No.	Records	Request
1	54137	FOOD
2	10629	CROPS
3	499	FOOD CROPS
4	46729	PY=2003-2004
* 5	124	#3 and (PY=2003-2004)

Record 1 of 124 - AGRICOLA 1998-2004/09

AU: Hamilton,-D.; Ambrus,-A.; Dieterle,-R.; Felsot,-A.; Harris,-C.; Petersen,-B.; Racke,-K.; Wong,-S.S.; Gonzalez,-R.; Tanaka,-K.

TI: Pesticide residues in food--acute dietary exposure.

SO: Pest management science. 2004 Apr., v. 60, issue 4 p. 311-339.

AB: Consumer risk assessment is a crucial step in the regulatory approval of pesticide use on food crops. Recently, an additional hurdle has been added to the formal consumer risk assessment process with the introduction of short-term intake or exposure assessment and a comparable short-term toxicity reference, the acute reference dose. Exposure to residues during one meal or over one day is important for short-term or acute intake. Exposure in the short term can be substantially higher than average because the consumption of a food on a single occasion can be very large compared with typical long-term or mean consumption and the food may have a much larger residue than average. Furthermore, the residue level in a single unit of a fruit or vegetable may be higher by a factor (defined as the variability factor, which we have shown to be typically x3 for the 97.5th percentile unit) than the average residue in the lot. Available marketplace data and supervised residue trial data are examined in an investigation of the variability of residues in units of fruit and vegetables. A method is described for estimating the 97.5th percentile value from sets of unit residue data. Variability appears to be generally independent of the pesticide, the crop, crop unit size and the residue level. The deposition of pesticide on the individual unit during application is probably the most significant factor. The diets used in the calculations ideally come from individual and household surveys with enough consumers of each specific food to determine large portion sizes. The diets should distinguish the different forms of a food consumed, eg canned, frozen or fresh, because the residue levels associated with the different forms may be quite different. Dietary intakes may be calculated by a deterministic method or a probabilistic method. In the deterministic method the intake is estimated with the assumptions of large portion consumption of a high residue food (high residue in the sense that the pesticide was used at the highest recommended label rate, the crop was harvested at the smallest interval after treatment and the residue in the edible portion was the highest found in any of the supervised trials in line with these use conditions). The deterministic calculation also includes a variability factor for those foods consumed as units (eg apples, carrots) to allow for the elevated residue in some single units which may not be seen in composited samples. In the probabilistic method the distribution of dietary consumption and the distribution of possible residues are combined in repeated probabilistic calculations to yield a distribution of possible residue intakes. Additional information such as percentage commodity treated and combination of residues from multiple

commodities may be incorporated into probabilistic calculations. The IUPAC Advisory Committee on Crop Protection Chemistry has made 11 recommendations relating to acute dietary exposure.

Record 2 of 124 - AGRICOLA 1998-2004/09

AU: Adin,-A.; Weber,-J.C.; Sotelo-Montes,-C.; Vidaurre,-H.; Vosman,-B.; Smulders,-M.J.M.

TI: Genetic differentiation and trade among populations of peach palm (Bactris gasipaes Kunth) in the Peruvian Amazon--implications for genetic resource management.

SO: Theoretical and applied genetics. 2004 May, v. 108, no. 8 p. 1564-1573.

AB: Peach palm (Bactris gasipaes Kunth) is cultivated for fruit and 'heart of palm', and is an important component of agroforestry systems in the Peruvian Amazon. In this study, AFLP was used to compare genetic diversity among domesticated populations along the Paranapura and Cuiparillo rivers, which are managed by indigenous and colonist farming communities, respectively. Gene diversity was 0.2629 for the populations in indigenous communities and 0.2534 in colonist communities. Genetic differentiation among populations (Gst) was 0.0377-0.0416 ($P<0.01$) among populations along both rivers. There was no relation between genetic differentiation and the geographical location of populations along the rivers. Since natural seed dispersal by birds and rodents is thought to occur only across relatively short distances (100-200 m), it is likely that exchange of material by farmers and commercial traders is responsible for most of the 'long-distance' (over more than 20 km) gene flow among populations along the two rivers studied. This exchange of material may be important to counteract the effects of selection as well as genetic drift in small groups of trees in farmers fields, much as in a metapopulation, and may account for the weak genetic differentiation between the two rivers ($Gst=0.0249$, $P<0.01$). A comparison with samples from other landraces in Peru and Brazil showed the existence of an isolation-by-distance structure up to 3,000 km, consistent with gene flow on a regional scale, likely mediated by trade in the Amazon Basin. Results are discussed with regard to practical implications for the management of genetic resources with farming communities.

Record 3 of 124 - AGRICOLA 1998-2004/09

AU: Awika,-J.M.; Rooney,-L.W.

TI: Sorghum phytochemicals and their potential impact on human health.

SO: Phytochemistry. 2004 May, v. 65, no. 9 p. 1199-1221.

AB: Sorghum is a rich source of various phytochemicals including tannins, phenolic acids, anthocyanins, phytosterols and policosanols. These phytochemicals have potential to significantly impact human health. Sorghum fractions possess high antioxidant activity in vitro relative to other cereals or fruits. These fractions may offer similar health benefits commonly associated with fruits. Available epidemiological evidence suggests that sorghum consumption reduces the risk of certain types of cancer in humans compared to other cereals. The high concentration of phytochemicals in sorghum may be partly responsible. Sorghums containing tannins are widely reported to reduce caloric availability and hence weight gain in animals.

This property is potentially useful in helping reduce obesity in humans. Sorghum phytochemicals also promote cardiovascular health in animals. Such properties have not been reported in humans and require investigation, since cardiovascular disease is currently the leading killer in the developed world. This paper reviews available information on sorghum phytochemicals, how the information relates to current phytonutrient research and how it has potential to combat common nutrition-related diseases including cancer, cardiovascular disease and obesity.

Record 4 of 124 - AGRICOLA 1998-2004/09

AU: James,-D.; Schmidt,-A.M.

TI: Use of an intron region of a chloroplast tRNA gene (trnL) as a target for PCR identification of specific food crops including sources of potential allergens.

SO: Food research international. 2004, v. 37, no. 4 p. 395-402.

AB: Simple but reliable PCR techniques were developed for the detection and identification of several food crops, including crops known to contain allergens. A single pair of oligonucleotide primers (PL-1C and PL-2D), that target the trnL region of the chloroplast tRNA gene in polymerase chain reaction (PCR) analysis, was used to amplify crop specific fragments. The specific DNA fragments were of the following sizes; 387 bp (canola), 532 bp (corn), 571 bp (potato), 584 bp (soybean), 615 bp (white and red rice), 642 bp (peanut), and 662 bp (wheat). Each amplified fragment was reliably identified using 3% agarose gel electrophoresis. The amplified fragments were cloned, sequenced, and a variable region was used to design specific sense primers for identity confirmation of some selected crops. When combined with the antisense primer PL-2D, specific fragments of 403, 397, 343, and 304 bp were amplified for peanut, wheat, soybean, and rice, respectively. These are common crops known to contain allergens. The PCR techniques described may be easily adapted for the detection of other crops and may be modified for use in multiplex PCR detection techniques, or micro-/macro-array analysis.

Record 5 of 124 - AGRICOLA 1998-2004/09

AU: Tregoning,-J.; Maliga,-P.; Dougan,-G.; Nixon,-P.J.

TI: New advances in the production of edible plant vaccines: chloroplast expression of a tetanus vaccine antigen, TetC.

SO: Phytochemistry. 2004 Apr., v. 65, no. 8 p. 989-994.

AB: Vaccines are a proven method of controlling disease. However there are issues with the delivery and administration of vaccines. A particular problem is that the majority of vaccines currently used are injected, which can be unsafe if needles are reused in areas where blood-borne diseases are prevalent. Vaccines targeting the mucosal immune system avoid many of the problems associated with injections. One potential form of mucosal vaccine is based on the expression of vaccine antigens in plants. Current research in this area has focused on the expression of immunogens from the plant's nuclear genome but low expression levels generally achieved using this system have limited progress. In recent work we have used the model antigen, TetC, which confers resistance to Tetanus infection, to demonstrate the feasibility of expressing vaccine antigens at high levels in the plant chloroplast.

Record 6 of 124 - AGRICOLA 1998-2004/09
AU: Schaad,-N.W.; Frederick,-R.D.; Shaw,-J.; Schneider,-W.L.; Hickson,-R.; Petrillo,-M.D.; Luster,-D.G.
TI: Advances in molecular-based diagnostics in meeting crop biosecurity and phytosanitary issues.
SO: Annual review of phytopathology. 2003, v. 41 p. 305-324.

Record 7 of 124 - AGRICOLA 1998-2004/09
AU: Madden,-L.V.; Wheelis,-M.
TI: The threat of plant pathogens as weapons against U.S. crops.
SO: Annual review of phytopathology. 2003, v. 41 p. 155-176.

Record 8 of 124 - AGRICOLA 1998-2004/09
AU: Oerke,-E.C.; Dehne,-H.W.
TI: Safeguarding production--losses in major crops and the role of crop protection.
SO: Crop protection. 2004 Apr., v. 23, no. 4 p. 275-285.
AB: It is well accepted that agricultural production must be increased considerably in the foreseeable future to meet the food and feed demands of a rising human population and increasing livestock production. Crop protection plays a key role in safeguarding crop productivity against competition from weeds, animal pests, pathogens and viruses. The loss potential of these pest groups and the actual losses--i.e. losses despite the present crop protection practices--have been estimated for wheat, rice, maize, barley, potatoes, soybeans, sugar beet and cotton for the period 1996-1998 on a regional basis for 17 regions. Among crops the loss potential of pests worldwide varied from less than 50% (on barley) to more than 80% (on sugar beet and cotton). Actual losses are estimated at 26-30% for sugar beet, barley, soybean, wheat and cotton, and 35%, 39% and 40% for maize, potatoes and rice, respectively. Overall, weeds had the highest loss potential (32%) with animal pests and pathogens being less important (18% and 15%, respectively). Although viruses cause serious problems in potatoes and sugar beets in some areas, worldwide losses due to viruses averaged 6-7% on these crops and <1-3% in other crops. The efficacy of crop protection was highest in cash crops (53-68%) and lower (43-50%) in food crops. The variation coefficient of efficacy among regions was low in cash crops (12-18%) and highest in wheat (28%). As weed control can be achieved through mechanical or chemical means, worldwide efficacy in weed control (68%) was considerably higher than the control of animal pests or diseases (39% and 32%, respectively), which relies heavily on pesticides. The intensification of crop production necessary to meet the increasing demand through enhanced productivity per unit area might be impossible without a concomitant intensification of pest control. The perspectives of integrated pest management in safeguarding crop production and preventing negative effects on the environment are discussed for developing and developed countries.

Record 9 of 124 - AGRICOLA 1998-2004/09
AU: Bennett,-R.N.; Mellon,-F.A.; Kroon,-P.A.
TI: Screening crucifer seeds as sources of specific intact glucosinolates using ion-pair high-performance liquid

chromatography negative ion electrospray mass spectrometry.
SO: Journal of agricultural and food chemistry. 2004 Feb. 11, v. 52, no. 3 p. 428-438.
AB: Seeds, of either commercial crucifer crops or some wild and weed relatives, were screened for intact glucosinolates using a previously developed ion-pair LC-MS method. This method, in contrast to GC-MS techniques, ensures the accurate measurement of all classes of glucosinolates. Many crucifer seeds contained very high concentrations of glucosinolates with low concentrations of additional pigments and secondary metabolites. The other common seed metabolites were cinnamoylcholine esters, for example, sinapine. Glucosinolates derived from homologues of L-methionine were characteristic of Brassica and related crucifer species. In addition, significant concentrations of 4-hydroxy-3-indolylmethylglucosinolate were found in the majority of Brassica species. Wild and weed species often had relatively simple glucosinolate profiles: either a single glucosinolate or a predominant glucosinolate together with trace amounts of others. Species identified with seed glucosinolate profiles suitable for purification included various Alyssum, Erysimum, and Iberis species for 3-methythiopropyl-glucosinolate and 3-methylsulfinylpropyl-glucosinolate and various Alyssum, Erysimum, and Lepidium species with very high concentrations of C4-C6 aliphatic glucosinolates. Seeds of Arabis, Barbarea, Lepidium, Moringa, and Sinapis species were good sources of aromatic glucosinolates, and Azima tetracantha was a good source for N-methoxy-3-indolylmethyl-glucosinolate. MS data are reported for all of the intact glucosinolates detected from the screening process.

Record 10 of 124 - AGRICOLA 1998-2004/09
AU: Jaffe,-G.
TI: Regulating transgenic crops: a comparative analysis of different regulatory processes.
SO: Transgenic research. 2004 Feb., v. 13, no. 1 p. 5-19.

Record 11 of 124 - AGRICOLA 1998-2004/09
AU: Thomson,-J.
TI: Genetically modified food crops for improving agricultural practice and their effects on human health.
SO: Trends in food science and technology. 2003 Apr., v. 14, no. 5-8 p. 210-228.

Record 12 of 124 - AGRICOLA 1998-2004/09
AU: Bouis,-H.E.; Chassy,-B.M.; Ochanda,-J.O.
TI: Genetically modified food crops and their contribution to human nutrition and food quality.
SO: Trends in food science and technology. 2003 Apr., v. 14, no. 5-8 p. 191-209.

Record 13 of 124 - AGRICOLA 1998-2004/09
AU: Shewry,-P.R.
TI: Tuber storage proteins.
SO: Annals of botany. 2003 June, v. 91, no. 7 p. 755-769.
AB: A wide range of plants are grown for their edible tubers, but five species together account for almost 90% of the total world production. These are potato (Solanum tuberosum), cassava (

Manihot esculenta), sweet potato (Ipomoea batatus), yams (Dioscorea spp.) and taro (Colocasia, Cyrtosperma and Xanthosoma spp.). All of these, except cassava, contain groups of storage proteins, but these differ in the biological properties and evolutionary relationships. Thus, patatin from potato exhibits activity as an acylhydrolase and esterase, sporamin from sweet potato is an inhibitor of trypsin, and dioscorin from yam is a carbonic anhydrase. Both sporamin and dioscorin also exhibit antioxidant and radical scavenging activity. Taro differs from the other three crops in that it contains two major types of storage protein: a trypsin inhibitor related to sporamin and a mannose-binding lectin. These characteristics indicate that tuber storage proteins have evolved independently in different species, which contrasts with the highly conserved families of storage proteins present in seeds. Furthermore, all exhibit biological activities which could contribute to resistance to pests, pathogens or abiotic stresses, indicating that they may have dual roles in the tubers.

Record 14 of 124 - AGRICOLA 1998-2004/09
AU: Taylor,-M.R.
TI: Rethinking US leadership in food biotechnology.
SO: Nature biotechnology. 2003 Aug., v. 21, no. 8 p. 852-854.

Record 15 of 124 - AGRICOLA 1998-2004/09
AU: Vasil,-I.K.
TI: The science and politics of plant biotechnology--a personal perspective.
SO: Nature biotechnology. 2003 Aug., v. 21, no. 8 p. 849-851.

Record 16 of 124 - AGRICOLA 1998-2004/09
AU: Evenson,-R.E.; Gollin,-D.
TI: Assessing the impact of the Green Revolution, 1960 to 2000.
SO: Science Science Weekly. 2003 May 2, v. 300, no. 5620 p. 758-762.
AB: We summarize the findings of a recently completed study of the productivity impacts of international crop genetic improvement research in developing countries. Over the period 1960 to 2000, international agricultural research centers, in collaboration with national research programs, contributed to the development of "modern varieties" for many crops. These varieties have contributed to large increases in crop production. Productivity gains, however, have been uneven across crops and regions. Consumers generally benefited from declines in food prices. Farmers benefited only where cost reductions exceeded price reductions.

Record 17 of 124 - AGRICOLA 1998-2004/09
AU: Neumann,-K.
TI: New Guinea: a cradle of agriculture.
SO: Science Science Weekly. 2003 July 11, v. 301, no. 5630 p. 180-181.

Record 18 of 124 - AGRICOLA 1998-2004/09
AU: Haslberger,-A.G.
TI: Codex guidelines for GM foods include the analysis of unintended effects.
SO: Nature biotechnology. 2003 July, v. 21 no. 7 p. 739-741.

Record 19 of 124 - AGRICOLA 1998-2004/09

AU: Miller,-H.I.

TI: First salvo in transatlantic food fight is far from last word.

SO: Nature biotechnology. 2003 July, v. 21 no. 7 p. 737-738.

Record 20 of 124 - AGRICOLA 1998-2004/09

AU: Piyasena,-P.; Dussault,-C.; Koutchma,-T.; Ramaswamy,-H.S.; Awuah,-G.B.

TI: Radio frequency heating of foods: principles, applications and related properties--a review.

SO: Critical reviews in food science and nutrition. 2003, v. 43, no. 6 p. 587-606.

AB: Radio frequency (RF) heating is a promising technology for food applications because of the associated rapid and uniform heat distribution, large penetration depth and lower energy consumption. Radio frequency heating has been successfully applied for drying, baking and thawing of frozen meat and in meat processing. However, its use in continuous pasteurization and sterilization of foods is rather limited. During RF heating, heat is generated within the product due to molecular friction resulting from oscillating molecules and ions caused by the applied alternating electric field. RF heating is influenced principally by the dielectric properties of the product when other conditions are kept constant.This review deals with the current status of RF heating applications in food processing, as well as product and system specific factors that influence the RF heating. It is evident that frequency level, temperature and properties of food, such as viscosity, water content and chemical composition affect the dielectric properties and thus the RF heating of foods. Therefore, these parameters should be taken into account when designing a radio frequency heating system for foods.

Record 21 of 124 - AGRICOLA 1998-2004/09

AU: Dijkstra,-D.S.; Linnemann,-A.R.; Boekel,-T.A.J.S.-van

TI: Towards sustainable production of protein-rich foods: appraisal of eight crops for Western Europe. II. Analysis of the technological aspects of the production chain.

SO: Critical reviews in food science and nutrition. 2003, v. 43, no. 5 p. 481-506.

AB: Increased production of plant protein is required to support the production of protein-rich foods which can replace meat in the human diet to reduce the strain that intensive animal husbandry poses on the environment. The suitability of lupin (Lupinus spp.), pea (Pisum sativum), quinoa (Chenopodium quinoa Willd.), triticale (x Triticosecale), lucerne (Medicago sativa), grasses (Lolium and Festuca spp.), rapeseed/canola (Brassica napus) and potato (Solanum tuberosum) for protein production in Western Europe was studied on the basis of a chain-approach. The technological aspects, which are considered in this paper, are the processing methods, and the functional and nutritional properties of the derived protein products. The overall evaluation of the technological prospects of the eight crops as a protein source for Western Europe leads to the conclusion that this part of the production chain is not decisive for that choice. Pea and lupin have a slight advantage over the other

crops, because their concentrates and isolates are already commercially available.

Record 22 of 124 - AGRICOLA 1998-2004/09
AU: Loebenstein,-G. (Gad); Thottappilly,-G.
TI: Virus and virus-like diseases of major crops in developing countries.
SO: Dordrecht ; Boston : Kluwer Academic Publishers, c2003. xlvii, 800 p. : ill. (some col.)

Record 23 of 124 - AGRICOLA 1998-2004/09
TI: Plant biotechnology research and development in Africa : challenges and opportunities : hearing before the Subcommittee on Research, Committee on Science, House of Representatives, One Hundred Eighth Congress, first session, June 12, 2003.
SO: Washington : U.S. G.P.O. : For sale by the Supt. of Docs., U.S. G. P.O., 2003. iv, 87 p.

Record 24 of 124 - AGRICOLA 1998-2004/09
AU: Maluszynski,-M., 1941-
TI: Doubled haploid production in crop plants : a manual.
SO: Dordrecht ; Boston : Kluwer Academic Publishers, c2003. xlvi, 428 p. : ill. (some col.)

Record 25 of 124 - AGRICOLA 1998-2004/09
AU: Igwe,-S.A.; Akunyili,-D.N.; Ogbogu,-C.
TI: Effects of Solanum melongena (garden egg) on some visual functions of visually active Igbos of Nigeria.
SO: J-ethnopharmacol. Oxford : Elsevier Science Ltd. June 2003. v. 86 (2/3) p. 135-138.

Record 26 of 124 - AGRICOLA 1998-2004/09
AU: Yamane,-K.; Kawasaki,-M.; Taniguchi,-M.; Miyake,-H.
TI: Differential effect of NaCl and polyethylene glycol on the ultrastructure of chloroplasts in rice seedlings.
SO: J-plant-physiol. May 2003. v. 160 (5) p. 573-575.
AB: Ionic and osmotic effects of salinity on the ultrastructure of chloroplasts in salt-treated rice seedlings were investigated. After rice seedlings were grown in hydroponic culture for three weeks, they were treated with NaCl and polyethylene glycol (PEG) 4000 both at a water potential of -1.0 MPa for 3 days. The most notable difference in ultrastructural change between NaCl and PEG treatment was observed in the damage in chloroplast membranes. NaCl induced swelling of thylakoids and caused only a slight destruction of the chloroplast envelope. PEG caused severe destruction of the chloroplast envelope compared with NaCl, however thylakoids did not swell. Our observations suggested that in salt-treated rice plants, the ionic effects induced swelling of thylakoids and the osmotic effects caused the destruction of chloroplast envelope.

Record 27 of 124 - AGRICOLA 1998-2004/09
AU: Kato-Noguchi,-H.
TI: Anoxia tolerance in rice roots acclimated by several different periods of hypoxia.
SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. May 2003. v. 160 (5) p. 565-568.

AB: Rice (Oryza sativa L.) seedlings were subjected to hypoxic pretreatment (H-PT; incubated in 5% O2 atmosphere) for various lengths of time followed by an anoxic stress. Anoxia tolerance of rice roots was improved with increasing duration of H-PT, but longer H-PT than 12h gave no additional improvement. Concentrations of ATP and ethanol, and activities of pyruvate decarboxylase (EC 4.1.1.1) and alcohol dehydrogenase (EC 1.1.1.1) in the roots were increased by H-PT, and the times and patterns of increasing in these concentrations and activities were similar to those of increasing in the anoxia tolerance. These results suggest that the H-PT may increase anoxia tolerance due to maintenance of ATP levels with rapid induction of ethanolic fermentation, and hypoxic acclimation may occur within 12h.

Record 28 of 124 - AGRICOLA 1998-2004/09

AU: Durot,-N.; Gaudard,-F.; Kurek,-B.

TI: The unmasking of lignin structures in wheat straw by alkali.

SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. July 2003. v. 63 (5) p. 617-623.

AB: This study reports on the structural modifications of wheat straw cell wall promoted by potassium carbonate and sodium hydroxide that lead to the unmasking of some lignin structures. The first impact of the treatments was the extraction of a particular fraction of lignin enriched in C-C linked structures compared to the mean composition in reference wheat straw. Concomitantly, an apparent increase in the amount of lignin monomers released by the cleavage of alkyl-aryl ether bonds was observed in alkali-extracted samples. By summing the amount of ether linked monomers analyzed by thioacidolysis in the solubilized lignin to that found in the extracted wheat straw, an excess of up to 37% is apparent, relative to the corresponding amount in the reference wheat straw. Other modifications of the cell wall were also found. Indeed, a fraction of uronic acids was lost during the treatments and a new fractionation pattern of the lignin-carbohydrate complexes was evidenced. It can thus be concluded that a significant proportion of lignin within the cell wall was unmasked after (i) the selective removal of a particular lignin fraction, (ii) a partial saponification of the esterified fraction of lignin with uronic acids and (iii) a modification of the interactions between the cell wall constituents.

Record 29 of 124 - AGRICOLA 1998-2004/09

AU: Kato-Noguchi,-H.; Ino,-T.

TI: Rice seedlings release momilactone B into the environment.

SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. July 2003. v. 63 (5) p. 551-554.

AB: Since the growth inhibitor momilactone B was found recently in root exudates of rice (Oryza sativa L.), 3-day-old rice seedlings were transferred to hydroponic culture and the level of momilactone B released into the environment from the seedlings was measured. At day 15 after transfer, the level of momilactone B in the culture solution was 1.8 nmol per seedling compared with endogenous levels of 0.32 and 0.63 nmol per root and shoot, respectively, suggesting that rice seedlings actively releases momilactone B into the culture solution. This release must occur from the roots because only rice roots were immersed in the culture solution. Momilactone B inhibited the growth of ten cress

(Lepidium sativum L.) seedlings at concentrations greater than 3 micromolar. Ten rice seedlings were incubated with ten cress seeds in a Petri dish containing 1 ml of medium, the medium contained 18 nmol of momilactone B, which came to 18 micromolar. This level of momilactone B was enough to reveal growth inhibition of the cress seedlings. Release level of momilactone B and its effectiveness as a growth inhibitor suggest that it may play an important role in rice allelopathy.

Record 30 of 124 - AGRICOLA 1998-2004/09

AU: Jung,-H.J.G.

TI: Maize stem tissues: ferulate deposition in developing internode cell walls.

SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. July 2003. v. 63 (5) p. 543-549.

AB: It has been hypothesized that ferulates are only deposited in the primary cell wall of grasses. To test this hypothesis, the fourth elongating, above-ground internode of maize (Zea mays l.) was sampled from three maize hybrids throughout development. Cell wall composition was determined by the Uppsala Dietary Fibre method. Ester- and ether-linked ferulates were determined by HPLC analysis of ferulic acid released from the internodes by low and high temperature alkaline treatments. Internode length increased from 9 to 152 mm over 96 days of growth, with elongation being complete in the first 12 days. More than half of the cell wall material in the maize internodes accumulated after elongation had ended. Deposition of cell wall material appeared to reach its maximum extent 40 days after sampling began, well before physiological maturity of the maize plants. Galactose and arabinose began to accumulate early in cell wall development which was presumed to be associated with primary wall growth during internode elongation. The major secondary wall constituents (analyzed as glucose, xylose, and Klason lignin) did not begin to accumulate rapidly until shortly before internode elongation ended. Ferulate ester deposition began before ferulate ethers were observed in the cell wall, but both forms of ferulate continued to accumulate in secondary cell walls, long after internode elongation had ceased. These data clearly show that contrary to the hypothesis, ferulate deposition was not restricted to the primary wall and that active lignin/ polysaccharide cross-linking mediated by ferulates occurs in the secondary wall.

Record 31 of 124 - AGRICOLA 1998-2004/09

AU: Price,-L.J.; Herbert,-D.; Cole,-D.J.; Harwood,-J.L.

TI: Use of plant cell cultures to study graminicide effects on lipid metabolism.

SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. July 2003. v. 63 (5) p. 533-541.

AB: Graminicides belonging to the cyclohexanedione and aryloxyphenoxypropionate classes are well established to act by disrupting acyl lipid biosynthesis via specific inhibition of acetyl-CoA carboxylase. Species of grass inherently resistant to such herbicides, or biotypes of grassy weed species which display acquired resistance to recommended rates of graminicide application, are known to possess an altered plastidic multifunctional acetyl-CoA carboxylase showing reduced

sensitivity to these herbicides in vitro. Studies reported here demonstrate that cell suspension cultures of maize, a graminicide-sensitive species and Poa annua, a graminicide-insensitive species, display a similar differential sensitivity of acyl lipid biosynthesis as tissue from corresponding intact plants. Acyl lipid biosynthesis in P. annua can be inhibited if sufficiently high concentrations of graminicide are used. The major plastidic form and the minor cytosolic forms of acetyl-CoA carboxylase were successfully purified from maize cell suspensions, were compared to those from leaf tissue and were shown to be differentially inhibited by graminicides in a similar manner to their counterparts from leaf tissue. These studies demonstrate that cell suspensions are useful for studying the mode of action of graminicides, especially in view of the limited amount of material obtainable from many grassy species which are very fine-growing.

Record 32 of 124 - AGRICOLA 1998-2004/09
AU: Aroca,-R.; Vernieri,-P.; Irigoyen,-J.J.; Sanchez-Diaz,-M.; Tognoni,-F.; Pardossi,-A.
TI: Involvement of abscisic acid in leaf and root of maize (Zea mays L.) in avoiding chilling-induced water stress.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Sept 2003. v. 165 (3) p. 671-679.

Record 33 of 124 - AGRICOLA 1998-2004/09
AU: Suzuki,-S.; Burnell,-J.N.
TI: The pck1 promoter from Urochloa panicoides (a C4 plant) directs expression differently in rice (a C3 plant) and maize (a C4 plant).
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Sept 2003. v. 165 (3) p. 603-611.

Record 34 of 124 - AGRICOLA 1998-2004/09
AU: Wang,-Y.; Kausch,-A.P.; Chandlee,-J.M.; Luo,-H.; Ruemmele,-B.A.; Browning,-M.; Jackson,-N.; Goldsmith,-M.R.
TI: Co-transfer and expression of chitinase, glucanase, and bar genes in creeping bentgrass for conferring fungal disease resistance.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Sept 2003. v. 165 (3) p. 497-506.

Record 35 of 124 - AGRICOLA 1998-2004/09
AU: Zhong,-H.; Teymouri,-F.; Chapman,-B.; Maqbool,-S.B.; Sabzikar,-R.; El-Maghraby,-Y.; Dale,-B.; Sticklen,-M.B.
TI: The pea (Pisum sativum L.) rbcS transit peptide directs the Alcaligenes eutrophus polyhydroxybutyrate enzymes into the maize (Zea mays L.) chloroplasts.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Sept 2003. v. 165 (3) p. 455-462.

Record 36 of 124 - AGRICOLA 1998-2004/09
AU: Kalimullah,-M.; Gaikwad,-J.U.; Thomas,-S.; Sarma,-A.; Vidyasagar,-P.B.
TI: Assessment of 1H heavy ion irradiation induced effects in the development of rice (Oryza sativa L.) seedlings.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Sept 2003. v. 165 (3) p. 447-454.

Record 37 of 124 - AGRICOLA 1998-2004/09
AU: Ozawa,-K.; Kawahigashi,-H.; Kayano,-T.; Ohkawa,-Y.
TI: Enhancement of regeneration of rice (Oryza sativa L.) calli by integration of the gene involved in regeneration ability of the callus.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Aug 2003. v. 165 (2) p. 395-402.

Record 38 of 124 - AGRICOLA 1998-2004/09
AU: Kawahigashi,-H.; Hirose,-S.; Ohkawa,-H.; Ohkawa,-Y.
TI: Transgenic rice plants expressing human CYP1A1 exude herbicide metabolites from their roots.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Aug 2003. v. 165 (2) p. 373-381.

Record 39 of 124 - AGRICOLA 1998-2004/09
AU: Jin,-Q.; Waters,-D.; Cordeiro,-G.M.; Henry,-R.J.; Reinke,-R.F.
TI: A single nucleotide polymorphism (SNP) marker linked to the fragrance gene in rice (Oryza sativa L.).
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Aug 2003. v. 165 (2) p. 359-364.

Record 40 of 124 - AGRICOLA 1998-2004/09
AU: Brandalise,-M.; Maia,-I.-de-G.; Borecky,-J.; Vercesi,-A.E.; Arruda,-P.
TI: ZmPUMP encodes a maize mitochondrial uncoupling protein that is induced by oxidative stress.
SO: Plant-sci. Aug 2003. v. 165 (2) p. 329-335.

Record 41 of 124 - AGRICOLA 1998-2004/09
AU: Laggner,-P.; Filek,-M.; Szechynska-Hebda,-M.; Kriechbaum,-M.
TI: X-ray structure investigations of winter wheat membrane systems. II. Effect of phytohormones on structural properties of mixed phospholipid--sterols membranes.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 271-275.

Record 42 of 124 - AGRICOLA 1998-2004/09
AU: Laggner,-P.; Filek,-M.; Marcinska,-I.; Szechynska-Hebda,-M.; Kriechbaum,-M.
TI: X-ray structure investigations of winter wheat membrane systems. I. Influence of phytohormones on phospholipid orientation in non- and embryogenic cells.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 265-270.

Record 43 of 124 - AGRICOLA 1998-2004/09
AU: Zhao,-T.Y.; Meeley,-R.B.; Downie,-B.
TI: Aberrant processing of a Maize GALACTINOL SYNTHASE transcript is caused by heat stress.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 245-256.

Record 44 of 124 - AGRICOLA 1998-2004/09
AU: Han,-J.J.; An,-G.
TI: Flower-preferential poly(A) binding (PAB) protein gene from rice.

SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 103-112.

Record 45 of 124 - AGRICOLA 1998-2004/09
AU: Ella,-E.S.; Kawano,-N.; Ito,-O.
TI: Importance of active oxygen-scavenging system in the recovery of rice seedlings after submergence.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 85-93.

Record 46 of 124 - AGRICOLA 1998-2004/09
AU: Chung,-H.; Hirata,-Y.; Ando,-S.; Kamachi,-S.; Sakai,-S.
TI: Mechanism regulating telomerase activity in Oryza sativa L.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 43-54.

Record 47 of 124 - AGRICOLA 1998-2004/09
AU: Martinez-Trujillo,-M.; Limones-Briones,-V.; Chavez-Barcenas,-T.; Herrera-Estrella,-L.
TI: Functional analysis of the 5' untranslated region of the sucrose phosphate synthase rice gene (sps1).
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. July 2003. v. 165 (1) p. 9-20.

Record 48 of 124 - AGRICOLA 1998-2004/09
AU: Li,-W.; Ding,-C.H.; Hu,-Z.; Lu,-W.; Guo,-G.Q.
TI: Relationship between tissue culture and agronomic traits of spring wheat.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 1079-1085.

Record 49 of 124 - AGRICOLA 1998-2004/09
AU: Bertini,-L.; Leonardi,-L.; Caporale,-C.; Tucci,-M.; Cascone,-N.; Di-Berardino,-I.; Buonocore,-V.; Caruso,-C.
TI: Pathogen-responsive wheat PR4 genes are induced by activators of systemic acquired resistance and wounding.
SO: Plant-sci. June 2003. v. 164 (6) p. 1067-1078.

Record 50 of 124 - AGRICOLA 1998-2004/09
AU: Kubo,-N.; Arimura,-S.; Tsutsumi,-N.; Hirai,-A.; Kadowaki,-K.
TI: Involvement of N-terminal region in mitochondrial targeting of rice RPS10 and RPS14 proteins.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 1047-1055.

Record 51 of 124 - AGRICOLA 1998-2004/09
AU: Ishikawa,-Y.; Park,-J.H.; Kisaka,-H.; Lee,-H.Y.; Kanno,-A.; Kameya,-T.
TI: A 5-methyltryptophan resistant mutant of rice has an altered regulation of anthranilate synthase gene expression.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 1037-1045.

Record 52 of 124 - AGRICOLA 1998-2004/09
AU: Plazek,-A.; Zur,-I.
TI: Cold-induced plant resistance to necrotrophic pathogens and antioxidant enzyme activities and cell membrane permeability.

SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 1019-1028.

Record 53 of 124 - AGRICOLA 1998-2004/09
AU: Hadzi-Taskovic-Sukalovic,-V.; Vuletic,-M.
TI: The characterization of peroxidases in mitochondria of maize roots.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 999-1007.

Record 54 of 124 - AGRICOLA 1998-2004/09
AU: Agrawal,-G.K.; Jwa,-N.S.; Agrawal,-S.K.; Tamogami,-S.; Iwahashi,-H.; Rakwal,-R.
TI: Cloning of novel rice allene oxide cyclase (OsAOC): mRNA expression and comparative analysis with allene oxide synthase (OsAOS) gene provides insight into the transcriptional regulation of octadecanoid pathway biosynthetic genes in rice.
SO: Plant-sci. June 2003. v. 164 (6) p. 979-992.

Record 55 of 124 - AGRICOLA 1998-2004/09
AU: Yao,-S.G.; Taketa,-S.; Ichii,-M.
TI: Isolation and characterization of an abscisic acid-insensitive mutation that affects specifically primary root elongation in rice (Oryza sativa L.).
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 971-978.

Record 56 of 124 - AGRICOLA 1998-2004/09
AU: Chandru,-H.K.; Kim,-E.; Kuk,-Y.; Cho,-K.; Han,-O.
TI: Kinetics of wound-induced activation of antioxidative enzymes in Oryza sativa: differential activation at different growth stages.
SO: Plant-sci. June 2003. v. 164 (6) p. 935-941.

Record 57 of 124 - AGRICOLA 1998-2004/09
AU: Karabal,-E.; Yucel,-M.; Oktem,-H.A.
TI: Antioxidant responses of tolerant and sensitive barley cultivars to boron toxicity.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. June 2003. v. 164 (6) p. 925-933.

Record 58 of 124 - AGRICOLA 1998-2004/09
AU: Xiang,-F.; Xia,-G.; Chen,-H.
TI: Effect of UV dosage on somatic hybridization between common wheat (Triticum aestivum L.) and Avena sativa L.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. May 2003. v. 164 (5) p. 697-707.

Record 59 of 124 - AGRICOLA 1998-2004/09
AU: Verma,-S.; Dubey,-R.S.
TI: Lead toxicity induces lipid peroxidation and alters the activities of antioxidant enzymes in growing rice plants.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Apr 2003 v. 164 (4) p. 645-655.

Record 60 of 124 - AGRICOLA 1998-2004/09
AU: Souza-Filho,-G.A.-de.; Ferreira,-B.S.; Dias,-J.M.; Queiroz,-K.S.; Branco,-A.T.; Bressan-Smith,-R.E.; Oliveira,-J.G.; Garcia,-A.B.

TI: Accumulation of SALT protein in rice plants as a response to environmental stresses.
SO: Plant-sci. Apr 2003 v. 164 (4) p. 623-628.

Record 61 of 124 - AGRICOLA 1998-2004/09
AU: Halbwirth,-H.; Martens,-S.; Wienand,-U.; Forkmann,-G.; Stich,-K.
TI: Biochemical formation of anthocyanins in silk tissue of Zea mays.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Apr 2003 v. 164 (4) p. 489-495.

Record 62 of 124 - AGRICOLA 1998-2004/09
AU: Goto,-M.; Ehara,-H.; Karita,-S.; Takabe,-K.; Ogawa,-N.; Yamada,-Y. ; Ogawa,-S.; Yahaya,-M.S.; Morita,-O.
TI: Protective effect of silicon on phenolic biosynthesis and ultraviolet spectral stress in rice crop.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Mar 2003. v. 164 (3) p. 349-356.

Record 63 of 124 - AGRICOLA 1998-2004/09
AU: Shakirova,-F.M.; Sakhabutdinova,-A.R.; Bezrukova,-M.V.; Fatkhutdinova,-R.A.; Fatkhutdinova,-D.R.
TI: Changes in the hormonal status of wheat seedlings induced by salicylic acid and salinity.
SO: Plant-sci. Mar 2003. v. 164 (3) p. 317-322.

Record 64 of 124 - AGRICOLA 1998-2004/09
AU: Jiang,-H.; Dian,-W.; Wu,-P.
TI: Effect of high temperature on fine structure of amylopectin in rice endosperm by reducing the activity of the starch branching enzyme.
SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. May 2003. v. 63 (1) p. 53-59.
AB: Rice (Oryza sativa L.) grain quality is affected by the environmental temperature it experiences. To investigate the physiological molecular mechanisms of the effect of high temperatures on rice grain, a non-waxy indica rice was grown under two temperature conditions, (29/35 degree C) and (22/28 degree C), during the ripening stage in two phytotrons. The activities and gene expression of key enzymes for the biosynthesis of amylose and amylopectin were examined. The activity and expression levels of soluble endosperm starch synthase I were higher at 29/35 degree C than that at 22/28 degree C. In contrast, the activities and expression levels of the rice branching enzyme1, the branching enzyme3 and the granule bound starch synthase of the endosperm were lower at 29/35 degree C than those at 22/28 degree C. These results suggest that the decreased activity of starch branching enzyme reduces the branching frequency of the branches of amylopectin, which results in the increased amount of long chains of amylopectin of endosperm in rice grain at hight temperature.

Record 65 of 124 - AGRICOLA 1998-2004/09
AU: Bharali,-S.; Chrungoo,-N.K.
TI: Amino acid sequence of the 26 kDa subunit of legumin-type seed storage protein of common buckwheat (Fagopyrum esculentum Moench): molecular characterization and phylogenetic analysis.
SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. May 2003. v.

63 (1) p. 1-5.
AB: The paper describes the amino acid sequence of a 26 kDa basic subunit of 13S globulin of common buckwheat (Fagopyrum esculentum Moench). The protein has 93 and 75% sequence homology with 11S globulin of Coffea arabica and beta subunit of 11S globulin of Cucurbita pepo respectively. The subunit has the "globally conserved" N-terminal sequence consisting of Gly-Ile-Asp-Glu and the cysteine at P7' from the proteolytic processing site. A conserved 7 residue domain of Pro-His-Trp-Asn-Ile-Asn-Ala, characteristic of basic subunits of legumins from non-leguminous angiosperms, is also present in this protein. A distinguishing features of this subunit is the relatively high level of lysine and methionine.

Record 66 of 124 - AGRICOLA 1998-2004/09
AU: Astolfi,-S.; Zuchi,-S.; Chiani,-A.; Passera,-C.
TI: In vivo and in vitro effects of cadmium on H+ ATPase activity of plasma membrane vesicles from oat (Avena sativa L.) roots.
SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Apr 2003. v. 160 (4) p. 387-393.
AB: The effect of an in vivo and in vitro treatment with cadmium on transport activities of root plasma membrane enriched vesicles was studied in oat (Avena sativa L. cv. Argentina) plants. Addition of 100 mol/L CdSO4 to nutrient solution decreases both proton transport activity and ATPase activity to the same level. In vitro experiments show that cadmium seems to have a differential inhibiting effect on proton transport activity and ATPase activity, the most pronounced one on ATP-dependent H+-accumulation, suggesting that cadmium would interfere with membrane permeability properties. This is indeed the case. The results demonstrate that cadmium decreases passive permeability to protons.

Record 67 of 124 - AGRICOLA 1998-2004/09
AU: Drazkiewicz,-M.; Tukendorf,-A.; Baszynski,-T.
TI: Age-dependent response of maize leaf segments to cadmium treatment: effect on chlorophyll fluorescence and phytochelatin accumulation.
SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Mar 2003. v. 160 (3) p. 247-254.
AB: The relationship between the age of leaf tissue and response of the photosynthetic apparatus and phytochelatin accumulation to Cd treatment was studied. Studies were carried out with seedlings of Zea mays L. cv. Hidosil grown in the presence of 100-200 micromoles/L Cd for 14 days under low light conditions. The third leaf was divided into 3 segments of equal length differing in the stage of tissue maturity and used for measurements of chlorophyll content, chlorophyll fluorescence, glutathione and phytochelatin content and Cd accumulation. A close relationship between the age of leaf tissue and response of the photosynthetic apparatus to Cd was shown. Cadmium (200 micromoles/L) reduced photochemical processes more in older than younger leaf segments as seen in the Chl fluorescence parameters F(v)/F(0), and t1/2, while the chlorophyll fluorescence decrease ratio (R(fd)) was inhibited more strongly in younger ones. F(v)/F(m) was slightly affected. Cd-induced enhancement of GSH content was correlated with higher phytochelatin accumulation to a greater extent in younger than in

older leaf segments. Phytochelatin level corresponded to changes of photochemical processes in older leaves. The peptide thiol: Cd molar ratio for the phytochelatins varied depending on Cd concentration and age of leaf segments. The protective role of phytochelatins for the photosynthetic apparatus is discussed.

Record 68 of 124 - AGRICOLA 1998-2004/09

AU: Tani,-H.; Honma,-T.; Fujii,-Y.; Yoneyama,-K.; Nakajima,-H.

TI: A plant growth retardant related to chlamydocin and its proposed mechanism of action.

SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. Apr 2003. v. 62 (7) p. 1133-1140.

AB: A comparison of the plant growth retardant activity of the chlamydocin analogues, compound 1, six derivatives from 1 and 2, and two synthetic analogues revealed that there are two types of retardant in chlamydocin analogues. One, for example in compound 1, requires an oxygen atom at C-8 of the 2-aminodecanoic acid moiety to show retardant activity. The other, for example in compound 8, requires no oxygen atom at C-8 but requires a specific alkyl group chain length for activity. To determine the differences in mode of action of both types of retardant, rice seedlings were separately treated with compounds 1 and 8, and after appearance of dwarfism, their endogenous ABA and GA1 levels were determined and compared to those of the control. Treatment with 1 (10 nmol/plant) increased ABA levels 4 times higher than that of the control and decreased GA1 levels to 20% of that of the control. Treatment with 8 (30 nmol/plant) did not affect the ABA level but decreased GA1 content to 5% of that of the contro.

Record 69 of 124 - AGRICOLA 1998-2004/09

AU: Khanna,-H.K.; Daggard,-G.E.

TI: Agrobacterium tumefaciens-mediated transformation of wheat using a superbinary vector and a polyamine-supplemented regeneration medium.

SO: Plant-cell-rep. Berlin : Springer-Verlag. Jan 2003. v. 21 (5) p. 429-436.

AB: Immature embryo-derived calli of spring wheat (Triticum aestivum L.) cv Veery5 were transformed using Agrobacterium tumefaciens strain LBA4404 carrying either binary vector pHK22 or superbinary vector pHK21, the latter carrying an extra set of vir genes - vir B, -C and -G. In both cases, transient #-glucuronidase (GUS) expression ranging from 35-63% was observed 3 days after co-cultivation, but 587 calli infected with pHK22/LBA4404 failed to produce a single stably transformed plant, whereas 658 calli infected with pHK21/LBA4404 gave rise to 17 transformants carrying both the GUS and bar genes. Regeneration media supplemented with 0.1 M spermidine improved the recovery of transformants from pHK21/LBA4404-infected calli from 7% to 24.2%, resulting in an increase in the overall transformation frequency from 1.2% to 3.9%. The results suggest that two important factors that could lead to an improvement in transformation frequencies of cereals like wheat are (1) the use of superbinary vectors and (2) modification of the polyamine ratio in the regeneration medium. Stable expression and inheritance of the transgenes was confirmed by both genetic and molecular analyses. T1 progeny showed segregation of the transgenes in a typical Mendelian fashion in most of the plants. Of the transformed plants, 35%

showed single-copy insertion of the transgene as shown by both Southern analysis and the segregation ratios.

Record 70 of 124 - AGRICOLA 1998-2004/09

AU: Burns,-J.; Fraser,-P.D.; Bramley,-P.M.

TI: Identification and quantification of carotenoids, tocopherols and chlorophylls in commonly consumed fruits and vegetables.

SO: Phytochemistry-Oxford. Oxford : Elsevier Science Ltd. Mar 2003. v. 62 (6) p. 939-947.

AB: The carotenoid, tocopherol and chlorophyll metabolic profiles and content of a selection of fruits and vegetables found commonly in the diet, have been determined using a rapid RP-HPLC technique with on-line PDA detection. Information gathered from the screening of secondary plant metabolites is vital for the accurate determination of the dietary intake of these micro-nutrients, and in the development of comprehensive food tables. Determination of basal levels is also necessary for the rational engineering of health-promoting phytochemicals in food crops. In addition this approach can also be applied to the routine screening of products to determine metabolic differences between varieties and cultivars, as well as between genetically modified and the corresponding non-genetically modified tissue.

Record 71 of 124 - AGRICOLA 1998-2004/09

AU: Duncan,-D.R.; Kriz,-A.L.; Paiva,-R.; Widholm,-J.M.

TI: Globulin-1 gene expression in regenerable Zea mays (maize) callus.

SO: Plant-cell-rep. Berlin : Springer-Verlag. Mar 2003. v. 21 (7) p. 684-689.

AB: Since maize callus cultures regenerate plants via somatic embryogenesis, one might expect to find similar proteins in both zygotic embryos and tissue cultures. The 63-kD globulin protein designated GLB1, the expression of which is regulated by abscisic acid (ABA), is one such protein. When maize Type I regenerable callus was exposed for 24 h to 0.1 mM ABA or a water stress induced by 0.53 M mannitol, GLB1 was produced as determined by Western analysis. This protein was not detected in ABA or mannitol-treated regenerable cultured tissue of a null genotype or in tissues not exposed to ABA or water stress. Exposure to ABA in the culture medium increased the callus ABA levels greatly but a mannitol-induced water stress had only a small effect on ABA levels. Regenerable callus exposed to 0.1 mM ABA also produced mRNA that hybridized on a Northern blot with a globulin-1 gene (Glb1) probe.

When both Type I and Type II regenerable cultured tissues were exposed to regeneration medium without ABA or mannitol, several GLB1 antibody immunoreactive proteins were produced. These proteins were not detected in regenerated plants nor in non-regenerable callus treated with ABA. These results suggest that: (1) at least for expression of Glb1, somatic embryogenesis is similar to zygotic embryogenesis, (2) there may be a regulatory role for auxin in the processing of Glb1-encoded polypeptides since fewer are seen when dicamba is present in the medium, (3) ABA has a role in somatic embryogenesis, and (4) regenerability of a maize callus culture may be assessed by treating the cultured tissue with 0.1 mM ABA to determine if GLB1 proteins are induced.

Record 72 of 124 - AGRICOLA 1998-2004/09

AU: Wu,-H.; Sparks,-C.; Amoah,-B.; Jones,-H.D.

TI: Factors influencing successful Agrobacterium-mediated genetic transformation of wheat.

SO: Plant-cell-rep. Berlin : Springer-Verlag. Mar 2003. v. 21 (7) p. 659-668.

AB: The development of a robust Agrobacterium-mediated transformation protocol for a recalcitrant species like bread wheat requires the identification and optimisation of the factors affecting T-DNA delivery and plant regeneration. We have used immature embryos from range of wheat varieties and the Agrobacterium strain AGL1 harbouring the pGreen-based plasmid pAL156, which contains a T-DNA incorporating the bar gene and a modified uidA (beta-glucuronidase) gene, to investigate and optimise major T-DNA delivery and tissue culture variables.

Factors that produced significant differences in T-DNA delivery and regeneration included embryo size, duration of pre-culture, inoculation and co-cultivation, and the presence of acetosyringone and Silwet-L77 in the media. We fully describe a protocol that allowed efficient T-DNA delivery and gave rise to 44 morphologically normal, and fully fertile, stable transgenic plants in two wheat varieties. The transformation frequency ranged from 0.3% to 3.3%. Marker-gene expression and molecular analysis demonstrated that transgenes were integrated into the wheat genome and subsequently transmitted into progeny at Mendelian ratios.

Record 73 of 124 - AGRICOLA 1998-2004/09

AU: Liu,-Z.Z.; Wang,-J.L.; Huang,-X.; Xu,-W.H.; Liu,-Z.M.; Fang,-R.X.

TI: The promoter of a rice glycine-rich protein gene, Osgrp-2, confers vascular-specific expression in transgenic plants.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Mar 2003. v. 216 (5) p. 824-833.

AB: The genomic sequence of a rice (Oryza sativa L.) glycine-rich protein (GRP) gene, designated Osgrp-2, has been previously determined (GenBank U40708). Primer extension analysis indicated that transcription starts 47 bp upstream of the translation start codon. To gain an insight into the transcriptional regulation of this gene, the 2,401-bp promoter sequence and a series of its 5' deletions were transcriptionally fused to the beta-glucuronidase (GUS) gene. GUS activity was subsequently assayed in a transient expression system of tobacco (Nicotiana tabacum L.) protoplasts, which revealed the presence of a positive regulatory region (-2290 to -1406) and two negative regulatory regions (-2401 to -2291 and -1405 to -1022) in the Osgrp-2 promoter for the promoter activity. The positive regulatory region displayed an enhancer-like activity when fused to the cauliflower mosaic virus (CaMV) 35S minimal promoter (-89 to +6) to drive GUS expression and assayed on tobacco leaves by the Agrobacterium-mediated transient expression technique (agroinfiltration).

Histochemical staining for GUS activity on transgenic tobacco plants has further indicated a preferential expression in vascular tissues of stems and leaves conferred by the positive regulatory region. A 1,023-bp fragment of the Osgrp-2 promoter (-1021 to +2) fused with GUS was transformed into tobacco and proved to be capable of conferring vascular-specific expression.

Further 5' and 3' deletion analysis of the 1,023-bp promoter revealed that a 99-bp fragment located from -497 to -399 contained cis-elements responsible for vascular-specific expression.

Record 74 of 124 - AGRICOLA 1998-2004/09

AU: Butt,-Y.K.C.; Lum,-J.H.K.; Lo,-S.C.L.

TI: Proteomic identification of plant proteins probed by mammalian nitric oxide synthase antibodies.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Mar 2003. v. 216 (5) p. 762-771.

AB: Several studies suggest that a mammalian-like nitric oxide synthase (NOS) exists in plants. Researchers have attempted to verify its presence using two approaches: (i) determination of NOS functional activity and (ii) probing with mammalian NOS antibodies. However, up to now, neither a NOS-like gene nor a protein has been found in plants. While there is still some controversy over whether the NOS functional activity seen is due to nitrate reductase, using the mammalian NOS antibodies in western blot analysis, several groups have reported the presence of immunoreactive protein bands in plant homogenates. Based on these results, immunohistochemical studies using these antibodies have also been used to localize NOS in plant tissues. However, plant NOS has never been positively identified or characterized. Thus, we used a proteomic approach to verify the identities of plant proteins that cross-reacted with the mammalian NOS antibodies.

Proteins extracted from maize (Zea mays L.) embryonic axes were separated by two-dimensional gel electrophoresis and subjected to western blot analysis with the mammalian neuronal NOS and inducible NOS antibodies. Twenty immunoreactive protein spots recognized on a corresponding Coomassie blue-stained two-dimensional gel were subjected to tryptic digestion, followed by identification using matrix-assisted laser desorption/ ionization-time of flight mass spectrometry. Fifteen proteins were successfully identified and they have described functions that are unrelated to NO metabolism. The remaining five proteins could not be identified. The amino acid sequences of these identified proteins and those used to raise the antibodies were aligned. However, no homologous region could be found. Our results demonstrate that the mammalian NOS antibodies recognize many NOS-unrelated plant proteins. Therefore, it is inappropriate to infer the presence of plant NOS using this immunological technique.

Record 75 of 124 - AGRICOLA 1998-2004/09

AU: Toriyama,-K.; Chiba,-A.; Nakagawa,-Y.

TI: Visualization of somatic deletions mediated by R/RS site-specific recombination and induction of germinal deletions caused by callus differentiation and regeneration in rice.

SO: Plant-cell-rep. Berlin : Springer-Verlag. Feb 2003. v. 21 (6) p. 605-610.

AB: A transgenic rice plant expressing the recombinase of Zygosaccharomyces rouxii under the control of the CaMV 35S promoter was crossed with a transgenic plant carrying a cryptic (beta-glucuronidase) GUS reporter gene, which was activated by recombinase-mediated deletions between two specific recombination

sites (RSs). In F1 plants, GUS activity was observed as blue spots and stripes in vascular bundles in several parts of the leaves. GUS expression was detected in all of the calli induced from F1 seeds and throughout the regenerated plants. DNA analysis using the polymerase chain reaction and Southern blotting showed that R/RS-mediated deletions occurred in all of the cells of the regenerated plants. Stable GUS expression was confirmed in the progeny resulting from self-pollination. Thus, the deletions obtained in the regenerated plants were genetically equivalent to the germinal deletions. These results indicate that the induction of callus differentiation and shoot regeneration is an effective manner to activate the R/RS system and to produce plants with chromosomal deletions.

Record 76 of 124 - AGRICOLA 1998-2004/09

AU: Aulinger,-I.E.; Peter,-S.O.; Schmid,-J.E.; Stamp,-P.

TI: Gametic embryos of maize as a target for biolistic transformation: comparison to immature zygotic embryos.

SO: Plant-cell-rep. Berlin : Springer-Verlag. Feb 2003. v. 21 (6) p. 585-591.

AB: The aim of the present study was to determine the suitability of maize gametic embryos of three ETH genotypes as a target for biolistic transformation. We studied parameters considered essential for a successful transformation, such as the frequency of secondary embryo formation, their regeneration ability and the transient transgene expression. Transformable zygotic embryos of one of the ETH genotypes were used as positive control. Our results indicate that gametic embryos can potentially be transformed by particle bombardment, since they responded positively to all the studied parameters, although with lower efficiencies than the zygotic embryos. In particular, differences were found in the rate of secondary embryogenesis and the density of transformed cells.

Record 77 of 124 - AGRICOLA 1998-2004/09

AU: Rasco-Gaunt,-S.; Liu,-D.; Li,-C.P.; Doherty,-A.; Hagemann,-K.; Riley,-A.; Thompson,-T.; Brunkan,-C.; Mitchell,-M.; Lowe,-K.

TI: Characterisation of the expression of a novel consitutive maize promoter in transgenic wheat and maize.

SO: Plant-cell-rep. Berlin : Springer-Verlag. Feb 2003. v. 21 (6) p. 569-576.

AB: A novel constitutive promoter from the maize histone H2B gene was recently identified. In this study, we characterised H2B promoter activity in both wheat and maize tissues using the gusA reporter gene and two synthetic versions of the pat (phosphinothricin acetyl transferase) selectable marker gene, namely mopat and popat. Analyses of transgenic plants showed that the H2B promoter is able to drive the expression of gusA to strong, constitutive levels in wheat and maize tissues. Using an H2B:mopat construct and phosphinothricin selection, we recovered transgenic wheat plants at efficiencies ranging from 0.3% to 7.4% (mean 1.6%), and the efficiency of selection ranged from 40% to 100% (mean 77.7%). In another application, H2B was combined with the maize Ubi-1 or the maize Adh-1 intron to drive the expression of mopat and popat. Transformation efficiencies with the Ubi-1 intron were between 1.4- to 16-fold greater than with the Adh-1 intron. However, the use of either of the introns was necessary for the

recovery of transgenic plants. Mopat gave higher transformation efficiencies and induced higher levels of PAT protein in maize tissues than popat.

Record 78 of 124 - AGRICOLA 1998-2004/09

AU: Turnbull,-K.M.; Marion,-D.; Gaborit,-T.; Appels,-R.; Rahman,-S.

TI: Early expression of grain hardness in the developing wheat endosperm.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 699-706.

AB: Seeds from near-isogenic hard and soft wheat lines were harvested at regular intervals from 5 days post-anthesis to maturity and examined for hardness using the single kernel characterisation system (SKCS). SKCS analysis revealed that hard and soft lines could be distinguished from 15 days post-anthesis (dpa). This trend continued until maturity where the difference between the hard and soft lines was most marked. SKCS could not be applied to the small 5- and 10-dpa wheat kernels. Fresh developing endosperm material was examined using light microscopy and no visible differences between the cultivars were detected. When air-dried material was examined using scanning electron microscopy (SEM) differences between soft and hard lines were visible from as early as 5 dpa. Accumulation of puroindoline a and puroindoline b was investigated in developing seeds using both Western blotting and ELISA. Low levels of puroindoline a could be detected in the soft cultivar from 10 dpa, reaching a maximum at 32 dpa. In the hard cultivar, puroindoline a levels were negligible throughout grain development. Puroindoline b accumulates in both the soft and hard cultivars from 15 dpa, but overall contents were higher in the soft cultivar. These findings indicate that endosperm hardness is expressed very early in developing grain when few starch granules and storage proteins were deposited in the endosperm cells. Further, the near-isogenic soft and hard Heron lines could be differentiated by SEM at a stage in development when the accumulation of puroindolines could not be detected by the methods used in this study.

Record 79 of 124 - AGRICOLA 1998-2004/09

AU: Sobajima,-H.; Takeda,-M.; Sugimori,-M.; Kobashi,-N.; Kiribuchi,-K. ; Cho,-E.M.; Akimoto,-C.; Yamaguchi,-T.; Minami,-E.; Shibuya,-N.

TI: Cloning and characterization of a jasmonic acid-responsive gene encoding 12-oxophytodienoic acid reductase in suspension-cultured rice cells.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 692-698.

AB: In suspension-cultured rice (Oryza sativa L.) cells, jasmonic acid (JA) functions as a signal transducer in elicitor N-acetylchitoheptaose-induced phytoalexin production. Differential screening of a cDNA library constructed using poly(A) + RNA from suspension-cultured rice cells treated with JA (10(-4) M) for 2 h yielded a cDNA for a gene that responded to exogenous JA by an increase in mRNA level. Nucleotide sequence analysis indicated that the cDNA encodes an homologue of the yeast Old Yellow Enzyme. The deduced amino acid sequence was very similar to the sequences of 12-oxophytodienoic acid reductases (OPR) 1 and 2 from Arabidopsis thaliana (AtOPR1 and AtOPR2) and OPR1 from tomato (Lycopersicon esculentum) (LeOPR1). The cDNA-encoded

protein purified from recombinant Escherichia coli cells as a hexahistidine-tagged fusion protein exhibited OPR activity similar to that of AtOPR1, AtOPR2, and LeOPR1, which catalyze reduction of (-)-cis-12-oxophytodienoic acid (OPDA) preferentially over (+)-cis-OPDA, a natural precursor of JA. Thus the rice enzyme was termed OsOPR1. The physiological roles of OsOPR1 are discussed. This is the first report of the cloning of an OPR gene from a monocot plant.

Record 80 of 124 - AGRICOLA 1998-2004/09

AU: Schmelz,-E.A.; Alborn,-H.T.; Banchio,-E.; Tumlinson,-J.H.

TI: Quantitative relationships between induced jasmonic acid levels and volatile emission in Zea mays during Spodoptera exigua herbivory.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 665-673.

AB: Jasmonic acid (JA) has long been hypothesized to be an important regulator of insect-induced volatile emission; however, current models are based primarily on circumstantial evidence derived from pharmacological studies. Using beet armyworm caterpillars (BAW: Spodoptera exigua) and intact corn seedlings, we examine this hypothesis by measuring both the time-course of insect-induced JA levels and the relationships between endogenous JA levels, ethylene, indole and sesquiterpenes. In separate Morning and Evening time-course trials, BAW feeding stimulated increases in JA levels within the first 4-6 h and resulted in maximal increases in JA, indole, sesquiterpenes and ethylene 8-16 h later. During BAW herbivory, increases in JA either paralleled or preceded the increases in indole, sesquiterpenes and ethylene in the Morning and Evening trials, respectively. By varying the intensity of the BAW herbivory, we demonstrate that strong positive relationships exist between the resulting variation in insect-induced JA levels and volatile emissions such as indole and the sesquiterpenes. To address potential signaling interactions between herbivore-induced JA and ethylene, plants were pretreated with 1-methylcyclopropene (1-MCP), an inhibitor of ethylene perception. 1-MCP pretreatment resulted in reduced production of ethylene and volatile emission following BAW herbivory but did not alter the insect-induced accumulation of JA. Our results strongly support a role for JA in the regulation of insect-induced volatile emission but also suggest that ethylene perception regulates the magnitude of volatile emission during herbivory.

Record 81 of 124 - AGRICOLA 1998-2004/09

AU: Smidansky,-E.D.; Martin,-J.M.; Hannah,-L.C.; Fischer,-A.M.; Giroux,-M.J.

TI: Seed yield and plant biomass increases in rice are conferred by deregulation of endosperm ADP-glucose pyrophosphorylase.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 656-664.

AB: In this work we test the hypothesis that yield of rice (Oryza sativa L.) can be enhanced by increasing endosperm activity of ADP-glucose pyrophosphorylase (AGP), a key enzyme in starch biosynthesis. The potential for increases in yield exist because rice initiates more seeds than are taken to maturity and possesses excess photosynthetic capacity that could be utilized

if there were more demand for assimilate. Following an approach already shown to be successful in wheat, experiments were designed to increase demand for assimilate by increasing the capacity for starch synthesis in endosperm. This was accomplished by transforming rice with a modified maize AGP large subunit sequence (Sh2r6hs) under control of an endosperm-specific promoter. This altered subunit confers upon AGP decreased sensitivity to allosteric inhibition by inorganic phosphate (Pi) and enhanced heat stability, potentially leading to higher AGP activity in vivo. The Sh2r6hs transgene increased AGP activity in developing endosperm by 2.7-fold in the presence of Pi. Increases in AGP activity in transgenic seeds compared with controls were maximal between 10-15 days after anthesis. Starch content of individual seeds at harvest was not increased, but seed weight per plant and total plant biomass were each increased by more than 20%. Increased endosperm AGP activity thus stimulates setting of additional seeds and overall plant growth rather than increasing yield of seeds already set. Results demonstrate that deregulation of endosperm AGP increases overall plant sink strength, leading to larger, more productive plants in a manner similar to that in wheat having similar genetic modification.

Record 82 of 124 - AGRICOLA 1998-2004/09

AU: Esposito,-S.; Massaro,-G.; Vona,-V.; Di-Martino-Rigano,-V.; Carfagna,-S.

TI: Glutamate synthesis in barley roots: the role of the plastidic glucose-6-phosphate dehydrogenase.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 639-647.

AB: Evidence is provided for a close link between glutamate (Glu) synthesis and the production of reducing power by the oxidative pentose phosphate pathway (OPPP) in barley (Hordeum vulgare L. var. Alfeo) root plastids. A rapid procedure for isolating organelles gave yields of plastids of over 30%, 60% of which were intact. The formation of Glu by intact plastids fed with glutamine and 2-oxoglutarate, both substrates of glutamate synthase (GOGAT), depends on glucose-6-phosphate (Glc-6-P) supply. The whole process exhibited an apparent Km Glc-6-P of 0.45 mM and is abolished by azaserine, a specific inhibitor of GOGAT; ATP caused a decrease in the rate of Glu formation. Glucose and other sugar phosphates were not as effective in supporting Glu synthesis with respect to Glc-6-P; only ribose-5-phosphate, an intermediate of OPPP, supported rates equivalent to Glc-6-P. Glucose-6-phosphate dehydrogenase (Glc6PDH) rapidly purified from root plastids showed an apparent Km Glc-6-P of 0.96 mM and an apparent Km NADP+ of 9 micromolar. The enzyme demonstrated high tolerance to NADPH, exhibiting a Ki NADPH of 58.6 micromolar and selectively reacted with antibodies against potato plastidic, but not chloroplastic, Glc6PDH isoform. The data support the hypothesis that plastidic OPPP is the main site of reducing power supply for GOGAT within the plastids, and suggest that the plastidic OPPP would be able to sustain Glu synthesis under high NADPH:NADP+ ratios even if the plastidic Glc6PDH may not be functioning at its highest rates.

Record 83 of 124 - AGRICOLA 1998-2004/09

AU: Bukhov,-N.G.; Carpentier,-R.

TI: Measurement of photochemical quenching of absorbed quanta in photosystem I of intact leaves using simultaneous measurements of absorbance changes at 830 nm and thermal dissipation.
SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 630-638.
AB: The relationship between the redox state of the photosystem (PS) I primary donor, P700, and thermal energy dissipation in PSI were examined in intact leaves using simultaneous measurements of absorbance changes at 830 nm and variations of thermal emission monitored by photoacoustic (PA) spectroscopy, respectively. A strict proportionality (close to a 1:1 ratio) was found between the magnitudes of P700 oxidation and a positive variable PA signal induced by far-red light of various irradiances under conditions favoring effective electron donation from PSII to PSI. The proportionality was observed also between the ratio of reduced P700 to the total P700 content and the ratio of the variable component to the total PA signal measured with modulated light of 695 nm. Those findings clearly revealed that in intact leaves, variable thermal dissipation in PSI is determined by the fraction of P700 in the reduced state. Diuron-treated leaves exposed to 45 degrees C in which PSI received electrons not from PSII, but from soluble reductants localized in the chloroplast stroma were also used. In such leaves, the linear relationship between the ratio of reduced P700 to the total P700 content and the ratio of the variable component to the total PA signal measured with modulated light of 700 nm has been found as well, but its slope was twice smaller than in untreated leaves. This is probably related to an increased contribution of thermal emission from inactive PSII to the steady-state level of the PA signal in diuron-treated leaves exposed to high temperatures. The results demonstrated that the yield of variable thermal dissipation is strictly dependent on the redox pressure applied to the photosystem.
The above illustrates the strong photochemical energy quenching occurring when the reaction centers are in open state (reduced P700).

Record 84 of 124 - AGRICOLA 1998-2004/09
AU: Obel,-N.; Porchia,-A.C.; Scheller,-H.V.
TI: Intracellular feruloylation of arabinoxylan in wheat: evidence for feruloyl-glucose as precursor.
SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 620-629.
AB: Incorporation of [3H]arabinose and [14C]ferulic acid into soluble and polymeric fractions from suspension-cultured wheat (Triticum aestivum L.) cells and the corresponding extracellular medium was studied. The major part of these products was identified as arabinoxylan and two proteins of 40 and 100 kDa. The time course suggests an intracellular synthesis of feruloylated arabinoxylan with feruloyl-glucose as substrate. In contrast, synthesis of feruloylated proteins appears to occur with feruloyl-CoA as precursor. Intracellular formation of ferulic acid dimers is limited to 8,5-diferulic acid, while other dimers appear to be formed extracellularly. [3H]Arabinose was incorporated into polymeric material in both the cellular and in the medium fraction while [14C]ferulic was only found in polymers from the cellular fraction, indicating synthesis of both feruloylated and

non-feruloylated arabinoxylan by the cells.

Record 85 of 124 - AGRICOLA 1998-2004/09

AU: Yang,-D.; Guo,-F.; Liu,-B.; Huang,-N.; Watkins,-S.C.

TI: Expression and localization of human lysozyme in the endosperm of transgenic rice.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 597-603.

AB: In order to understand the characteristics of recombinant protein expression and sublocalization in rice (Oryza sativa L.) endosperm, we examined the expression level of human lysozyme protein and its subcellular location in transgenic rice seeds driven by rice glutelin and globulin promoters and signal peptides. A time course of human lysozyme expression during endosperm development was analyzed. The results showed that the expression profile of recombinant protein accumulation in endosperm paralleled that of the two storage proteins. Immunofluorescence microscopy revealed that human lysozyme and storage proteins co-localized to type-II protein bodies. Both promoter-signal peptide parings targeted recombinant protein to the protein bodies. In addition, a transgenic line with a higher lysozyme expression level exhibited morphologically different protein bodies with an unbalanced composition of lysozyme and native storage proteins. The high-level expression of recombinant protein distorted the trafficking and sorting of native storage proteins in rice endosperm and affected the expression of native storage protein.

Record 86 of 124 - AGRICOLA 1998-2004/09

AU: Dong,-A.; Zhu,-Y.; Yu,-Y.; Cao,-K.; Sun,-C.; Shen,-W.H.

TI: Regulation of biosynthesis and intracellular localization of rice and tobacco homologues of nucleosome assembly protein 1.

SO: Planta. Berlin ; New York : Springer-Verlag, 1925-. Feb 2003. v. 216 (4) p. 561-570.

AB: The nucleosome assembly protein 1 (NAP1) is considered to be a conserved histone chaperone, facilitating the assembly of nucleosomes in all eukaryotes. However, studies in yeast and animal cells also indicated that NAP1 proteins have diverse functions likely independent of nucleosome-assembly activity. Here, we describe the isolation and characterization of cDNAs encoding NAP1-like proteins from the monocotyledon rice (Oryza sativa L.) and the dicotyledon tobacco (Nicotiana tabacum L.). Northern-blot analysis demonstrated that the two rice NAP1-like genes are predominantly expressed in stem tissues such as root and shoot apical meristems as well as in young flowers. During the cell cycle, all four tobacco NAP1-like genes are highly expressed, with one of them showing a slightly increased expression at the G1/S transition. These results are consistent with a role for plant NAP1-like proteins in cell division. In vitro binding assays revealed that different NAP1-like proteins bind, with distinct relative binding strengths, to different classes of histone. Intracellular localization analyses showed that some NAP1-like proteins could be targeted into the nucleus whereas others are exclusively cytoplasm-localized. It is thus likely that different plant NAP1-like proteins have distinct functions in vivo. Plant NAP1-like proteins were observed to concentrate around the metaphase plate and in the phragmoplast,

suggesting a role in mitotic events and cytokinesis.

Record 87 of 124 - AGRICOLA 1998-2004/09
AU: Janda,-T.; Szalai,-G.; Rios-Gonzalez,-K.; Veisz,-O.; Paldi,-E.
TI: Comparative study of frost tolerance and antioxidant activity in cereals.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Feb 2003. v. 164 (2) p. 301-306.

Record 88 of 124 - AGRICOLA 1998-2004/09
AU: Groppa,-M.D.; Benavides,-M.P.; Tomaro,-M.L.
TI: Polyamine metabolism in sunflower and wheat leaf discs under cadmium or copper stress.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Feb 2003. v. 164 (2) p. 293-299.

Record 89 of 124 - AGRICOLA 1998-2004/09
AU: Kulwal,-P.L.; Roy,-J.K.; Balyan,-H.S.; Gupta,-P.K.
TI: QTL mapping for growth and leaf characters in bread wheat.
SO: Plant-sci. Oxford, UK : Elsevier Science Ltd. Feb 2003. v. 164 (2) p. 267-277.

Record 90 of 124 - AGRICOLA 1998-2004/09
AU: Wendt,-J.; Izquierdo,-J.
TI: Management of appropriate agricultural biotechnology for small producers: case study--Ecuador.
SO: EJB-Electron-J-Biotechnol. Apr 15, 2003. v. 6 (1) Online access.

Record 91 of 124 - AGRICOLA 1998-2004/09
AU: Davidson,-S.E.; Elliott,-R.C.; Helliwell,-C.A.; Poole,-A.T.; Reid,-J.B.
TI: The pea gene NA encodes ent-kaurenoic acid oxidase.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Jan 2003. v. 131 (1) p. 335-344.
AB: The gibberellin (GA)-deficient dwarf na mutant in pea (Pisum sativum) has severely reduced internode elongation, reduced root growth, and decreased leaflet size. However, the seeds develop normally. Two genes, PsKAO1 and PsKAO2, encoding cytochrome P450 monooxygenases of the subfamily CYP88A were isolated. Both PsKAO1 and PsKAO2 had ent-kaurenoic acid oxidase (KAO) activity, catalyzing the three steps of the GA biosynthetic pathway from ent-kaurenoic acid to GA12 when expressed in yeast (Saccharomyces cerevisiae). In addition to the intermediates ent-7alpha-hydroxykaurenoic acid and GA12-aldehyde, some additional products of the pea KAO activity were detected, including ent-6alpha,7alpha-dihydroxykaurenoic acid and 7beta-hydroxykaurenolide. The NA gene encodes PsKAO1, because in two independent mutant alleles, na-1 and na-2, PsKAO1 had altered sequences and the five-base deletion in PsKAO1 associated with the na-1 allele cosegregated with the dwarf na phenotype. PsKAO1 was expressed in the stem, apical bud, leaf, pod, and root, organs in which GA levels have previously been shown to be reduced in na plants. PsKAO2 was expressed only in seeds and this may explain the normal seed development and normal GA biosynthesis in seeds of na plants.

Record 92 of 124 - AGRICOLA 1998-2004/09

AU: Koag,-M.C.; Fenton,-R.D.; Wilkens,-S.; Close,-T.J.
TI: The binding of maize DHN1 to lipid vesicles. Gain of structure and lipid specificity.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Jan 2003. v. 131 (1) p. 309-316.
AB: Dehydrins (DHNs; late embryogenesis abundant D-11) are a family of plant proteins induced in response to abiotic stresses such as drought, low temperature, and salinity or during the late stages of embryogenesis. Spectral and thermal properties of these proteins in purified form suggest that they are "intrinsically unstructured." However, DHNs contain at least one copy of a consensus 15-amino acid sequence, the "K segment," which resembles a class A2 amphipathic alpha-helical, lipid-binding domain found in other proteins such as apolipoproteins and alpha-synuclein. The presence of the K segment raises the question of whether DHNs bind lipids, bilayers, or phospholipid vesicles. Here, we show that maize (Zea mays) DHN DHN1 can bind to lipid vesicles that contain acidic phospholipids. We also observe that DHN1 binds more favorably to vesicles of smaller diameter than to larger vesicles, and that the association of DHN1 with vesicles results in an apparent increase of alpha-helicity of the protein. Therefore, DHNs, and presumably somewhat similar plant stress proteins in the late embryogenesis abundant and cold-regulated classes may undergo function-related conformational changes at the water/membrane interface, perhaps related to the stabilization of vesicles or other endomembrane structures under stress conditions.

Record 93 of 124 - AGRICOLA 1998-2004/09
AU: Zolla,-L.; Timperio,-A.M.; Walcher,-W.; Huber,-C.G.
TI: Proteomics of light-harvesting proteins in different plant species. Analysis and comparison by liquid chromatography-electrospray ionization mass spectrometry. Photosystem II.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Jan 2003. v. 131 (1) p. 198-214.
AB: An overview of the intact molecular masses and the hydrophobic properties of the photosystem II (PSII) light-harvesting proteins in 14 different plant species is presented. The protein separation and identification was achieved by means of reversed-phase high-performance liquid chromatography-electrospray ionization-mass spectrometry. The good correspondence of the molecular masses measured by reversed-phase high-performance liquid chromatography-electrospray ionization-mass spectrometry with those deduced from the DNA sequence (0.008%-0.016% relative deviation in Arabidopsis) enabled the identification of the different protein types. Utilizing this correlation, it was possible in several cases to spot a gene product for the previously cloned genes. In PSII, all antenna proteins show hydrophobic properties considerably different within the same as well as among various species, in contrast to observations made previously with PSI. These differences might reflect a tuning of protein-protein interactions that play a role in inducing different supramolecular organizations of PSII: within the same species as a consequence of short-term adaptations, and among species for seasonal species adaptation. The relative antenna

stoichiometry was readily established on the basis of relative peak areas of the separated proteins in the ultraviolet chromatograms. The correspondence found between the high copy number of genes with the gene products reveals that the genes are not silent in their protein expression. Moreover, the high copy number of gene products as well as protein heterogeneity observed in PSII suggest a possible plant strategy to realize the high degree of organization and interconnection of the light-harvesting systems under any environmental conditions.

Record 94 of 124 - AGRICOLA 1998-2004/09

AU: Tang,-W.; Brady,-S.R.; Sun,-Y.; Muday,-G.K.; Roux,-S.J.

TI: Extracellular ATP inhibits root gravitropism at concentrations that inhibit polar auxin transport.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Jan 2003. v. 131 (1) p. 147-154.

AB: Raising the level of extracellular ATP to mM concentrations similar to those found inside cells can block gravitropism of Arabidopsis roots. When plants are grown in Murashige and Skoog medium supplied with 1 mM ATP, their roots grow horizontally instead of growing straight down. Medium with 2 mM ATP induces root curling, and 3 mM ATP stimulates lateral root growth. When plants are transferred to medium containing exogenous ATP, the gravity response is reduced or in some cases completely blocked by ATP. Equivalent concentrations of ADP or inorganic phosphate have slight but usually statistically insignificant effects, suggesting the specificity of ATP in these responses. The ATP effects may be attributable to the disturbance of auxin distribution in roots by exogenously applied ATP, because extracellular ATP can alter the pattern of auxin-induced gene expression in DR5-beta-glucuronidase transgenic plants and increase the response sensitivity of plant roots to exogenously added auxin. The presence of extracellular ATP also decreases basipetal auxin transport in a dose-dependent fashion in both maize (Zea mays) and Arabidopsis roots and increases the retention of [3H]indole-3-acetic acid in root tips of maize. Taken together, these results suggest that the inhibitory effects of extracellular ATP on auxin distribution may happen at the level of auxin export. The potential role of the trans-plasma membrane ATP gradient in auxin export and plant root gravitropism is discussed.

Record 95 of 124 - AGRICOLA 1998-2004/09

AU: Fedina,-I.S.; Grigorova,-I.D.; Georgieva,-K.M.

TI: Response of barley seedlings to UV-B radiation as affected by NaCl.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Feb 2003. v. 160 (2) p. 205-208.

AB: The response of barley seedlings, subjected to 150 mmol/L NaCl for 4 days at different light regimes (4 d in the light, 4 d in darkness and a 12 h light/dark cycle) before UV-B radiation was investigated. NaCl treatment resulted in a decrease of total chlorophyll content and an increase in H2O2, free proline and lipid peroxidation, as quantified by measurement of malondialdehyde. Significantly more proline was accumulated in the light than in darkness. The combination of UV-B and NaCl treatment produced an additive effect on most of the parameters

studied. UV-B radiation reduced the chlorophyll/carotenoids ratio and photochemical efficiency of PSII as estimated by chlorophyll fluorescence. NaCl pre-exposure decreased H2O2 generation and lipid peroxidation and alleviated the inhibitory effect of UV-B on PSII activity. Proline accumulated under salt stress conditions might be one of the reasons for the observed tolerance of barley seedlings to UV-B radiation.

Record 96 of 124 - AGRICOLA 1998-2004/09

AU: Ohno,-R.; Takumi,-S.; Nakamura,-C.

TI: Kinetics of transcript and protein accumulation of a low-molecular-weight wheat LEA D-11 dehydrin in response to low temperature.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Feb 2003. v. 160 (2) p. 193-200.

AB: We studied the kinetics of induction of the wheat (Triticum aestivum L.) gene Wdhn 13, which encodes a predominantly cold-responsive protein belonging to the LEA D-11 dehydrin family. The deduced polypeptide WDHN13 (MW = 12.8 kDa) represented the smallest dehydrin member in cereals with three lysine-rich K-segments. Purified WDHN 13 was boiling-stable due to its high hydrophilicity. Western blot analysis using the polyclonal anti-WDHN 13-antibody revealed a number of cross-reacting proteins in mature embryos and endosperms and in seedling leaves under normal temperature (25 degrees C), while a single major protein and a transcript were induced in response to low temperature (4 degrees C) in the leaves. An increase in the amount of mRNA was temporary with a peak occurring at day 3 to 5 of the low temperature treatment, while the protein accumulation proceeded with a significant time lag and continued until the end of the experiment (day 10). Steady-state levels of the transcript and protein were much higher in the leaves than in the roots of low temperature-treated seedlings and were apparently modulated by light/dark conditions. The light/dark modulation of the transcript and protein levels suggested stabilization of the mRNA under the low temperature condition. Genomic Southern blot analysis showed that Wdhn 13 is located on the homoeologous group 7 chromosomes, unlike all other wheat Dhn genes that are located on the group 6 chromosomes.

Record 97 of 124 - AGRICOLA 1998-2004/09

AU: Quaggiotti,-S.; Abrahamshon,-C.; Malagoli,-M.; Ferrari,-G.

TI: Physiological and molecular aspects of sulphate uptake in two maize hybrids in response to S-deprivation.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Feb 2003. v. 160 (2) p. 167-173.

AB: Two maize hybrids (KW2 and KW7), chosen on the basis of their productivity with low nutritional input, showed different physiological strategies, with opposite sulphate uptake V(max) and K(m) values, in response to sulphate deprivation. In order to characterise the physiological differences between the two hybrids, sulphate influx rates were measured in different nutritional conditions. When grown for 7 days in S-deprived solution, significantly higher influx rates were measured in roots of KW7 than KW2. Withdrawal of sulphate, after 7 days in presence of S, induced the derepression of the sulphate transport system in both hybrids. However, maize hybrid KW2 seemed to have

a more rapid activation than that of KW7, which, in turn, seemed to be more resistant to prolonged sulphur deprivation. The data obtained were not supported by the outcome of the analysis of mRNA abundance, performed with the homologue probe ZmST1 on roots of both hybrids. Root sulphate and glutathione contents were in all cases higher in KW7 than KW2. The discrepancy between the physiological and the molecular data suggests the possible existence of other root transporters involved in sulphate uptake, and/or of some post-transcriptional regulatory mechanisms.

Record 98 of 124 - AGRICOLA 1998-2004/09

AU: Behera,-S.K.; Nayak,-L.; Biswal,-B.

TI: Senescing leaves possess potential for stress adaptation: the developing leaves acclimated to high light exhibit increased tolerance to osmotic stress during senescence.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Feb 2003. v. 160 (2) p. 125-131.

AB: Plants may experience environmental stress factors operating in nature either simultaneously or in sequence. In the study, we have acclimated the developing primary leaves of wheat seedlings to high light stress and examined their photosynthetic response to polyethylene glycol (PEG) mediated osmotic stress during different developmental phases including senescence. The high light acclimated leaves show higher level of total carotenoids as compared to their non-acclimated counterparts experiencing osmotic stress during senescence. They also exhibit greater membrane stability as indicated by the measurements of fluorescence polarisation and energy transfer efficiency in photosystem I (PSI) and Photosystem II (PSII). From the data of DCPIP photoreduction and pulse amplitude modulated (PAM) fluorimetry, a similar trend is observed for PSII photochemistry of the leaves experiencing osmotic stress during senescence. Our results may suggest that the stress adaptive potential induced by one stress during development is retained by the leaves and helps to mitigate another stress effect operating in sequence during another developmental phase, namely senescence.

Record 99 of 124 - AGRICOLA 1998-2004/09

AU: Mohanty,-N.

TI: Photosynthetic characteristics and enzymatic antioxidant capacity of flag leaf and the grain yield in two cultivars of Triticum aestivum (L.) exposed to warmer growth conditions.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Jan 2003. v. 160 (1) p. 71-74.

AB: Using late sowing practice, the reproductive growth (anthesis and kernel filling) phase of two wheat cultivars, HD1553 and HD2307 was exposed to warmer growth conditions, and the effect on grain yield was examined. The grain weight declined in late-sown plants of both cultivars, but the number of grains per spike decreased drastically in HD1553 plants. In this cultivar exposure to warmer temperature during reproductive phase led to 67% fewer grains per spike. Examination of photosynthetic and enzymatic antioxidant capacity in flag leaves of late-sown plants revealed a marked reduction in chlorophyll and carotenoid pigmentation in addition to a decline in the activity of H2O2 metabolising enzymes in HD1553 cultivar. The photo-oxidative pigment loss due to warmer growth conditions in late-shown HD1553 plants could lead to a

reduction in flag leaf photosynthesis and contribute to poor grain yield.

Record 100 of 124 - AGRICOLA 1998-2004/09

AU: Sakakibara,-H.

TI: Differential response of genes for ferredoxin and ferredoxin:NADP+ oxidoreductase to nitrate and light in maize leaves.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Jan 2003. v. 160 (1) p. 65-70.

AB: In higher plants, ferredoxin (Fd) and Fd : NADP+ oxidoreductase (FNR, EC 1.18.1.2) are encoded by small multigene families, and the individuals transfer electrons to the dependent enzymes in the photosynthetic and the non-photosynthetic plastids. In maize, a C4 plant, expression of genes for the non-photosynthetic isoproteins, Fd VI and R-FNR, is responsive to nitrate in roots whereas the expression and the spatial distribution in the leaves have not been analysed. Here, we studied the expression pattern of a series of Fd and FNR genes in maize leaves in response to nitrate and light. Upon addition of nitrate, the transcripts for Fd VI and R-FNR rapidly accumulated in the leaves, whereas light did not induce accumulation. Expression of genes for the other isoproteins was not changed significantly by the nitrogen source. In the leaf, the transcripts for Fd VI and R-FNR were predominantly detected in mesophyll cells as were those for nitrate-assimilatory enzymes. Since R-FNR is an isoprotein transferring electrons from NADPH to non-photosynthetic type Fd, the redox equivalent is supplied in nitrate reduction, at least partially, via an oxidative pentose phosphate pathway, even in photosynthetic organs.

Record 101 of 124 - AGRICOLA 1998-2004/09

AU: Murmu,-J.; Chinthapalli,-B.; Raghavendra,-A.S.

TI: Light activation of NADP malic enzyme in leaves of maize: Marginal increase in activity, but marked change in regulatory properties of enzyme.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Jan 2003. v. 160 (1) p. 51-56.

AB: This article reports the characteristics of light activation of NADP-malic enzyme (NADP-ME, EC 1.1.1.40) in leaf discs of maize (Zea mays cv. VMH 404) for the first time. The leaf discs were illuminated in the presence of 2 mmol/L bicarbonate, as light activation increases in the presence of bicarbonate. Upon illumination, the V(max) of NADP-ME increased by about 30%. Although small, the increase was consistent and significant. The changes in regulatory properties of NADP-ME were quite pronounced. The extent of light activation was similar when substrate (malate) concentration was either 4 mmol/L (saturating) or 0.01 mmol/L (limiting). There was only a marginal change in the K(m) for malate, but there was marked change in the response of NADP-ME to activators or inhibitors. The K(i) for pyruvate and oxalate increased by 100 and 67% respectively, while the K(a) for the citrate and succinate increased by 36 and 32% respectively. These results suggest that the NADP-ME becomes less sensitive to feedback inhibition on illumination. The light-induced change seems to be due, at least partially, to the reduction of dithiols, as incubation of leaf extracts with DTE dampened light

activation of NADP-ME. We conclude that the properties of NADP-ME do change on illumination. Although there was only a marginal increase in the activity of the enzyme on illumination of leaf discs, the changes in regulatory properties of NADP-ME were marked.

Record 102 of 124 - AGRICOLA 1998-2004/09

AU: Tamada,-Y.; Imanari,-E.; Kurotani,-K.; Nakai,-M.; Andreo,-C.S.; Izui,-K.

TI: Effect of photooxidative destruction of chloroplasts on the expression of nuclear genes for C4 photosynthesis and for chloroplast biogenesis in maize.

SO: J-plant-physiol. Stuttgart ; New York : G. Fischer,. Jan 2003. v. 160 (1) p. 3-8.

AB: Norflurazon, an inhibitor of carotenoid synthesis, is known to cause photooxidative destruction of chloroplasts. Expression of many nuclear genes for chloroplast-destined proteins is suppressed in the photobleached seedlings due to impairment of signaling from chloroplasts to nuclei. Here the effect of norflurazon-treatment on the expression of genes for C4 photosynthesis was investigated. Unlike the genes of Cab and RbcS, the levels of mRNA for pyruvate Pi dikinase and NADP-malic enzyme were not markedly reduced. However, their protein levels were more significantly reduced suggesting a control by chloroplast exerted at the translational step. From their molecular sizes these proteins seemed to have been correctly processed and hence localized in the rudimental chloroplasts. In support of this, 9 kinds of proteins for chloroplast biogenesis such as Toc family and Hsp70 proteins were not suppressed, suggesting that protein import machinery and processing are still functional in the cells harboring rudimental chloroplasts. Diurnal changes of the levels of transcripts for photosynthetic genes persisted in the norflurazon-treated seedlings indicating non-involvement of chloroplast in this light control.

Record 103 of 124 - AGRICOLA 1998-2004/09

AU: Toenniessen,-G.H.; O'Toole,-J.C.; DeVries,-J.

TI: Advances in plant biotechnology and its adoption in developing countries.

SO: Curr-opin-plant-biol. Kidlington, Oxford, UK : Elsevier Science Ltd. Apr 2003. v. 6 (2) p. 191-198.

Record 104 of 124 - AGRICOLA 1998-2004/09

AU: Thro,-A.M.; Zankowski,-P.

TI: Classical plant breeding is the route to food security.

SO: Nature. London : Macmillan Magazines Ltd. Apr 10, 2003. v. 422 (6932) p. 559.

Record 105 of 124 - AGRICOLA 1998-2004/09

AU: Lin,-D.; Tsuzuki,-E.; Sugimoto,-Y.; Dong,-Y.; Matsuo,-M.; Terao,-H.

TI: Assessment of dwarf lilyturf (Ophiopogon japonicus K.) dried powders for weed control in transplanted rice.

SO: Crop-prot. Oxford, U.K. : Elsevier Science Ltd. Mar 2003. v. 22 (2) p. 431-435.

AB: Dwarf lilyturf (Ophiopogon japonicus K.) has been known to be both a cover crop with weed suppression for gardening in Japan

and a medicinal plant. Experiments were conducted to determine the potential of using dwarf lilyturf dried powders for weed control in transplanted rice. All aqueous extracts (1%, 2%, 4%, 8%, w/v) from the dried powders of underground parts of dwarf lilyturf inhibited the germination and seedling growth for three weed species, viz., monchoria (Monocharia Vaginalis P.), smallflower umbrella (Cyperus difformis L.) and bur-Marigold (Bidens biternata L.). However, for barnyardgrass (Echinochloa crusgalli L.), the low concentration (1,2%, w/v) extracts had stimulatory effects of the seedling growths and the higher concentrations (4,8%, w/v) extracts had inhibitory effects. In addition, application of dwarf lilyturf dried powders (50, 100, 150 g m-2) significantly inhibited emergence and dry weights of weeds existed in paddy field and had no adverse effects on growth of transplanted rice. From these results, the dwarf lilyturf plants might be used as a natural herbicide to control weeds in rice fields.

Record 106 of 124 - AGRICOLA 1998-2004/09

AU: Gbehounou,-G.; Adango,-E.

TI: Trap crops of Striga hermonthica: in vitro identification and effectiveness in situ.

SO: Crop-prot. Oxford, U.K. : Elsevier Science Ltd. Mar 2003. v. 22 (2) p. 395-404.

AB: The parasitic weed Striga hermonthica is a major yield-reducing factor for cereal crops in savannah regions in Africa. This applies in particular to agro-ecosystems where a high human population density imposes a strong pressure on arable land. In these areas rotation with a leguminous trap crop is an attractive control method. Effectiveness of root exudates from varieties of cowpea (Vigna unguiculata), groundnut (Arachis hypogea) and soybean (Glycine max), on germination of S. hermonthica seeds were assessed in vitro. In addition, a 2-year study on effectiveness in situ was conducted with cowpea variety IT 90k-56 identified in vitro as a potential trap crop. Furthermore, cowpea variety TVX 1850-01 F also identified in vitro as a potential trap crop, was tested on-farm. Results indicated that effectiveness of root exudates depends on Striga seed population and it is recommended that geographical origin and host crop of S. hermonthica, period of the year, as well as age of seeds be taken into consideration for identification of potential trap crops. There was no significant difference in Striga infestation of maize in 1995 if sowing of cowpea variety IT 90k-56 had been carried out on June 3 (early sowing), June 20 (intermediate sowing) or July 5 (late sowing) in 1994. However, plots where maize was grown in 1995 after they had been maintained as weed-free-fallow in 1994 showed significantly higher Striga infestation than plots where during previous year early sowing of trap crop had been undertaken. Maize grain yields in 1995 were significantly higher after trap cropping in 1994, regardless of sowing date, compared to weed free fallow plots.

On-farm evaluation of cowpea variety TVX 1850-01 F showed good results, reducing incidence of S. hermonthica on maize to nearly undetectable level after one season rotation.

Record 107 of 124 - AGRICOLA 1998-2004/09

AU: Emechebe,-A.M.; Ahonsi,-M.O.
TI: Ability of excised root and stem pieces of maize, cowpea and soybean to cause germination of Striga hermonthica seeds.
SO: Crop-prot. Oxford, U.K. : Elsevier Science Ltd. Mar 2003. v. 22 (2) p. 347-353.
AB: High variation in results from Striga hermonthica experiments is common. The cut-root assay for in vitro screening of host and non-host plant cultivars for germination of S. hermonthica is particularly insensitive. In this study, some factors of the cut-root technique that could effect significant variation in germination percentage of a population of S. hermonthica seeds induced by the same crop cultivar were studied. It was found that excised pieces of both root and stem of maize (hybrid var 8338-1), cowpea (var IT81D-994) and soybean (var TGx 1448-2E) stimulated the germination of S. hermonthica seeds. Germination percentages obtained with maize and cowpea stem pieces were significantly higher than those produced by root pieces. Moistening filter paper on which conditioned Striga seeds were subjected to germination stimulants with 5 ml of distilled water resulted in significantly higher germination of the parasite's seeds induced by stimulants from both maize and soybean, than adding 3 ml of water, regardless of the plant part tested. Starting germination stimulant extraction immediately after cutting plant parts gave significantly higher germination percentage of S. hermonthica seeds than starting 3 h later, regardless of crop species and plant part tested. Conditioning S. hermonthica seeds and subsequent extraction of germination stimulant with non-sterile water generally resulted in higher germination percentage of S. hermonthica seeds than with sterile distilled water. These results are discussed and suggestions made about how to reduce variability of results of the cut-root method of in vitro assaying of germination stimulant production by hosts and trap crops of S. hermonthica.

Record 108 of 124 - AGRICOLA 1998-2004/09
AU: Govereh,-J.; Jayne,-T.S.
TI: Cash cropping and food crop productivity: synergies or trade-offs.
SO: Agric-econ. Amsterdam ; New York : Elsevier, c1986-. Jan 2003. v. 28 (1) p. 39-50.
AB: The case for promoting export-oriented cash crops in Africa has generally been based on their direct potential contribution to agricultural productivity and small farmer incomes. A relatively neglected avenue of research concerns the synergistic effects that cash cropping can have on other household activities, including food production. The conventional view that cash crops compete with food crops for land and labour neglects the potential for cash crop schemes to make available inputs on credit, management training, and other resources that can contribute to food crop productivity, which might otherwise not be accessible to farmers if they did not participate in cash crop programs. This article builds on previous research by hypothesising key pathways by which cash crops may affect food crop activities and empirically measuring these effects using the case of cotton in Gokwe North District in Zimbabwe. Analysis is based on instrumental variable analysis of survey data on 430 rural households in 1996. Results indicate that--after

controlling for household assets, education and locational differences--households engaging intensively in cotton production obtain higher grain yields than non-cotton and marginal cotton producers. We also find evidence of regional spill-over effects whereby commercialisation schemes induce second round investments in a particular area that provide benefits to all farmers in that region, regardless of whether they engage in that commercialisation scheme. The study suggests that the potential spill-over benefits for food crops through participation in cash crop programs are important to consider in the development of strategies designed to intensify African food crop production.

Record 109 of 124 - AGRICOLA 1998-2004/09
AU: Stevens,-J.L.; Jones,-K.C.
TI: Quantification of PCDD/F concentrations in animal manure and comparison of the effects of the application of cattle manure and sewage sludge to agricultural land on human exposure to PCDD/Fs.
SO: Chemosphere. Kidlington, Oxford, U.K. : Elsevier Science Ltd. Mar 2003. v. 50 (9) p. 1183-1191.

Record 110 of 124 - AGRICOLA 1998-2004/09
AU: Cortes,-S.; Gromova,-M.; Evrard,-A.; Roby,-C.; Heyraud,-A.; Rolin, -D.B.; Raymond,-P.; Brouquisse,-R.M.
TI: In plants, 3-O-methylglucose is phosphorylated by hexokinase but not perceived as a sugar.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 824-837.
AB: In plants, sugars are the main respiratory substrates and important signaling molecules in the regulation of carbon metabolism. Sugar signaling studies suggested that sugar sensing involves several key components, among them hexokinase (HXK). Although the sensing mechanism of HXK is unknown, several experiments support the hypothesis that hexose phosphorylation is a determining factor. Glucose (Glc) analogs transported into cells but not phosphorylated are frequently used to test this hypothesis, among them 3-O-methyl-Glc (3-OMG). The aim of the present work was to investigate the effects and fate of 3-OMG in heterotrophic plant cells. Measurements of respiration rates, protein and metabolite contents, and protease activities and amounts showed that 3-OMG is not a respiratory substrate and does not contribute to biosynthesis. Proteolysis and lipolysis are induced in 3-OMG-fed maize (Zea mays L. cv DEA) roots in the same way as in sugar-starved organs. However, contrary to the generally accepted idea, phosphorous and carbon nuclear magnetic resonance experiments and enzymatic assays prove that 3-OMG is phosphorylated to 3-OMG-6-phosphate, which accumulates in the cells. Insofar as plant HXK is involved in sugar sensing, these findings are discussed on the basis of the kinetic properties because the catalytic efficiency of HXK isolated from maize root tips is five orders of magnitude lower for 3-OMG than for Glc and Man.

Record 111 of 124 - AGRICOLA 1998-2004/09
AU: Cona,-A.; Cenci,-F.; Cervelli,-M.; Federico,-R.; Mariottini,-P.; Moreno,-S.; Angelini,-R.
TI: Polyamine oxidase, a hydrogen peroxide-producing enzyme, is up-regulated by light and down-regulated by auxin in the outer

tissues of the maize mesocotyl.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 803-813.
AB: Exogenously supplied auxin (1-naphthaleneacetic acid) inhibited light-induced activity increase of polyamine oxidase (PAO), a hydrogen peroxide-producing enzyme, in the outer tissues of maize (Zea mays) mesocotyl. The same phenomenon operates at PAO protein and mRNA accumulation levels. The wall-bound to extractable PAO activity ratio was unaffected by auxin treatment, either in the dark or after light exposure. Ethylene treatment did not affect PAO activity, thus excluding an effect of auxin via increased ethylene biosynthesis. The auxin polar transport inhibitors N1-naphthylphthalamic acid or 2,3,5-triiodobenzoic acid caused a further increase of PAO expression in outer tissues after light treatment. The small increase of PAO expression, normally occurring in the mesocotyl epidermis during plant development in the dark, was also inhibited by auxin, although to a lesser extent with respect to light-exposed tissue, and was stimulated by N1-naphthylphthalamic acid or 2,3,5-triiodobenzoic acid, thus suggesting a complex regulation of PAO expression. Immunogold ultrastructural analysis in epidermal cells revealed the association of PAO with the secretory pathway and the cell walls. The presence of the enzyme in the cell walls of this tissue greatly increased in response to light treatment. Consistent with auxin effects on light-induced PAO expression, the hormone treatment inhibited the increase in immunogold staining both intraprotoplasmically and in the cell wall. These results suggest that both light and auxin finely tune PAO expression during the light-induced differentiation of the cell wall in the maize mesocotyl epidermal tissues.

Record 112 of 124 - AGRICOLA 1998-2004/09
AU: Dal-Bosco,-C.; Busconi,-M.; Govoni,-C.; Baldi,-P.; Stanca,-A.M.; Crosatti,-C.; Bassi,-R.; Cattivelli,-L.
TI: cor Gene expression in barley mutants affected in chloroplast development and photosynthetic electron transport.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 793-802.
AB: The expression of several barley (Hordeum vulgare) cold-regulated (cor) genes during cold acclimation was blocked in the albino mutant a(n), implying a chloroplast control on mRNAs accumulation. By using albino and xantha mutants ordered according to the step in chloroplast biogenesis affected, we show that the cold-dependent accumulation of cor14b, tmc-ap3, and blt14 mRNAs depends on plastid developmental stage. Plants acquire the ability to fully express cor genes only after the development of primary thylakoid membranes in their chloroplasts. To investigate the chloroplast-dependent mechanism involved in cor gene expression, the activity of a 643-bp cor14b promoter fragment was assayed in wild-type and albino mutant a(n) leaf explants using transient beta-glucuronidase reporter expression assay. Deletion analysis identified a 27-bp region between nucleotides -274 and -247 with respect to the transcription start point, encompassing a boundary of some element that contributes to the cold-induced expression of cor14b. However, cor14b promoter was equally active in green and in albino a(n) leaves, suggesting that chloroplast controls cor14b expression by

posttranscriptional mechanisms. Barley mutants lacking either photosystem I or II reaction center complexes were then used to evaluate the effects of redox state of electron transport chain components on COR14b accumulation. In the mutants analyzed, the amount of COR14b protein, but not the steady-state level of the corresponding mRNA, was dependent on the redox state of the electron transport chain. Treatments of the vir-zb63 mutant with electron transport chain inhibitors showed that oxidized plastoquinone promotes COR14b accumulation, thus suggesting a molecular relationship between plastoquinone/plastoquinol pool and COR14b.

Record 113 of 124 - AGRICOLA 1998-2004/09

AU: Podkowinski,-J.; Jelenska,-J.; Sirikhachornkit,-A.; Zuther,-E.; Haselkorn,-R.; Gornicki,-P.

TI: Expression of cytosolic and plastid acetyl-coenzyme A carboxylase genes in young wheat plants.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 763-772.

AB: Expression of cytosolic and plastid acetyl-coenzyme A carboxylase (ACCase) gene families at the mRNA level was analyzed in developing wheat (Triticum aestivum) plants. The major plastid ACCase mRNA level is high in the middle part of the plant and low in roots and leaf blades. An alternative plastid ACCase transcript initiated at a different promoter and using an alternative 5' splice site for the first intron accumulates to its highest level in roots. Cytosolic ACCase mRNA also consists of two species, one of which is present at approximately a constant level, whereas the other accumulates to a high level in the lower sheath section. It is likely that different promoters are also responsible for the two forms of cytosolic ACCase mRNA. The abundances of cytosolic and plastid ACCase mRNAs in the sheath section of the plant are similar. ACCase protein level is significantly lower in the leaf blades, in parallel with changes in the total ACCase mRNA level. Homoeologous ACCase genes show the same expression patterns and similar mRNA levels, suggesting that none of the genes was silenced or acquired new tissue specificity after polyploidization.

Record 114 of 124 - AGRICOLA 1998-2004/09

AU: Johnson,-P.E.; Patron,-N.J.; Bottrill,-A.R.; Dinges,-J.R.; Fahy,-B.F.; Parker,-M.L.; Waite,-D.N.; Denyer,-K.

TI: A low-starch barley mutant, Riso 16, lacking the cytosolic small subunit of ADP-glucose pyrophosphorylase, reveals the importance of the cytosolic isoform and the identity of the plastidial small subunit.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 684-696.

AB: To provide information on the roles of the different forms of ADP-glucose pyrophosphorylase (AGPase) in barley (Hordeum vulgare) endosperm and the nature of the genes encoding their subunits, a mutant of barley, Riso 16, lacking cytosolic AGPase activity in the endosperm was identified. The mutation specifically abolishes the small subunit of the cytosolic AGPase and is attributable to a large deletion within the coding region of a previously characterized small subunit gene that we have called Hv.AGP.S.1. The plastidial AGPase activity in the mutant

is unaffected. This shows that the cytosolic and plastidial small subunits of AGPase are encoded by separate genes. We purified the plastidial AGPase protein and, using amino acid sequence information, we identified the novel small subunit gene that encodes this protein. Studies of the Riso 16 mutant revealed the following. First, the reduced starch content of the mutant showed that a cytosolic AGPase is required to achieve the normal rate of starch synthesis. Second, the mutant makes both A- and B-type starch granules, showing that the cytosolic AGPase is not necessary for the synthesis of these two granule types. Third, analysis of the phylogenetic relationships between the various small subunit proteins both within and between species, suggest that the cytosolic AGPase single small subunit gene probably evolved from a leaf single small subunit gene.

Record 115 of 124 - AGRICOLA 1998-2004/09

AU: Carden,-D.E.; Walker,-D.J.; Flowers,-T.J.; Miller,-A.J.

TI: Single-cell measurements of the contributions of cytosolic Na+ and K+ to salt tolerance.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 676-683.

AB: Ion concentrations in the roots of two barley (Hordeum vulgare) varieties that differed in NaCl tolerance were compared after exposure to NaCl. Triple-barreled H+-, K+-, and Na+-selective microelectrodes were used to measure cytosolic activities of the three ions after 5 and 8 d of NaCl stress. In both varieties of barley, it was only possible to record successfully from root cortical cells because the epidermal cells appeared to be damaged. The data show that from the 1st d of full NaCl stress, there were differences in the way in which the two varieties responded. At 5 d, the tolerant variety maintained a 10-fold lower cytosolic Na+ than the more sensitive variety, although by 8 d the two varieties were not significantly different. At this time, the more tolerant variety was better at maintaining root cytosolic K+ in the high-NaCl background than was the more sensitive variety. In contrast to earlier work on K+-starved barley (Walker et al., 1996), there was no acidification of the cytosol associated with the decreased cytosolic K+ activity during NaCl stress. These single-cell measurements of cytosolic and vacuolar ion activities allow calculation of thermodynamic gradients that can be used to reveal (or predict) the type of active transporters at both the plasma membrane and tonoplast.

Record 116 of 124 - AGRICOLA 1998-2004/09

AU: Ende,-W.-van-den.; Clerens,-S.; Vergauwen,-R.; Riet,-L.-van.; Laere,-A.-van.; Yoshida,-M.; Kawakami,-A.

TI: Fructan 1-exohydrolases. beta-(2,1)-trimmers during graminan biosynthesis in stems of wheat? Purifiction, characterization, mass mapping, and cloning of two fructan 1-exohydrolase isoforms.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 621-631.

AB: Graminan-type fructans are temporarily stored in wheat (Triticum aestivum) stems. Two phases can be distinguished: a phase of fructan biosynthesis (green stems) followed by a breakdown phase (stems turning yellow). So far, no plant fructan exohydrolase enzymes have been cloned from a monocotyledonous species. Here, we report on the cloning, purification, and characterization of

two fructan 1-exohydrolase cDNAs (1-FEH w1 and w2) from winter wheat stems. Similar to dicot plant 1-FEHs, they are derived from a special group within the cell wall-type invertases characterized by their low isoelectric points. The corresponding isoenzymes were purified to electrophoretic homogeneity, and their mass spectra were determined by quadrupole-time-of-flight mass spectrometry. Characterization of the purified enzymes revealed that inulin-type fructans [beta-(2,1)] are much better substrates than levan-type fructans [beta-(2,6)]. Although both enzymes are highly identical (98% identity), they showed different substrate specificity toward branched wheat stem fructans. Although 1-FEH activities were found to be considerably higher during the fructan breakdown phase, it was possible to purify substantial amounts of 1-FEH w2 from young, fructan biosynthesizing wheat stems, suggesting that this isoenzyme might play a role as a beta-(2,1)-trimmer throughout the period of active graminan biosynthesis. In this way, the species and developmental stage-specific complex fructan patterns found in monocots might be determined by the relative proportions and specificities of both fructan biosynthetic and breakdown enzymes.

Record 117 of 124 - AGRICOLA 1998-2004/09

AU: Hacisalihoglu,-G.; Hart,-J.J.; Wang,-Y.H.; Cakmak,-I.; Kochian,-L. V.

TI: Zinc efficiency is correlated with enhanced expression and activity of zinc-requiring enzymes in wheat.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 595-602.

AB: Zinc (Zn) is an essential micronutrient for plants. The ability of plants to maintain significant yields under low Zn is termed Zn efficiency (ZE) and its genetic and mechanistic basis is still not well understood. Previously, we showed that root Zn uptake did not play a role in ZE. In the current study, Zn-efficient and -inefficient wheat (Triticum aestivum) genotypes were grown for 13 d in chelate buffer nutrient solutions at low (0.1 pM), sufficient (150 pM), and high (1 micromolar) Zn2+ activities and analyzed for root-to-shoot translocation of Zn, subcellular leaf Zn distribution, and activity and expression of the Zn-requiring enzymes in leaves. No correlation between ZE and Zn translocation to the shoot was found. Furthermore, total and water-soluble concentrations of leaf Zn were not associated with ZE, and no differences in subcellular Zn compartmentation were found between Zn-efficient and -inefficient genotypes. However, the expression and activity of the Zn-requiring enzymes copper (Cu)/Zn superoxide dismutase (SOD) and carbonic anhydrase did correlate with differences in ZE. Northern analysis suggested that Cu/ZnSOD gene expression was up-regulated in the Zn-efficient genotype, Kirgiz, but not in inefficient BDME. Under Zn deficiency stress, the very Zn-efficient genotype Kirgiz and moderately Zn-efficient Dagdas exhibited an increased activity of Cu/ZnSOD and carbonic anhydrase when compared with Zn-inefficient BDME. These results suggest that Zn-efficient genotypes may be able to maintain the functioning of Zn-requiring enzymes under low Zn conditions; thus, biochemical Zn utilization may be an important component of ZE in wheat.

Record 118 of 124 - AGRICOLA 1998-2004/09

AU: Yu,-L.X.; Setter,-T.L.
TI: Comparative transcriptional profiling of placenta and endosperm in developing maize kernels in response to water deficit. [Erratum: 2003 Apr., v. 131, no. 4, p. 1921-1922.].
SO: Plant-physiol. Feb 2003. v. 131 (2) p. 568-582.
AB: The early post-pollination phase of maize (Zea mays) development is particularly sensitive to water deficit stress. Using cDNA microarray, we studied transcriptional profiles of endosperm and placenta/pedicel tissues in developing maize kernels under water stress. At 9 d after pollination (DAP), placenta/pedicel and endosperm differed considerably in their transcriptional responses. In placenta/pedicel, 79 genes were significantly affected by stress and of these 89% were up-regulated, whereas in endosperm, 56 genes were significantly affected and 82% of these were down-regulated. Only nine of the stress-regulated genes were in common between these tissues. Hierarchical cluster analysis indicated that different sets of genes were regulated in the two tissues. After rewatering at 9 DAP, profiles at 12 DAP suggested that two regulons exist, one for genes responding specifically to concurrent imposition of stress, and another for genes remaining affected after transient stress. In placenta, genes encoding recognized stress tolerance proteins, including heat shock proteins, chaperonins, and major intrinsic proteins, were the largest class of genes regulated, all of which were up-regulated. In contrast, in endosperm, genes in the cell division and growth category represented a large class of down-regulated genes. Several cell wall-degrading enzymes were expressed at lower levels than in controls, suggesting that stress delayed normal advance to programmed cell death in the central endosperm. We suggest that the responsiveness of placenta to whole-plant stress factors (water potential, abscisic acid, and sugar flux) and of endosperm to indirect factors may play key roles in determining the threshold for kernel abortion.

Record 119 of 124 - AGRICOLA 1998-2004/09
AU: Zhang,-Z.; Quick,-M.K.; Kanelakis,-K.C.; Gijzen,-M.; Krishna,-P.
TI: Characterization of a plant homolog of hop, a cochaperone of Hsp90.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 525-535.
AB: The 90-kD molecular chaperone hsp90 is the key component of a multiprotein chaperone complex that facilitates folding, stabilization, and functional modulation of a number of signaling proteins. The components of the animal chaperone complex include hsp90, hsp70, hsp40, Hop, and p23. The animal Hop functions to link hsp90 and hsp70, and it can also inhibit the ATPase activity of hsp90. We have demonstrated the presence of an hsp90 chaperone complex in plant cells, but not all components of the complex have been identified. Here, we report the isolation and characterization of soybean (Glycine max) GmHop-1, a soybean homolog of mammalian Hop. An analysis of soybean expressed sequence tags, combined with preexisting data in literature, suggested the presence of at least three related genes encoding Hop-like proteins in soybean. Transcripts corresponding to Hop-like proteins in soybean were detected under normal growth conditions, and their levels increased further in response to stress. A recombinant GmHop-1 bound hsp90 and its binding to

hsp90 could be blocked by the tetratricopeptide repeat (TPR) domain of rat (Rattus norvegicus) protein phosphatase 5. Deletion of amino acids 325 to 395, adjacent to the TPR2A domain in GmHop-1, resulted in loss of hsp90 binding. In a minimal assembly system, GmHop-1 was able to stimulate mammalian steroid receptor folding. These data show that plant and animal Hop homologs are conserved in their general characteristics, and suggest that a Hop-like protein in plants is an important cochaperone of plant hsp90.

Record 120 of 124 - AGRICOLA 1998-2004/09

AU: Jang,-I.C.; Oh,-S.J.; Seo,-J.S.; Choi,-W.B.; Song,-S.I.; Kim,-C.H. ; Kim,-Y.S.; Seo,-H.S.; Choi,-Y.D.; Nahm,-B.H.

TI: Expression of a bifunctional fusion of the Escherichia coli genes for trehalose-6-phosphate synthase and trehalose-6-phosphate phosphatase in transgenic rice plants increases trehalose accumulation and abiotic stress tolerance without stunting growth.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 516-524.

AB: Trehalose plays an important role in stress tolerance in plants. Trehalose-producing, transgenic rice (Oryza sativa) plants were generated by the introduction of a gene encoding a bifunctional fusion (TPSP) of the trehalose-6-phosphate (T-6-P) synthase (TPS) and T-6-P phosphatase (TPP) of Escherichia coli, under the control of the maize (Zea mays) ubiquitin promoter (Ubi1). The high catalytic efficiency (Seo et al., 2000) of the fusion enzyme and the single-gene engineering strategy make this an attractive candidate for high-level production of trehalose; it has the added advantage of reducing the accumulation of potentially deleterious T-6-P. The trehalose levels in leaf and seed extracts from Ubi1::TPSP plants were increased up to 1.076 mg g fresh weight-1. This level was 200-fold higher than that of transgenic tobacco (Nicotiana tabacum) plants transformed independently with either TPS or TPP expression cassettes. The carbohydrate profiles were significantly altered in the seeds, but not in the leaves, of Ubi1::TPSP plants. It has been reported that transgenic plants with E. coli TPS and/or TPP were severely stunted and root morphology was altered. Interestingly, our Ubi1::TPSP plants showed no growth inhibition or visible phenotypic alterations despite the high-level production of trehalose. Moreover, trehalose accumulation in Ubi1::TPSP plants resulted in increased tolerance to drought, salt, and cold, as shown by chlorophyll fluorescence and growth inhibition analyses. Thus, our results suggest that trehalose acts as a global protectant against abiotic stress, and that rice is more tolerant to trehalose synthesis than dicots.

Record 121 of 124 - AGRICOLA 1998-2004/09

AU: Shi,-J.; Wang,-H.; Wu,-Y.; Hazebroek,-J.; Meeley,-R.B.; Ertl,-D.S.

TI: The maize low-phytic acid mutant lpa2 is caused by mutation in an inositol phosphate kinase gene.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Feb 2003. v. 131 (2) p. 507-515.

AB: Reduced phytic acid content in seeds is a desired goal for genetic improvement in several crops. Low-phytic acid mutants have been used in genetic breeding, but it is not known what

genes are responsible for the low-phytic acid phenotype. Using a reverse genetics approach, we found that the maize (Zea mays) low-phytic acid lpa2 mutant is caused by mutation in an inositol phosphate kinase gene. The maize inositol phosphate kinase (ZmIpk) gene was identified through sequence comparison with human and Arabidopsis Ins(1,3,4)P3 5/6-kinase genes. The purified recombinant ZmIpk protein has kinase activity on several inositol polyphosphates, including Ins(1,3,4)P3, Ins(3,5,6)P3, Ins(3,4,5,6)P4, and Ins(1,2,5,6)P4. The ZmIpk mRNA is expressed in the embryo, the organ where phytic acid accumulates in maize seeds. The ZmIpk Mutator insertion mutants were identified from a Mutator F2 family. In the ZmIpk Mu insertion mutants, seed phytic acid content is reduced approximately 30%, and inorganic phosphate is increased about 3-fold. The mutants also accumulate myo-inositol and inositol phosphates as in the lpa2 mutant. Allelic tests showed that the ZmIpk Mu insertion mutants are allelic to the lpa2. Southern-blot analysis, cloning, and sequencing of the ZmIpk gene from lpa2 revealed that the lpa2-1 allele is caused by the genomic sequence rearrangement in the ZmIpk locus and the lpa2-2 allele has a nucleotide mutation that generated a stop codon in the N-terminal region of the ZmIpk open reading frame. These results provide evidence that ZmIpk is one of the kinases responsible for phytic acid biosynthesis in developing maize seeds.

Record 122 of 124 - AGRICOLA 1998-2004/09
AU: Chakraverty,-Amalendu.
TI: Handbook of postharvest technology : cereals, fruits, vegetables, tea, and spices.
SO: New York : Marcel Dekker, c2003. xviii, 884 p. : ill.

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AU: Saxena,-N.-P.
TI: Management of agricultural drought : agronomic and genetic options.
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SO: Enfield, NH : Science Publishers, c2003. x, 273 p. : ill. (some col.)