pests disrupts beneficial insects and spiders. For Australian cotton crops, a beneficial disruption index (BDI) has been developed that ranks the impact of different insecticides on beneficial arthropods. To evaluate this index as a measure of natural enemy disruption, the abundance of beneficial arthropods was monitored in ten conventional and nine INGARD(R) Bt cotton fields on ten commercial farms during the 2001-2002 season. Beneficial insects were more abundant in those fields subjected to a more selective insecticide regime (low BDI) than in fields that received broad-spectrum insecticide treatments (high BDI). However spider abundance did not change in relation to insecticide regime. Family composition of spider communities was affected by BDI and crop type (Bt or conventional), whereas family composition of insect communities only showed a trend to be affected by BDI and crop type. This difference may indicate that insects are more uniformly affected by the BDI than spiders. The beneficial disruption index is an effective measure of insecticide impacts on beneficial insects in Australian cotton crops.
Keywords: Australia; Beneficial arthropods; BDI; Biological control; Cotton; Insecticide regime; IPM; Parasitoids; Predatory insects; Spiders

Hezhong Dong, Xuekun Zhang, Yigal Choen, Yu Zhou, Weijiang Li, Zhenhuai Li, Dry mycelium of Penicillium chrysogenum protects cotton plants against wilt diseases and increases yield under field conditions, Crop Protection, Volume 25, Issue 4, April 2006, Pages 324-330, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.05.003.
(http://www.sciencedirect.com/science/article/B6T5T-4GJM3C3-1/2/0b4081d339c22af6a1df81ad4bec61c8)
Abstract:
Previous studies have indicated that dry mycelium (DM) of Penicillium chrysogenum (PEN), a waste product of the pharmaceutical industry, is effective in controlling fungal diseases in crop plants under greenhouse or shade-house conditions. In the present study, cotton was grown in fields amended with DM before planting, or squaring, or both, in Linqing and Liaocheng, Shandong province, China, and disease severity of Fusarium oxysporum f.sp vasinfectum (Fov) and Verticillium dahliae (Vd) was monitored from 2001 to 2004. Results from the first experiment in 2001 and 2002 showed that DM was effective in protecting, in an application mode-dependent manner, against these two pathogens. At a dose of 30 g m-2, either basal application alone or basal application plus side dressing of DM provided significant protection against Fusarium wilt and Verticillium wilt, but side dressing alone was not significantly effective in controlling the two diseases. In the second experiment in 2003 and 2004, it was shown that disease-control efficacy of DM was dependent on application rates. Averaged across two sites and both years (2003 and 2004), basal application plus side dressing at doses of 30, 90 and 150 g m-2 provided protection of 20.1, 34.6 and 42.7% against Fov, and of 26.8, 47.8 and 49.6% against Vd, respectively, compared to their corresponding DM-free controls. Increases in lint yield of cotton was also obtained by application of DM each year, which could be attributed to both disease control and nutritional effects of DM. DM ([less-than-or-equals, slant]2%) had no effect on mycelial growth of the pathogens in vitro, suggesting that the protection was probably attributable to induced resistance. It is concluded that DM of PEN may serve as an organic product for both disease control and plant nutrition in cotton production.
Keywords: Penicillium chrysogenum; Cotton; Wilt disease; Induced resistance

John J. Read, K. Raja Reddy, Johnie N. Jenkins, Yield and fiber quality of Upland cotton as influenced by nitrogen and potassium nutrition, European Journal of Agronomy, Volume 24, Issue 3, April 2006, Pages 282-290, ISSN 1161-0301, DOI: 10.1016/j.eja.2005.10.004.
(http://www.sciencedirect.com/science/article/B6T67-4HWXP5T-3/2/c4b2a2b4818207f7d69de9eb74501125)
Abstract:
Nutrient stress in Upland cotton (Gossypium hirsutum L.) depresses lint yield, particularly of late-season fruit (bolls), and may disrupt fiber development. A 2-year (1999 and 2000) study was conducted outdoors in large pots to determine individual effects of nitrogen (N) and potassium (K) stress at flowering stage on lint yield and fiber quality. Treatments were half-strength nutrient solution from emergence to crop maturity (control), 20% and 0% of control N from first flower onward, and 20% and 0% of control K from first flower onward in 1999 and first square onward in 2000. Leaf N and K were determined every 2-3 days from an uppermost, fully expanded leaf on the main-stem of five plants selected at random. Mature bolls were harvested from sympodial (fruiting) branches only and grouped according to week of anthesis across a 35-day flowering period, providing five flowering groups, from which fiber length, strength, and micronaire were determined. Fiber length was not consistently altered by stress, suggesting early stages of fiber development were indirectly affected by plant N and K status. Nitrogen deficiency decreased yield through early termination of reproductive growth. In 1999, although flowering group four of N-deficient cotton had low length, strength, and micronaire, values for weighted-sum micronaire (whole-plant micronaire) increased under N stress by about 12% in 0% N treatment and about 18% in 20% N treatment. In general, N and K stress had opposite effects on weighted-sum

micronaire. The year by N treatment interaction was significant for weighted-sum strength, due to weak fibers in N-deficient cotton in 1999, but no treatment difference in 2000. Apparently, crop response to N stress was influenced by environment, as flowering groups with low quality fiber also comprised a large fraction of total lint, and thus placed heavy demands on plant N and carbohydrate reserves. Severe K deficiency in 2000 decreased yield and lint weight boll-1, and micronaire values of 3.7 or less were evident in flowering groups two, three and four. Results support evidence that N stress indirectly affects cotton growth, as N deficiency decreased fiber length, strength and micronaire primarily in flowering groups with large percentage of bolls. Results from 2000 support evidence that K deficiency adversely affects reproductive growth, boll weight, and sugar translocation in cotton.
Keywords: Cotton; Fiber development; Micronaire; Nitrogen deficiency; Potassium deficiency; 2.5% span length; Yarn strength

E. Atis, Economic impacts on cotton production due to land degradation in the Gediz Delta, Turkey, Land Use Policy, Volume 23, Issue 2, April 2006, Pages 181-186, ISSN 0264-8377, DOI: 10.1016/j.landusepol.2004.06.004.
(http://www.sciencedirect.com/science/article/B6VB0-4DD9BPF-3/2/7c0bc494002e397704f40c58a4926ca9)
Abstract:
Soil salinity and waterlogging and other forms of land degradation reduce the agricultural productivity and farm income, while threatening the sustainability of agriculture in many areas. The purpose of the study is to estimate the economic impacts of land degradation on cotton production in the Gediz Delta, Turkey, where salinization and waterlogging threaten the sustainability of irrigated agriculture. Salinity and waterlogging have developed over time in the region, due to unfavorable use of irrigation water and inadequate drainage. We use data collected in a survey of farmers in the region to estimate regression models for cotton production on degraded and non-degraded soils. We conclude that cotton yields are reduced by 34.4% and gross margins are reduced by $860.2/ha, as a result of land degradation.
Keywords: Salinization; Waterlogging; Yield impacts

Andreas E. Voloudakis, Philippe Marmey, Etienne Delannoy, Aida Jalloul, Christelle Martinez, Michel Nicole, Molecular cloning and characterization of Gossypium hirsutum superoxide dismutase genes during cotton-Xanthomonas campestris pv. malvacearum interaction, Physiological and Molecular Plant Pathology, Volume 68, Issues 4-6, April-June 2006, Pages 119-127, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2006.09.001.
(http://www.sciencedirect.com/science/article/B6WPC-4MFCW0G-1/2/3cd8cea1a0ce2bbc875b55a258c6b521)
Abstract:
Total superoxide dismutase (SOD) enzymatic activity of cotton (Gossypium hirsutum L.) cotyledons peaked 4 h post-infiltration (hpi) with the avirulent Xanthomonas campestris pv. malvacearum race 18 (Xcm18), contributing to the oxidative burst observed in the hypersensitive reaction (HR). cDNA fragments encoding cotton SOD genes were isolated by RT-PCR, sequenced and their similarities to known Cu/ZnSOD (cytoplasmic and chloroplastic), MnSOD and FeSOD were established based on amino acid sequences. Transcriptional expression of cotton SODs, during the development of cotton HR, was studied using a semiquantitative RT-PCR analysis. Cu/ZnSODcyt and Cu/ZnSODchl transcripts were similar in both the compatible and incompatible interactions. However, in the incompatible interaction MnSOD was induced 2 hpi and remained at higher levels when compared to the compatible interaction, and FeSOD was induced 6 hpi and peaked at 10-12 hpi. These results suggest that MnSOD may contribute to the SOD activity observed 4 hpi playing a role in the early apoptotic events of the HR in cotton-Xcm interaction. Cotton FeSOD gene expression pattern postulates a contribution of this enzyme in the later stages

of HR development. Furthermore, catalase 1 was transcriptionally stable in cotton-Xcm interaction, with a slightly increased level in the incompatible interaction.
Keywords: Cotton (Gossypium hirsutum); Hypersensitive reaction; Oxidative stress; SOD; Superoxide dismutase gene

G. Murtaza, A. Ghafoor, M. Qadir, Irrigation and soil management strategies for using saline-sodic water in a cotton-wheat rotation, Agricultural Water Management, Volume 81, Issues 1-2, 10 March 2006, Pages 98-114, ISSN 0378-3774, DOI: 10.1016/j.agwat.2005.03.003.
(http://www.sciencedirect.com/science/article/B6T3X-4G24XF5-1/2/b490fcb80272425381df09ed1faf43f3)
Abstract:
Consequent to population growth and high living standards in several arid and semi-arid regions, competition for freshwater among different water-use sectors is expected to increase vis-a-vis its decreased allocation to irrigation. Non-conventional water resources, such as saline and/or sodic drainage and groundwater represent complementary supply to narrow the gap between freshwater availability and demand. We carried out a 3-year field study in the Indus Plains of Pakistan to evaluate different irrigation and soil management strategies for using saline-sodic water to grow cotton (Gossypium hirsutum L.) and wheat (Triticum aestivum L.) on a sandy loam soil (ECe = 1.31-1.76 dS m-1, pHs = 8.47-8.61, SAR = 5.50-7.41, infiltration rate = 0.6-0.8 cm h-1, [rho]b = 1.56-1.61 Mg m-3). The treatments were: (1) irrigation with freshwater from a nearby canal (FW); (2) irrigation with saline-sodic water (EC = 3.32 dS m-1, SAR = 16.29, SARadj = 18.24, RSC = 5.25 mmolc L-1) (SSW); (3) cyclic use of fresh and saline-sodic water through alternate irrigations (FW - SSW); (4) Soil application of farm manure at 25 Mg ha-1 year-1 and irrigation with saline-sodic water (FM + SSW); and (5) soil application of gypsum equivalent to gypsum requirement of saline-sodic water and irrigation with the same water (G + SSW). The seed yield of first cotton crop was not significantly affected by different treatments. The yields of subsequent wheat and cotton crops were lower in the SSW than other treatments, indicating negative impacts of saline-sodic water when used in the absence of a soil or irrigation management approach. The treatments using saline-sodic water did increase soil ECe and SAR levels, but this increase was only significant in SSW treatment. Irrigation with saline-sodic water together with amendments significantly increased infiltration rate than SSW alone, where bulk density was increased. The net benefit was the maximum from FW - SSW treatment followed by FW, G + SSW, FM + SSW and SSW.
Keywords: Salinity; Sodicity; Farm manure; Gypsum; Crop production

Ersan Putun, Basak Burcu Uzun, Ayse Eren Putun, Fixed-bed catalytic pyrolysis of cotton-seed cake: Effects of pyrolysis temperature, natural zeolite content and sweeping gas flow rate, Bioresource Technology, Volume 97, Issue 5, March 2006, Pages 701-710, ISSN 0960-8524, DOI: 10.1016/j.biortech.2005.04.005.
(http://www.sciencedirect.com/science/article/B6V24-4GCX06M-3/2/e6ac44cd36ffcf6a815b80be1b904eb7)
Abstract:
Catalyzed pyrolysis of cotton-seed cake was studied under different experimental conditions. Variables investigated were pyrolysis temperature, zeolite content and sweeping gas flow rate. Experiments were carried out isothermally. Liquids, gases and char were obtained as products of pyrolysis. The distributions of these products were determined for various contents (1, 5, 10, 20 wt.% of raw material) of zeolite at four different pyrolysis temperatures. The maximum liquid yield obtained was 30.84% at a pyrolysis temperature of 550 [degree sign]C with a sweeping gas flow rate of 100 cm3 min-1 in the presence of clinoptilolite (20% based on raw material) as catalyst. The pyrolytic and catalytic liquid products were analysed in detail to determine the predominant chemical classes and the identities of the major compounds present.

Keywords: Natural zeolite; Catalytic pyrolysis; Cotton-seed cake

Ahmet Uludag, Ilhan Uremis, Ahmet Can Ulger, Bulent Cakir, Eda Aksoy, The use of maize as replacement crop in trifluralin treated cotton fields in Turkey, Crop Protection, Volume 25, Issue 3, March 2006, Pages 275-280, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.05.005.
(http://www.sciencedirect.com/science/article/B6T5T-4GNCFTR-2/2/8f3f6bba8351b867afe0fc951a480d43)
Abstract:
Maize and cotton are primary crops in Turkey. Trifluralin is commonly used in cotton. In some years heavy rain after cotton sowing kills cotton seedlings. Although maize is the best choice as a replacement crop, the trifluralin label prohibits maize sowing for 12 months. The current study was carried out to look at possible use of maize as a catch crop in trifluralin treated cotton fields. Maize varieties showed varying response to trifluralin. However, better and worse responding varieties responded to trifluralin similarly in field conditions due to environmental conditions which was favorable for higher trifluralin loss. Temperature during flooding and duration of flooding do not have any affect on trifluralin injury.
Keywords: Bioassay; Catch crop; Flooding; Varietal response

Linjian Jiang, Liusheng Duan, Xiaoli Tian, Baomin Wang, Haifeng Zhang, Mingcai Zhang, Zhaohu Li, NaCl salinity stress decreased Bacillus thuringiensis (Bt) protein content of transgenic Bt cotton (Gossypium hirsutum L.) seedlings, Environmental and Experimental Botany, Volume 55, Issue 3, March 2006, Pages 315-320, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2005.01.003.
(http://www.sciencedirect.com/science/article/B6T66-4FHJG7V-1/2/40538f307f8b45e5897b4d796452b990)
Abstract:
Seedling responses of two transgenic Bacillus thuringiensis (Bt) cotton (Gossypium hirsutum L.) cultivars, 99B and SGK9708-41, to salinity stress were studied under 0, 50, 100 and 200 mM NaCl treatments. Cotton seedling growth, indicated by height, leaf area, and fresh and dry weights, of both cultivars was reduced by NaCl in a concentration-dependent manner. Total N concentrations of seedling roots, stems and leaves of both cotton cultivars decreased with increasing NaCl concentrations. For both cultivars, soluble protein content increased in leaves and decreased in stems due to salt stress, and decreased in roots by 50 and 100 mM NaCl. Bt protein concentrations in leaves of both cultivars were decreased by salt stress, but still were biologically effective to control the neonate bollworm larvae in seedling cotton.
Keywords: Transgenic Bt cotton; Salinity stress; Seedling growth; Bt protein

Haiyan Xu, Guoqing Li, Mulan Liu, Guangnan Xing, Oviposition deterrents in larval frass of the cotton boll worm, Helicoverpa armigera (Lepidoptera: Noctuidae): Chemical identification and electroantennography analysis, Journal of Insect Physiology, Volume 52, Issue 3, March 2006, Pages 320-326, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2005.11.011.
(http://www.sciencedirect.com/science/article/B6T3F-4HYN5B8-2/2/f5f72c33fd5e5d89b84357f829a60ccb)
Abstract:
Oviposition deterrents in the frass of cotton bollworm (CBW), Helicoverpa armigera larvae fed on an artificial diet (FA) and on cotton Gossypium hirsutum leaves (FC) were investigated by behavioral bioassays and electroantennography analyses in the laboratory. It was found that a water suspension or a hexane extract of the frass FA or FC, in contrast to the corresponding foods, significantly deterred oviposition of conspecifics. When hexane extracts of the frass FA and FC were further partitioned into polar and neutral lipid fractions, two polar fractions significantly reduced oviposition. The neutral fraction from frass FC also exhibited significant deterrence, although the activity was much lower than that of the corresponding polar fraction. The polar lipid

fractions contained several fatty acids, mainly palmitic and oleic acid at the ratio nearly 1:1. A blend of authentic fatty acids of the same composition found in frass FA or FC mimicked the deterring effect. Moreover, these fatty acids and their blend at the ratio found in frass FA or FC elicited significant electroantennogram responses and typical dose-response curves. Thus, it is suggested that CBW larvae may deploy two types of oviposition deterrents: a non-specific and a specific one. The former is a blend of fatty acids, independent of food and plays an important role in oviposition deterrence, whereas the latter may be produced only when the larvae feed on cotton leaves. The possible explanations of this deployment have also been discussed.
Keywords: Helicoverpa armigera; Larval frass; Oviposition deterrents; Fatty acids

Ai-Min Wu, Chen Ling, Jin-Yuan Liu, Isolation of a cotton reversibly glycosylated polypeptide (GhRGP1) promoter and its expression activity in transgenic tobacco, Journal of Plant Physiology, Volume 163, Issue 4, March 2006, Pages 426-435, ISSN 0176-1617, DOI: 10.1016/j.jplph.2005.06.014.
(http://www.sciencedirect.com/science/article/B7GJ7-4H2PJ9T-1/2/ca5686bf4e351db4ecd85ef6765555b7)
Abstract: Summary
Reversibly glycosylated polypeptides (RGPs) are thought to be involved in polysaccharide metabolism. A cDNA of the cotton (Gossypium hirsutum) RGP gene, designated GhRGP1, has previously been characterized, and is preferentially expressed in fiber cells. In order to investigate its temporal and spatial control, we isolated a 624 bp fragment upstream of the GhRGP1 coding sequence using a polymerase chain reaction (PCR)-based genomic walking method, transcriptionally fused the 624 bp promoter sequence to the [beta]-glucuronidase (GUS) gene, and analyzed the stable gene expression in tobacco (Nicotiana tabacum). In 4-week-old transgenic tobacco plants, the highest expression level was observed in roots, and the GUS activity was 1.13- and 6.65-fold higher than that in stems and leaves, respectively. In the reproductive growth stage, the GUS expression level was highest in the pistils and the GUS activity in the stigmas and styles were 17.6-fold higher than that in the ovaries. High GUS activity was also detected in the anthers. In addition, histochemical staining for GUS activity on transgenic tobacco plants further indicated a higher expression in the trichomes, seeds and vascular tissues of stems. Abiotic stress treatments on transgenic tobacco plants showed that wounding and dehydration induced GUS expression. These results demonstrated the spatial and temporal regulation of a cotton RGP promoter in a model plant, and provided an important insight into the factors that control the fiber development and stress responses of the gene.
Keywords: Cotton; Promoter activity; Reversibly glycosylated polypeptide; Transgenic tobacco; Wound-induced expression

Andrew Paul Gutierrez, Sergine Ponsard, Physiologically based demographics of Bt cotton-pest interactions: I. Pink bollworm resistance, refuge and risk, Ecological Modelling, Volume 191, Issues 3-4, 5 February 2006, Pages 346-359, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2005.06.001.
(http://www.sciencedirect.com/science/article/B6VBS-4H5MYW4-1/2/310e4aee7d54bcbd5bce9a0e66f16bf7)
Abstract:
Transgenic cotton expressing the genes for the production of protoxin of the bacterium Bacillus thuringiensis (Bt) is used to control lepidopterous pests. Among the most successful applications is for control pink bollworm (Pectinophora gossypiella Saunders (i.e. PBW)) in irrigated cotton of the southwestern United States. A major threat to this technology is the development of resistance commonly assumed recessive, autosomal and controlled by a single diallelic gene.
A physiologically based, distributed maturation time demographic model of Bt cotton and 10 of its major pests is developed. Here we used the model to examine the population dynamics and

resistance development in pink bollworm as modified by weather and spatial and temporal refuges. The dynamics of the other pest species are reviewed in the second paper of this series.
The economics of Bt cotton for control of PBW in southern California is put in the context of the historical overuse of pesticides and the alternative short season cotton technology. The analysis posits that in the short run, the Bt cotton may be risk reducing and economic, but in the longer term it may be risk increasing.
Keywords: Demographic model; Bt cotton; Pink bollworm; Resistance; Refuges; Risk

Andrew Paul Gutierrez, John J. Adamczyk Jr., Sergine Ponsard, C.K. Ellis, Physiologically based demographics of Bt cotton-pest interactions: II. Temporal refuges, natural enemy interactions, Ecological Modelling, Volume 191, Issues 3-4, 5 February 2006, Pages 360-382, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2005.06.002.
(http://www.sciencedirect.com/science/article/B6VBS-4H4T39S-1/2/ba38b6945de35571fd9895e78fb6e218)
Abstract:
An holistic demographic physiologically based age-mass structured model of transgenic Bt cotton expressing one or two toxin of the bacterium Bacillus thuringiensis Berliner (Bt) and 10 of its pests as affected by generalist natural enemies is developed. The goal of the model is to assess factors favoring the development of resistance in pest species. Among the pest included in the model are the pink bollworm (a primary pest of cotton), and several secondary pests of the family Noctuidae (tobacco budworm, bollworm, fall armyworm, beet armyworm, cabbage looper, soybean looper) as well as a plant bug, boll weevil and whitefly. The pests have widely varying tolerance to the toxin.
Resistance to the Bt toxin is assumed recessive, autosomal and controlled by a single diallelic gene. Spatial refuges of non-Bt cotton have been mandated to increase heterozygosity in Bt cotton, but spatial refuges may exist for many pest species in non-Bt and/or sylvan hosts. In addition, temporal refuges may arise within Bt cotton due to innate pest tolerance to the toxin that increases with larval age, and variable toxin concentrations in the plant over time and with plant subunit age. Mortality rates and non-lethal effects that increase larval developmental time and decrease adult fecundity vary with Bt toxin concentration. All genotypes are affected but resistant genotypes are assumed less affected than susceptible ones. The effects of spatial and temporal refuges on the development of resistance and pest densities in one and two toxin cottons are examined over several consecutive seasons.
Resistance to Bt toxin is more likely to develop in stenophagous highly susceptible pests such as pink bollworm and budworm than in polyphagous highly tolerant pests such as fall armyworm, beet armyworm and soybean looper that have large temporal refuges that slow and possibly reverse resistance development.
Predator longevity feeding on Bt intoxicated prey is decreased ca. 28% [Ponsard, S., Gutierrez, A.P., Mills, N.J., 2002. Effects of Bt-toxin in transgenic cotton on the adult longevity of four heteropteran predators. Environ. Entomol. 31, 1197-1205.] creating tradeoffs between the mortality caused by the toxin and that due to reduced predation. Despite reduced natural enemy efficacy, levels of susceptible pests (budworm) are reduced, while levels of Bt tolerant and immune pests (e.g. fall armyworm, Lygus) increase. The use of pesticide for supplementary control of tolerant pests in Bt cotton may further disrupts natural enemies and increase pest levels.
Keywords: Model; Bt cotton; Pests; Natural enemies; Resistance; Refuges; Risk

Kanglai He, Zhenying Wang, Shuxiong Bai, Li Zheng, Yubo Wang, Haiying Cui, Efficacy of transgenic Bt cotton for resistance to the Asian corn borer (Lepidoptera: Crambidae), Crop Protection, Volume 25, Issue 2, February 2006, Pages 167-173, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.04.003.
(http://www.sciencedirect.com/science/article/B6T5T-4G5BJ8H-4/2/d209e529838186598da0b148c2b56cef)

Abstract:
Transgenic Bt cotton is expected to provide satisfactory control of several lepidopteran species in cotton. The Asian corn borer (ACB), Ostrinia furnacalis (Guenee), is an important component of the lepidopteran pest complex of cotton in China. Monsanto's transgenic Bt cotton NC 33B, expressing Cry1Ac protein, and a Chinese transgenic Bt cotton GK-2, expressing Cry1A protein, were evaluated for resistance to ACB during 2001-2002. Field trials were conducted with an artificial infestation of ACB at different cotton crop stages, which coincided with the generations of natural ACB occurrence. Damage ratings were significantly reduced in transgenic cotton cultivars both NC 33B and GK-2 compared with their parental non-transgenic Bt cotton cultivars DP5415 and Simian 3, and a major conventional cultivar Shiyuan 321, respectively. In addition, percentage of plants stem-bored and mean number of tunnels per plant were significantly higher on GK-2 than on NC 33B in the second generation. Laboratory bioassays were carried out by exposing neonates to plant tissues collected from the field during the season. Tissues assayed included the new leaves, floral buds, match-head squares, and white flowers, which are the tissues initially attacked by the neonates in the field. Low larval survival rates were observed on NC 33B and GK-2, contrasting greatly to the high number of survivors found on equivalent non-Bt cotton tissue isolated throughout the season. However, larval survival was higher on the tissues isolated from late-season Bt cotton plants than on early season. In addition, higher larval survival was observed on GK-2 than NC 33B in assays with the late season tissues. This may be associated with reduced levels of available toxin in plant tissues as they age. Both laboratory and field data indicated that NC 33B and GK-2 were highly resistant to ACB. The high level of efficacy for Bt cotton against ACB offers the potential for season-long control.
Keywords: Bt cotton; Transgenic plant; Host plant resistance; Ostrinia furnacalis

Xiaoning Liu, Pei Liang, Xiwu Gao, Xueyan Shi, Induction of the cytochrome P450 activity by plant allelochemicals in the cotton bollworm, Helicoverpa armigera (Hubner), Pesticide Biochemistry and Physiology, Volume 84, Issue 2, February 2006, Pages 127-134, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2005.06.002.
(http://www.sciencedirect.com/science/article/B6WP8-4GX0C45-1/2/f23123d3b1a67a9b06093a765381f6ee)
Abstract:
The p-nitroanisole O-demethylase activity of P450s and expression of CYP6B6 mRNA induced by two plant secondary substances, 2-tridecanone and quercetin, were investigated in cotton bollworm, Helicoverpa armigera (Hubner). The O-demethylase activity was higher in the fat body than that in the midgut of the sixth-instar larvae fed on the artificial diets mixed with these allelochemicals. The similar results were obtained when induced by the combination of 2-tridecanone and quercetin at different concentrations. When the concentration of inducers, mixture of 2-tridecanone and quercetin, was 0.5 mg/ml in the diet, the maximum O-demethylase activities of P450 in the midgut and fat body were 2.6 and 3.88 times higher than those in the relevant control, respectively. Specific primers were designed according to the CYP6B6 and an actin gene of cotton bollworm and used to determine the expression level of CYP6B6 mRNA in the midgut and fat body by a reverse transcription-polymerase chain reaction (RT-PCR) method. The expression levels of CYP6B6 mRNA were obviously correlated with the concentrations of 2-tridecanone, but no correlation with the concentrations of quercetin. When induced with the mixture of 2-tridecanone and quercetin at a concentration of 0.5 mg/ml in the diet, the maximum expression amount of CYP6B6 mRNA in the midgut and fat body was induced, which was 1.74 and 1.8 times compared with the corresponding control, respectively. It suggests that the cytochrome P450 has an important role in the metabolism of plant secondary substances in cotton bollworm.
Keywords: O-Demethylase activity; mRNA expression of CYP6B6; 2-Tridecanone; Quercetin; Helicoverpa armigera

Zi-hong YE, Jun ZHU, Heterosis Study on Developmental Behavior of Flowering and Boll Setting in Upland Cotton, Agricultural Sciences in China, Volume 5, Issue 1, January 2006, Pages 23-32, ISSN 1671-2927, DOI: 10.1016/S1671-2927(06)60015-1.
(http://www.sciencedirect.com/science/article/B82XG-4JCC40Y-3/2/1f4eba35b68106fbb1fdb4b66148cdeb)
Abstract:
The developmental behavior was examined for flowering and boll setting in upland cotton (Gossypium hirsutum L.) at different boll-setting sites and blooming periods. Conventional and conditional methods were applied to analyze heterosis by an additive-dominance model with genotype by environment (GE) interaction effects. Positive general heterosis was significantly detected on middle-lower nodes at positions 1 and 2 for a number of flowers and bolls per plant. Deviation between HPBE1 and HPBE2 was relatively large for a number of flowers per plant at positions 3, 4, and 5, but much smaller for number of bolls per plant. There was increase of heterosis before the end of July, and the highest heterosis was observed at 22 DAF (22 days after flowering) for flowers and at 16 DAF for bolls, and then declined. There existed significant diversity of interaction heterosis for flowers as well as for bolls during blooming stages, but deviation between HPBE1 and HPBE2 was smaller for number of bolls per plant than that of flowers per plant. The cross of DP-15 (late-season variety)' HG-H-12 had positive general heterosis since 19 DAF, and negative HPB was observed for the cross of GL-5 (early-season variety)' HG-H-12 after 37 DAF. Interaction heterosis was mostly not significant for cross DP-15' HG-H-12, but the reverse was true for cross GL-5' HG-H-12. Positive conditional HPB was detected since 16 DAF until 43 DAF for cross DP-15' HG-H-12, and before 13 DAF for cross GL-5' HG-H-12.
Keywords: Gossypium hirsutum L.; heterosis; conditional analysis; number of flowers; number of bolls

S. Karen Gomez, Derrick M. Oosterhuis, Donald L. Hendrix, Donald R. Johnson, Donald C. Steinkraus, Diurnal pattern of aphid feeding and its effect on cotton leaf physiology, Environmental and Experimental Botany, Volume 55, Issues 1-2, January 2006, Pages 77-86, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2004.10.001.
(http://www.sciencedirect.com/science/article/B6T66-4DVBF89-2/2/4a1e100625f3461033dd62b737ed3c7f)
Abstract:
Cotton aphid (Aphis gossypii G.) populations seemed to fluctuate over the past years in cotton (Gossypium hirsutum L.) perhaps as a result of excessive use of insecticides for controlling more problematic pests. Contradictory plant responses have been observed depending upon the aphid/plant system, and it is unclear if cotton aphids, abiotic stress or both are responsible for cotton yield reduction in aphid-infested fields. Our objectives were to investigate the diurnal changes in the physiology of cotton leaves following aphid herbivory, and the diurnal pattern of aphid feeding. The experiment was conducted in a growth chamber using the cotton cultivar `Stoneville 474'. Leaves of the same age and size were infested with wingless adults plus nymphs. Cotton aphids were allowed to increase in numbers without restriction for 9 days, after which the amounts of carbohydrates in aphid-honeydew, and the number of honeydew droplets excreted per aphid were measured. Photosynthetic rates, dark respiration rates and foliar non-structural carbohydrates were measured. The amount of individual carbohydrates found in the honeydew was significantly different with time. The total amount of carbohydrates excreted per aphid within a 24-h period averaged 2.5 [mu]g. The number of honeydew droplets excreted per aphid varied significantly from time to time period. Cotton aphids did not significantly alter photosynthesis or respiration rates or non-structural carbohydrates on leaves. Aphid populations of approximately 300 per leaf on the 9th day of infestation did not appear to significantly alter the physiology of cotton leaves.

Keywords: Aphis gossypii G.; Aphid-honeydew carbohydrates; Gossypium hirsutum L.; Leaf carbohydrates; Photosynthesis; Respiration

N.M.M. Abdullah, Joginder Singh, B.S. Sohal, Behavioral hormoligosis in oviposition preference of Bemisia tabaci on cotton, Pesticide Biochemistry and Physiology, Volume 84, Issue 1, January 2006, Pages 10-16, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2005.03.011.
(http://www.sciencedirect.com/science/article/B6WP8-4HH819J-1/2/330805b4752a1ce6313d830aa1bb018c)
Abstract:
The study on behavioral hormoligosis in oviposition preference in Bemisia tabaci (Genn.) on cotton was conducted, at Entomological Research Farm, Punjab Agricultural University (PAU), Punjab, India, during 2001 crop season and repeated in the same season. Multiple-choice test was followed for conducting the experiment. Quinalphos (250, 375, and 500), carbaryl (625, 938, and 1250), acephate (750, 1125, and 1500), endosulfan (438, 656, and 875), and fenvalerate (25, 38, and 50 g ai/ha) were repeatedly sprayed on potted plants of American cotton (var. LH-1556). The impact of these insecticides was evaluated in term of oviposition preference by B. tabaci to treated plants. Also, it investigated changes in biochemical components of treated cotton leaves and the correlation with oviposition preference. The results revealed that, fenvalerate treated plants were more preferred by whitefly for oviposition. Maximum number of eggs was observed on fenvalerate treated plants, 38, 50, and 25 g/ha (39.3, 37.3, and 36.1 eggs/leaf, respectively) followed by acephate 1500 g/ha (26.9 eggs/ leaf) compared with untreated control (14.1 eggs/leaf). Almost similar trend of results was observed in the repeated experiment. The results obtained from biochemical studies revealed that all the insecticidal treatments caused reduction in total sugars compared with untreated control except fenvalerate and low dose of quinalphos. All insecticides caused increase in total free amino acids and brought significant changes in total phenols and pH value of treated plants. These results have confirmed the behavioral hormoligosis in oviposition preference that induced by fenvalerate and acephate in B. tabaci, which may be one of the causes behind its resurgence on plants repeatedly treated with these insecticides.
Keywords: Bemisia tabaci; Insecticides; Hormoligosis; Oviposition; Cotton; Biochemical changes

Mehmet Mert, Ece Aslan, Yasar Akiscan, Mehmet Emin Caliskan, Response of cotton (Gossypium hirsutum L.) to different tillage systems and intra-row spacing, Soil and Tillage Research, Volume 85, Issues 1-2, January 2006, Pages 221-228, ISSN 0167-1987, DOI: 10.1016/j.still.2005.01.016.
(http://www.sciencedirect.com/science/article/B6TC6-4FM0NYM-2/2/f7092cfb981947de0b00e342463e890f)
Abstract:
The earliness is of great importance to cotton production in Mediterranean-type environments due to detrimental effects of autumn rainfall on lint quality. However, farmers commonly avoid early sowing due to risks of cold soil temperature and waterlogging after sowing in spring. Ridge-tillage system is one approach to increase soil temperature and mitigate adverse effects of waterlogging. The ridge-tillage system is also advantageous in reducing inputs in tillage operations. However, a limited experimental data are available about the effects of ridge-tillage system on earliness of harvesting, lint yield and quality of cotton in the Mediterranean-type environments. Thus, the objective of this study was to determine how ridge-tillage (RT)-planting system and intra-row spacing affect cotton lint yield, earliness and fiber quality compared with conventional tillage (CT)-planting system. Field experiments were conducted on a clay soil (Vertisol) in Hatay province (36[degree sign]39'N-36[degree sign]40'E, 83 m a.s.l.) in the Eastern Mediterranean Region of Turkey during 2000 and 2001. The experiment was laid out as a split-plot with three replications with tillage systems as main plots and intra-row spacings (13, 17, 21 and 25 cm) as subplots. The effects of tillage systems on lint yield and earliness were inconsistent among years. The RT-planting system resulted in 13.5% higher lint yield and 14.5% more earliness in 2001 when

abundant rainfall occurred after sowing, while significant effects of tillage systems were not observed in 2000. The intra-row spacings significantly affected lint yield and earliness in both years. The earliness increased with closer spacing, while the highest lint yield was obtained from 17 cm intra-row spacing in both years. However, the fiber quality parameters were not significantly affected by tillage systems, intra-row spacings and tillage system x spacing interaction in both years. Finally, the results suggest that RT-planting system with 17 cm intra-row spacing can be used in cotton production instead of CT-planting system in the Eastern Mediterranean Region of Turkey. Ridging in 17 cm intra-row spacing also seems to be suitable to mechanical harvesting.
Keywords: Cotton (Gossypium hirsutum L.); Ridge tillage; Conventional tillage; Intra-row spacing; Lint yield; Earliness; Fiber quality

Gamal E. Abo Elghar, Zeinab A. Elbermawy, Adel G. Yousef, Hany K. Abd Elhady, Monitoring and Characterization of Insecticide Resistance in the Cotton Leafworm, Spodoptera littoral is (Boisd.) (Lepidoptera: Noctuidae), Journal of Asia-Pacific Entomology, Volume 8, Issue 4, December 2005, Pages 397-410, ISSN 1226-8615, DOI: 10.1016/S1226-8615(08)60263-0.
(http://www.sciencedirect.com/science/article/B8JJN-4V6TFF3-D/2/6451625cb45528b3832ba38e5a7cfe1d)
Abstract:
Resistance to several classes of insecticides was diagnosed in the cotton leafworm (CLW), Spodoptera littoralis (Boisd.), from cotton fields in the Nile Delta Egypt through 2002-2004 seasons. Two types of laboratory bioassays were used for the detection of insecticide resistance. Leaf-dip larval bioassay and discriminating concentration (LC99 for susceptible laboratory strain) technique revealed the presence of resistance to insecticides tested. Both larval and adult stages showed relatively similar response to most insecticides tested. However, the glass vial-discriminating concentration technique is particularly more useful when resistance is related to the target -site insensitivity rather than to increased metabolism. The pattern of reversion of resistance to five insecticides was determined in two field strains that have been released from continuous insecticide application and then reared under laboratory conditions for 6-8 generations in the absence of insecticide pressure. It was considered that losing of resistance to Cypermethrin in both resistant field strains seemed to be quicker than other insecticides tested, in which resistance ratios decreased from 47.7-fold (F0- parents) to 17.8- fold (F6 generation) in MNF- strain, and from 38.5- fold (F0-parents) to 10.7-fold (F6 generation) in KPR-strain. On the other hand, biochemical assays indicated that both MNF- and KFR-field strains, expressed higher levels of acetylcholinesterase (AChE) activity by 13.2- and 8.4-times, respectively, than that of the susceptible strain. AChE activity was sharply decreased to 1.01- and 1.92- times in MNF- and KFR-strains, respectively, compared to that of susceptible strain, following insect rearing for six successive generations without insecticide pressure. Esterases activity was also decreased 2.02-times (F0) to 1.41 (F6) in MNF-strain and from 2.0-times (F0) to 1.21 -times (F6) in KFR-strain, compared to that of susceptible strain. On the other hand, analysis of esterases by native Polyacrylamide gel electrophoresis (PAGE) confirmed the association between esterases activity and resistance to insecticides tested in both field strains.
Keywords: acetylcholinesterase; discriminating vial technique; esterase; insecticide resistance; resistance reversion; Spodoptera littoralis

Clovis S. Palmer, Jennifer A. Saleeba, Bruce R. Lyon, Phytotoxicity on cotton ex-plants of an 18.5 kDa protein from culture filtrates of Verticillium dahliae, Physiological and Molecular Plant Pathology, Volume 67, Issue 6, December 2005, Pages 308-318, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2006.05.003.
(http://www.sciencedirect.com/science/article/B6WPC-4K9C59H-1/2/534dec257585479d5860c352508bea5f)
Abstract:

A phytotoxic protein that evokes the typical symptoms of Verticillium wilt disease in seedlings of Gossypium hirsutum L. (Upland cotton) was isolated from culture filtrates of Verticillium dahliae. The protein was purified by ammonium sulfate precipitation, Sephadex-G100 fractionation, and native PAGE. The 18.5 kDa protein, designated VD18.5, appears to be a single subunit protein with an isoelectric point between 3 and 5. VD18.5 induces symptoms of leaf dehydration, chlorosis, necrosis and stem discoloration in seedlings of the disease susceptible cotton cultivar Siokra 1-4. The LD50 of VD18.5 on protoplasts of Siokra 1-4 was 18 [mu]g mL-1. VD18.5 had no noticeable effect on Pima S-7, which is a disease resistant cultivar. Phytotoxic activity was partially destroyed at high temperature and was abolished by digestion with proteinase K. Mass spectrometry fingerprinting and protein sequence data from VD18.5 yielded no significant matches when submitted to the Mascot search engine and NCBI non-redundant protein databases, respectively. These results suggest that VD18.5 is a novel protein that may be involved in the development of some of the symptoms associated with Verticillium wilt disease in the cotton plant.
Keywords: Fungal toxin; Gossypium hirsutum; Pathogenicity; Plant disease; Verticillium wilt

Mohini A. Patil, Margaret L. Pierce, Angela L. Phillips, Bryan J. Venters, Margaret Essenberg, Identification of genes up-regulated in bacterial-blight-resistant upland cotton in response to inoculation with Xanthomonas campestris pv. malvacearum, Physiological and Molecular Plant Pathology, Volume 67, Issue 6, December 2005, Pages 319-335, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2006.05.004.
(http://www.sciencedirect.com/science/article/B6WPC-4KCXJCM-1/2/1cc55d3e719c263fe13ba977871f043a)
Abstract:
In this first transcriptome study of the cotton-Xanthomonas campestris pv. malvacearum interaction, clones from a cDNA library were used to identify host genes expressed in upland cotton leaves following inoculation. cDNA was prepared from inoculated and non-inoculated leaves of cotton line Im216, which has exceptionally high, broad and stable resistance to bacterial blight, expressed as a hypersensitive-resistant response. Suppression subtractive hybridization was used to make a normalized cDNA library that is differential between transcripts of inoculated and non-inoculated leaves. More than 2000 clones were generated. They yielded 121 unique non-redundant sequences, consisting of 97 with similarity to sequences submitted to GenBank and 24 without good matches. PCR-amplified cDNAs of the 121 genes, as well as of 13 previously identified genes, were arrayed onto glass slides. These microarrays were used to analyze transcripts in Im216 leaves over the extended period of 8-60 h after inoculation. Microarray analysis indicated that 98% of the genes were significantly up-regulated at one or more of the sampling times. Of these, 63% had sequence similarity to plant genes associated with defense responses, i.e., to genes that function in disease/defense, protein synthesis/turnover, secondary metabolism, signaling, stress/programmed cell death, or code for pathogenesis-related proteins or retrotransposon-like proteins. Seventeen percent of the genes showed highest differential abundance during the first day after inoculation, prior to when the microscopic hypersensitive response is first seen. A majority had their highest differential expression at the latest time observed, 60 h, when healthy cells neighboring dying or dead cells are likely to be the major participants in the response.
Keywords: Bacterial blight; Expressed sequence tags; Gossypium hirsutum L.; Hypersensitive response; Im216; Microarrays; Xanthomonas axonopodis pv. malvacearum; Xanthomonas campestris pv. malvacearum (E.F. Smith) Dye; Suppression subtractive hybridization

Dmytro Kornyeyev, Barry A. Logan, Randy D. Allen, A. Scott Holaday, Field-grown cotton plants with elevated activity of chloroplastic glutathione reductase exhibit no significant alteration of diurnal or seasonal patterns of excitation energy partitioning and CO2 fixation, Field Crops

Research, Volume 94, Issues 2-3, 15 November 2005, Pages 165-175, ISSN 0378-4290, DOI: 10.1016/j.fcr.2005.01.001.
(http://www.sciencedirect.com/science/article/B6T6M-4FD79R9-1/2/b538820336139f02b3936e73491101bf)
Abstract:
Transgenic cotton plants with elevated activity of chloroplast-targeted glutathione reductase (GR+) were grown in field plots over two seasons in order to compare their photosynthetic performance with that of wildtype plants. We hypothesised that transgenic plants would show enhanced protection of the photosynthetic apparatus against photoinhibition, primarily through an increase in electron transport associated with the role of the chloroplastic antioxidant system as an alternative electron sink. Diurnal measurements of chlorophyll a fluorescence from cotyledons, stem leaves, and leaves subtending developing fruits (bolls) were used to estimate the rate of linear electron transport (Je) and the rates of reversible, regulated (NPDREG) and photoinhibitory (NPDPI) non-photochemical energy dissipation (NPD) at several times (June, July, September, October) during each growing season. GR+ cotyledons exhibited greater Je than wildtype cotyledons during the middle of a day in early June, while NPDPI was the same for both genotypes. Throughout most days on which measurements were conducted, no genotypic differences in Je and NPD were observed for stem leaves. Only during the late morning of one day in early October did leaves subtending bolls of GR+ plants exhibit greater Je compared to that for wildtype plants. As leaves subtending bolls of both genotypes aged, Je and CO2 assimilation declined, while NPD increased. Maximum NPDPI and minimum Fv/Fm remained essentially the same for all measurement days. However, the maximum NPDREG, the greatest contributor to NPD, increased with leaf age. We conclude that the rapid rise in leaf temperature during most mornings created conditions in which elevated GR activity conferred no advantage. Also, as light energy absorption became excessive in late morning, cotton leaves exhibited a strong capacity for regulated, non-photochemical energy dissipation that may have served as the major photoprotective mechanism.
Keywords: Antioxidants; Chlorophyll fluorescence; Glutathione reductase; Gossypium hirsutum; Photoinactivation; Photosynthesis

K. Raja Reddy, Duli Zhao, Interactive effects of elevated CO2 and potassium deficiency on photosynthesis, growth, and biomass partitioning of cotton, Field Crops Research, Volume 94, Issues 2-3, 15 November 2005, Pages 201-213, ISSN 0378-4290, DOI: 10.1016/j.fcr.2005.01.004.
(http://www.sciencedirect.com/science/article/B6T6M-4FGX818-1/2/e1ebff5a16e21bae53ea7c8416e7def3)
Abstract:
In modern cotton production systems, potassium (K) deficiency is one of the major factors limiting lint yield and affecting fiber quality. Although influence of K deficiency on cotton plant physiology and growth and lint yield responses to K fertilizer applications have received intensive studies, it is not clear whether elevated atmospheric CO2 concentration [CO2] affects plant requirements and sensitivity to K. An experiment was conducted in sunlit controlled-environment chambers to determine the interaction effects of elevated [CO2] and K deficiency during squaring and flowering on cotton plant growth, photosynthesis, and biomass accumulation and partitioning. The treatments included two levels of [CO2] (360 and 720 [mu]L L-1) and five levels of K supply (optimum (control) and 40, 20, 5, and 0% of the control K) at each [CO2] level. Elevated [CO2] significantly increased photosynthesis, leaf area and biomass production of K sufficient plants, but did not affect leaf K concentration. Potassium deficiency not only reduced these growth variables but also changed biomass partitioning among plant tissues with the greatest decrease in fruit biomass. There were significant interactive effects of [CO2] x K on leaf area, canopy photosynthesis, and biomass accumulation and partitioning. The stimulation of the physiological and growth parameters observed due to elevated [CO2] was lost under severe K deficiency. Under ambient [CO2], leaf critical K level depended on growth variables measured and was 17 g kg-1 for

leaf area expansion and 12 g kg-1 for canopy photosynthesis, stem elongation and biomass accumulation. Plants grown under elevated [CO2] were more sensitive to K deficiency with higher leaf critical K levels. The information from this study is useful for understanding the cotton K requirement in the present as well as in the future higher [CO2] environment and for recommendations of K application.
Keywords: Cotton (Gossypium hirsutum L.); Elevated CO2; Potassium deficiency; Leaf K concentration; Leaf area; Biomass; Photosynthesis; Leaf critical K levels

Li-Song Tang, Yan Li, Jianhua Zhang, Physiological and yield responses of cotton under partial rootzone irrigation, Field Crops Research, Volume 94, Issues 2-3, 15 November 2005, Pages 214-223, ISSN 0378-4290, DOI: 10.1016/j.fcr.2005.01.005.
(http://www.sciencedirect.com/science/article/B6T6M-4FDS9TP-1/2/a2a038740487deabae07a53050d3805b)
Abstract:
Partial rootzone irrigation (PRI) means that part of the root system is exposed to drying soil while the remaining part is irrigated as in full irrigation. The wetted and dried sides may be shifted according to the soil drying rate and crop water requirement. The hypothesis is that such irrigation may save water without much reduction in economic yield in field crops such as cotton. We therefore designed a field experiment in an arid area where cotton production almost completely relies on irrigation. Water was applied to furrows in the cotton field either alternatively (alternative furrow irrigation, AFI), evenly to all the furrows (conventional furrow irrigation, CFI) or to one fixed furrow in every two (fixed furrow irrigation, FFI). PRI (AFI and FFI) saved up to 30% irrigated water but produced comparable numbers of opened bolls per plant. The total seed cotton yields of AFI and FFI were 92 and 84%, respectively, of that of CFI, but AFI produced 12% more the first and second harvest seed cottons before the frost (i.e. higher quality fibers for better price) than the CFI. Stomatal conductance was lower in AFI and FFI than in CFI in the early days after each irrigation but leaf water potential was comparable among the three treatments during whole crop season. The AFI and FFI plants produced less leaf area and shorter plants than CFI but the bud numbers per plant showed no significant difference. We concluded that AFI is an effective water-saving irrigation method in arid area and plant vegetative growth can be controlled by the irrigation such that seed cotton yield can be maintained with less water but higher quality fibers.
Keywords: Partial rootzone irrigation (PRI); Leaf water potential; Stomatal conductance; Soil water distribution; Cotton (Gossypium hirsutum)

Xiao-xia Liu, Qing-wen Zhang, Jian-Zhou Zhao, Jian-cheng Li, Bao-liang Xu, Xiao-mu Ma, Effects of Bt transgenic cotton lines on the cotton bollworm parasitoid Microplitis mediator in the laboratory, Biological Control, Volume 35, Issue 2, November 2005, Pages 134-141, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.08.006.
(http://www.sciencedirect.com/science/article/B6WBP-4H6XM0G-2/2/0923e0e36de0525e4b6d8ca5cf8e2c6d)
Abstract:
Microplitis mediator (Haliday) is an important endoparasitoid of the cotton bollworm, Helicoverpa armigera (Hubner) in northern China. Interactions among H. armigera, its larval parasitoid M. mediator, and insect-resistant transgenic cotton lines were evaluated under laboratory conditions. Two major transgenic cotton cultivars used in Hebei province of northern China, DP99B (Bollgard), carrying the cry1Ac gene, and SGK321, carrying both cry1A and CpTI (Cowpea trypsin inhibitor) genes, were used in the experiments. The results indicated that there was significant growth inhibition of the H. armigera larvae when they were fed a diet containing Bt transgenic cotton powder. The parasitoid offspring developed more slowly and pupal and adult weight was reduced significantly when the parasitized host larvae fed on the Bt cotton powder leaf diet compared with non-Bt treatment. With an increase of Bt cotton leaf powder concentration in the host larvae diet,

the parasitism rate and adult emergence of the parasitoid decreased and the abnormal pupal rate increased. There was no evident difference in the effects on M. mediator between the transgenic single- and two-gene cotton cultivars; however, the parasitized host larval mortality was higher than that of unparasitized larvae in most treatments. The observed effects on M. mediator were probably host-quality mediated rather than direct effects of transgenic cotton because the H. armigera larvae which fed on diet with leaf powder of both transgenic cotton cultivars also experienced a significant decrease in weight, particularly when the host larvae were parasitized.
Keywords: Microplitis mediator; Braconidae; Helicoverpa armigera: Noctuidae; Bacillus thuringiensis; Bt cotton; Transgenic plant; Parasitism rate; Non-target insect

Fei Li, Zhaojun Han, Erratum to 'Mutations in acetylcholinesterase associated with insecticide resistance in the cotton aphid, Aphis gossypii Glover': [Insect Biochemistry and Molecular Biology 34 (2004) 397-405], Insect Biochemistry and Molecular Biology, Volume 35, Issue 11, November 2005, Page 1309, ISSN 0965-1748, DOI: 10.1016/j.ibmb.2005.08.003.
(http://www.sciencedirect.com/science/article/B6T79-4GV9B41-3/2/184ecc817e633b5a8cd9924f23c15f18)

E.R. Cay, S.R. Cattle, The effects of landforming on soil profile characteristics of an irrigated cotton-producing area of southeastern Australia, Soil and Tillage Research, Volume 84, Issue 1, November 2005, Pages 76-86, ISSN 0167-1987, DOI: 10.1016/j.still.2004.09.019.
(http://www.sciencedirect.com/science/article/B6TC6-4F8TK9S-2/2/699e1f78181699c9f26a66aaab41fb0f)
Abstract:
Broadacre, irrigated cotton production in Australia is reliant on landforming to optimise water-use efficiency during the growing season. A side-effect of landforming, or 'cut' and 'fill' operations, is that the suitability of land for crop production may be altered by the removal, addition, exposing or raising of surface or near-surface soil layers. For landowners considering bringing new areas of land into irrigated crop production, knowledge of what these alterations will be is crucial in determining the likely success of such a venture. In this study, the effects of landforming on the profile attributes of three soil types in a relatively new cotton-growing area of southeastern Australia are examined. For each soil type, profiles in landformed fields, including both 'cut' and 'fill' profiles, are compared to uncropped ('native') profiles within and below the zone of soil disturbance typically involved in landforming. Although the topsoil features of landformed profiles differ to those of native profiles for each of the three soil types, the oldest and most pedologically differentiated soil type exhibits the greatest change from the native state following the cut and fill operations. In this case, landforming has served to scalp or mix a thin topsoil layer with significantly more clayey, alkaline and sodic subsoil material, which accounts for landowner observations of poor cotton yields on this soil type. Topsoil properties of the landformed profiles of the other two soil types are not as limiting to plant growth, and so the potential side-effects of landforming on crop production are less.
Keywords: Irrigated cotton; Landforming; Sodicity; Subsoil

D. Blaise, G. Majumdar, K.U. Tekale, On-farm evaluation of fertilizer application and conservation tillage on productivity of cotton + pigeonpea strip intercropping on rainfed Vertisols of central India, Soil and Tillage Research, Volume 84, Issue 1, November 2005, Pages 108-117, ISSN 0167-1987, DOI: 10.1016/j.still.2004.09.016.
(http://www.sciencedirect.com/science/article/B6TC6-4DXT80K-1/2/295ef2e968bedc6a3e35ccc045f4a332)
Abstract:
Cotton + pigeonpea strip intercropping is a traditional cropping system in central India. On-farm trials were conducted on five farms each on medium deep soils (MDS) and deep soils (DS) during

2001-2002 and 2002-2003 on Vertisols under rainfed conditions to evaluate the effect of technological interventions on cotton + pigeonpea system. The interventions (applying recommended dose of fertilizer (RDF), conservation tillage (CT) with in situ green manure + RDF (CT1) and CT1 + zinc sulphate (CT2)) were compared with the farmers' practice (FP). Cotton (Gossypium hirsutum L.) and pigeonpea (Cajanus cajan (L.) Millsp.) were sown in 6:2 row ratio at a spacing of 0.75 m x 0.75 m on MDS and 0.90 m x 0.90 m on DS. Mean seed cotton yield was significantly greater in 2001-2002 (809 kg ha-1) compared to 2002-2003 (508 kg ha-1), while the reverse was true for pigeonpea grain yield. Averaged over years, seed cotton yield did not differ between locations (MDS versus DS). However, in 2001-2002 seed cotton yield was significantly greater on DS (855 kg ha-1) than on MDS (764 kg ha-1). Seed cotton yield increased by 114 with application of RDF, while the contributions for CT and Zn application were 51 and 76, respectively. Seed cotton yield increase in plots with interventions was because of more and heavier bolls (2.66-2.75 g) retained per plant than the FP (2.39 g). Pigeonpea grain yield was 80 kg ha-1 higher on DS than on MDS. For the interventions, yield followed the trend: CT2 >= CT1 >= RDF > FP, suggesting the need to apply fertilizers to pigeonpea. Fibre quality was better in the cotton grown on DS than on MDS. Marginal benefit:cost ratio (MBC) was the greatest for the RDF (3.08) followed by CT2 (1.71) and CT1 (1.41). Considering the farmer's low-income and high-risk nature of rainfed farming, investment on herbicide (US$ 37 ha-1) could be a deterrent to adopting CT.
Keywords: Cajanus cajan; Conservation tillage; Fibre quality; Gossypium hirsutum; Zinc sulphate

X.F. Sheng, Growth promotion and increased potassium uptake of cotton and rape by a potassium releasing strain of Bacillus edaphicus, Soil Biology and Biochemistry, Volume 37, Issue 10, October 2005, Pages 1918-1922, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2005.02.026.
(http://www.sciencedirect.com/science/article/B6TC7-4FSX4BM-3/2/4f905b0e010015327ce5cae55f37aee2)
Abstract:
A potassium-releasing bacterial strain Bacillus edaphicus NBT was examined for plant-growth-promoting effects and nutrient uptake on cotton and rape in K-deficient soil in pot experiments. Inoculation with bacterial strain B. edaphicus NBT was found to increase root and shoot growth of cotton and rape. Strain NBT was able to mobilize potassium efficiently in both plants when illite was added to the soil. In cotton and rape growing in soils treated with insoluble potassium and inoculated with strain NBT, the potassium content was increased by 30 and 26%, respectively. Bacterial inoculation also resulted in higher N and P contents of above ground plant components. The bacterial isolate was also able to colonize and develop in the rhizosphere soil of cotton and rape after root inoculation.
Keywords: Bacillus edaphicus; Bacterial strain; Bacterial inoculation; Potassium

T. Saito, I. Shibata, A. Isogai, N. Suguri, N. Sumikawa, Distribution of carboxylate groups introduced into cotton linters by the TEMPO-mediated oxidation, Carbohydrate Polymers, Volume 61, Issue 4, 21 September 2005, Pages 414-419, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2005.05.014.
(http://www.sciencedirect.com/science/article/B6TFD-4GPW6J2-2/2/3fbff05704cfb562ef680c91a92fb9bb)
Abstract:
The 2,2,6,6-tetramethylpiperidine-1-oxy radial (TEMPO)-mediated oxidation was applied to aqueous slurries of cotton linters. The water-insoluble fibrous fractions thus obtained in the yields of more than 78% were characterized by solid-state 13C-NMR, X-ray diffraction and scanning electron microscopic analyses for evaluation of distribution of carboxylate groups formed in the TEMPO-oxidized celluloses. The patterns of solid-state 13C-NMR spectra revealed that the oxidation occurred at the C6 primary hydroxyl groups of cellulose. X-ray diffraction and scanning electron microscopic analyses showed that such C6 oxidation took place at the surfaces of

cellulose I crystallites without any oxidation at the C6 of inside cellulose I crystallites. Thus, carboxylate and aldehyde groups introduced into the TEMPO-oxidized celluloses are densely present on the surfaces of cellulose I crystallites. In addition, the obtained results revealed that the shoulder signal due to non-crystalline C6 carbons at about 63 ppm in solid-state 13C-NMR spectra of native celluloses is ascribed to those of surfaces of cellulose I crystallites or those of cellulose microfibrils.
Keywords: TEMPO; Cellulose; Oxidation; NMR; Distribution of carboxyl group

S.J. Yeates, G.A. Constable, T. McCumstie, Cotton growth and yield after seed treatment with mepiquat chloride in the tropical winter season, Field Crops Research, Volume 93, Issues 2-3, 14 September 2005, Pages 122-131, ISSN 0378-4290, DOI: 10.1016/j.fcr.2004.09.014.
(http://www.sciencedirect.com/science/article/B6T6M-4DN1PG6-1/2/0011034461044f677744b75c73ab979b)
Abstract:
Cottonseed (Gossypium hirsutum L.) was treated with mepiquat chloride (MC) to examine its potential for the management of vigorous early growth experienced on cotton grown in the tropical winter season. As there is little published research from the field on this topic, we aimed to determine the effect of seed treatment of cotton with MC grown to maturity. In two field experiments over two seasons the seed surface was treated. Seed surface treatment was compared with pre-sowing priming with MC in experiment 2.
Lint yields were high, 2059 and 2270 kg/ha averaged over all treatments in experiments 1 and 2. In both experiments, seed surface treatment with 2 g MC/kg reduced ($P < 0.05$) plant height for up to 30 days after sowing and there were no significant changes to rate of crop development, time to maturity, lint yield or fibre quality. In experiment 2 treating with MC reduced plant establishment in proportion to the amount of MC applied ($P < 0.01$). Pre-sowing priming caused approximately twice the reduction in plant height per gram of MC than surface treatment and significant differences persisted longer, even until maturity using 8 g MC/kg seed. Priming with >=4 g MC/kg seed had additional effects ($P < 0.05$): (1) reduced node development between first square and first flower, (2) delayed the time to first square, first flower and maturity by 4 days, (3) increased production of bolls on monopodial branches, and (4) reduced lint yield compared to the same concentrations applied to the surface. Fewer smaller plants having smaller bolls were implicated in this response.
It was concluded that the relative benefit of seed treatment with MC at the concentrations and methods that did not reduce lint yield appears questionable as height reductions per gram of MC/ha were less than measured at this location with the same amount applied as a foliar spray.
Keywords: Cotton; Mepiquat chloride; Tropics; Seed treatment; Seed priming

James A. Larson, Roland K. Roberts, Burton C. English, Rebecca L. Cochran, Bradly S. Wilson, A computer decision aid for the cotton yield monitor investment decision, Computers and Electronics in Agriculture, Volume 48, Issue 3, September 2005, Pages 216-234, ISSN 0168-1699, DOI: 10.1016/j.compag.2005.04.001.
(http://www.sciencedirect.com/science/article/B6T5M-4GBD6H7-1/2/e80480e1eca538bcabfec569a14fc8a6)
Abstract:
This article introduces the Cotton Yield Monitor Investment Decision Aid (CYMIDA), a stand alone, interactive, and user-friendly computerized decision aid for analyzing the cotton yield monitor information system investment choice. Because electronic cotton yield monitors are a relatively new technology, the decision aid was developed to meet the need for better educational information about annual ownership costs and required returns for the cotton yield monitoring information investment decision. The partial budgeting and breakeven analysis methods and data

used in CYMIDA are documented. In addition, the use of the decision aid is explained and three example investment analyses using the decision aid are described.
Keywords: Breakeven analysis; Profit; Sensitivity analysis; Site-specific management

M.N. Shashirekha, S. Rajarathnam, Zakia Bano, Effects of supplementing rice straw growth substrate with cotton seeds on the analytical characteristics of the mushroom, Pleurotus florida (Block & Tsao), Food Chemistry, Volume 92, Issue 2, September 2005, Pages 255-259, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.07.034.
(http://www.sciencedirect.com/science/article/B6T6R-4DS6VB1-J/2/f5d34a4eb5b780038fe648929a1fe22a)
Abstract:
Incorporation of cotton seed powder (3%) with rice straw substrate, while culturing Pleurotus florida, enhanced mushroom yield and net protein yield. The free sugars and polymeric carbohydrates were 13.2% and 39.6% in mushrooms grown on rice straw (RS-M) and 8.3% and 19.8% in the mushrooms grown on cotton seed-supplemented rice straw (CS-M). There was a significant decrease in the total dietary fibre content due to cotton seed supplementation. There was a desired softening (~45% reduction in firmness) observed in the CS-M as measured on a Zenken texturometer. The free amino acids showed about 125% increase in the CS-M compared to the RS-M. There was a significant increase in most of the essential amino acids, such as leucine, isoleucine, valine, cysteine, methionine and phenylalanine. The total protein content (Kjeldahl N x 4.38) showed ~90% increase in the CS-M. The total lipids increased by 35% due to cotton seed supplementation of the rice straw substrate; there was a predominance of unsaturated fatty acids, and linoleic acid in particular.
Keywords: Carbohydrates; Cotton seeds; Fatty acids; Free amino acids; Pleurotus florida; Rice straw; Total dietary fibre

Mehmet Hakki Alma, Hulya Kalaycioglu, Ibrahim Bektas, Ahmet Tutus, Properties of cotton carpel-based particleboards, Industrial Crops and Products, Volume 22, Issue 2, September 2005, Pages 141-149, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2004.08.001.
(http://www.sciencedirect.com/science/article/B6T77-4DH2JC9-1/2/c20864e021c52c2a0f6560600309bc75)
Abstract:
In this study, the cotton carpel-based particleboards were produced from the chips of cotton (Gossypium hirsutum L.) by using urea-formaldehyde (UF) and melamine urea-formaldehyde (MUF) adhesives. The chemical composition of cotton carpels and various mechanical and physical properties of cotton carpel-based particleboards were investigated. In producing particleboards, having minimum physical and mechanical properties as required in the conventional standards for general purpose particleboards, the optimum pressure time and density were found to be 5 min and about 0.7 g/cm3, respectively. The MUF-bonded particleboards with a density of about 0.7 g/cm3 resulted in better physical and mechanical properties than UF-bonded ones. In general, with the exception of perpendicular screw-holding strength, all the studied properties (i.e., bending strength, IB, lateral screw-holding strength and Janka hardness) of the cotton carpel-based particleboards nearly met the minimum requirements for general grade particleboards. Furthermore, the additional studies are required to improve the properties, especially physical, of cotton carpel-based particleboards.
Keywords: Cotton carpel; Particleboard; Physical properties; Mechanical properties; Chemical composition

Liu Yeqiu, Hu Jinlian, Zhu Yong, Yang Zhuohong, Surface modification of cotton fabric by grafting of polyurethane, Carbohydrate Polymers, Volume 61, Issue 3, 29 August 2005, Pages 276-280, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2005.03.010.

(http://www.sciencedirect.com/science/article/B6TFD-4GFCT00-2/2/ebe90a5a59e3d711b3b54dbe980aab46)
Abstract:
Chemical modification of cotton was investigated using blocked isocyanates prepared from reaction of 4,4-diphenylmethane diisocyanate (MDI) with Poly(propylene glyols) followed by addition of methyl ethyl ketoxime (MEKO). The products were characterized by Fourier transform infrared spectroscopy (IR) and X-ray photoelectron spectroscopy (XPS). Evidences of grafting were obtained by IR from the appearance of CO bands absorbance and the reducing of relative intensity of OH, with respect to cotton. The results of XPS and SEM also give the same evidences that polyurethane has been grafted onto the surface of cotton.
Keywords: Polyurethane; Grafting; Cotton

D.H. Zhao, J.L. Li, J.G. Qi, Identification of red and NIR spectral regions and vegetative indices for discrimination of cotton nitrogen stress and growth stage, Computers and Electronics in Agriculture, Volume 48, Issue 2, August 2005, Pages 155-169, ISSN 0168-1699, DOI: 10.1016/j.compag.2005.03.003.
(http://www.sciencedirect.com/science/article/B6T5M-4G94H8X-1/2/951662b707715689488a9a137efd2083)
Abstract:
Studies have demonstrated the value of spectral vegetation indices (VIs) based on red and near-infrared (NIR) spectral reflectance in agriculture. The objective of this research was to analyze the effects of central wavelengths and bandwidths of red and NIR bands on VIs, and to evaluate the potential of red-NIR VIs in discriminating cotton canopies by nitrogen stress and growth stage. A completely randomized experiment was conducted in a cotton (Gossypium hirsutum L. cv. Sumian 3) field treated with four nitrogen application rates: 0%, 50%, 100% and 200% of the recommended rate. Hyperspectral reflectance was measured at 2.3 m above the cotton canopy on July 15, August 14 and October 1 using a FieldSpec(R) FR spectroradiometer. Using one-way analysis of variance (ANOVA) for 150 x 150 = 22,500 combinations of wavelengths and bandwidths in the normalized difference vegetation index ([lambda]2 - [lambda]1)/([lambda]1 + [lambda]2), results suggested that the proper central wavelengths of [lambda]1 and [lambda]2 were at 680-730 nm (not 640-660 nm, the central wavelengths of the red channels of most multi-spectral sensors on the current generation satellites) and 750-850 nm, respectively. However, the effect of bandwidth on VIs was complicated. A single VI was not enough for nitrogen stress and growth stage detection. A single VI, in the 96 VIs used in this paper, was able to correctly classify 30-45% of the samples by nitrogen rate and growth stage. Using the 96 VIs as independent variables, a canonical discriminant analysis resulted in an accuracy of 62.4% with a six-VI model by the stepwise procedure.
Keywords: Cotton; Nitrogen stress detection; Hyperspectral reflectance; Vegetation indices; Red and NIR bands; Central wavelengths and bandwidths

Jeffery R. Wilkinson, Kimberly D. Spradling, David W. Yoder, Irma L. Pirtle, Robert M. Pirtle, Molecular cloning and analysis of a cotton gene cluster of two genes and two pseudogenes for the PR5 protein osmotin, Physiological and Molecular Plant Pathology, Volume 67, Issue 2, August 2005, Pages 68-82, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2005.09.006.
(http://www.sciencedirect.com/science/article/B6WPC-4HR72DS-4/2/3825c1b241794d9dbf960397a42adc32)
Abstract:
To isolate prospective cotton osmotin genes to study their gene structure, organization, and expression, cotton genomic libraries in lambda phage were screened using tobacco and cotton osmotin gene probes. Three overlapping clones encompassing a 29.0-kb cotton DNA segment were found to contain a cluster of two genes and two pseudogenes. The two genes have an

identity of 92%, with open reading frames of 729 basepairs without introns, and would encode conceptual preproteins of 242 amino acids. Two partial cDNA clones corresponding to the two genes were isolated from a cotton cDNA library, indicating that the genes are indeed expressed in cotton. The two presumptive cotton osmotin preproteins can clearly be classified as PR5 proteins due to their identities with the deduced amino acid sequences and predicted three-dimensional structures of other PR5 preproteins. The two osmotin preproteins have predicted N-terminal signal sequences of 24 amino acids, and the mature forms of the proteins might be targeted for extracellular secretion as neutral isoforms. Prospective promoter elements, such as two ethylene response elements, implicated as being positive regulatory elements for expression of other PR proteins, occur in the 5'-flanking sequences of the two genes. The two pseudogenes are likely nonfunctional, because they have internal stop codons in their coding regions. Cotton plants are apparently induced to express the osmotin proteins upon treatment with ethephon and hydrogen peroxide, as detected by Western blot analysis with a polyclonal anti-osmotin antibody preparation.
Keywords: Gossypium hirsutum; Cotton genomic DNA; Cotton cDNA; Pathogenesis-related (PR) protein gene; Osmotin gene; Thaumatin-like protein; PR5 protein

Hezhong Dong, Dongmei Zhang, Wei Tang, Weijiang Li, Zhenhuai Li, Effects of planting system, plant density and flower removal on yield and quality of hybrid seed in cotton, Field Crops Research, Volume 93, Issue 1, 14 July 2005, Pages 74-84, ISSN 0378-4290, DOI: 10.1016/j.fcr.2004.09.010.
(http://www.sciencedirect.com/science/article/B6T6M-4DM2CMY-3/2/b76d3fc6dc6bcac11da746d7c9a65d45)
Abstract:
Seedling transplanting and plastic mulching are widely adopted intensive planting systems in cotton production in China. Manual removal of early- or late-season flowers may improve seed quality without sacrificing yield through the compensatory growth of cotton plants. Two experiments were conducted, in Yellow River Valley in China from 2002 to 2003, to test if the intensive systems and flower removal can be used for enhancing hybrid seed production. Results in the first experiment show that yields of seed cotton and seed, and seed quality parameters averaged across three plant densities (2.25, 3.00 and 3.75 plants/m2), were significantly improved by either transplanting or plastic mulching relative to conventional planting. The improvements in yield and quality in two intensive planting systems were mainly attributed to longer and earlier flowering period. Transplanted plants did not differ significantly from mulched plants in seed yield, seed maturity and percentage germination, but transplanting decreased lint percentage and increased seed index relative to mulching. In terms of seed yield and quality, the optimum plant density for each planting system was 3.00 plants/m2. At the optimum plant density, seed yields averaged across two years for transplanting and mulching systems were 31.3% and 32.6% higher than for conventional planting system, respectively. Flower removal did not significantly affect seed yield, but removal of late-season or both early- and late-season flowers significantly improved seed quality. It was concluded that transplanting or plastic mulching, low plant density (3.00 plants/m2), and removal of late-season or both early- and late-season flowers can be integrated to enhance yield and quality of hybrid seed of cotton.
Keywords: Hybrid cotton; Seed yield; Seed quality; Transplanting; Mulching; Plant density; Flower removal

Xiao-Wen Cheng, Lihua Wang, Gerald R. Carner, Basil M. Arif, Characterization of three ascovirus isolates from cotton insects, Journal of Invertebrate Pathology, Volume 89, Issue 3, July 2005, Pages 193-202, ISSN 0022-2011, DOI: 10.1016/j.jip.2005.06.011.
(http://www.sciencedirect.com/science/article/B6WJV-4GP81B1-1/2/db12f9d6dabdcb45193cb3a9a33551ca)

Abstract:
Three new ascovirus isolates were discovered from lepidopteran larvae in cotton fields in Blackville, South Carolina, USA, and were named TnAV-2c, TnAV-2d, and HvAV-3f. TnAV-2c and TnAV-2d were compared by restriction endonuclease (REN) profiles and found to be similar. HvAV-3f was isolated from Helicoverpa zea, and bears remarkable dissimilarity in REN profiles to the reported SeAV-5a from Spodoptera exigua but DNA hybridization shows they are closely related. Major capsid protein (MCP) and [delta] DNA polymerase from the three isolates were sequenced, which suggests the three isolates are novel. Phylogenetic analyses showed that TnAV-2c is distantly related to other lepidopteran ascoviruses. HvAV-3f and SeAV-5a may also be variants of the same species based on Southern, Western, and MCP/DNA polymerase gene sequence analyses. High levels of TnAV-2 infection in an H. zea population (as high as 74%) were recorded in a cotton field in Blackville, SC. Observations in this field showed that infection by ascovirus altered the feeding behavior of H. zea larvae.
Keywords: Ascoviruses; Behavior of diseased larvae; Phylogenetic analyses; Restriction profile; DNA hybridization; Immunoblot and histopathology

Khaled F. El-tahlawy, Magda A. El-bendary, Adel G. Elhendawy, Samuel M. Hudson, The antimicrobial activity of cotton fabrics treated with different crosslinking agents and chitosan, Carbohydrate Polymers, Volume 60, Issue 4, 20 June 2005, Pages 421-430, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2005.02.019.
(http://www.sciencedirect.com/science/article/B6TFD-4G361J5-5/2/b9e5b8bdf6acfcc249ba19e6aa93a59b)
Abstract:
Cotton fabrics were treated with two different crosslinking agents [butanetetracarboxylic acid (BTCA) and Arcofix NEC (low formaldehyde content)] in the presence of chitosan to provide the cotton fabrics a durable press finishing and antimicrobial properties by chemical linking of chitosan to the cellulose structure. Both type and concentration of finishing agent in the presence of chitosan as well as the treatment conditions significantly affected the performance properties and antimicrobial activity of treated cotton fabrics. The treated cotton fabrics showed broad-spectrum antimicrobial activity against gram-positive and gram-negative bacteria and fungi tested. Treatment of cotton fabrics with BTCA in the presence of chitosan strengthened the antimicrobial activity more than the fabrics treated with Arcofix NEC. The maximum antimicrobial activity was obtained when the cotton fabrics were treated with 0.5-0.75% chitosan of molecular weight 1.5-5 kDa, and cured at 160 [degree sign]C for 2-3 min. Application of different metal ions to cotton fabrics treated with finishing agent and chitosan showed a negligible effect on the antimicrobial activity. Partial replacement of Arcofix NEC with BTCA enhanced antimicrobial activity of the treated fabrics in comparison with that of Arcofix NEC alone. Transmission electron microscopy showed that the exposure of bacteria and yeast to chitosan treated fabrics resulted in deformation and shrinkage of cell membranes. The site of chitosan action is probably the microbial membrane and subsequent death of the cell.
Keywords: Antimicrobial finish; Chitosan; Cotton; Butanetetracarboxylic acid; Arcofix NEC

Victor Alchanatis, Leonid Ridel, Amots Hetzroni, Leonid Yaroslavsky, Weed detection in multi-spectral images of cotton fields, Computers and Electronics in Agriculture, Volume 47, Issue 3, June 2005, Pages 243-260, ISSN 0168-1699, DOI: 10.1016/j.compag.2004.11.019.
(http://www.sciencedirect.com/science/article/B6T5M-4FG2X0K-1/2/585ab7d705e20fccebf8ee949b36a24a)
Abstract:
A means for automatic detection and evaluation of weeds in the field was developed and tested; it was based on an acousto-optic tunable hyperspectral sensor and a detection algorithm. The algorithm that was developed used spectral reflectance properties and robust statistics features for

weed detection. Soil-crop segmentation was done with two spectral channels, chosen from 100 channels available from the hyperspectral sensor. Weed detection was based on texture features, extracted from the segmented images. The algorithm was applied to a database of images of cotton plants and weeds, in their early stages of development. The results showed a good detection ability. The occurrence of weeds was detected in all images; the weed-infested area was estimated with 14% error, and the false detection rate was 15%.
Keywords: Spectral reflectance; Cotton; Weeds; Classification; Detection; Acousto-optic tunable filter

Dehua Chen, Guoyou Ye, Changqin Yang, Yuan Chen, Yunkang Wu, The effect of high temperature on the insecticidal properties of Bt Cotton, Environmental and Experimental Botany, Volume 53, Issue 3, June 2005, Pages 333-342, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2004.04.004.
(http://www.sciencedirect.com/science/article/B6T66-4CVR0MM-7/2/0dfac0151210598f3d71d17956633f0d)
Abstract:
Bt transgenic cotton has not shown the same level of resistance to bollworm in China, as in other major Bt cotton growing areas of the world. The objective of this study was to investigate the effects of high temperature on the CryIA insecticidal protein content and nitrogen metabolism, in the leaf of Bt transgenic cotton. The study was undertaken on two transgenic cotton cultivars, one conventional (Xinyang 822) and the other a hybrid (Kumian No. 1), during the 2001 and 2002 growing seasons at the Yangzhou University Farm, Yangzhou, China.
In the 2001 study, potted cotton plants were exposed to 37 [degree sign]C for 24 h under glasshouse conditions at three growth stages - peak square, peak flowering and peak boll developing periods. Based on the 2001 results, in 2002 the same two cultivars were exposed to the same temperature for 48 h at two growth stages--peak flowering and boll developing periods. The results of the study indicated that the insecticidal protein content of the leaf was not significantly affected by the stress during the square and flowering periods. However, exposure to high temperature for 24 h during the boll period reduced the CryIA protein content by approximately 51% in the cultivar Kumian No 1, and 30% in Xinyang 822 in the 2001 study, and by approximately 73 and 63% for 48 h with the same cultivars, respectively, in the 2002 study. Glutamic-pyruvic transaminase (GPT) activity, total free amino acid and soluble protein content, and the activity of protease in the leaf, showed relatively little change in response to high temperature in the flowering period. However, exposure to high temperature in the boll period resulted in the following changes - a reduction of GPT activity, a sharp increase in free amino acid content, a significant decrease in soluble protein content, and significant increases in the activity of protease.
The results suggest that high temperature may result in the degradation of soluble protein in the leaf, with a resulting decline in the level of the toxin CryIA. It is believed that this may be the cause of the reduced efficacy of Bt cotton in growing conditions in China, where temperatures during the boll period often reach 36-40 [degree sign]C.
Keywords: Bt cotton; High temperature; CryIA insecticidal protein; Nitrogen metabolism

Zhao-Jun Wei, Qi-Rui Zhang, Le Kang, Wei-Hua Xu, David L. Denlinger, Molecular characterization and expression of prothoracicotropic hormone during development and pupal diapause in the cotton bollworm, Helicoverpa armigera, Journal of Insect Physiology, Volume 51, Issue 6, Diapause and Biological Clocks, June 2005, Pages 691-700, ISSN 0022-1910, DOI: 10.1016/j.jinsphys.2005.03.005.
(http://www.sciencedirect.com/science/article/B6T3F-4G7NFH7-1/2/93e8f1276993321784bdb8ad124319e9)
Abstract:

Using a strategy of rapid amplification of cDNA ends, the cDNA encoding prothoracicotropic hormone (PTTH) was cloned from the brain of Helicoverpa armigera (Hearm). The Hearm-PTTH cDNA contains an open reading frame encoding a 226-amino acid preprohormone, which shows high identity with the closely related noctuid moths, Helicoverpa zea (98%) and Heliothis virescens (94%), and low identity with five species of Bombycoidea: Bombyx mori (57%), Manduca sexta (55%), Hyalophora cecropia (52%), Samia cynthia ricini (49%) and Antheraea peryni (48%). Hearm-PTTH cDNA shares important structural characterization known from other PTTHs, such as seven cysteine residues, proteolytic cleavage site, glycosylation site, and hydrophobic regions within the mature peptides. Northern blot analysis indicated a 0.9 kb transcript present only in the brain. Using the more sensitive technique of RT-PCR, PTTH mRNA was also detected in the subesophageal ganglion, thoracic ganglion, abdominal ganglion, midgut and fat body. During the pupal stage, PTTH mRNA in the brain remained at a constant high level in nondiapausing individuals, was low in diapausing pupae, but increased again at diapause termination. The PTTH protein was detected only in the brain by Western blot analysis. Immunocytochemical results revealed that Hearm-PTTH is localized in two pairs of dorsolateral neurosecretory cells within the brain. Recombinant Hearm-PTTH was successfully expressed in E. coli, and purified recombinant-PTTH was effective in breaking pupal diapause. The results are consistent with a role for PTTH in the regulation of diapause in this species.
Keywords: Prothoracicotropic hormone; cDNA structure; Developmental expression; Helicoverpa armigera

Yuksel Bolek, Kamal M. El-Zik, Alan E. Pepper, Alois A. Bell, Clint W. Magill, Peggy M. Thaxton, O. Umesh K. Reddy, Mapping of verticillium wilt resistance genes in cotton, Plant Science, Volume 168, Issue 6, June 2005, Pages 1581-1590, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2005.02.008.
(http://www.sciencedirect.com/science/article/B6TBH-4FR8KYF-1/2/afc8d4ba245150ef77c7508bf5b1df54)
Abstract:
Cotton quality and yield are affected by several factors during the growing season. A soil inhabiting fungus, Verticillium dahliae Kleb., can cause substantial yield loss in cotton. A molecular mapping F2 population derived from the interspecific cross of the highly tolerant Gossypium barbadense cv. Pima S-7 and the susceptible G. hirsutum cv. Acala 44 was phenotyped for disease incidence and severity. Phenotyping of individual plant reactions to the disease was quantified using a set of growth parameters measured 3 weeks after inoculation. The F2 phenotypic distribution of these parameters (number of healthy leaves, node number, leaf weight, stem weight, and total shoot weight) suggested that resistance is polygenic inherited. Microsatellites were used to reveal polymorphism between resistant and susceptible parents. A total of 255 simple sequence repeat (SSR) primer pairs were screened over bulks constituted by 10 resistant and 10 susceptible progeny. Sixty markers were used to analyze quantitative trait loci (QTLs). Eleven linkage groups were constructed consisting of 35 markers and spanning 531 cM with an average distance of 15.17 cM. QTL analysis was performed with MapQTL and QTL Cartographer. MapQTL indicated that 15 markers have significant linkage associations and 9 were distributed to chromosomes 10, 11, 12, and 25. Interval mapping also indicated the most likely position of markers that are significant and located on linkage groups. Three loci (CM12, STS1, 3147-2) had large effect on resistance to Verticillium wilt. Two loci were located on LG-1 and one on LG-2 and both linkage groups are located on chromosome 11.
Keywords: Bulk segregant analysis; Cotton; Microsatellites; Quantitative trait loci; Verticillium wilt

Yao-Ting Wu, Jin-Yuan Liu, Molecular cloning and characterization of a cotton glucuronosyltranferase gene, Journal of Plant Physiology, Volume 162, Issue 5, 13 May 2005, Pages 573-582, ISSN 0176-1617, DOI: 10.1016/j.jplph.2004.10.002.

(http://www.sciencedirect.com/science/article/B7GJ7-4FH0W2G-1/2/0bfac4e95917c8b04f42790611ad6b0c)
Abstract: Summary
A glucuronosyltranferase gene has been isolated from cotton (Gossypium hirsutum) fiber cells using rapid amplification of the cDNA ends. The full-length cDNA, designated GhGlcAT1, is 1400 bp in length (AY346330) and contains an open reading frame of 1107 bp encoding a protein of 368 amino acids. Alignment of the GhGlcAT1 predicted amino acid sequence was shown to have high sequence similarity with animal glucuronosyltranferases. A phylogenic tree generated by the PHYLIP program package showed that GhGlcAT1 is clustered into the plant glucuronosyltranferase proteins and is distinct from those of other species. Homology modeling of the GhGlcAT1 structure using Homo sapiens native glucuronosyltranferase (1 kws and 1 fgg) structure as a template strongly suggests that the main-chain conformation and the folding patterns were similar to structural features characteristic of animal glucuronosyltranferases. Northern blot analysis showed that the transcripts of GhGlcAT1 were abundant in fiber cells, moderate in stem, but not detected in ovule, flower, seed, root and leaf. Transcripts were most abundant at 15 dpa fiber. The transcription occurred at both the primary wall elongation stage and former stage of secondary cell thickening, suggesting that GhGlcAT1 may be involved in non-cellulose polysacchrides biosynthesis of the cotton cell wall.
Keywords: Expression patterns; Glucuronosyltranferase gene; Gossypium hirsutum; Molecular cloning; Phylogenic analysis

Alan L. Wright, Frank M. Hons, John E. Matocha Jr., Tillage impacts on microbial biomass and soil carbon and nitrogen dynamics of corn and cotton rotations, Applied Soil Ecology, Volume 29, Issue 1, May 2005, Pages 85-92, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2004.09.006.
(http://www.sciencedirect.com/science/article/B6T4B-4DVBYD1-1/2/c70b2774e353c3902e34bbe6ca424299)
Abstract:
Long-term no tillage (NT) may enhance soil C sequestration and alter soil C and N dynamics. The objectives of this study were to investigate the impacts of tillage on soil C and N sequestration and microbial C and N dynamics of corn (Zea mays L.) and cotton (Gossypium hirsutum L.) cropping sequences after 20 years of management. Tillage regimes included conventional tillage (CT), moldboard plow (MP), minimum tillage (MT), and NT. No tillage increased soil organic carbon (SOC) and nitrogen (SON) concentrations in surface soil (0-2.5 cm) for cotton but not for corn. Few tillage effects on SOC and SON were observed in subsurface soils. For corn, SOC and SON were 11 and 21% higher under NT than other tillage regimes at 0-2.5 cm, but were 22 and 12% lower under NT from 2.5 to 20 cm. Averaged between depths, SOC and SON for cotton were 8 and 7% greater under NT than CT, while NT and MT had 24 and 43% greater SOC and SON than MP. Soil organic C and SON were significantly greater for corn than cotton, but this did not result in greater microbial biomass and mineralizable C and N than for cotton. Microbial biomass carbon (MBC) and microbial biomass nitrogen (MBN) were often highest under NT and MT in surface soils, but few tillage impacts were observed at 2.5-20 cm. Mineralizable C and N were highest under NT and MT in surface soils for corn and cotton, and in subsurface soils for cotton. Even though SOC and SON were greater for corn than cotton, cotton exhibited greater soil mineralizable C and N under NT and MT than corn, especially in subsurface soils. These results indicate a greater potential supply of N for the cotton than corn crop during the growing season. Increased SOM content in surface soils under reduced tillage may increase N mineralization and the nutrient supply to crops, but the potential of these soils for C and N sequestration appeared limited.
Keywords: Carbon sequestration; Microbial biomass; No tillage; Soil organic matter

C.R. Howell, L.S. Puckhaber, A study of the characteristics of 'P' and 'Q' strains of Trichoderma virens to account for differences in biological control efficacy against cotton seedling diseases,

Biological Control, Volume 33, Issue 2, May 2005, Pages 217-222, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.02.003.
(http://www.sciencedirect.com/science/article/B6WBP-4FPJB0F-1/2/87d821c04cd8868905975901681fb428)
Abstract:
Strains of Trichoderma virens belonging to the 'P' group are ineffective as biocontrol agents of seedling disease in cotton, and they are pathogenic to susceptible seed lots. Those strains belonging to the 'Q' group are effective biocontrol agents of cotton seedling disease, and they are not pathogenic to cotton. To account for these behavioral differences, comparative assays were made of 'P' and 'Q' strains for production of phytotoxin, for cellulase, polygalacturonase and protease activity, for induction of phytoalexin synthesis in cotton roots, and for metabolism of pathogen germination stimulants. The results showed little difference in phyotoxin production or enzyme activity between the two groups, and that 'P' strain mutants deficient for viridiol production were still pathogenic to cotton. There was also no difference between strains in their ability to metabolize pathogen germination stimulants. HPLC analyses of extracts from roots treated with 'P' or 'Q' strains, however, showed that 'Q' strains induced high levels of phytoalexin synthesis, while 'P' strains did not. Treatment of seeds or seedling radicles with combination 'P' + 'Q' seed coat preparations or cultures filtrates, respectively, ameliorated seedling kill, and increased phytoalexin production in treated roots. These results indicate that an inability by 'P' strains to induce high levels of phytoalexins in cotton, not only makes them ineffective as biocontrol agents, but renders them pathogenic to susceptible cultivar seed lots. Induction by 'Q' strains of high levels of phytoalexin synthesis in cotton makes them effective biocontrol agents, and it inhibits their development in cotton roots which might lead to pathogenesis.
Keywords: Trichoderma virens; Germination stimulants; Cellulase; Polygalacturonase; Protease; Phytotoxin; Phytoalexins; Pathogenicity

S. Morse, R.M. Bennett, Y. Ismael, Genetically modified insect resistance in cotton: some farm level economic impacts in India, Crop Protection, Volume 24, Issue 5, May 2005, Pages 433-440, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.09.008.
(http://www.sciencedirect.com/science/article/B6T5T-4DPYKNP-1/2/a7e9281c49e53aad1a2d7ab426b4572e)
Abstract:
The paper explores the impact of insect-resistant Bacillus thuringiensis (Bt) cotton on costs and returns over the first two seasons of its commercial release in three sub-regions of Maharashtra State, India. It is the first such research conducted in India based on farmers' own practices rather than trial plots. Data were collected for a total of 7793 cotton plots in 2002 and 1577 plots in 2003. Results suggest that while the cost of cotton seed was much higher for farmers growing Bt cotton relative to those growing non-Bt cotton, the costs of bollworm spray were much lower. While Bt plots had greater costs (seed plus insecticide) than non-Bt plots, the yields and revenue from Bt plots were much higher than those of non-Bt plots (some 39% and 63% higher in 2002 and 2003, respectively). Overall, the gross margins of Bt plots were some 43% (2002) and 73% (2003) higher than those of non-Bt plots, although there was some variation between the three sub-regions of the state. The results suggest that Bt cotton has provided substantial benefits for farmers in India over the 2 years, but there are questions as to whether these benefits are sustainable.
Keywords: India; Maharashtra; Bt cotton; Economic impact; Genetic modification

Paul C.C. Feng, Tommy Chiu, Distribution of [14C]glyphosate in mature glyphosate-resistant cotton from application to a single leaf or over-the-top spray, Pesticide Biochemistry and Physiology, Volume 82, Issue 1, May 2005, Pages 36-45, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2004.07.010.

(http://www.sciencedirect.com/science/article/B6WP8-4FD13CR-1/2/75120de060c54e93fd780dd3add009c8)
Abstract:
Distribution of [14C]glyphosate was examined in mature glyphosate-resistant cotton plants at the 13-node stage in the absence of phytotoxicity. Initial experiments employed manual application of glyphosate to individual leaves within a relatively immature (Node 9) or mature (Node 5) sympodium (i.e., fruiting node) in the plant. We measured glyphosate export out of the treated leaf to the fruiting structures and foliage in the sympodium as well as out of the sympodium into the plant. Application to the Stem leaf, Leaf 1 or Leaf 2 in Node 9 showed 30-37% glyphosate export by 14 days after treatment. While Stem leaf exported mainly to the plant, Leaves 1 and 2 exported equally between the plant and the sympodium. Within the sympodium, glyphosate was distributed almost entirely to the fruiting structures with Boll 1 containing the highest level irrespective of the treated leaf. In Node 5, application to the Stem leaf or Leaves 1-3 showed overall lower glyphosate export (20-27%) with Stem leaf and Leaf 3 exporting mainly to the plant, and Leaves 1 and 2 exporting mainly to the sympodium. Within Node 5, the subtending boll of the treated leaf was not the main distribution target, but instead the boll at the next higher sympodial position relative to the treated leaf. Subsequent studies were conducted using over-the-top spray application of [14C]glyphosate at field use-rates in mature plants at the 13-node stage. Analysis of open bolls at full maturity showed high residues in seeds and fiber of Bolls 1 and 2 in the mature sympodia. Our results suggest that glyphosate distribution in mature plants was affected by sympodial age, position of the treated leaf, and position and sink strength of the bolls.
Keywords: Glyphosate; Glyphosate-resistant cotton; Roundup Ultra; Roundup Ready

Francisco J.L. Aragao, Giovanni R. Vianna, Silvia B.R.C. Carvalheira, Elibio L. Rech, Germ line genetic transformation in cotton (Gossypium hirsutum L.) by selection of transgenic meristematic cells with a herbicide molecule, Plant Science, Volume 168, Issue 5, May 2005, Pages 1227-1233, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2004.12.024.
(http://www.sciencedirect.com/science/article/B6TBH-4F9JB4W-1/2/0f81948c07ea45deb97ee77675ef6f0e)
Abstract:
Imazapyr is a herbicide molecule that when applied, concentrates in the apical meristematic region of plants. It inhibits the activity of acetohydroxyacid synthase, the enzyme that catalyzes the initial step in biosynthesis of isoleucine, leucine and valine. Previously isolated from Arabidopsis thaliana, the selectable marker gene, ahas, contains a mutation at position 653. Using a combination of imazapyr, the ahas gene, and a multiple shoot induction protocol, we have developed a novel system to select transgenic cotton meristematic cells after the physical introduction of foreign genes. In the present study, we describe the protocol for obtaining germ line transformation of Brazilian cotton varieties (var. 7MH: 0.49%; var. Antares: 0.62%; var. CD-401: 0.71% and var. ITA94: 0.47%).
Keywords: Agricultural biotechnology; Gene transfer; Cotton; Imazapyr; Plant transformation; ahas gene

Dehua Chen, Guoyou Ye, Changqin Yang, Yuan Chen, Yunkang Wu, Effect of introducing Bacillus thuringiensis gene on nitrogen metabolism in cotton, Field Crops Research, Volume 92, Issue 1, 14 April 2005, Pages 1-9, ISSN 0378-4290, DOI: 10.1016/j.fcr.2003.11.005.
(http://www.sciencedirect.com/science/article/B6T6M-4FBM1NS-1/2/ba33d2039462c991140aa49780e7e927)
Abstract:
Bacillus thuringiensis (Bt) transgenic cotton has shown changes in vegetative and reproductive growth characteristics. The objective of this study was to investigate the physiological changes in nitrogen metabolism that related closely to growth in Bt cotton cultivars. The study was undertaken

on two Bt transgenic cotton cultivars and their parents, one conventional (Xingyang 822) and recurrent parent (Sumian No. 9), the other a hybrid (Kumian No. 1) and female parent (Yumian No. 1), during the 2001 and 2002 growing seasons at the Yangzhou University Farm, Yangzhou, China.
In the 2001 study, the results indicated that the Bt cotton cultivars (during peak reproductive growth) possessed greater leaf N, free amino acid and soluble protein than their parents. The biggest increase of total nitrogen was at peak boll period, with 36 and 19% increase for Kumian No. 1 and Xingyang 822, respectively. Similar results were found for free amino acid and soluble protein content. Further in 2002, the nitrate reductase activity increased dramatically at peak squaring and early boll open period, the biggest increase at early boll open period, with Kumian No. 1 and Xingyang 822 exhibiting 88 and 61% greater activity than their parents, respectively. The biggest increase in glutamic-pyruvic transaminase activity was at peak boll period, with Kumian No. 1 and Xingyang 822 having 39 and 29% higher activity than their parents, respectively. However, protease activity of Bt cultivars reduced significantly before flowering and early boll open period, the biggest decrease was before the flowering period. The results suggest that the Bt cotton cultivars have a more intense leaf nitrogen metabolism than their parents during reproductive development. The enhanced N metabolism may lead to excessive vegetative growth. Cultural practices should therefore be aimed at reducing leaf nitrogen metabolic strength and keeping the balance of vegetative and reproductive growth.
Keywords: Bt cotton; Nitrogen metabolism; Nitrate reductase; Glutamic-pyruvic transaminase; Protease

D.K. Mandal, C. Mandal, M.V. Venugopalan, Suitability of cotton cultivation in shrink-swell soils in central India, Agricultural Systems, Volume 84, Issue 1, April 2005, Pages 55-75, ISSN 0308-521X, DOI: 10.1016/j.agsy.2004.06.010.
(http://www.sciencedirect.com/science/article/B6T3W-4DXBBJT-1/2/ff12b60a17a82f93ae8f8ed2d2579eea)
Abstract:
Rainfed cotton farming is a risky enterprise. It has always been a challenge to sustain cotton productivity under rainfed conditions not only in India but also in similar agro-environments elsewhere. The present study is an attempt to find out the most sustainable soil under varying rainfall through crop yield correlation with agro-environment factors, like soil physiographic conditions, growing period rainfall, crop ET and phasic rainfall, by conducting (farmers') field experiment in a representative catena with four different soil types in central India. Cotton (hybrid-H4) was grown for 5 years; 3 years under normal rainfall, 1 year under excessive rainfall and 1 year under drought conditions. The investigation revealed that in the excess rainfall to drought years, yield fluctuation varied from 2% to 38% over the normal year in shallow soils occurring on a pediment plain to the very deep soils in a valley plain. However, the yield fluctuation in deep Vertisols occurring on lower Piedmont and narrow valley, representing Vertic Haplustepts (P3) and Typic Haplusterts (P4), was 25-38% and 6-25%, respectively. The low yield fluctuation and high yield correlation with agro-environmental factors, observed for P3 soils, suggests the suitability of Vertic Haplustepts (P3) for cotton production under varying rainfall conditions. Cultivating P3 soils for cotton could stabilize the income of cotton farmers and research relating to cotton genotype improvement under rainfed conditions should be carried out to minimize soil effects. The international land evaluation criteria suggested by FAO show that Vertisols (P3 and P4) qualify as a suitable category for cotton production under rainfed conditions. However, the present study indicates that this categorization may need revision in view of the adverse climatic conditions of central India. In order to improve the effectiveness of the FAO's land evaluation criteria for sub-tropical Vertisols, the study suggests that more emphasis be given to rainfall in the critical growth phases related to crop yield and to soil hydraulic conductivity related to the Ca2+/Mg2+ ratio in computing land indices, rather than total quantum rainfall during the growing period. Also, too

many soil properties are presently considered in the FAO method. A quantum of 250-325 mm rainfall at the square initiation to peak flowering stages was found to influence yield. Under climatic aberration, the high fluctuation of cotton productivity in deep Vertisol (P4) may be minimized by adoption of any soil management technology (e.g. ridges or broad-bed furrow system) that helps in improving internal drainage. It is, therefore, urgent that the Indian Government should enact special legislation or introduce incentives for the Vertisol farmers who mostly use old cultivation practices to adopt such technology on a large scale. A quadratic regression model developed in this study to compute the yield under varying rainfall may help in estimating the economic losses to the farmers and quantifying crop insurance compensation.
Keywords: Shrink-Swell soil; Land evaluation; Rainfed

Xingyuan Men, Feng Ge, Clive A. Edwards, Erdal N. Yardim, The influence of pesticide applications on Helicoverpa armigera Hubner and sucking pests in transgenic Bt cotton and non-transgenic cotton in China, Crop Protection, Volume 24, Issue 4, April 2005, Pages 319-324, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.08.006.
(http://www.sciencedirect.com/science/article/B6T5T-4DJ4BRM-2/2/5cd0fba1270e64c44804d95810d806e2)
Abstract:
Effects of pesticide applications, based on an IPM program on cotton bollworm, Helicoverpa armigera Hubner, cotton mirids and cotton leafhoppers, were evaluated in transgenic Bt-cotton and non-transgenic cotton agroecosystems between 1999 and 2001 in China. Differences in pest populations between cotton varieties were also compared.
In 1999 and 2000, bollworm populations on non-transgenic cotton were larger than those on transgenic Bt-cotton. In Bt-cotton fields, the numbers of fourth-generation bollworms were greater than those of in the second and the third generations over all 3 years of study. Leafhopper populations on Bt-cotton were consistently larger than those on non-transgenic cotton during the 3 years of study. Although the use of transgenic Bt-cotton decreased the need for insecticide applications against cotton bollworm, this relaxation from pesticide applications could cause increased populations of sucking insects, which could require additional insecticide applications.
Keywords: Transgenic Bt-cotton; Pesticides; Bollworm (Helicoverpa armigera); Mirids; Leafhoppers

Puyun Yang, Malcolm Iles, Su Yan, Flavia Jolliffe, Farmers' knowledge, perceptions and practices in transgenic Bt cotton in small producer systems in Northern China, Crop Protection, Volume 24, Issue 3, March 2005, Pages 229-239, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.07.012.
(http://www.sciencedirect.com/science/article/B6T5T-4D99C5W-1/2/9a265c433e702d29dfa93463b651e164)
Abstract:
Farmers in Northern China were interviewed during the 2002 season concerning their knowledge, perceptions and practices on Bt cotton. Farmers have some awareness of insect pests in Bt cotton, especially on the resurgence of sucking pests such as red spider mites and aphids, but 60% of farmers overestimated damage by Helicoverpa armigera, the cotton bollworm in Bt cotton. Farmers' knowledge was very poor on the identification of diseases and natural enemies of pests in cotton. Farmers' knowledge and perceptions of Bt cotton were not significantly associated with their gender or formal education. All the farmers in the survey had adopted Bt cotton during the 5-year period since seed became commercially available in 1997. Their reasons for adoption were either; to save labour, to reduce pesticide applications, to obtain higher yields or to make cotton growing more profitable. Farmers used more than 7 varieties of Bt cotton and 29% of the seed used was home-retained. Pesticide was sprayed intensively on Bt cotton with an average of 12.7 applications per season. The results indicate that farmers were still over-utilising pesticides in the control of pests in Bt cotton. Farmers in small producer cotton systems need further training in the

identification of pests, natural enemies, basic ecology and integrated pest management strategies to ensure sustainable production of Bt cotton.
Keywords: Farmer knowledge; Pest management; Bt cotton; Helicoverpa armigera

Donald C. Steinkraus, Gabriele O. Boys, Mass harvesting of the entomopathogenic fungus, Neozygites fresenii, from natural field epizootics in the cotton aphid, Aphis gossypii, Journal of Invertebrate Pathology, Volume 88, Issue 3, March 2005, Pages 212-217, ISSN 0022-2011, DOI: 10.1016/j.jip.2005.01.008.
(http://www.sciencedirect.com/science/article/B6WJV-4FJXNJY-2/2/7e4b8100cfe6aad415a2f7c21d2cf449)
Abstract:
Epizootics caused by insect pathogens sometimes occur over wide areas and result in millions of infected insects. Naturally infected insects can be considered a natural resource for harvesting insect pathogens. We developed methods to mass harvest the fungal pathogen Neozygites fresenii (Entomophthorales: Neozygitaceae) from epizootics in Aphis gossypii (Homoptera: Aphididae) in a commercial cotton field in Arkansas. A total of 30,722 aphids infected with N. fresenii in the mature hyphal body or early conidiophore stages were harvested, dried, and frozen. Three desiccants were compared: silica gel, dry rock salt, and wet rock salt. Silica gel was the superior material because it more rapidly and thoroughly dried cotton leaves and aphids. Using this method a mean of 193.4 infected aphids could be harvested per hour from cotton leaves dried over silica gel. The quality of harvested infected aphids was high and resulted in a mean of 70.4% sporulation from infected aphids harvested from the silica gel desiccant.
Keywords: Entomophthorales; Neozygitaceae; Homoptera; Aphididae; Pathogen; Cotton; Desiccant; Silica gel

R.J. Smith, S.R. Raine, J. Minkevich, Irrigation application efficiency and deep drainage potential under surface irrigated cotton, Agricultural Water Management, Volume 71, Issue 2, 2 February 2005, Pages 117-130, ISSN 0378-3774, DOI: 10.1016/j.agwat.2004.07.008.
(http://www.sciencedirect.com/science/article/B6T3X-4D9R8WT-2/2/6a0fa7cce1c224caabca13ad6e4280c4)
Abstract:
Furrow irrigation events conducted under usual farmer management were analysed to determine the irrigation application efficiencies being attained, and the magnitude of the irrigation contribution to deep drainage under surface irrigated cotton in Queensland. Application efficiencies were shown to vary widely from 17 to 100% and on average were a low 48%. Losses to deep drainage were substantial, averaging 42.5 mm per irrigation. This has the potential for significant environmental harm and also represents an annual loss of up to 2500 m3/ha (2.5 Ml/ha) of water that could be beneficially used to grow more cotton. Simulations of each event using the simulation model SIRMOD illustrated simple `recipe' strategies that would lead to gains in efficiency and reductions in the deep drainage losses. Additional simulations of selected events showed that further significant improvements in performance can be achieved by the application of more advanced irrigation management practices, involving in-field evaluation and optimisation of the flow rate and irrigation time to suit the individual soil conditions and furrow characteristics. Application efficiencies in the range 85-95% are achievable in all but the most adverse conditions. The dependency between deep drainage and irrigation management was demonstrated, confirming that substantial reductions in deep drainage are possible by ensuring that irrigation applications do not exceed the soil moisture deficit.
Keywords: Surface irrigation; Application efficiency; Requirement efficiency; Infiltration; Deep drainage; Simulation; Optimisation

M.S. Aujla, H.S. Thind, G.S. Buttar, Cotton yield and water use efficiency at various levels of water and N through drip irrigation under two methods of planting, Agricultural Water Management, Volume 71, Issue 2, 2 February 2005, Pages 167-179, ISSN 0378-3774, DOI: 10.1016/j.agwat.2004.06.010.
(http://www.sciencedirect.com/science/article/B6T3X-4F2V58B-1/2/98d24621eb35b47868f73bcfd379892f)
Abstract:
The present investigation was undertaken to evaluate the effect of various levels of water and N application through drip irrigation on seed cotton yield and water use efficiency (WUE). In this experiment three levels of water (Epan 0.4, 0.3, and 0.2) and three levels of N (100, 75, and 50% of recommended N, 75 kg/ha) through drip were compared with check-basin method of irrigation under two methods of planting (normal sowing, NS; paired sowing, PS). The results revealed that when the same quantity of irrigation water and N was applied through drip irrigation system, it increased the seed cotton yield to 2144 from 1624 kg/ha (an increase of 32%) under check-basin method of irrigation. When the quantity of water through drip was reduced to 75%, the increase in seed cotton yield was 12%; however, when water was reduced to 50%, it resulted 2% lower yield than check-basin. The decrease in N through fertigation resulted in reduction in seed cotton yield at all the levels of water supply, but the magnitude of reduction was the highest at highest level of water supply. In paired sowing (PS), 20% higher seed cotton yield was obtained as compared with check-basin method under NS along with 50% saving of water. In paired sowing the sacrifice of 9% seed cotton yield as compared with NS resulted in saving of 50% water as well as the cost of laterals because there was one lateral for two paired rows. The WUE increased by 26% (22.1 from 17.6 kg/ha cm) in drip irrigation system when same quantity of water and N fertilizer was applied as compared with check-basin. WUE was not affected with quantity of water but decrease in rate of N caused a decrease in WUE at all the quantities of water applied. In general, WUE was higher in PS as compared with NS. The agronomic efficiency of nitrogen increased from 21.65 to 28.59 kg of seed cotton per kg of N applied when same quantity of water and N was applied through drip irrigation as compared with check-basin. However, decrease in quantity of water applied resulted in a decrease in agronomic efficiency of N but reverse was true for rates of N applied. When the same quantity of water and N was applied under both the methods of planting, PS produced 22% higher seed cotton yield and along with reduced cost owing to half the number of laterals required.
Keywords: Cotton; Drip; Irrigation; Nitrogen; Paired sowing; WUE

D. Blaise, J. V. Singh, A. N. Bonde, K. U. Tekale, C. D. Mayee, Effects of farmyard manure and fertilizers on yield, fibre quality and nutrient balance of rainfed cotton (Gossypium hirsutum), Bioresource Technology, Volume 96, Issue 3, February 2005, Pages 345-349, ISSN 0960-8524, DOI: 10.1016/j.biortech.2004.03.008.
(http://www.sciencedirect.com/science/article/B6V24-4CB0996-1/2/baf94cd483175f26acff1ca70fab9840)
Abstract:
Two-year field experiments were conducted to evaluate the effect of fertilizer with or without farmyard manure (FYM) application on cotton productivity and fibre quality. A partial nutrient balance was calculated by the difference method (nutrient applied--crop removal). Seed cotton yield was improved with addition of FYM (5 Mg ha-1). Application of both N and P resulted in significant improvements in seed cotton yield than the control and without N plots (PK). Uniformity ratio and ginning outturn (GOT) was greater in the FYM amended plots than the plots without FYM. Nitrogen and P balance was positive in the fertilizer-N and P applied plots whereas K balance was negative in spite of the addition of fertilizer-K. Potassium balance was positive only when FYM was applied. These studies suggest that it is advantageous to apply FYM as it improves fibre yield by way of improved GOT and maintains a positive nutrient balance.

Keywords: Gossypium hirsutum; Ginning out turn; Nutrient balance; Staple length; Uniformity ratio; Micronaire

D. Lykouressis, D. Perdikis, D. Samartzis, A. Fantinou, S. Toutouzas, Management of the pink bollworm Pectinophora gossypiella (Saunders) (Lepidoptera: Gelechiidae) by mating disruption in cotton fields, Crop Protection, Volume 24, Issue 2, February 2005, Pages 177-183, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.07.007.
(http://www.sciencedirect.com/science/article/B6T5T-4DHX616-1/2/5c29f46705b291512c158d39d7d8a20b)
Abstract:
The efficacy of mating disruption of pink bollworm Pectinophora gossypiella (Saunders) was evaluated by monitoring its population with pheromone baited traps as well as by sampling flowers and bolls to record damage levels in cotton fields in 1988 and 1989, in central Greece. PB-rope dispensers were used at a rate of 1000 per hectare in the treated fields, each field covered an area of 10 and 15 ha in the first and second year, respectively. These treated fields were compared with control fields in which 2-3 insecticide sprays were applied. The dispensers reduced pink bollworm catches in pheromone traps and reduced crop damage. The direction of cotton rows in relation to the prevailing wind had a significant effect on moth catches and needs to be taken into account when using dispensers. Mating disruption was effective in preventing damage when applied early season, but damage levels were not proportionally reduced in relation to the reduction of trap catches. Sufficient gossyplure for reducing moth catches in the traps was in pheromone dispensers even 90 days in the field.
Keywords: Mating disruption; Gossyplure; Crop damage; Pink bollworm; Lepidoptera; Cotton; Pectinophora gossypiella

Jay A. Rosenheim, Intraguild predation of Orius tristicolor by Geocoris spp. and the paradox of irruptive spider mite dynamics in California cotton, Biological Control, Volume 32, Issue 1, January 2005, Pages 172-179, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2004.09.007.
(http://www.sciencedirect.com/science/article/B6WBP-4DTKXHK-2/2/91c3491d13386ecaf81bd4304802fc5d)
Abstract:
It is paradoxical when a community of several natural enemies fails to control a pest population when it can be shown experimentally that single members of the natural enemy community are effective control agents when tested individually. This is the case for spider mites, Tetranychus spp., in California cotton. Spider mites exhibit irruptive population dynamics despite that fact that experiments have shown that there are at least four predators (Galendromus occidentalis, Frankliniella occidentalis, Orius tristicolor, and Geocoris spp.) that, when tested singly, can suppress mite populations. One possible explanation for the paradox is intraguild predation, wherein one predator consumes another. Here, I evaluate the hypothesis that intraguild predation is a strong interaction among spider mite predators. I report manipulative field experiments, focal observations of freely foraging predators in the field, and population survey data that suggest that the minute pirate bug O. tristicolor, is subject to strong predation by other members of the predator community, and in particular by Geocoris spp. These results, combined with the results of prior work, suggest that pervasive intraguild predation among spider mite predators may explain the pest status of Tetranychus spp. in cotton.
Keywords: Intraguild predation; Predator-predator interactions; Herbivore population suppression; Spider mites; Orius tristicolor; Geocoris pallens; Geocoris punctipes; Tetranychus spp.; Chrysoperla spp.; Nabis spp.; Zelus renardii

Lester O. Pordesimo, Samuel J. Ray, Michael J. Buschermohle, John C. Waller, John B. Wilkerson, Processing cotton gin trash to enhance in vitro dry matter digestibility in reduced time,

Bioresource Technology, Volume 96, Issue 1, January 2005, Pages 47-53, ISSN 0960-8524, DOI: 10.1016/j.biortech.2004.02.031.
(http://www.sciencedirect.com/science/article/B6V24-4C56NRB-2/2/a2538072c4f01133ef6d840d2924a664)
Abstract:
Cotton gin trash (CGT) in the raw form is poorly digested by ruminants due to lignocellulosic complexes. These structures must be broken down before adequate digestion can occur. This may be performed by physical and/or chemical means. Two methods for improving digestibility are particle size reduction and/or treatment with sodium hydroxide (NaOH). To evaluate the effectiveness of each method, three experiments were performed in which different CGT types were tested. Each type represented trash from a particular cleaning stage in the cotton ginning process. First, each type was ground with a knife-type grinding mill using screen sizes 0.5, 1.0, and 2.0 mm. For the second experiment, particle size was held constant at 2 mm, and all CGT types were treated with 4% and 6% NaOH (w/w) at room temperature. An agitation cycle of 5 min on and 10 min off was used, with the total mixing time being 4 h. Lastly, particle size and NaOH concentration were held constant, and treatments were performed at room temperature, 40 [degree sign]C, and 50 [degree sign]C. The total mixing times were 2 and 3 h for 50 and 40 [degree sign]C, respectively. For all experiments two subsamples of each treatment were tested for in vitro dry matter digestibility (IVDMD). From grinding alone, digestibility increased as particle size decreased. Grinding to 0.5 mm resulted in an average IVDMD of 47.8% while grinding to 2.0 mm resulted in an average IVDMD of only 33.8%. Digestibility also improved with a greater NaOH concentration. An average in vitro digestibility of 70.5% was achieved with 6% NaOH (w/w) treatment, essentially doubling that of the raw CGT. Increasing the reaction temperature did not result in increased digestibility because the mixture dried out, with a consequent reduction in chemical distribution and uniformity in heat transfer. There are still chemical residues in the CGT, and elimination/reduction of these is an issue that needs to be addressed in further research.

Yurdagul Ferhatoglu, Sergei Avdiushko, Michael Barrett, The basis for the safening of clomazone by phorate insecticide in cotton and inhibitors of cytochrome P450s, Pesticide Biochemistry and Physiology, Volume 81, Issue 1, January 2005, Pages 59-70, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2004.09.002.
(http://www.sciencedirect.com/science/article/B6WP8-4DXJT11-3/2/b84a407aefcbef856822202fa867b2bb)
Abstract:
Clomazone may be safely used in cotton to manage weeds when applied following treatments of the organophosphate insecticides phorate or disulfoton. The loss of chlorophyll and carotenoids with 6 days of 100 nM clomazone treatment of cotton seedlings was partially prevented with phorate in hydroponic solution in a rate-dependent manner. In a study to examine the timing of safening from a one-day clomazone (100 nM) treatment, maximum safening was achieved when phorate (50 [mu]M) was applied the same day as clomazone. Phorate decreased metabolism of 14C-clomazone to polar metabolites in excised cotton shoots and shoots of intact cotton plants. Microsomal studies of corn shoots showed an NADPH-dependent/cytochrome P450 reaction was inhibited by phorate. Additional studies with corn microsomes, corn seedlings and cotton seedlings supported the basis of clomazone safening is the inhibition of toxic clomazone metabolism by P450 inhibitors.
Keywords: Clomazone; Safening; Phorate; Cotton; Corn; P450; Microsomes; 5-OH clomazone; P450 inhibitors

Chuan-Yu Hsu, Johnie N. Jenkins, Sukumar Saha, Din-Pow Ma, Transcriptional regulation of the lipid transfer protein gene LTP3 in cotton fibers by a novel MYB protein, Plant Science, Volume

168, Issue 1, January 2005, Pages 167-181, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2004.07.033.
(http://www.sciencedirect.com/science/article/B6TBH-4D5P0DW-1/2/d7143360358923dca4e8f5fd9be58d64)
Abstract:
Two cotton fiber cDNAs (GhMyb7 and GhMyb9) and their corresponding genes, encoding R2R3-MYB proteins, have been isolated from the allotetraploid cotton (Gossypium hirsutum L. cv. DES119) and characterized. Genomic origin analysis reveals that GhMyb7 and 9 are alloallelic genes in the allotetraploid cotton (AD genome). GhMyb7 is derived from the A2 subgenome, whereas GhMyb9 is from the D5 subgenome. Northern blot analysis showed that GhMyb7/9 is expressed in flowers and fibers, and its expression in fibers is developmentally regulated. Auxin treatment increases transcript levels of GhMyb7/9 in fiber cells in an in vitro ovule culture system. The Escherichia coli-expressed GhMYB7 fusion protein binds to the promoter region (nt -614 to -580) of Ltp3, a cotton-fiber-specific gene, in an in vitro DNA-protein-binding assay, suggesting that GhMYB7/9 may play a role in the transcriptional regulation of the Ltp3 gene during fiber development. The overexpression of GhMyb7 in both transgenic tobacco and Arabidopsis plants causes a pleiotropic effect on plant development, including dwarf, abnormal leaf shape, and retarded root development. The late-flowering phenotype is observed in the 35S:GhMyb7 transgenic tobacco and Arabidopsis plants under long day (LD) condition. The transgenic Arabidopsis plants, however, show the absence of inflorescence under short day (SD) condition, suggesting that GhMYB7 overexpression might inhibit the GA biosynthesis or signaling pathway.
Keywords: Gossypium (cotton); R2R3-Myb; Transcriptional regulation; Ltp3; Auxin; Gibberellic acid

Xiao-Hua Zhen, Ying-Zhang Li, Ultrastructural changes and location of [beta]-1,3-glucanase in resistant and susceptible cotton callus cells in response to treatment with toxin of Verticillium dahliae and salicylic acid, Journal of Plant Physiology, Volume 161, Issue 12, 13 December 2004, Pages 1367-1377, ISSN 0176-1617, DOI: 10.1016/j.jplph.2004.04.007.
(http://www.sciencedirect.com/science/article/B7GJ7-4DXB86P-8/2/df030a57b20f1293f131e7746cba2878)
Abstract:
Calli from two cotton cultivars susceptible and resistant to Verticillium wilt, were treated with a crude toxin of Verticillium dahliae (VD-toxin) plus salicylic acid (SA). Cells treated with VD-toxin showed distinct ultrastructural changes. Cells from the susceptible cultivar displayed damage to plasma membrane and cytoplasm. The deleterious effect on cells of the resistant cultivar, with an accumulation of electron-dense precipitate in the vacuoles, was less noticeable. Exogenous SA protected callus cells from VD-toxin. We also report the localization of [beta]-1,3-glucanase in callus cells with immunofluorescence labeling. Stronger fluorescence was observed in the extra-cellular space in resistant than in susceptible cotton; strongest in resistant cotton after 5 days of treatment with VD-toxin plus SA. The findings reported here indicate an important role of exogenous salicylic acid in the induction of resistance to VD-toxin in cotton. Coupled with an increase in [beta]-1,3-glucanase, cellular integrity is maintained and damage to cell wall and plasma membrane is avoided.
Keywords: Callus; [beta]-1,3-glucanase; Gossypium hirsutum; Immunofluorescence labeling; Salicylic acid; Toxin of Verticillium dahliae; Ultrastructure

Chinkap Chung, Myunghee Lee, Eun Kyung Choe, Characterization of cotton fabric scouring by FT-IR ATR spectroscopy, Carbohydrate Polymers, Volume 58, Issue 4, 7 December 2004, Pages 417-420, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2004.08.005.
(http://www.sciencedirect.com/science/article/B6TFD-4D8VHX1-4/2/7ec133bc1768f4745b7efcd16f51267f)

Abstract:
FT-IR attenuated total reflectance (ATR) spectroscopy has been used for the fast characterization of cotton fabric scouring process. The greige and the scoured cotton fabrics showed very similar FT-IR spectrum in transmission mode because the bulk composition of the fabrics are similar. However, FT-IR ATR spectroscopy can provide information about the surface of a fabric. By examination of C-H stretching region at 2800-3000 cm-1, the amount of waxes left on the fabric can be estimated. The presence of pectins and/or waxes can also be probed by observation of carbonyl peak induced by the HCl vapor treatment on the fabric. Based on these changes of FT-IR ATR spectra, the scouring process has been characterized.
Keywords: FT-IR ATR; Scouring; Cotton; Wax; Pectin

D. Pemsl, H. Waibel, J. Orphal, A methodology to assess the profitability of Bt-cotton: case study results from the state of Karnataka, India, Crop Protection, Volume 23, Issue 12, December 2004, Pages 1249-1257, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.05.011.
(http://www.sciencedirect.com/science/article/B6T5T-4D1YXNJ-1/2/e155087123c544361c8f90b733984b76)
Abstract:
Bt-cotton varieties can control lepidopterous pests, hence offering the possibility to reduce chemical pesticide use. India, with the largest cotton-growing area globally, gave commercial approval for Bt cotton in 2002 and a rapid adoption of the technology is expected. This paper uses a stochastic partial budgeting approach that captures the key pest control properties of Bt cotton taking into account uncertainty of pest pressure, control effectiveness and prices to assess the profitability effects of Bt varieties and hence complements previous studies that generally excluded such issues. Results of the simulation model reveal that under the current price situation a prophylactic chemical control strategy dominates the use of Bt varieties in both, irrigated and non-irrigated cotton. The effect of a higher cotton price is assessed in a second scenario that depicts a Bt cotton variety with improved fiber quality than varieties currently approved for commercial planting. Under this assumption, the Bt strategy would be slightly better than the prophylactic use of chemical pesticides. The model can be extended to include pests other than the bollworm and correlations among variables, e.g. prices and yield, provided sufficient evidence for such correlation exists. Results of this analysis show the impact of uncertainty in the main variables that influence the profitability of Bt cotton and alternative crop protection methods.
Keywords: Bt cotton; Profitability; Economic assessment; Uncertainty

S. Suni, A.-L. Kosunen, M. Hautala, A. Pasila, M. Romantschuk, Use of a by-product of peat excavation, cotton grass fibre, as a sorbent for oil-spills, Marine Pollution Bulletin, Volume 49, Issues 11-12, December 2004, Pages 916-921, ISSN 0025-326X, DOI: 10.1016/j.marpolbul.2004.06.015.
(http://www.sciencedirect.com/science/article/B6V6N-4D09DWH-2/2/5bc44cc872d5bddc9847fe34ecc05cdf)
Abstract:
The sorbents used to collect oil in case of oil-spills are mostly synthetic, which limits the possibilities of their disposal. We studied the absorption capacities and rates of cotton grass fibre, a by-product of peat excavation, and cotton grass mats for several oil types and compared them with a synthetic, commercially available oil sorbent. We found cotton grass fibre to have superior absorption properties: Cotton grass sorbent absorbed oil approximately two to three times as much, and two to three times as fast as the synthetic one. Cotton grass fibre absorbed no measurable amount of water in the conditions used in the tests making it ideal for absorbing oil from the surface of water. In removing diesel oil from the surface of water, the efficiency was over 99% up to an absorbing factor of 20 times its own weight. The biodegradable cotton grass fibre proved to be an effective oil sorbent with low raw-material costs.

Keywords: Oil; Sorbents; Bioremediation; Cotton grass

J. Beyo, S. Nibouche, E. Goze, J. -P. Deguine, Application of probability distribution to the sampling of cotton bollworms (Lepidoptera: Noctuidae) in Northern Cameroon, Crop Protection, Volume 23, Issue 11, November 2004, Pages 1111-1117, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.04.001.
(http://www.sciencedirect.com/science/article/B6T5T-4CG2JF8-1/2/c55aa52b214a57fe58ca4e3c945e179c)
Abstract:
The main pests of cotton in Cameroon are the bollworms Helicoverpa armigera, Diparopsis watersi and Earias spp. The implementation of integrated management of these pests requires sampling plans for population monitoring. For practical reasons, these sampling plans have to enable the monitoring of the three bollworm species together rather than each separately. Based on our examination of 2083 samples, 80 or 100 plants each, this study shows that the number of larvae per plant fits a negative binomial distribution (NBD), with a common k value of 5.70, although the numbers of larvae of the three species considered separately fit different NBDs with k values ranging from 1.37 to 3.64. However, we show that possible fluctuations of the distribution resulting from fluctuations in the relative abundance of the three bollworm species would have little or no effect on either the fixed size or sequential sampling plans. We propose the design of a pegboard that allows the extension of sequential sampling in a smallholder context.
Keywords: Cotton; Bollworm larvae; Sampling; Cameroon; Pegboard

J. L. Ping, C. J. Green, R. E. Zartman, K. F. Bronson, Exploring spatial dependence of cotton yield using global and local autocorrelation statistics, Field Crops Research, Volume 89, Issues 2-3, 8 October 2004, Pages 219-236, ISSN 0378-4290, DOI: 10.1016/j.fcr.2004.02.009.
(http://www.sciencedirect.com/science/article/B6T6M-4C2NMHB-3/2/024c43c3ce8a4cd098a55a4bb1e0e440)
Abstract:
The understanding of spatial dependence of yield and abiotic factors that influence yield plays a key role in successful application of precision agriculture. The objectives of this study were to (i) evaluate the application of both global and local autocorrelation statistics to explore the spatial dependence of cotton (Gossypium hirsutum) yield and yield pattern changes under two weather scenarios, and (ii) compare effects of weight selection on spatial autocorrelation statistics. Cotton yield was measured from 1 ha grids in a 49 ha production field from 1998 through 2000. Spatial dependence was described in terms of global Moran's I and Geary's C, local indicator of spatial association, and local Gi and Gi* statistics. While global spatial autocorrelation statistics could describe the overall spatial dependence of cotton yields over the entire field, local spatial autocorrelation statistics were useful in identifying the influences from individual positions compared to their neighbors. The application of Moran scatterplots could decompose the spatial dependence and identify influential positions. Spatial dependence of cotton yield was highly affected by weather conditions. The lint yields were significantly spatially autocorrelated in the drier years (1998 and 2000), but not in wetter year (1999) in this study. Furthermore, a trend existed with changing locations and the detrending decreased the spatial association. Additionally, spatial autocorrelation of lint yield in the drier years turned from positive into negative as contiguity order increased. Maximum spatial autocorrelation was obtained in inverse distance with power 1 and in k-nearest points with k as 4. In comparison, there were some similarities between spatial semivariogram, and global and local spatial association statistics but the latter can provide some useful spatial association to be used for management zone delineation. Based on global and local spatial statistics, three major and five minor management zones were identified, which could help decision making in site-specific management systems.
Keywords: Cotton; Spatial dependence; Autocorrelation; Weight matrix; Moran scatterplots

S. P. Milroy, M. P. Bange, A. B. Hearn, Row configuration in rainfed cotton systems: modification of the OZCOT simulation model, Agricultural Systems, Volume 82, Issue 1, October 2004, Pages 1-16, ISSN 0308-521X, DOI: 10.1016/j.agsy.2003.12.001.
(http://www.sciencedirect.com/science/article/B6T3W-4BMTHF4-1/2/61572f01a91aaf5dc01e1a5f01241b9b)
Abstract:
Over the last 10 years, there has been a rapid expansion of rainfed cotton production in Australia. The majority of this area has used 'skip row' configurations in which certain rows in the crop are not sown with the aim of providing a slowly available supply of soil moisture during periods of low rainfall. In the past, the OZCOT cotton crop simulation model has been used with long-term climate records to assess the impact of different management strategies for irrigated cotton production and to study the prospects for rainfed cotton production in the major cotton growing regions. In this paper, we present modifications made to OZCOT to better accommodate skip row. First, a simple procedure previously used to approximate light interception of row crops was assessed for its ability to enhance the capability of OZCOT to simulate skip row configurations and second, a modification to allow for the possibility that water in the skip is not as freely available as the water in the plant row was also explored. Including modifications to allow for differences in soil water extraction significantly improved predictions of crop yield for cotton in skip row configurations across a number of locations in the Eastern Australian cotton producing regions, but modifications to account for light interception in row configurations reduced the ability of the model to simulate skip row cotton yields. The modified model gave reasonable predictions of yield for solid planted and skip row crops. The performance was within the range of results published for solid planted crops over a range of nitrogen and irrigation treatments and planting dates. The model's simulation of skip row yields when compared to solid planted crops grown under the same conditions, reflected the relationships seen in the measured data and those published in the industry literature.
Keywords: Cotton; Rain-fed; Dryland; Row configuration; Simulation; Model; OZCOT

Sharon L. Lachnicht, Paul F. Hendrix, Robert L. Potter, David C. Coleman, D. A. Crossley Jr., Winter decomposition of transgenic cotton residue in conventional-till and no-till systems, Applied Soil Ecology, Volume 27, Issue 2, October 2004, Pages 135-142, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2004.05.001.
(http://www.sciencedirect.com/science/article/B6T4B-4D5KYFB-1/2/eb32a28f4d92b8c61b8bdb682933329a)
Abstract:
Current research suggests that genetic modification of commercial crops may lead to indirect effects on ecosystem function (i.e. decomposition and nutrient cycling processes). We investigated residue decomposition of cotton that was genetically modified to express an endotoxin insecticide isolated from Bacillus thuringiensis (Bt) and/or glyphosate tolerance (Roundup Ready(R)). Decomposition of the genetically modified residue was compared within agricultural systems under conventional-tillage (CT) or no-tillage (NT) management. We tested for variation in decomposition dynamics under the two tillage regimes because there are intrinsic differences in environmental and biotic conditions between them, and that both management methods are employed in cotton production. We hypothesized that decomposition dynamics would be affected by the presence or absence of the Bt endotoxin and that the degree of variation would be more distinct between tillage regimes. Decomposition dynamics were determined by change in mass remaining and nutrient content (C and N) of cotton litter material contained in mesh litterbags collected over a 20-week period from December to May. Rate of decomposition and change in nutrient content of decomposing litter within either tillage regime was not significantly different between the two cotton types examined. Percent mass remaining, total N and total C decreased over time and were

significantly different between tillage regimes only. Over the 20-week experiment, mass loss with subsurface decomposition in the CT reached 55% but surface decomposition in the NT reached only 25%. We observed that cotton genetically modified to express Bt endotoxin and glyphosate tolerance decomposed similarly to cotton modified for glyphosate tolerance only.
Keywords: Bacillus thuringiensis; Genetically modified organism; Nutrient dynamics; Conservation tillage; Litterbag method

W.James Grichar, Brent A. Besler, Kevin D. Brewer, Brad W. Minton, Using soil-applied herbicides in combination with glyphosate in a glyphosate-resistant cotton herbicide program, Crop Protection, Volume 23, Issue 10, October 2004, Pages 1007-1010, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.03.004.
(http://www.sciencedirect.com/science/article/B6T5T-4C7DD30-1/2/14bf252b4833f81d01196358e7ad9d3f)
Abstract:
Field studies were conducted to evaluate pendimethalin-applied preplant incorporated (PPI), prometryn-applied preemergence (PRE), or metolachlor-applied early postemergence (EPOST) in combination with glyphosate-applied EPOST or post-directed (POSDIR) for Amaranthus palmeri and Brachiaria platyphylla control in glyphosate-resistant cotton. Herbicide systems which included glyphosate-applied EPOST or POSDIR in combination with pendimethalin-applied PPI or prometryn-applied PRE controlled greater than 95% Amaranthus or Brachiaria. Herbicide systems which did not include glyphosate or included glyphosate-applied late post-emergence (LPOST) controlled less than 50% B. platyphylla. Greatest cotton yields were obtained with pendimethalin followed by glyphosate-applied EPOST followed by glyphosate plus prometryn-applied POSDIR.
Keywords: Glyphosate; Metolachlor; Pendimethalin; Prometryn; Brachiaria platyphylla (Griseb.) NASH; Amaranthus palmeri S. Wats.; Cotton; Gossypium hirsutum L.; Preplant incorporated; Preemergence; Postemergence

Sander J. Zwart, Wim G. M. Bastiaanssen, Review of measured crop water productivity values for irrigated wheat, rice, cotton and maize, Agricultural Water Management, Volume 69, Issue 2, 15 September 2004, Pages 115-133, ISSN 0378-3774, DOI: 10.1016/j.agwat.2004.04.007.
(http://www.sciencedirect.com/science/article/B6T3X-4CYNWM8-1/2/088d9182a7f29616467ccc06e17239a7)
Abstract:
The great challenge of the agricultural sector is to produce more food from less water, which can be achieved by increasing Crop Water Productivity (CWP). Based on a review of 84 literature sources with results of experiments not older than 25 years, it was found that the ranges of CWP of wheat, rice, cotton and maize exceed in all cases those reported by FAO earlier. Globally measured average CWP values per unit water depletion are 1.09, 1.09, 0.65, 0.23 and 1.80 kg m-3 for wheat, rice, cottonseed, cottonlint and maize, respectively. The range of CWP is very large (wheat, 0.6-1.7 kg m-3; rice, 0.6-1.6 kg m-3; cottonseed, 0.41-0.95 kg m-3; cottonlint, 0.14-0.33 kg m-3 and maize, 1.1-2.7 kg m-3) and thus offers tremendous opportunities for maintaining or increasing agricultural production with 20-40% less water resources. The variability of CWP can be ascribed to: (i) climate; (ii) irrigation water management and (iii) soil (nutrient) management, among others. The vapour pressure deficit is inversely related to CWP. Vapour pressure deficit decreases with latitude, and thus favourable areas for water wise irrigated agriculture are located at the higher latitudes. The most outstanding conclusion is that CWP can be increased significantly if irrigation is reduced and crop water deficit is intendently induced.
Keywords: Crop water productivity; Water scarcity; Wheat; Rice; Cotton; Maize

J. H. Hancock, J. B. Wilkerson, F. H. Moody, M. A. Newman, Seed-specific placement of in-furrow fungicides for control of seedling disease in cotton, Crop Protection, Volume 23, Issue 9, September 2004, Pages 789-794, ISSN 0261-2194, DOI: 10.1016/j.cropro.2003.12.004.
(http://www.sciencedirect.com/science/article/B6T5T-4BN519J-1/2/b184faa8172e774c471a656104dc11e0)
Abstract:
Fungicides are often applied as in-furrow sprays during planting to control cotton seedling disease. To be effective, the fungicide product should cover each seed and the surrounding soil, thus forming a zone of protection for each emerging seedling. Traditional practice has been to apply the product as a solid band along the length of the furrow. However, limiting fungicide application to an area near the cottonseed, and minimizing the amount of chemical applied between seeds, could reduce fungicide inputs significantly while maintaining an acceptable level of disease control. To this end, a seed-specific applicator has been developed to apply discrete pulses of liquid chemical to individual seeds and the surrounding soil at planting. The concept of seed-specific fungicide application was evaluated during 2002 and 2003 using side-by-side, field comparisons of seed-specific and conventional applications of PCNB and etridiazole in plots inoculated with Pythium spp. and Rhizoctonia solani. Cotton was planted at 9.8 seeds m-1, and seed-specific treatments were applied as spray bands 5.1 cm in length such that fungicide savings of 50% were realized where seed-specific applications were implemented.
Seedling disease pressure was present in both years of the study. Stands in the untreated plots averaged less than 25% of that in treated plots. Stand counts in all plots receiving an in-furrow fungicide treatment were significantly greater (P=0.05) than in untreated plots. There were no significant differences in either year among the seed-specific and conventional treatments. In these tests, seed-specific fungicide applications provided seedling disease control comparable to conventional application while reducing fungicide use by 50%. Seed-specific application equipment has potential to help cotton growers reduce input costs and increase production efficiency.
Keywords: Seed-specific; Precision chemical application; Cotton; Seedling disease; Fungicide; In-furrow treatment

Osmundo B. Oliveira-Neto, Joao A. N. Batista, Daniel J. Rigden, Rodrigo R. Fragoso, Rodrigo O. Silva, Eliane A. Gomes, Octavio L. Franco, Simoni C. Dias, Celia M. T. Cordeiro, Rose G. Monnerat, Maria F. Grossi-de-Sa, A diverse family of serine proteinase genes expressed in cotton boll weevil (Anthonomus grandis): implications for the design of pest-resistant transgenic cotton plants, Insect Biochemistry and Molecular Biology, Volume 34, Issue 9, September 2004, Pages 903-918, ISSN 0965-1748, DOI: 10.1016/j.ibmb.2004.06.001.
(http://www.sciencedirect.com/science/article/B6T79-4CRXWPB-1/2/935a853f555f0e498643479a190a90c4)
Abstract:
Fourteen different cDNA fragments encoding serine proteinases were isolated by reverse transcription-PCR from cotton boll weevil (Anthonomus grandis) larvae. A large diversity between the sequences was observed, with a mean pairwise identity of 22% in the amino acid sequence. The cDNAs encompassed 11 trypsin-like sequences classifiable into three families and three chymotrypsin-like sequences belonging to a single family. Using a combination of 5' and 3' RACE, the full-length sequence was obtained for five of the cDNAs, named Agser2, Agser5, Agser6, Agser10 and Agser21. The encoded proteins included amino acid sequence motifs of serine proteinase active sites, conserved cysteine residues, and both zymogen activation and signal peptides. Southern blotting analysis suggested that one or two copies of these serine proteinase genes exist in the A. grandis genome. Northern blotting analysis of Agser2 and Agser5 showed that for both genes, expression is induced upon feeding and is concentrated in the gut of larvae and adult insects. Reverse northern analysis of the 14 cDNA fragments showed that only two

trypsin-like and two chymotrypsin-like were expressed at detectable levels. Under the effect of the serine proteinase inhibitors soybean Kunitz trypsin inhibitor and black-eyed pea trypsin/chymotrypsin inhibitor, expression of one of the trypsin-like sequences was upregulated while expression of the two chymotrypsin-like sequences was downregulated.
Keywords: Anthonomus grandis; Serine proteinases; cDNA cloning; Multigene family

Mushtaq Ahmad, Potentiation/antagonism of deltamethrin and cypermethrins with organophosphate insecticides in the cotton bollworm, Helicoverpa armigera (Lepidoptera: Noctuidae), Pesticide Biochemistry and Physiology, Volume 80, Issue 1, September 2004, Pages 31-42, ISSN 0048-3575, DOI: 10.1016/j.pestbp.2004.06.002.
(http://www.sciencedirect.com/science/article/B6WP8-4CTN48P-1/2/e4d7a3067388d2c27ea7b6a3a5270007)
Abstract:
The joint action of pyrethroids deltamethrin and cypermethrins in combination with organophosphates ethion, profenofos, chlorpyrifos, quinalphos, and triazophos was studied on putatively resistant field populations of Helicoverpa armigera from Pakistan by using a leaf-dip method. Ethion produced a good potentiation with deltamethrin, cypermethrin, alphacypermethrin, and zetacypermethrin, whereas profenofos, chlorpyrifos, quinalphos, and triazophos exhibited an antagonism with deltamethrin as well as cypermethrins. Implications of using mixtures for counteracting insecticide resistance are discussed.
Keywords: Helicoverpa armigera; Pakistan; Potentiation; Antagonism; Deltamethrin; Cypermethrin; Alphacypermethrin; Zetacypermethrin; Ethion; Profenofos; Chlorpyrifos; Quinalphos; Triazophos

M. P. Bange, S. P. Milroy, P. Thongbai, Growth and yield of cotton in response to waterlogging, Field Crops Research, Volume 88, Issues 2-3, 10 August 2004, Pages 129-142, ISSN 0378-4290, DOI: 10.1016/j.fcr.2003.12.002.
(http://www.sciencedirect.com/science/article/B6T6M-4BRPBDF-1/2/1c1302ce15cad3e1b735793b7c7830a0)
Abstract:
Cotton is known to be poorly adapted to waterlogged conditions. In Australia, cotton production is concentrated on soils with inherently low drainage rates, which, combined with the almost exclusive use of furrow irrigation and a summer dominant rainfall pattern, results in a significant risk of intermittent waterlogging. Three field experiments were conducted in which cotton was subjected to intermittent waterlogging by extending the duration of irrigation events. Timing of waterlogging, cultivar and landforming were also varied. Treatments required to generate significant impacts on crop growth and yield were more extreme than previously reported. Possible reasons for this are discussed. Consistent with the literature, yield loss was associated with reduced boll number (R2=0.82). The reduction in boll number was commensurate with the reduction in total plant dry matter: dry matter was reduced by up to 32% with the allometric ratio between boll number and glucose adjusted dry matter being unaltered by the treatments. The reduction in dry matter was due to lower radiation use efficiency (RUEg), which fell by up to 35%, rather than lower light interception. While leaf area was reduced, the resultant change in cumulative light interception was less than 5%. Thus, yield loss was caused by a reduction in the number of bolls. This reduction was commensurate with the reduced dry matter production from lower RUEg rather than light interception. A single waterlogging event during early squaring and five events throughout growth of the same cumulative duration gave the same impact on lint yield. However, when the single event was imposed at peak green bolls, it had no significant effect on yield. No impact of waterlogging on fibre quality was detected in any of the experiments.
Keywords: Cotton; Waterlogging; Radiation use efficiency; Yield components

Viktor Krakhmalev, Adkham Paiziev, Morphological defects in cotton hairs and the nature of their origin, Journal of Plant Physiology, Volume 161, Issue 7, 19 July 2004, Pages 873-878, ISSN 0176-1617, DOI: 10.1016/j.jplph.2004.03.001.
(http://www.sciencedirect.com/science/article/B7GJ7-4CP0JMB-H/2/0b7e457dd5479e311283c6932fa7f305)
Abstract:
In vivo observations of the origin of native defects in cotton hairs were carried out during their development in unopened cotton bolls. It is shown that the formation of these structural defects is related to features of their packing inside the cotton bolls during the formation of the boll segments. A mechanism explaining the origination of these morphological defects is proposed. It is based on the hydrodynamic properties of the cytoplasm at the sites of bending in developing cotton hairs.
Keywords: Fiber; Gossypium; Origin of defects; Pathology of growth

D. F. Wanjura, S. J. Maas, J. C. Winslow, D. R. Upchurch, Scanned and spot measured canopy temperatures of cotton and corn, Computers and Electronics in Agriculture, Volume 44, Issue 1, July 2004, Pages 33-48, ISSN 0168-1699, DOI: 10.1016/j.compag.2004.02.005.
(http://www.sciencedirect.com/science/article/B6T5M-4CKFKSP-4/2/5c42ddfcf51e565305ee271c33f0fc39)
Abstract:
Canopy temperature is a useful indicator of crop water stress and can also be used for making timely irrigation scheduling decisions for center pivot and subsurface drip irrigation systems. However, it is not known how closely the measured canopy temperature from a circular area of the canopy surface compares with a larger continuous area that includes the full canopy width. A study was conducted in 2001 where canopy temperatures were measured with infrared thermocouples (IT) and a thermal scanner (TS) in field plots irrigated by surface drip irrigation using cotton (Gossypium hirsutum L.) and corn (Zea maize L.). Two water levels included full evapotranspiration replacement (high water, HW) in cotton and corn and a second water level in cotton (low water, LW), which received 50% of the HW cotton amount. The purpose of the study was to compare canopy temperature measured from a small canopy area using IT with that obtained from a larger area with a TS. Canopy temperatures in the HW cotton, and HW corn were measured on 8 days during a 20-day period that started at first bloom in cotton and the V14 growth stage of corn, including four successive days during one irrigation cycle. Differences in canopy temperature measured by the two sensors averaged 0.2 [degree sign]C in HW cotton, 3.2 [degree sign]C in LW cotton, and 0.6 [degree sign]C in HW corn. When leaf cover within the canopy was sufficient to mask the soil background, canopy temperatures measured from a small area by IT were comparable to those from a larger area sensed by a TS.
Keywords: Canopy temperature; Cotton; Corn; Infrared thermocouple; Thermal image

Sang-Hoon Lim, Samuel M. Hudson, Application of a fiber-reactive chitosan derivative to cotton fabric as an antimicrobial textile finish, Carbohydrate Polymers, Volume 56, Issue 2, 4 June 2004, Pages 227-234, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2004.02.005.
(http://www.sciencedirect.com/science/article/B6TFD-4C53PKX-1/2/60f106a26bf01ffb0c135eb09fb8c50b)
Abstract:
A fiber-reactive chitosan derivative, O-acrylamidomethyl-N-[(2-hydroxy-3-trimethylammonium)propyl] chitosan chloride (NMA-HTCC), was applied to cotton fabrics by a cold pad-batch method in the presence of an alkaline catalyst to evaluate its use as a durable antimicrobial textile finish. The antimicrobial activities of the NMA-HTCC treated cotton fabrics were evaluated quantitatively against Staphylococcus aureus. The cotton treated with NMA-HTCC at a concentration of 1% on weight of fabric showed 100% of bacterial reduction. The activity was

maintained over 99% even after being exposed to 50 consecutive home laundering condition. The effect of an anionic surfactant on the antimicrobial activity of the NMA-HTCC treated fabric was discussed.
Keywords: Antimicrobial textile finish; Chitosan; Cotton; Fiber-reactive chitosan derivative

K. Wu, H. Feng, Y. Guo, Evaluation of maize as a refuge for management of resistance to Bt cotton by Helicoverpa armigera (Hubner) in the Yellow River cotton-farming region of China, Crop Protection, Volume 23, Issue 6, June 2004, Pages 523-530, ISSN 0261-2194, DOI: 10.1016/j.cropro.2003.10.009.
(http://www.sciencedirect.com/science/article/B6T5T-4B8BMRG-1/2/a121be9038cc332dcf644b049e43f936)
Abstract:
Bt cotton has been planted to the exclusion of non-Bt cotton in the Yellow River cotton-farming region of China since 2000. Alternative non-Bt hosts, such as maize, soybean, peanut, wheat, and other host plants of Helicoverpa armigera (Hubner) may be acting as refuges for Bt-susceptible larvae of this pest, thereby delaying evolution of resistance to Bt cotton. Egg, larval, and adult densities of H. armigera were measured on Bt cotton, and on maize that was planted on dates that reflected local farming practices, in order to assess the role of maize as a refuge during 2001-2002 in Xinxiang County, Henan Province and Anci County, Hebei Province. The results indicated that the average egg densities for the second-fourth generation of the pest on Bt cotton in Xinxiang and the second generation in Anci County were significantly higher than those in maize fields. However, maize typically had much higher larval densities in the third and fourth generation of H. armigera than on Bt cotton. These data indicate that maize is probably serving as an effective refuge for third and fourth generation H. armigera, but is of less value for the second generation. The densities of moths produced by Bt cotton and by maize in a cage experiment confirmed the importance of maize as a refuge in the third and fourth generation.
Keywords: Helicoverpa armigera; Bt transgenic cotton; Resistance management; Refugia; Maize; China

Ibrahim Akinci, Engin Cakir, Mehmet Topakci, Murad Canakci, Onal Inan, The effect of subsoiling on soil resistance and cotton yield, Soil and Tillage Research, Volume 77, Issue 2, June 2004, Pages 203-210, ISSN 0167-1987, DOI: 10.1016/j.still.2003.12.006.
(http://www.sciencedirect.com/science/article/B6TC6-4BYRTJ2-1/2/d48db6600f7b707998ea8f2c6a813eb5)
Abstract:
Soil compaction occurs due to heavy wheeling or repetitive tillage in the field. Soil compaction changes the soil physical parameters and water infiltration that cause reduction in the crop yield. Proper subsoiling alleviates the negative effect of soil compaction. The objectives of the research was to examine the effects of subsoiling on the resistance of the soil and to find out deep tillage effects on the cotton yield and the convenient time for applying subsoil treatment for reducing the soil compaction. One-pass (B) and two-passes (C) subsoil treatments were applied in the fields where wheat, silage maize (Zea mays L.) and cotton (Gossypium hirsutum L.) crops were grown by 2 years rotation. The experiment was started in 1998 and carried out for 4 years. Soil penetrations were measured during the experiments years at thaw conditions of silty-clay soil (43% clay, 50% silt, 7% sand) before seedbed preparation in autumn seasons. According to the results, the subsoiling treatments created statistically significant effects on the soil resistance ($P<0.05$) comparing the control plots (A). The initial disruption in subsoiled plots has almost disappeared after 2 and 4 years in B and C plots, respectively. The soil resistance in C plots was lower than in B plot. The percentage of decrease in the soil resistance from A to B and A to C plots was calculated as 13.3 and 26.2%, respectively, in the first year. In the effective subsoiling area from 0.20 to 0.50 m depth, the ratio of penetration decrease in both plots was about 7-8% per

year. The difference of penetration decrease between B and C plots was found to be about 15.8% level. Cotton yields at each subsoiled plots increased slightly comparing with control plots (A) where subsoiling was not applied. However, these increments were found to be statistically insignificant. It may be concluded that the subsoiling treatments does not affect the crop yield in intensive and fully irrigated field conditions.
Keywords: Subsoiling; Soil penetration; Cotton yield

Dehua Chen, Guoyou Ye, Changqin Yang, Yuan Chen, Yunkang Wu, Effect after introducing Bacillus thuringiensis gene on nitrogen metabolism in cotton, Field Crops Research, Volume 87, Issues 2-3, 10 May 2004, Pages 235-244, ISSN 0378-4290, DOI: 10.1016/j.fcr.2003.11.001.
(http://www.sciencedirect.com/science/article/B6T6M-4BDM39G-1/2/109dae2204c18b9a80e587df04f46e5e)
Abstract:
Bacillus thuringiensis (Bt) transgenic cotton has shown changes of vegetative and reproductive growth characteristics. The objective of this study was to investigate the physiological change of nitrogen metabolism that related closely to the growth in Bt cotton cultivars. The study was undertaken on two Bt transgenic cotton cultivars and their parents, one conventional (Xingyang822) and recurrent parent (Sumian No. 9), the other a hybrid (Kumian No. 1) and female parent (Yumian No. 1), during the 2001 and 2002 growing seasons at the Yangzhou University Farm, Yangzhou, China.
In the 2001 study, The results indicated that the Bt cotton cultivars were higher than their parents in leaf total nitrogen, free amino acid and soluble protein content, greater in NR and GPT activity, and lower in protease activity, during peak square and boll developing period. The biggest increase of total nitrogen was at peak boll period, which increased by 36.01 and 18.96% for Kumian No. 1 and Xingyang822, respectively. There were similar results for free amino acid and soluble protein content. The results showed further in 2002 study that NR activity increased dramatically at peak square and early boll open period, the biggest increase at early boll open period, with Kumian No. 1 and Xingyang822 being 87.5 and 61.4% higher than their parent, respectively, the biggest increase of GPT activity was at peak boll period, with Kumian No. 1 and Xingyang822 being 39.1 and 29.1% higher than their parent, respectively. However, protease activity of Bt cultivars reduced significantly before flowering and early boll open period, the biggest decrease was before flowering period, with Kumian No. 1 being more than 30%, Xingyang822 being 26.5% at peak square period. Moreover, the boll total nitrogen content reduced sharply.
The results suggest that the Bt cotton cultivars have higher intensity of leaf nitrogen metabolism than their parent, especially during square and boll development period. It is disadvantage for square development and earlier boll maturity under high nitrogen condition. The cultural practice should aim at reducing leaf nitrogen metabolic strength and keep the balance of vegetative and reproductive growth.
Keywords: Bt cotton; Nitrogen metabolism; Nitrate reductase; Glutamic-pyruvic transaminase; Protease

Sam C. Allen, Shibu Jose, P. K. R. Nair, Barry J. Brecke, Peter Nkedi-Kizza, Craig L. Ramsey, Safety-net role of tree roots: evidence from a pecan (Carya illinoensis K. Koch)-cotton (Gossypium hirsutum L.) alley cropping system in the southern United States, Forest Ecology and Management, Volume 192, Issues 2-3, 6 May 2004, Pages 395-407, ISSN 0378-1127, DOI: 10.1016/j.foreco.2004.02.009.
(http://www.sciencedirect.com/science/article/B6T6X-4C2FFVV-1/2/2cf805fd4429f60aad2e8bfb16d5c92d)
Abstract:
Excessive application of nitrogen (N) fertilizer in commercial agriculture and forestry can result in leaching of nitrate (NO_3-N) into surface and subsurface drainage water. Temperate alley cropping

is considered to be a potentially useful land use practice for mitigating this problem because deep roots of trees could serve as a 'safety net' for capturing the N that is leached below the root zone of crops. This hypothesis was tested in a pecan (Carya illinoensis K. Koch)-cotton (Gossypium hirsutum L.) alley cropping system in northwestern Florida from June 2001 to August 2002. A belowground polyethylene root barrier was used to isolate tree roots from cotton alleys in half the number of test plots in order to provide two treatments--barrier and non-barrier. Soil water nutrient concentrations were quantified 1-2 times monthly from lysimeter water samples collected from two depths (0.3 and 0.9 m) at specific distances (1.5, 4.2 and 8.4 m from tree) in alley rows. Using this data, nutrient leaching rates were calculated using water drainage estimates derived from the LEACHMN soil modeling program. Overall, ammonium concentrations in soil solution were found to be close to the minimum limit of detection, a result similar to other lysimetric studies. Nitrate concentrations varied by depth but not by treatment in both growing seasons, with 0.9 m levels being significantly lower than 0.3 m levels. However, N leaching rates were found to be lower in the non-barrier treatment compared to barrier treatment, and also lower at 0.9 m depths in both treatments compared to 0.3 m depths. Cumulative amounts of nitrate leached during the study period were 63.83 and 13.05 kg ha-1 for 0.3 and 0.9 m depths, respectively, in non-barrier treatment, compared to 121.94 and 45.56 kg ha-1 for respective depths in barrier treatment, representing a significant reduction in total NO3-N leached at both depths. Hence, it is likely that tree roots were able to capture N in the non-barrier treatment, resulting in lower rates of leaching below the root zone. Further, tree water uptake, in addition to cotton water uptake in the non-barrier treatment, may have decreased water drainage in comparison to the barrier treatment, thereby influencing leaching rates. It appears that tree roots play a significant role in alleviating groundwater nitrate leaching through their safety-net role in temperate alley cropping systems.
Keywords: Nitrate leaching; Safety-net hypothesis; Net retention index; Lysimeter

Ramana G. Colfer, Jay A. Rosenheim, Larry D. Godfrey, Cynthia L. Hsu, Evaluation of large-scale releases of western predatory mite for spider mite control in cotton, Biological Control, Volume 30, Issue 1, May 2004, Pages 1-10, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2003.09.007.
(http://www.sciencedirect.com/science/article/B6WBP-4B1SGKW-2/2/0c68bc9631e22d2fec5a7ed1f7bdc2a1)
Abstract:
We evaluated economically feasible release rates of the western predatory mite, Galendromus occidentalis, for spider mite control in organically and conventionally managed commercial cotton fields. An important feature of the experimental design was the evaluation of predatory mite releases at a large spatial scale; the majority of plots were near 2 ha. Predatory mite releases did not enhance the density of the western predatory mite, and populations of western predatory mites remained very low throughout the growing season. However, predatory mite releases did appear to reduce the seasonal abundance of spider mites. Nevertheless, spider mite densities exceeded economic thresholds in many of the release plots, and neither early releases (3-6 nodes per plant) or late releases (>7 nodes per plant) enhanced seed cotton yields. We discuss some potential factors that could have limited the impact of the released predatory mites.
Keywords: Galendromus occidentallis; Tetranychus urticae; T. pacificus; T. turkestani; Gossypium hirsutum; Large-scale augmentation; Spider mite biological control

Steven E. Naranjo, Peter C. Ellsworth, James R. Hagler, Conservation of natural enemies in cotton: role of insect growth regulators in management of Bemisia tabaci, Biological Control, Volume 30, Issue 1, May 2004, Pages 52-72, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2003.09.010.
(http://www.sciencedirect.com/science/article/B6WBP-4B1SGKW-3/2/740846868a555b5c9943a41cb7bd9f53)
Abstract:

Field studies were conducted from 1997 to 1999 to contrast the effects of two insect growth regulators (IGRs) and conventional insecticides on natural enemy conservation in cotton within the context of alternative management strategies for Bemisia tabaci (Gennadius). Compared with an untreated control, insecticide regimes based on the initial use of the IGR buprofezin or pyriproxyfen reduced densities of eight predator taxa out of 20 examined in at least one year, including common species such as Geocoris punctipes (Say), Nabis alternatus Parshley, Chrysoperla carnea s.l., and the empidid fly Drapetis nr. divergens. Patterns of predator and pest population change relative to IGR application dates suggest that factors other than direct toxic effects, such as reduction in prey availability, were likely involved. In comparison, the use of conventional insecticides reduced populations of nearly all the predatory taxa examined in most years, including those affected by IGRs, with the impact being greater and more immediate in all cases. Predator:prey ratios were significantly increased by the use of IGRs compared with both the untreated control and a conventional insecticide regime in most instances. The application of conventional insecticides for suppression of Lygus hesperus Knight, another key pest in the system, in a split-plot design reduced densities of most predator taxa and diminished the selective advantage of the IGRs. Rates of parasitism by aphelinid parasitoids (Eretmocerus eremicus Rose and Zolnerowich and Encarsia spp.) were generally low and did not vary consistently due to B. tabaci or L. hesperus insecticide regimes over the three years. Our 3-year study demonstrates the more selective action of buprofezin and pyriproxyfen in an effective integrated control system for B. tabaci. The use of these IGRs could further facilitate biologically based management in cotton production systems.
Keywords: Bemisia tabaci; Bemisia argentifolii; Arthropod predators; Aphelinid parasitoids; IPM; Selective insecticides; Conservation biological control; Principal response curves

M. P. Bange, S. A. Deutscher, D. Larsen, D. Linsley, S. Whiteside, A handheld decision support system to facilitate improved insect pest management in Australian cotton systems, Computers and Electronics in Agriculture, Volume 43, Issue 2, May 2004, Pages 131-147, ISSN 0168-1699, DOI: 10.1016/j.compag.2003.12.003.
(http://www.sciencedirect.com/science/article/B6T5M-4BWYDV3-1/2/3bef5d963243395d15d927bb885431d9)
Abstract:
Decision support systems (DSS) are widely accepted in the Australian cotton industry for assisting with integrated pest management (IPM), crop nutrition and other aspects of information transfer. EntomoLOGIC, part of the CottonLOGIC software suite, is one example. To operate EntomoLOGIC, users select sample areas in their cotton fields and collect information on the types of beneficial and `pest' insects present, their stage of development and quantity. The software is then used to predict future pest numbers, using weather data, and indicates when pest numbers are over defined economic thresholds. Cotton pest managers can then use this information to make their own decisions on when and how to control pests. For many years, users have requested an electronic device that can be taken into the field to streamline the data entry process, run models of pest development, generate in-field reports of pest status, access historical data for insects and crops, and most of all, save time. To address this, many of the pest management components of EntomoLOGIC were developed for handheld devices that run the Palm(R) operating system (Palm(R) OS). Previously, users had to write the information they collected in the field on paper cards, then copy it to their desktop computers. Associated software was developed to manage the transfer of data between the handheld device and the existing CottonLOGIC desktop software. It can support applications where multiple handheld devices are used to collect pest information. Its value to the users has been established by extensive field testing and independent evaluation. The system has helped with maintaining data integrity, consistency when there is more than one person collecting information, and time savings in collating information for

pest management decisions using an IPM approach. The system specifications, software development, delivery, and the application of the handheld system are described.
Keywords: Decision support systems; Cotton; Pest management; Handheld

S. A. Dadari, N. C. Kuchinda, Evaluation of some pre- and post-emergence weed control measures on rain-fed cotton (Gossypium hirsutum L) in Nigerian savannah, Crop Protection, Volume 23, Issue 5, May 2004, Pages 457-461, ISSN 0261-2194, DOI: 10.1016/j.cropro.2003.09.018.
(http://www.sciencedirect.com/science/article/B6T5T-4BWCBY3-1/2/ec35da703ad508ef54dc48088c3d7452)
Abstract:
The concept of season-long weed control has remained elusive in most cropping systems of the Nigerian savannah. Integration of pre-emergence herbicides with post-emergence weed control measures is likely to be the most viable option in this respect. Rainfed trials were conducted at Samaru, Nigeria in 1999, 2000 and 2001 seasons to evaluate the performance of some pre-emergence followed by post-emergence weed control treatments on cotton. Mechanical ridge moulding, hoe-weeding and fluazifop-butyl plus dimethametryne at 1.0 + 0.5 kg a.i./ha applied at 6 WAS reduced weed weight in two of the three trials. Fuazifop-butyl plus dimethametryne at 1.0 + 0.5 kg a.i./ha increased seed cotton yield in 1999 and 2000. Pre-emergence application of metolachlor plus fluometuron at 1.0 + 1.0 kg a.i./ha and mixtures of diuron with alachlor and metolachlor, each at 0.8 + 1.5 kg a.i./ha, reduced weed weight in two of the three trials; while weed cover score was depressed by all the treatments, except alachlor plus diuron at 1.5 + 0.8 kg a.i./ha and metolachlor plus terbutryne at 1.14 + 0.86 kg a.i./ha in 2000. Cotton stand count was depressed by alachlor plus diuron in 1999 and 2000. Metolachlor plus diuron at 1.5 + 0.8 kg a.i./ha, metolachlor plus fluometuron at 1.0 + 1.0 kg a.i./ha and metolachlor plus terbutryne at 1.14 + 0.86 kg a.i./ha increased plant height in two trials, while there was no consistent positive effect of any pre-emergence herbicide on bolls number and seed cotton yield. However, seed cotton yield was consistently higher (but not statistically higher) with metolachlor plus diuron, metolachlor plus fluometuron at 1.0 + 1.0 kg and metolachlor plus terbutryne at 1.14 + 0.86 kg a.i./ha than the weedy check.
Keywords: Rainfed; Cotton; Weed control; Ridge moulding

P. Wan, K. Wu, M. Huang, J. Wu, Seasonal pattern of infestation by pink bollworm Pectinophora gossypiella (Saunders) in field plots of Bt transgenic cotton in the Yangtze River valley of China, Crop Protection, Volume 23, Issue 5, May 2004, Pages 463-467, ISSN 0261-2194, DOI: 10.1016/j.cropro.2003.09.017.
(http://www.sciencedirect.com/science/article/B6T5T-4B2CKHD-1/2/0d3ff753161f33c26660cd2812529d41)
Abstract:
Two transgenic cotton lines (BG1560 and GK19) carrying a Cry1A gene from Bacillus thuringiensis subsp. kurstaki (Berliner), developed, respectively, by Monsanto Co. and Biotechnology Research Institute, Chinese Academy of Agricultural Sciences, were evaluated for resistance to pink bollworm Pectinophora gossypiella (Saunders) in field plots in Tianmen County of Hubei Province, located in the Yangtze River valley of China during 2001 and 2002. The results showed that there were no significant differences in egg density among the two Bt cotton lines and a conventional cotton line, but larval densities on both Bt lines were significantly lower than on the conventional line in both years. In comparison with the larval density on a conventional line without chemical control, the control efficacy in different growth stages of cotton in several treatments were 89-100% for BG1560, 73-100% for GK19, and 54-88% for chemically treated conventional cotton, where insecticides were sprayed 9 times in 2001 and 11 times in 2002 for control of pink bollworm.

We conclude that Bt cotton planting in the Yangtze River region possesses a high potential for control of pink bollworm.
Keywords: Bt transgenic cotton; Pink bollworm; Control efficiency; China

V. Angelova, R. Ivanova, V. Delibaltova, K. Ivanov, Bio-accumulation and distribution of heavy metals in fibre crops (flax, cotton and hemp), Industrial Crops and Products, Volume 19, Issue 3, May 2004, Pages 197-205, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2003.10.001.
(http://www.sciencedirect.com/science/article/B6T77-4B66CRN-2/2/994ce7036f369c34b883cb368e181acd)
Abstract:
Flax, hemp and cotton, grown in industrially polluted region, were included in the present research. The experimental plots were situated at different distances (0.5 and 15 km) from the source of pollution--the Non-Ferrous-Metal Works (MFMW) near Plovdiv. We investigated the level of pollution and the way heavy metals enter the fibre crops, by taking soil and plant samples. The contents of heavy metals in plant materials (roots, stems, leaves, seeds, flowers) were determined after the method of the dry mineralization. The quantitative measurements were carried out with inductively-coupled plasma (ICP).
A clearly distinguished species peculiarity exists in the accumulation of heavy metals in the vegetative and reproductive organs of flax, hemp and cotton. Flax is the crop that most strongly absorbs and accumulates heavy metals from the soil, followed by hemp and cotton. The distribution of the heavy metals along the plant axis of the studied crops seems to be selective, therefore their contents in flax and hemp are decreasing in the following order: roots>stems>leaves>seeds, while in cotton: leaves>seeds>roots>stems. A strongly exhibited tendency towards decrease of the contents of heavy metals in the fibre crops is observed as the distance from the NFMW increases.
Flax and hemp are cultures, suitable for growing in industrially polluted regions--they remove considerable quantities of heavy metals from the soil with their root system and can be used as potential crops for cleaning the soil from heavy metals.
Keywords: Bio-accumulation; Heavy metals; Fibre crops

Chauncey R. Benedict, Gail S. Martin, Jinggao Liu, Lorraine Puckhaber, Clint W. Magill, Terpenoid aldehyde formation and lysigenous gland storage sites in cotton: variant with mature glands but suppressed levels of terpenoid aldehydes, Phytochemistry, Volume 65, Issue 10, May 2004, Pages 1351-1359, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2004.03.032.
(http://www.sciencedirect.com/science/article/B6TH7-4CBV1S0-2/2/ee28399d39e2aa1088e0c511bfdd545e)
Abstract:
A new cotton variant with reduced levels of terpenoid aldehydes (sesquiterpenoids and sesterterpenoids (heliocides)) was isolated from the progeny of hemizygous cotton (Gossypium hirsutum cv. Coker 312) transformed with antisense (+)-[delta]-cadinene synthase cDNA. Southern analysis of leaf DNA digested with HindIII, Pst or KpnI restriction endonucleases did not detect any antisense cdn1-C1 DNA in the genome of the variant. The gossypol content in the seed of the variant was markedly lower than in the seed of T1 antisense plants. Eighty-nine percent of the variant seed had a 71.1% reduction in gossypol and the foliage of the variant plants showed a 70% reduction in gossypol and a 31% reduction in heliocides. Compared to non-transformed plants there was no reduction in the number of lysigenous glands in the seed of the variant. The cotton variant shows uncoupling of terpenoid aldehyde synthesis and gland formation. The cotton variant may have resulted from somaclonal variation occurring in the callus tissue during the transformation-regeneration process.
Keywords: Gossypium hirsutum; Malvaceae; Cotton variant; Low gossypol; Lysigenous glands

Deepak Saxena, C. Neal Stewart, Illimar Altosaar, Qingyao Shu, G. Stotzky, Larvicidal Cry proteins from Bacillus thuringiensis are released in root exudates of transgenic B. thuringiensis corn, potato, and rice but not of B. thuringiensis canola, cotton, and tobacco, Plant Physiology and Biochemistry, Volume 42, Issue 5, May 2004, Pages 383-387, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2004.03.004.
(http://www.sciencedirect.com/science/article/B6VRD-4C3S1NW-3/2/efffbc73b6d588a73d4a8ed5d7e1d9cd)
Abstract:
Larvicidal proteins encoded by cry genes from Bacillus thuringiensis were released in root exudates from transgenic B. thuringiensis corn, rice, and potato but not from B. thuringiensis canola, cotton, and tobacco. Nonsterile soil and sterile hydroponic solution in which B. thuringiensis corn, rice, or potato had been grown were immunologically positive for the presence of the Cry proteins; from B. thuringiensis corn and rice, the soil and solution were toxic to the larva of the tobacco hornworm (Manduca sexta), and from potato, to the larva of the Colorado potato beetle (Leptinotarsa decemlineata), representative lepidoptera and coleoptera, respectively. No toxin was detected immunologically or by larvicidal assay in soil or hydroponic solution in which B. thuringiensis canola, cotton, or tobacco, as well as all near-isogenic non-B. thuringiensis plant counterparts or no plants, had been grown. All plant species had the cauliflower mosaic virus (CaMV) 35S promoter, except rice, which had the ubiquitin promoter from maize. The reasons for the differences between species in the exudation from roots of the toxins are not known. The released toxins persisted in soil as the result of their binding on surface-active particles (e.g. clay minerals, humic substances), which reduced their biodegradation. The release of the toxins in root exudates could enhance the control of target insect pests, constitute a hazard to nontarget organisms, and/or increase the selection of toxin-resistant target insects.
Keywords: Bacillus thuringiensis; Hydroponics; Insecticidal proteins; Root exudates; Soil; Surface-active particles (e.g. clay minerals, humic substances); Transgenic Bt plants

Peter W. Perschbacher, Gerald M. Ludwig, Effects of diuron and other aerially applied cotton herbicides and defoliants on the plankton communities of aquaculture ponds, Aquaculture, Volume 233, Issues 1-4, 26 April 2004, Pages 197-203, ISSN 0044-8486, DOI: 10.1016/j.aquaculture.2003.09.029.
(http://www.sciencedirect.com/science/article/B6T4D-4B0NY9M-3/2/ed7b49fd34d7473172642a907e2f15b6)
Abstract:
Seven aerially applied cotton herbicides and defoliants were tested for possible adverse impacts on pond phytoplankton and zooplankton and critical water quality variables. Treatments simulated direct spraying of ponds and high and low amounts of drift judged able to reach the pond, 1/10 and 1/100 direct rates, respectively. The study was conducted in twelve 500-l outdoor pool mesocosms filled with pond water from an adjacent goldfish Carassius auratus culture pond. Plankton and water quality samples were taken just prior to application and at 24 and 48 h after application. Sampling for chemicals showing effects were continued approximately weekly until oxygen levels in drift treatments returned to no significant difference from control. Chemicals tested and direct rates (kg active ingredient ha-1) were diuron as herbicide (1.4), paraquat (0.83), quizalofop (0.05), dimethipin (0.15), diuron as defoliant (0.1675), ethephon (0.176), tribufos (0.99) and sodium chlorate (5.28). Except for the diuron compounds, the cotton herbicides and defoliants produced no measurable impacts on pond plankton or associated water quality. Following application on March 5 of diuron, used as an herbicide, chlorophyll a levels and photosynthesis were significantly depressed in relation to diuron concentration. Recovery occurred slowly, and at the high drift dosage by week 3 morning oxygen levels returned to near control levels, although chlorophyll a levels were 1/3 the control. However, the off-flavor cyanobacterium, Anabaena laevendri, was essentially eliminated by week 3; and pH and thus un-ionized ammonia were much lower in high

drift treatments. Copepod adult and nauplii zooplankton levels were depressed at week 2. However, rotifer numbers increased in the low drift treatment in weeks 3 and 4 and those of copepod nauplii in week 3. Fall application of diuron, as a defoliant at 1/10 the spring rate, produced similar effects when compared by concentration. The main adverse impact of diuron drift is on dissolved oxygen levels and can be anticipated by provision of adequate aeration capacity.
Keywords: Diuron; Cotton herbicides/defoliants; Water quality

Rajinder Singh, Simulations on direct and cyclic use of saline waters for sustaining cotton-wheat in a semi-arid area of north-west India, Agricultural Water Management, Volume 66, Issue 2, 15 April 2004, Pages 153-162, ISSN 0378-3774, DOI: 10.1016/j.agwat.2003.10.007.
(http://www.sciencedirect.com/science/article/B6T3X-4BM8G05-1/2/d8d20b7e197851167d96540a0a33499b)
Abstract:
A validated agro-hydrological model soil water atmosphere plant (SWAP) was applied to formulate guidelines for irrigation planning in cotton-wheat crop rotation using saline ground water as such and in alternation with canal water for sustainable crop production. Six ground water qualities (4, 6, 8, 10, 12 and 14 dS/m), four irrigation schedules with different irrigation depths (4, 6, 8 and 10 cm) and two soil types (sandy loam and loamy sand) were considered for each simulation. The impact of the each irrigation scenario on crop performance, and salinization/desalinisation processes occurring in the soil profile (0-2 m) was evaluated through Water Management Response Indicators (WMRIs). The criterion adopted for sustainable crop production was a minimum of pre-specified values of ETrel (>=0.75 and >=0.65 for wheat and cotton, respectively) at the end of the 5th year of simulation corresponding to minimum deep percolation loss of applied water. The extended simulation study revealed that it was possible to use the saline water upto 14 dS/m alternatively with canal water for cotton-wheat rotation in both sandy loam and loamy sand soils. In all situations pre-sown irrigation must be accomplished with canal water (0.3-0.4 dS/m). Also when the quality of ground water deteriorates beyond 10 dS/m, it was suggested to use groundwater for post-sown irrigations alternately with canal water. Generally, percolation losses increased with the increase in level of salinity of ground water to account for leaching and thus maintain a favourable salt balance in the root zone to achieve pre-specified values of ETrel.
Keywords: Sustainability; Irrigation scheduling; Percolation index; Salinity hazard index; Relative evapotranspiration

M. P. Bange, S. P. Milroy, Growth and dry matter partitioning of diverse cotton genotypes, Field Crops Research, Volume 87, Issue 1, 15 April 2004, Pages 73-87, ISSN 0378-4290, DOI: 10.1016/j.fcr.2003.09.007.
(http://www.sciencedirect.com/science/article/B6T6M-4B22Y3S-2/2/5430123a27462e1b4e8d9d61ef073c01)
Abstract:
As cotton is an indeterminate species, the timing of crop maturity is largely determined by the capacity of the plant to continue the production of new fruiting sites. According to the nutritional hypothesis, the cessation of fruit production (`cutout') occurs when the demand on the resource supply by growing fruit increases to a point where no resource remains for the initiation and support of new fruiting sites. Thus dry matter production could impinge both on the timing of crop maturity and yield. The aim of this work was to determine the extent to which cotton genotypes of diverse genetic background varied in their growth determinants and dry matter partitioning and how this related to crop maturity.
Two field experiments were conducted, each involving two sowing times to provide variation in effective season length and growing conditions. Growth analysis showed little difference in growth characteristics of eight genotypes that would affect timing of crop maturity. Allometric plots showed that partitioning to the fruit began earlier in early genotypes but there was little systematic

difference in the rate of partitioning after the onset of reproductive growth. The timing of crop maturity (60% bolls open) was related to the time when the growth rate of the fruit per unit area was equal to the crop growth rate (CGR). Taken together, the results imply that the key trait driving maturity was the timing of the onset of reproductive growth and the subsequent development of the demand for dry matter.
Keywords: Gossypium hirsutum; Development; Radiation use efficiency (RUE); Light interception; Canopy extinction coefficient

M. R. Attique, Z. Ahmad, A. I. Mohyuddin, M. M. Ahmad, Oviposition site preference of Pectinophora gossypiella (Lepidoptera: gelechiidae) on cotton and its effects on boll development, Crop Protection, Volume 23, Issue 4, April 2004, Pages 287-292, ISSN 0261-2194, DOI: 10.1016/j.cropro.2003.08.013.
(http://www.sciencedirect.com/science/article/B6T5T-4BNVW42-1/2/d8e401438c0a7ee5af66113a18a5e327)
Abstract:
Pectinophora gossypiella (Saunders) eggs were distributed over all parts of cotton plants with usually one per site. During early season (July-August) females preferred to oviposit on CIM-70, CIM-109 and NIAB-78 which flowered earlier than the late maturing varieties, Alseemi-515 and CIM-135. On medium maturing varieties, 77% more eggs were laid in September and 14% in October. On late maturing varieties, 85% and 46% more eggs were laid during the corresponding period compared with CIM-70.
Most oviposition on flower buds was during August (72.5%) and on bolls during September (70.6%) and October (85%), when few eggs were laid on vegetative parts.
Females from diapause larvae lived on average 7.3 days with lower fecundity (75 eggs/female) compared with the non-diapause generation (9.0 days; 125 eggs/female). Females preferred half grown flower buds (7-10 days old) for oviposition, laying 82-94% of the total eggs compared with 7-11% on large flower buds.
More bolls from rosette and healthy flowers during August were shed compared with September and October with significant differences between months. Shedding was minimum in CIM-70 and Alseemi-515 but the differences were non-significant. However, differences between these two varieties and NIAB-78, CIM-109 and CIM-135 were significant. Shedding of bolls was between 2nd and 12th day of boll formation, the maximum being from 4th to 6th day. More than 64% of bolls that developed from rosette flowers were shed, whereas, 8-10% were shrivelled on one side and the rest were normal. Bolls that developed from rosette flowers had fewer seeds and less lint than those which developed from healthy flowers.
Keywords: Pectinophora gossypiella; Oviposition; Flower bud age preference; Rosette flowers; Development of bolls; Pakistan

Fei Li, Zhaojun Han, Mutations in acetylcholinesterase associated with insecticide resistance in the cotton aphid, Aphis gossypii Glover, Insect Biochemistry and Molecular Biology, Volume 34, Issue 4, April 2004, Pages 397-405, ISSN 0965-1748, DOI: 10.1016/j.ibmb.2004.02.001.
(http://www.sciencedirect.com/science/article/B6T79-4BSWHN7-1/2/12b4a2722154da993ecb96ed330df2e9)
Abstract:
Two acetylcholinesterase genes, Ace1 and Ace2, have been fully cloned and sequenced from both organophosphate-resistant and susceptible clones of cotton aphid. Comparison of both nucleic acid and deduced amino acid sequences revealed considerable nucleotide polymorphisms. Further study found that two mutations occurred consistently in all resistant aphids. The mutation F139L in Ace2 corresponding to F115S in Drosophila acetylcholinesterase might reduce the enzyme sensitivity and result in insecticide resistance. The other mutation A302S in Ace1 abutting the conserved catalytic triad might affect the activity and insecticide sensitivity of

the enzyme. Phylogenetic analysis showed that insect acetylcholinesterases fall into two subgroups, of which Ace1 is the paralogous gene whereas Ace2 is the orthologous gene of Drosophila AChE. Both subgroups contain resistance-associated AChE genes. To avoid confusion in the future work, a nomenclature of insect AChE is also suggested in the paper.
Keywords: Aphis gossypii Glover; Acetylcholinesterase; Single nucleotide polymorphism; Insecticide resistance

Ruixiu Sui, J. Alex Thomasson, Robert Mehrle, Matt Dale, Calvin Perry, Glen Rains, Mississippi cotton yield monitor: beta test for commercialization, Computers and Electronics in Agriculture, Volume 42, Issue 3, March 2004, Pages 149-160, ISSN 0168-1699, DOI: 10.1016/j.compag.2003.08.004.
(http://www.sciencedirect.com/science/article/B6T5M-49W6RJ9-1/2/b69a29e0e769ccf014802ff7c4266a1f)
Abstract:
Based on a novel cotton-flow sensor, the Mississippi Cotton Yield Monitor has been under development at Mississippi State University since 1999, when one prototype of the yield monitor was field tested in Mississippi. Three prototypes were constructed and field tested in Texas, Georgia, and Mississippi in 2000. Five prototypes of an improved version were fabricated and field tested in 2001. All three years' testing results were promising. In 2001, Mississippi State University and Agricultural Information Management, LLC, signed a licensing option agreement to prepare for the eventual manufacture and marketing of the Mississippi cotton yield monitor. Research towards commercialization of the Mississippi cotton yield monitor was conducted in 2002. In this beta test, 10 prototypes of the Mississippi cotton yield monitor were built and extensively tested on commercial and research farms during the 2002 cotton harvesting season. Harvesting was conducted with both cotton pickers and strippers. The yield monitor system's accuracy was evaluated on a load-by-load weight basis. Reliability was tested under commercial harvesting conditions. All systems performed well during the tests. Each one was easy to install, maintain, and operate. No hardware problems occurred. The system's average absolute error was 3.8%. Cotton yield maps created with the data collected by the monitors realistically exhibited yield variations within the fields. Evaluator's suggestions, mainly related to software performance, are to be addressed in the commercial version of the Mississippi Cotton Yield Monitor.
Keywords: Yield monitor; Mass-flow sensor; Precision agriculture; Cotton

M. K. Dhillon, P. D. Sharma, Studies on biology and behavior of Earias vittella (Lepidoptera: Noctuidae) for mechanisms of resistance in different cotton genotypes, Crop Protection, Volume 23, Issue 3, March 2004, Pages 235-241, ISSN 0261-2194, DOI: 10.1016/j.cropro.2003.08.012.
(http://www.sciencedirect.com/science/article/B6T5T-49W1W01-1/2/ff3b10d5c44111c59a4a235abaa58b29)
Abstract:
Spotted bollworm, Earias vittella (Fab.), is one of the most important insect pests of cotton, and host plant resistance is an important component for the management of this pest. The antixenosis and antibiosis components of resistance to this pest in five Gossypium hirsutum (HS 6, HHH 81, PCHH 31, Somnath, SS 9) and one Gossypium arboreum (HD 107) genotypes were undertaken at 28+/-2[degree sign]C and 70+/-5% relative humidity under laboratory conditions. The larval period ranged from 8.2 to 9.2 days on buds and 9.2-12.2 days on bolls of different cotton genotypes. The mean larval period irrespective of food was significantly shorter in G. arboreum as compared to G. hirsutum cultivars. Pre-oviposition period (2.42 days) was longer on G. arboreum genotype than on G. hirsutum genotypes (1.44-2.00 days), while the reverse was true for oviposition and post-oviposition periods. Larval survival, pupation, adult emergence, fecundity, incubation period, and egg hatchability were significantly lower on G. arboreum than on G. hirsutum. The first- and third-instar larvae of spotted bollworm preferred buds than bolls in both, G. arboreum and G. hirsutum

genotypes. Multi-choice assays on larval preference for buds and bolls among different genotypes revealed that the preference for buds of G. arboreum was significantly higher by the first-instar and lower by the third-instar larvae than the G. hirsutum variety and hybrids. G. hirsutum cultivars were more preferred than the G. arboreum variety, and among the plant parts the lower leaf surface, buds and bolls were preferred over the other plant parts for egg laying by the female. The interactions between E. vittella larvae and cotton genotypes are quite diverse, and there is a distinct possibility for increasing the levels and diversifying the basis of resistance to this pest by intensive breeding program.
Keywords: Spotted bollworm; Earias vittella; Antixenosis; Antibiosis; Resistance mechanisms; Cotton; Gossypium

Khalid P. Akhtar, M. Hussain, Azeem I. Khan, M. Ahsanul Haq, M. Mohsin Iqbal, Influence of plant age, whitefly population and cultivar resistance on infection of cotton plants by cotton leaf curl virus (CLCuV) in Pakistan, Field Crops Research, Volume 86, Issue 1, 20 February 2004, Pages 15-21, ISSN 0378-4290, DOI: 10.1016/S0378-4290(03)00166-7.
(http://www.sciencedirect.com/science/article/B6T6M-4BFPF49-1/2/7b31f0886e6642544c3a1a458ed9185f)
Abstract:
The effect of plant age, the whitefly Bemisia tabaci population levels, and cultivar resistance to cotton leaf curl virus disease was determined for 10 newly developed mutant lines (via radiation) and one resistant and two susceptible/tolerant control varieties, under natural inoculation by the vector whiteflies. All cotton mutant lines/varieties become increasingly resistant to CLCuV as plants aged. Expression of the age-related resistance to CLCuV infection was more apparent in late growth stages. Maximum increase in % disease incidence occurred at 6 weeks. There was no significant correlation of whitefly levels with % disease incidence and only small differences in whitefly population levels for all mutant lines/varieties. None of the test lines/varieties under field or graft inoculation conditions were immune. All mutant lines including negative and positive controls were symptomatic but differed in their response to CLCuV. Six mutant lines, namely NIAB-103, NIAB-101, NIAB-998, NIAB-358, NIAB-98 and the negative control CIM-443 showed highly resistance responses while NIAB-78 and S-12 were highly susceptible. Similar results for disease reaction were obtained when test mutant lines were graft inoculated under net-house conditions (insect free conditions) except for CIM-443, which was resistant. Present results suggested that there is evidence that source of resistance against CLCuV is available in several of the tested mutant lines. These lines may be released as CLCuV resistant varieties or their resistance could be incorporated into other commercial cultivars to manage leaf curl disease. The current study furthered our knowledge about the epidemiology of CLCuV for improved forecasting to manage the disease and identified useful resistant materials.
Keywords: Cotton; CLCuV infection; Cultivar resistance; Graft inoculation; Gossypium hirsutum L.; Plant age; Whitefly levels

Hafeez ur Rahman, Saeed A. Malik, M. Saleem, Heat tolerance of upland cotton during the fruiting stage evaluated using cellular membrane thermostability, Field Crops Research, Volume 85, Issues 2-3, 10 February 2004, Pages 149-158, ISSN 0378-4290, DOI: 10.1016/S0378-4290(03)00159-X.
(http://www.sciencedirect.com/science/article/B6T6M-49FR88K-4/2/b4ec5274dfd14ad2e957a59395fd2457)
Abstract:
Excessively high temperature during the reproductive stage significantly reduces yield in cotton. The cellular membrane thermostability (CMT) assay indirectly measures integrity of cellular membranes through quantifying electrolyte leakage following heat treatment. Higher CMT has been related to heat tolerance and higher yields in several crop species, but its utility and

relationship with seed cotton yield (SCY) is not well established. Experiments were carried out in the greenhouse and in the field under optimum and high temperature regimes, to assess the response of upland cotton to CMT. Upland cotton cultivars as well as hybrids differed significantly ($P<0.01$) for CMT. Although the temperature regimes modified the relative ranking of the cultivars and hybrids, heat-tolerant and susceptible groups remained quite stable. Cultivars FH-900, MNH-552, CRIS-19, and Karishma emerged as relatively heat-tolerant (thermostable) and FH-634, CIM-448, HR109-RT and CIM-443 as heat-susceptible. Exposure to high temperature prior to the CMT test produced better distinction between heat-tolerant and heat-susceptible cultivars and hybrids. The relationship between CMT and SCY was stronger among cultivars than among hybrids. The regression analysis indicated higher SCY due to higher CMT in the presence of heat stress. CMT was positively related to SCY under supra-optimum greenhouse conditions as well as early and late field regimes. Under optimum (non-stressed) greenhouse conditions, however, CMT was negatively related to SCY, indicating that susceptible cultivars and hybrids produced higher yields in the absence of heat stress. This also implied that in upland cotton these two traits were independent of each other, the presence or absence of heat stress determined their relationship. The differential ability of cotton cultivars and hybrids to adjust to CMT under heat-stressed conditions points towards physiological adaptation to heat stress or heat hardening in upland cotton. It was concluded that CMT could be a useful technique for differentiating heat-tolerant and susceptible cottons, however, its indirect selection on the basis of SCY under non-heat-stressed environments must be implemented with caution.
Keywords: Cellular membrane thermostability; Upland cotton; Gossypium hirsutum L.; Heat tolerance; Yield

N. R. Hulugalle, D. B. Nehl, T. B. Weaver, Soil properties, and cotton growth, yield and fibre quality in three cotton-based cropping systems, Soil and Tillage Research, Volume 75, Issue 2, February 2004, Pages 131-141, ISSN 0167-1987, DOI: 10.1016/j.still.2003.07.003.
(http://www.sciencedirect.com/science/article/B6TC6-49WMXMB-7/2/cafa00510dda8200d4d5221c5abd8319)
Abstract:
The effects of three cotton-based cropping systems on soil properties, black root rot severity, and growth of cotton in a Vertisol were evaluated after a series of floods in eastern Australia. The experimental treatments, which had been imposed since 1985, were conventionally and minimum-tilled continuous cotton, and minimum-tilled cotton-wheat rotation. Frequent rainfall and flooding during the winter of 1998 resulted in near saturated soil at spring sowing in October. Although conventional tillage operations were completed before flooding, minimum tillage operations were not possible due to excessive moisture and cotton was sown onto the old beds with no-tillage. Soil specific volume (electrical conductivity of a 1:5 soil:water suspension) EC1:5, exchangeable Na content, pH and organic C were determined for the top 0.6 m of the profile in summer 1998 and again in 1999. Organic C in the surface 0.10 m was also evaluated during 1998-2000. Black root rot severity and mycorrhizal fungal colonisation were evaluated at 6 weeks after sowing. Tissue nutrient concentrations were measured in mature cotton plants. Cotton lint yield and fibre quality were evaluated after picking and ginning.
In comparison with either minimum- or conventionally tilled continuous cotton, minimum-tilled cotton-wheat rotation had the lowest exchangeable Na content and severity of bacterial black root rot, best surface structure and the highest crop growth, nutrient uptake and lint yields. Subsoil structure was the best with conventionally tilled continuous cotton. The 1998 floods appear to have decreased exchangeable Na and increased soil pH in all treatments. Surface organic C also decreased between 1998 and 2000. Soil structural damage was minimised by avoiding tillage and trafficking in wet conditions. Compared with 1998, average yield decreases in 1999 were of the order of 43%. Cotton lint fibre quality was also poorer in 1999.
Keywords: Vertisol; Soil quality; Black root rot; Cotton; Rotation; Flooding; Fibre quality; Irrigation

Duli Zhao, K. Raja Reddy, V. Gopal Kakani, Abdul R. Mohammed, John J. Read, W.e.i. Gao, Leaf and canopy photosynthetic characteristics of cotton (Gossypium hirsutum) under elevated CO2 concentration and UV-B radiation, Journal of Plant Physiology, Volume 161, Issue 5, 2004, Pages 581-590, ISSN 0176-1617, DOI: 10.1078/0176-1617-01229.
(http://www.sciencedirect.com/science/article/B7GJ7-4DPXGWB-MS/2/f81a34f5ef841bc76e82be53f047880a)
Abstract: Summary
Increases in both atmospheric CO2 concentration ([CO2]) and ultraviolet-B (UV-B) radiation on the Earth's surface are features of current climate change patterns. An experiment was conducted in sunlit, controlled environment chambers known as Soil-Plant-Atmosphere-Research (SPAR) units to determine interactive effects of elevated [CO2] and UV-B radiation on leaf and canopy photosynthetic characteristics of cotton. Six treatments were comprised of two CO2 levels of 360 (ambient) and 720 (elevated) [mu]L L-1 and three levels of 0 (control), 8, and 16 kJ m-2 d-1 biologically effective UV-B radiation. Treatments were imposed for 66 days from crop emergence through three weeks after the first flower stage. Plants grown in elevated [CO2] had significantly greater leaf area, higher leaf and canopy net photosynthetic rates (PN), lower dark respiration rate (Rd), and lower light compensation point (LCP) than plants grown in ambient [CO2]. There was no difference in CO2 compensation point ([Gamma]), maximum rate of Rubisco activity (Vcmax), or light-saturated rate of electron transport (Jmax) between ambient and elevated CO2 treatments. When plants were grown in 8 kJ m-2 d-1 UV-B radiation, most of the measured photosynthetic parameters did not differ from control plants. High UV-B (16 kJ) radiation, however, caused 47-50 % smaller leaf area, 38-44 % lower leaf PN, 72-74 % lower Vcmax, and 61-66 % lower Jmax compared to the control. There were no interactive effects of [CO2] and UV-B radiation on most of the photosynthetic parameters measured. From the results, it is concluded that decreased canopy photosynthesis due to enhanced UV-B radiation in cotton is associated with both smaller leaf area and lower leaf PN, and loss of Rubisco activity and electron transport are two major factors in UV-B inhibition of leaf PN.
Keywords: chlorophyll; electron transport; elevated [CO2]; leaf area; nonstructural carbohydrates; photosynthetic rate; rubisco activity; UV-B radiation

A.A.C. Sinzogan, A. Van Huis, D.K. Kossou, J. Jiggins, S. Vodouhe, Farmers' knowledge and perception of cotton pests and pest control practices in Benin: results of a diagnostic study, NJAS - Wageningen Journal of Life Sciences, Volume 52, Issues 3-4, 2004, Pages 285-303, ISSN 1573-5214, DOI: 10.1016/S1573-5214(04)80018-6.
(http://www.sciencedirect.com/science/article/B94T2-4WFBS5G-4/2/955d1ae7cd9889f89a2774d162bda38d)
Abstract:
Cotton production constraints in Benin as perceived by farmers were studied from May to July 2003. The knowledge, perceptions and practices of farmers growing cotton under different pest management regimes were analysed. The methods used were open and semi-structured interviews with groups and individuals, as well as participatory exercises (brainstorming, prioritization, and problem analysis). Pest damage, low price of produce, late payment for seed cotton, and increasing input costs were the main production constraints perceived by producers. Regardless of the pest management system practised, most of the farmers adapt the recommendations of the research institute and nongovernment organizations to their livelihood systems. In general, farmers had a poor understanding of the key concepts underlying alternative pest control systems. Pest damage was considered important and farmers were eager to share their knowledge, perceptions and practices in pest management. The study provides the foundation for the creation of a learning platform; actors will be invited to collaborate in participatory experimental agricultural technology development linked to the farmers' needs. In

order to develop sustainable pest management strategies further interactive research is proposed, involving all stakeholders.
Keywords: integrated pest management; farmers' knowledge; interactive research

Octavio L. Franco, Simoni C. Dias, Claudio P. Magalhaes, Ana C. S. Monteiro, Carlos Bloch Jr, Francislete R. Melo, Osmundo B. Oliveira-Neto, Rose G. Monnerat, Maria Fatima Grossi-de-Sa, Effects of soybean Kunitz trypsin inhibitor on the cotton boll weevil (A nthonomus grandis), Phytochemistry, Volume 65, Issue 1, January 2004, Pages 81-89, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2003.09.010.
(http://www.sciencedirect.com/science/article/B6TH7-4B0X33N-1/2/ec2491826502003cb8044749e704dfe9)
Abstract:
The cotton boll weevil, Anthonomus grandis, is an economically important pest of cotton in tropical and subtropical areas of several countries in the Americas, causing severe losses due to their damage in cotton floral buds. Enzymatic assays using gut extracts from larval and adult boll weevil have demonstrated the presence of digestive serine proteinase-like activities. Furthermore, in vitro assays showed that soybean Kunitz trypsin inhibitor (SKTI) was able to inhibit these enzymes. Previously, in vivo effects of black-eyed pea trypsin chymotrypsin inhibitor (BTCI) have been demonstrated towards the boll weevil pest. Here, when neonate larvae were reared on an artificial diet containing SKTI at three different concentrations, a reduction of larval weight of up to 64% was observed for highest SKTI concentration 500 [mu]M. The presence of SKTI caused an increase in mortality and severe deformities of larvae, pupae and adult insects. This work therefore represents the first observation of a Kunitz trypsin inhibitor active in vivo and in vitro against A. grandis. Bioassays suggested that SKTI could be used as a tool in engineering crop plants, which might exhibit increased resistance against cotton boll weevil.
Keywords: Cotton; Anthonomus grandis; Kunitz trypsin inhibitor; Serine proteinases; Soybean

Sakine Ozpinar, Alim Isik, Effects of tillage, ridging and row spacing on seedling emergence and yield of cotton, Soil and Tillage Research, Volume 75, Issue 1, January 2004, Pages 19-26, ISSN 0167-1987, DOI: 10.1016/j.still.2003.07.004.
(http://www.sciencedirect.com/science/article/B6TC6-4B4HC10-1/2/09b174c5f5321bed4f09675639786785)
Abstract:
Field experiments were conducted at Harran Plain on a clay silt soil (Xerosol in FAO/UNESCO soil classification) in Southeast of Turkey in 1996 and 1997 to study the effects of cotton planting system, tillage method, and row spacing on the performances of cotton (Gossypium hirsutum L.), such as seedling emergence and yield. The tillage methods evaluated were: traditional (inversion) with a mouldboard plough (M) and conservation (non-inversion) with chisel tine (C). The seedbeds studied were: normal planting system (NS) with no-ridging, and ridge planting system (RS). Results showed that mouldboard plough had slightly greater yield than chisel in each year but the difference was not significance in 1997. Non-ridging had the second best emergence rate and yield according to 2 years mean. Ridging with chisel in 70 cm row spacing produced the highest seedling emergence for both years, but the difference was not significance in 1997. The yields obtained for ridging with mouldboard plough from 70 cm row spacing in 1996, and for ridging with mouldboard plough from 76 cm in 1997 were superior to the other applications. Finally 70 cm row spacing produced the highest seedling emergence and yield in both years regardless of the treatment. Row spacing of 90 cm resulted in the lowest seedling emergence and yield in both years regardless of the treatment. The results indicate that ridging can be used instead of non-ridging with 76 cm row spacing (suitable for mechanical harvesting) which gave similar yield to the ridging with 70 cm row spacing in 1997, and both of the planting systems with 76 cm seem to be suitable to mechanical harvesting.

Keywords: Cotton yield; Ridging; Row spacing; Seedling emergence; Tillage