No.	Records	Request
1	36103	SOIL
2	17590	SOILS
3	39097	SOIL or SOILS
4	89585	PLANT
5	46280	PLANTS
6	12035	#3 and (PLANT or PLANTS)
7	16957	PY=2004
* 8	593	#6 and (PY=2004)

Record 1 of 593 - AGRICOLA 1998-2004/09
AU: Zhai,-T.; Mohtar,-R.H.; Karsten,-H.D.; Carlassare,-M.
TI: Modeling growth and competition of a multi-species pasture system.
SO: Transactions of the ASAE. 2004 Mar-Apr, v. 47, no. 2 p. 617-627.
AB: Pastures are often a mixture of different plant species. The growth patterns of these mixtures are determined by the interactions and competition among the coexisting species, as well as their response and interactions with the environment. Grassland management for economic and environmental sustainability should be based on the integrated view of the pasture system and the understanding of the processes involved. Computer models are ideal to study such complex systems. Most modeling efforts have focused on binary combinations of an agronomic crop and a major weed species in agricultural systems. In this research, the GRAzing SImulation Model (GRASIM) was extended to account for growth and interspecies competition among a mixture of plant species, including grasses, legumes, and weeds. In the multispecies GRASIM, a user-specified number of species grow separately on a daily time step, competing for light, soil water, and nitrogen. Forage experiments were conducted on a naturalized pasture at the Pennsylvania State University Beef Research Farm (University Park, Pa.). The pasture was divided and rotationally stocked at two intensities (high and low). Forage biomass data from 1998 and 1999 were used to develop and evaluate the multispecies GRASIM model. The multispecies GRASIM reasonably simulated the growth dynamics of multiple species on two grazing treatments across two seasons, despite the high variability of the pasture. The model-simulated and observed biomass data for the dominant species across the two treatments and the two growing seasons gave regression coefficients of determination (R2) ranging from 0.25 to 0.98. Model limitations and directions for future efforts are outlined and discussed. The multispecies GRASIM can be used to help evaluate coexisting species interaction and their response to the environment and provide insight into the complex mixed-species pasture ecosystem.

Record 2 of 593 - AGRICOLA 1998-2004/09
AU: Pierzynski,-G.M.; Heitman,-J.L.; Kulakow,-P.A.; Kluitenberg,-G.J.; Carlson,-J.
TI: Revegetation of waste fly ash landfills in a semiarid environment.
SO: Journal of range management. 2004 May, v. 57, no. 3 p. 312-319.
AB: This study investigated vegetation strategies for a fly ash landfill in a semi-arid environment. Ten plant species adapted to the local climate were initially evaluated for their germination characteristics in various mixtures of Tivoli fine sand, fly ash,

and cattle manure. Alkali sacaton (native, Sporobolus airoides (Torr.) Torr.), blue grama (native, Bouteloua gracilis (H.B.K.) Lag. Ex Griffiths), a forage sorghum (variety Canex, Sorghum bicolor (L.) Moench), sand bluestem (variety Woodward, Andropogon hallii Hack.), and sideoats grama (variety El Reno, Bouteloua curtipendula (michx.) Torr.) were selected for further evaluation. Concurrently, mixtures were evaluated to determine the effects of the soil amendments on soil saturated paste electrical conductivity (EC) and pH. The addition of even 50 g kg-1 fly ash increased EC values above 4.0 dS m-1, indicating salt tolerant species may be needed. Six mixtures were selected for use in a greenhouse study and for further study of moisture retention characteristics. Using an X/Y format, where X is fly ash content and Y is manure content (g kg-1) and the balance of the mixture was Tivoli fine sand, those mixtures were 0/0, 200/0, 200/100, 200/200, 100/100, and 300/100. The addition of manure provided ample quantities of plant nutrients. Alkali sacaton was the only plant specie not adversely affected by the addition of fly ash. For biomass production, height, vigor and leaf tip burn, all remaining species had significantly better growth or ratings with 0/0 as compared to any other mixture. Soil moisture retention characteristics of the Tivoli fine sand can be significantly changed through amendment with fly ash or manure. Sixty cm of Tivoli sand was estimated to have the same available water holding capacity as 45 cm of 200/0, 39 cm of 200/100, 34 cm of 200/200, 47 cm of 100/100, and 33 cm of 300/100.

Record 3 of 593 - AGRICOLA 1998-2004/09

AU: Butler,-J.L.; Cogan,-D.R.

TI: Leafy spurge effects on patterns of plant species richness.

SO: Journal of range management. 2004 May, v. 57, no. 3 p. 305-311.

AB: The objective of this study was to simultaneously evaluate the impact of leafy spurge (Euphorbia esula L.) on plant species richness within and among a wide variety of vegetation types typical of the region. The study was conducted in Theodore Roosevelt National Park in southwestern North Dakota where 11 plant associations were identified as being particularly susceptible to invasion by leafy spurge. Representative infested and non-infested stands of the 11 associations were sampled using the protocol described by the National Vegetation Classification System. To evaluate the effects of leafy spurge infestation across a variety of vegetation types, the 11 associations were grouped into 1 of 4 general physiographic/vegetative units (floodplain, grassland, woodland, and shrubland). Species richness per sampled infested stand was reduced by an average of 51% (P less than or equal to 0.05) in 7 of the 11 sampled associations. Total species richness in infested stands averaged 61% less than species richness within their non-infested counterparts for 10 of the 11 associations. Thirty species common to the majority of the associations were completely absent from infested stands and classified as sensitive, whereas 25 were minimally impacted and classified as persistent species. The overall effects of leafy spurge on species richness is complex and probably involves patterns of soil moisture, nutrient conditions, and disturbance that influence the abundance and distribution of all alien plants in Theodore Roosevelt National Park. However, because of the considerable redundancy in species distribution among a wide

variety of plant associations and an aggressive control program, overall species richness does not appear to be threatened by infestations of leafy spurge at this time.

Record 4 of 593 - AGRICOLA 1998-2004/09

AU: Romo,-J.T.; Bai,-Y.

TI: Seed bank and plant community composition, Mixed Prairie of Saskatchewan.

SO: Journal of range management. 2004 May, v. 57, no. 3 p. 300-304.

AB: Many range managers have suggested that clubmoss (Selaginella densa Rydb.) negatively alters the composition of seed banks and inhibits the establishment of plant species that decrease under improper grazing management. Alternatively it is possible that soil seed banks contain few seeds of decreaser species and composition of the seed bank is independent of clubmoss. The purpose of this study was to determine the composition and diversity of the soil seed bank in relation to the clubmoss cover and compositional characteristics of plant communities in the Northern Mixed Prairie of southwestern Saskatchewan. Cover of vascular plants was determined and soil seed bank samples were collected in 100 grazed plant communities. Soil seed bank samples were incubated in the laboratory with emerging seedlings being identified to species. Eight percent (SE « 1.9) of emerging seedlings in the seed bank were decreasers, 73% (SE « 2.8) were increasers, and 19% (SE « 2.3) were invaders, indicating regeneration of decreaser species might be limited by low numbers of seeds in seed banks. Clubmoss cover was not correlated (P = 0.32 to 0.98) with species richness, species diversity, density of decreasers, density of increasers, density of invaders, and total seedling densities in the seed banks. Seed banks and plant communities shared few species as indicated by a low similarity index (average = 0.31, SE « 0.02). Species richness (average = 3.6 species per 102 cm2, SE « 0.18) and diversity (average = 1.00, SE « 0.05) of seed banks were poorly correlated with characteristics of the plant communities. Range condition score was positively correlated (r = 0.17, P = 0.09) with total seedling densities in the soil seed bank, indicating more seedlings can potentially develop from the seed bank with increasing range condition of plant communities. We reject the hypothesis that clubmoss negatively affects the composition of seed banks. Mechanically disturbing plant communities to control clubmoss is predicted to lead to plant communities that are dominated by increasers and/or invaders. Managing for production of seeds by desired species should be a priority in promoting establishment of desired species.

Record 5 of 593 - AGRICOLA 1998-2004/09

AU: Todd,-R.W.; Guo,-W.; Stewart,-B.A.; Robinson,-C.

TI: Vegetation, phosphorus, and dust gradients downwind from a cattle feedyard.

SO: Journal of range management. 2004 May, v. 57, no. 3 p. 291-299.

AB: A native shortgrass pasture downwind from a 25,000-head beef cattle feedyard near Bushland, Tex. degraded after the feedyard was stocked in 1970. Objectives were to determine pre-1970 vegetation, quantify current vegetation, and describe changes in vegetation, soil P and dust deposition with distance from the feedyard. Pre-1970 vegetation was documented with published

measurements. In 2000, plant cover was quantified using 600 quadrats. Soil P, conserved in the local soil, was measured in soil samples from 119 locations. Dust was collected at 12 locations. From 1966-1972, cover was 18.8% blue grama [Bouteloua gracilis (H.B.K.) Lag. ex Griffiths] and 7.4% buffalograss [Buchloe dactyloides (Nutt.) Engelm.]; the 2 species comprised 95% of vegetation cover. In 2000, perennial grass (75-99% blue grama) cover averaged 3.7% at < 150 m from the feedyard, and increased to 28% at > 525 m from the feedyard. Conversely, annual grass (67% Hordeum pusillum Nutt.) and annual forb [72% Kochia scoparia (L.) Schrad.] covers were 49% and 35% nearest the feedyard and decreased to 9% and 1%, respectively, at > 525 m. Over a similar distance, soil P decreased from 75 to 17 mg kg-1. Dust deposition rate decreased with distance from the feedyard. Manure dust contribution to total dust ranged from negligible to 89%. It was estimated that 20-30 kg N ha-1year-1were deposited over 30 years to areas nearest the feedyard. Changes in vegetation and soil P were greatest at < 500 m from the feedyard. Vegetation and soil P were near values expected for shortgrass prairie at > 500 m downwind from the feedyard. The pattern of vegetation, soil fertility, and dust deposition gradients strongly suggested that the feedyard was the primary cause of the observed changes, although a direct causal link could not be established, and other factors, such as grazing, could have contributed to the observed changes.

Record 6 of 593 - AGRICOLA 1998-2004/09

AU: Karamanos,-A.J.; Bilalis,-D.; Sidiras,-N.

TI: Effects of reduced tillage and fertilization practices on soil characteristics, plant water status, growth and yield of upland cotton.

SO: Journal of agronomy and crop science = Zeitschrift fèur Acker- und Pflanzenbau. 2004 Aug., v. 190, no. 4 p. 262-276.

Record 7 of 593 - AGRICOLA 1998-2004/09

AU: Bret-Harte,-M.S.; Garcia,-E.A.; Sacre,-V.M.; Whorley,-J.R.; Wagner,-J.L.; Lippert,-S.C.; Chapin,-F.S.-III

TI: Plant and soil responses to neightbour removal and fertilization in Alaskan tussock tundra.

SO: Journal of ecology. 2004 Aug., v. 92, no. 4 p. 635-647.

Record 8 of 593 - AGRICOLA 1998-2004/09

AU: Denison,-R.F.; Kiers,-E.T.

TI: Lifestyle alternatives for rhizobia: mutualism, parasitism, and forgoing symbiosis.

SO: FEMS microbiology letters Federation of European Microbiological Societies. 2004 Aug. 15, v. 237, no. 2 p. 187-193.

AB: Strains of rhizobia within a single species can have three different genetically determined strategies. Mutualistic rhizobia provide their legume hosts with nitrogen. Parasitic rhizobia infect legumes, but fix little or no nitrogen. Nonsymbiotic strains are unable to infect legumes at all. Why have rhizobium strains with one of these three strategies not displaced the others? A symbiotic (mutualistic or parasitic) rhizobium that succeeds in founding a nodule may produce many millions of descendants. The chances of success can be so low, however, that nonsymbiotic rhizobia can have greater reproductive success.

Legume sanctions against nodules that fix little or no nitrogen favor more mutualistic strains, but parasitic strains that use plant resources only for their own reproduction may do well when they share nodules with mutualistic strains.

Record 9 of 593 - AGRICOLA 1998-2004/09

AU: Sajidan,-A.; Farouk,-A.; Greiner,-R.; Jungblut,-P.; Muller,-E.C.; Borriss,-R.

TI: Molecular and physiological characterisation of a 3-phytase from soil bacterium Klebsiella sp. ASR1.

SO: Applied microbiology and biotechnology. 2004 July, v. 65, no. 1 p. 110-118.

AB: Klebsiella sp. strain ASR1 isolated from an Indonesian rice field is able to hydrolyse myo-inositol hexakis phosphate (phytate). The phytase protein was purified and characterised as a 42 kDa protein accepting phytate, NADP and sugar phosphates as substrates. The corresponding gene (phyK) was cloned from chromosomal DNA using a combined approach of protein and genome analysis, and expressed in Escherichia coli. The recombinant enzyme was identified as a 3-phytase yielding myo-inositol monophosphate, Ins(2)P, as the final product of enzymatic phytate hydrolysis. Based on its amino acid sequence, PhyK appears to be a member of a hitherto unknown subfamily of histidine acid phytate-degrading enzymes with the active site RHGXRXP and HD sequence motifs, and is different from other general phosphatases and phytases. Due to its ability to degrade sodium phytate to the mono phosphate ester, the phyK gene product is an interesting candidate for industrial and agricultural applications to make phytate phosphorous available for plant and animal nutrition.

Record 10 of 593 - AGRICOLA 1998-2004/09

AU: Addington,-R.N.; Mitchell,-R.J.; Oren,-R.; Donovan,-L.A.

TI: Stomatal sensitivity to vapor pressure deficit and its relationship to hydraulic conductance in Pinus palustris.

SO: Tree physiology. 2004 May, v. 24, no. 5 p. 561-569.

AB: We studied the response of stomatal conductance at leaf (gS) and canopy (GS) scales to increasing vapor pressure deficit (D) in mature Pinus palustris Mill. (longleaf pine) growing in a sandhill habitat in the coastal plain of the southeastern USA. Specifically, we determined if variation in the stomatal response to D was related to variation in hydraulic conductance along the soil-to-leaf pathway (KL) over the course of a growing season. Reductions in KL were associated with a severe growing season drought that significantly reduced soil water content (theta) in the upper 90-cm soil profile. Although KL recovered partially following the drought, it never reached pre-drought values. Stomatal sensitivity to D was well correlated with maximum gS at low D at both leaf and canopy scales, and KL appeared to influence this response by controlling maximum gS. Our results are consistent with the hypothesis that stomatal response to D occurs to regulate minimum leaf water potential, and that the sensitivity of this response is related to changes in whole-plant hydraulics.

Record 11 of 593 - AGRICOLA 1998-2004/09

AU: Ma,-Q.; Wauchope,-R.D.; Ma,-L.; Rojas,-K.W.; Malone,-R.W.; Ahuja,-L.R.

TI: Test of the Root Zone Water Quality Model (RZWQM) for predicting runoff of atrazine, alachlor and fenamiphos species from conventional-tillage corn mesoplots.
SO: Pest management science. 2004 Mar., v. 60, issue 3 p. 267-276.
AB: The Root Zone Water Quality Model (RZWQM) is a comprehensive, integrated physical, biological and chemical process model that simulates plant growth and movement of water, nutrients and pesticides in a representative area of an agricultural system. We tested the ability of RZWQM to predict surface runoff losses of atrazine, alachlor, fenamiphos and two fenamiphos oxidative degradates against results from a 2-year mesoplot rainfall simulation experiment. Model inputs included site-specific soil properties and weather, but default values were used for most other parameters, including pesticide properties. No attempts were made to calibrate the model except for soil crust/seal hydraulic conductivity and an adjustment of pesticide persistence in near-surface soil. Approximately 2.5 («0.9), 3.0 («0.8) and 0.3 («0.2)% of the applied alachlor, atrazine and fenamiphos were lost in surface water runoff, respectively. Runoff losses in the 'critical' events - those occurring 24 h after pesticide application - were respectively 91 («5), 86 («6) and 96 («3)% of total runoff losses for these pesticides. RZWQM adequately predicted runoff water volumes, giving a predicted/observed ratio of 1.2 («0.5) for all events. Predicted pesticide concentrations and loads from the 'critical' events were generally within a factor of 2, but atrazine losses from these events were underestimated, which was probably a formulation effect, and fenamiphos losses were overestimated due to rapid oxidation. The ratios of predicted to measured pesticide concentrations in all runoff events varied between 0.2 and 147, with an average of 7. Large over-predictions of pesticide runoff occurred in runoff events later in the season when both loads and concentrations were small. The normalized root mean square error for pesticide runoff concentration predictions varied between 42 and 122%, with an average of 84%. Pesticide runoff loads were predicted with a similar accuracy. These results indicate that the soil-water mixing model used in RZWQM is a robust predictor of pesticide entrainment and runoff.

Record 12 of 593 - AGRICOLA 1998-2004/09
AU: Malone,-R.W.; Ahuja,-L.R.; Ma,-L.; Wauchope,-R.D.; Ma,-Q.; Rojas,-K.W.
TI: Application of the Root Zone Water Quality Model (RZWQM) to pesticide fate and transport: an overview.
SO: Pest management science. 2004 Mar., v. 60, issue 3 p. 205-221.
AB: Pesticide transport models are tools used to develop improved pesticide management strategies, study pesticide processes under different conditions (management, soils, climates, etc) and illuminate aspects of a system in need of more field or laboratory study. This paper briefly overviews RZWQM history and distinguishing features, overviews key RZWQM components and reviews RZWQM validation studies. RZWQM is a physically based agricultural systems model that includes sub-models to simulate: infiltration, runoff, water distribution and chemical movement in the soil; macropore flow and chemical movement through macropores; evapotranspiration (ET); heat transport; plant growth; organic matter/nitrogen cycling; pesticide processes; chemical

transfer to runoff; and the effect of agricultural management practices on these processes. Research to date shows that if key input parameters are calibrated, RZWQM can adequately simulate the processes involved with pesticide transport (ET, soil-water content, percolation and runoff, plant growth and pesticide fate). A review of the validation studies revealed that (1) accurate parameterization of restricting soil layers (low permeability horizons) may improve simulated soil-water content; (2) simulating pesticide sorption kinetics may improve simulated soil pesticide concentration with time (persistence) and depth and (3) calibrating the pesticide half-life is generally necessary for accurate pesticide persistence simulations. This overview/review provides insight into the processes involved with the RZWQM pesticide component and helps identify model weaknesses, model strengths and successful modeling strategies.

Record 13 of 593 - AGRICOLA 1998-2004/09

AU: Arregui,-M.C.; Lenardon,-A.; Sanchez,-D.; Maitre,-M.; Scotta,-R.; Enrique,-S.

TI: Monitoring glyphosate residues in transgenic glyphosate-resistant soybean.

SO: Pest management science. 2004 Feb., v. 60, issue 2 p. 163-166.

AB: The availability of Roundup Ready (RR) varieties of soybean has increased the use of glyphosate for weed control in Argentina. Glyphosate [(N-phosphonomethyl)glycine] is employed for the eradication of previous crop vegetation and for weed control during the soybean growing cycle. Its action is effective, and low environmental impact has been reported so far. No residues have been observed in soil or water, either of glyphosate or its metabolite, AMPA (aminomethylphosphonic acid). The objective of this work was to monitor glyphosate and AMPA residues in soybean plants and grains in field crops in Santa Fe Province, Argentina. Five sites were monitored in 1997, 1998 and 1999. Individual soybean plants were sampled from emergence to harvest, dried and ground. Analysis consisted in residue extraction with organic solvents and buffers, agitation, centrifugation, clean-up and HPLC with UV detection. In soybean leaves and stems, glyphosate residues ranged from 1.9 to 4.4 mg kg-1 and from 0.1 to 1.8 mg kg-1 in grains. Higher concentrations were detected when glyphosate was sprayed several times during the crop cycle, and when treatments approached the flowering stage. AMPA residues were also detected in leaves and in grains, indicating metabolism of the herbicide.

Record 14 of 593 - AGRICOLA 1998-2004/09

AU: Harrier,-L.A.; Watson,-C.A.

TI: The potential role of arbuscular mycorrhizal (AM) fungi in the bioprotection of plants against soil-borne pathogens in organic and/or other sustainable farming systems.

SO: Pest management science. 2004 Feb., v. 60, issue 2 p. 149-157.

AB: Sustainable farming systems strive to minimise the use of synthetic pesticides and to optimise the use of alternative management strategies to control soil-borne pathogens. Arbuscular mycorrhizal (AM) fungi are ubiquitous in nature and constitute an integral component of terrestrial ecosystems, forming symbiotic associations with plant root systems of over 80% of all terrestrial plant species, including many agronomically important

species. AM fungi are particularly important in organic and/or sustainable farming systems that rely on biological processes rather than agrochemicals to control plant diseases. Of particular importance is the bioprotection conferred to plants against many soil-borne pathogens such as species of Aphanomyces, Cylindrocladium, Fusarium, Macrophomina, Phytophthora, Pythium, Rhizoctonia, Sclerotinium, Verticillium and Thielaviopsis and various nematodes by AM fungal colonisation of the plant root. However, the exact mechanisms by which AM fungal colonisation confers the protective effect are not completely understood, but a greater understanding of these beneficial interactions is necessary for the exploitation of AM fungi within organic and/or sustainable farming systems. In this review, we aim to discuss the potential mechanisms by which AM fungi may contribute to bioprotection against plant soil-borne pathogens. Bioprotection within AM fungal-colonised plants is the outcome of complex interactions between plants, pathogens and AM fungi. The use of molecular tools in the study of these multifaceted interactions may aid the optimisation of the bioprotective responses and their utility within sustainable farming systems.

Record 15 of 593 - AGRICOLA 1998-2004/09

AU: McQuilken,-M.P.; Hopkins,-K.E.

TI: Biology and integrated control of Pestalotiopsis on container-grown ericaceous crops.

SO: Pest management science. 2004 Feb., v. 60, issue 2 p. 135-142.

AB: Pestalotiopsis isolates obtained from the foliage, stem-base and roots of diseased container-grown ericaceous crops (Calluna, Erica, Pieris and Rhododendron) collected from UK nurseries were identified as Pestalotiopsis sydowiana (Bresad) B Sutton on the basis of conidia morphology. Inoculum sources of the pathogen included diseased stock plants, crop debris, nursery soils, used growing media, pots and floor covering, and dust collected from greenhouse walkways. Isolates were not host-specific and infected other species of ericaceous plants, with typical symptoms including browning of foliage, stems and roots, and the presence of black or greenish black acervuli on diseased tissue. The optimum temperature for growth of three selected isolates of the pathogen was 20-25 ÀC, with little or no growth occurring below 5 or above 30 ÀC. Growth occurred over pH 2.6-8.6, with optimum at 5.5. Decreases in matric potential from -0.3 to -4.0 MPa reduced growth, which was totally inhibited at -6.5 MPa. Greenhouse trials were conducted to evaluate the effects of disease management methods (irrigation, flooring/pot disinfection and fungicide application) on control of the pathogen on potted plants of C vulgaris. Disease incidence and foliar browning caused by P sydowiana were less on fungicide-treated (five-spray programme of alternating prochloraz and carbendazim) potted plants watered by sub-irrigation compared with watering from overhead. Single and combined treatments of flooring/pot disinfection (hydrogen peroxide/peracetic acid) and the five-spray fungicide programme significantly reduced disease incidence and severity compared with dipping pots in water. The combined disinfection and fungicide programme significantly reduced disease incidence and severity, compared to disinfection or fungicide application alone. The importance of these findings for the integrated control of P sydowiana on ericaceous plant nurseries is

discussed.

Record 16 of 593 - AGRICOLA 1998-2004/09

AU: Bromilow,-R.H.

TI: Paraquat and sustainable agriculture.

SO: Pest management science. 2004 Apr., v. 60, issue 4 p. 340-349.

AB: Sustainable agriculture is essential for man's survival, especially given our rapidly increasing population. Expansion of agriculture into remaining areas of natural vegetation is undesirable, as this would reduce biodiversity on the planet. Maintaining or indeed improving crop yields on existing farmed land, whether on a smallholder scale or on larger farms, is thus necessary. One of the limiting factors is often weed control; biological control of weeds is generally of limited use and mechanical control is either often difficult with machinery or very laborious by hand. Thus the use of herbicides has become very important. Minimum cultivation can also be important, as it reduces the power required to work the soil, limits erosion and helps to maintain the organic matter content of the soil. This last aspect helps preserve both the structure of soil and its populations of organisms, and also sustains the Earth's soil as a massive sink for carbon, an important consideration in the light of global warming. The introduction of the bipyridinium herbicide paraquat in the early 1960s greatly facilitated weed control in many crops. Paraquat has the unusual property of being active only by direct spray onto plants and not by uptake from soil in which strong binding deactivates it. Together with its rapid action in light in killing green plant tissue, such properties allow paraquat to be used in many crops, including those grown by low-tillage methods. This paper reviews the ways in which agricultural systems have been and are being developed to make use of these properties, and provides a risk/benefit analysis of the world-wide use of paraquat over nearly 40 years.

Record 17 of 593 - AGRICOLA 1998-2004/09

AU: Freeman,-J.L.; Persans,-M.W.; Nieman,-K.; Albrecht,-C.; Peer,-W.; Pickering,-I.J.; Salt,-D.E.

TI: Increased glutathione biosynthesis plays a role in nickel tolerance in Thlaspi nickel hyperaccumulators.

SO: Plant cell. 2004 Aug., v. 16, no. 8 p. 2176-2191.

AB: Worldwide more than 400 plant species are now known that hyperaccumulate various trace metals (Cd, Co, Cu, Mn, Ni, and Zn), metalloids (As) and nonmetals (Se) in their shoots. Of these, almost one-quarter are Brassicaceae family members, including numerous Thlaspi species that hyperaccumulate Ni up to 3% of there shoot dry weight. We observed that concentrations of glutathione, Cys, and O-acetyl-L-serine (OAS), in shoot tissue, are strongly correlated with the ability to hyperaccumulate Ni in various Thlaspi hyperaccumulators collected from serpentine soils , including Thlaspi goesingense, T. oxyceras, and T. rosulare, and nonaccumulator relatives, including T. perfoliatum, T. arvense, and Arabidopsis thaliana. Further analysis of the Austrian Ni hyperaccumulator T. goesingense revealed that the high concentrations of OAS, Cys, and GSH observed in this hyperaccumulator coincide with constitutively high activity of both serine acetyltransferase (SAT) and glutathione reductase. SAT catalyzes the acetylation of L-Ser to produce OAS, which acts

as both a key positive regulator of sulfur assimilation and forms the carbon skeleton for Cys biosynthesis. These changes in Cys and GSH metabolism also coincide with the ability of T. goesingense to both hyperaccumulate Ni and resist its damaging oxidative effects. Overproduction of T. goesingense SAT in the nonaccumulator Brassicaceae family member Arabidopsis was found to cause accumulation of OAS, Cys, and glutathione, mimicking the biochemical changes observed in the Ni hyperaccumulators. In these transgenic Arabidopsis, glutathione concentrations strongly correlate with increased resistance to both the growth inhibitory and oxidative stress induced effects of Ni. Taken together, such evidence supports our conclusion that elevated GSH concentrations, driven by constitutively elevated SAT activity, are involved in conferring tolerance to Ni-induced oxidative stress in Thlaspi Ni hyperaccumulators.

Record 18 of 593 - AGRICOLA 1998-2004/09

AU: Bucci,-S.J.; Goldstein,-G.; Meinzer,-F.C.; Scholz,-F.G.; Franco,-A.C.; Bustamante,-M.

TI: Functional convergence in hydraulic architecture and water relations of tropical savanna trees: from leaf to whole plant.

SO: Tree physiology. 2004 Aug., v. 24, no. 8 p. 891-899.

AB: Functional convergence in hydraulic architecture and water relations, and potential trade-offs in resource allocation were investigated in six dominant neotropical savanna tree species from central Brazil during the peak of the dry season. Common relationships between wood density and several aspects of plant water relations and hydraulic architecture were observed. All species and individuals shared the same negative exponential relationship between sapwood saturated water content and wood density. Wood density was a good predictor of minimum (midday) leaf water potential and total daily transpiration, both of which decreased linearly with increasing wood density for all individuals and species. With respect to hydraulic architecture, specific and leaf-specific hydraulic conductivity decreased and the leaf:sapwood area ratio increased more than 5-fold as wood density increased from 0.37 to 0.71 g cm-3 for all individuals and species. Wood density was also a good predictor of the temporal dynamics of water flow in stems, with the time of onset of sap flow in the morning and the maximum sap flow tending to occur progressively earlier in the day as wood density increased. Leaf properties associated with wood density included stomatal conductance, specific leaf area, and osmotic potential at the turgor loss point, which decreased linearly with increasing wood density. Wood density increased linearly with decreasing bulk soil water potential experienced by individual plants during the dry season, suggesting that wood density was greatest in individuals with mostly shallow roots, and therefore limited access to more abundant soil water at greater depths. Despite their taxonomic diversity and large intrapopulation differences in architectural traits, the six co-occurring species and their individuals shared similar functional relationships between all pairs of variables studied. Thus, rather than differing intrinsically in physiological responsiveness, the species and the individuals appeared to have distinct operating ranges along common physiological response curves dictated by plant architectural and structural features. The patterns of water uptake and access to

soil water during the dry season appeared to be the main determinant of wood density, which constrained evolutionary options related to plant water economy and hydraulic architecture, leading to functional convergence in the neotropical savanna trees studied.

Record 19 of 593 - AGRICOLA 1998-2004/09
AU: Phillips,-N.G.; Oren,-R.; Licata,-J.; Linder,-S.
TI: Time series diagnosis of tree hydraulic characteristics.
SO: Tree physiology. 2004 Aug., v. 24, no. 8 p. 879-890.
AB: An in vivo method for diagnosing hydraulic characteristics of branches and whole trees is described. The method imposes short-lived perturbations of transpiration and traces the propagation of the hydraulic response through trees. The water uptake response contains the integrated signature of hydraulic resistance and capacitance within trees. The method produces large signal to noise ratios for analysis, but does not cause damage or destruction to tree stems or branches. Based on results with two conifer tree species, we show that the method allows for the simple parameterization of bulk hydraulic resistance and capacitance of trees. Bulk tree parameterization of resistance and capacitance predicted the overall diel shape of water uptake, but did not predict the overshoot water uptake response in trees to shorter-term variations in transpiration, created by step changes in transpiration rate. Stomatal dynamics likely complicated the use of simple resistanceÆcapacitance models of tree water transport on these short time scales. The results provide insight into dominant hydraulic and physiological factors controlling tree water flux on varying time scales, and allow for the practical assessment of necessary tree hydraulic model complexity in relation to the time step of soil- vegetation-atmosphere transport models.

Record 20 of 593 - AGRICOLA 1998-2004/09
AU: Li,-S.M.; Li,-L.; Zhang,-F.S.; Tang,-C.
TI: Acid phosphatase role in chickpea/maize intercropping.
SO: Annals of botany. 2004 Aug., v. 94, no. 2 p. 297-303.
AB: Background and aims Organic P comprises 30-80 % of the total P in most agricultural soils. It has been proven that chickpea facilitates P uptake from an organic P source by intercropped wheat. In this study, acid phosphatase excreted from chickpea roots is quantified and the contribution of acid phosphatase to the facilitation of P uptake by intercropped maize receiving phytate is examined. Methods For the first experiment using hydroponics, maize (Zea mays 'Zhongdan No. 2') and chickpea (Cicer arietinum 'Sona') were grown in either the same or separate containers, and P was supplied as phytate, KH2PO4 at 0.25 mmol P L-1, or not at all. The second experiment involved soil culture with three types of root separation between the two species: (1) plastic sheet, (2) nylon mesh, and (3) no barrier. Maize plants were grown in one compartment and chickpea in the other. Phosphorus was supplied as phytate, Ca(H2PO4)2 at 50 mg P kg-1, or no P added. Key results In the hydroponics study, the total P uptake by intercropped maize supplied with phytate was 2.1-fold greater than when it was grown as a monoculture. In the soil experiment, when supplied with phytate, total P uptake by maize with mesh barrier and without root barrier was 2.2 and 1.5 times,

respectively, as much as that with solid barrier. In both experiments, roots of both maize and chickpea supplied with phytate and no P secreted more acid phosphatase than those with KH2PO4 or Ca(H2PO4)2. However, average acid phosphatase activity of chickpea roots supplied with phytate was 2-3-fold as much as maize. Soil acid phosphatase activity in the rhizosphere of chickpea was also significantly higher than maize regardless of P sources. Conclusions Chickpea can mobilize organic P in both hydroponic and soil cultures, leading to an interspecific facilitation in utilization of organic P in maize/chickpea intercropping.

Record 21 of 593 - AGRICOLA 1998-2004/09

AU: Goncalves-Alvim,-S.J.; Collevatti,-R.G.; Fernandes,-G.W.

TI: Effects of genetic variability and habitat of Qualea parviflora (Vochysiaceae) on herbivory by free-feeding and gall-forming insects.

SO: Annals of botany. 2004 Aug., v. 94, no. 2 p. 259-268.

AB: Background and Aims Differences in the chemical and physical traits of plants caused by both genetic and habitat characteristics may influence attack by herbivores. Leaves of Qualea parviflora (Vochysiaceae), a common tree of different habitats in the Brazilian Neotropical savannas (cerrado), are susceptible to severe attack by herbivorous free-living and gall-forming insects. Attack by free-living and gall-forming insects within and between populations of Q. parviflora were examined and it was determined to what extent genetic variability (detected by RAPD markers), phenotypic characteristics of the plants and habit traits influence the number of free-living and gall-forming insect species and individuals attacking the plants, and the intensity of attack. Methods On four occasions in 2000, leaves were sampled from ten individual trees in each of three types of vegetation in the cerrado: campo sujo, cerrado sensu stricto and cerrado at the Ecological Station of Pirapitinga (ESP) , in Tres Marias, north-western Minas Gerais, Brazil. Genetic variability was detected by RAPD markers, and concentrations of nutrients, phenols and tannins, sclerophylly and pre-dawn water potential of leaves were measured. Water and nutrient contents in the soil below each tree characterized the habitat. The free-living and gall-forming herbivorous insects were determined. Key Results Of 69 RAPD markers analysed, 41 were polymorphic and were used for analyses of genetic variability of Q. parviflora. Most of the variability occurred within habitats, accounting for 97.65 % of the genetic variability. Plants in the cerrado sensu stricto and campo sujo were the most similar. There were no significant associations between genetic similarity and the chemical and physical traits of Q. parviflora, or with habitat, nor was there significant correlation between phenotypic and habitat traits. Increasing concentrations of tannins and sulphur, C : N ratio and sclerophylly correlated with increasing percentage of leaf area damaged by herbivores. Decreased sclerophylly, concentration of tannins and C : N ratio, and increased concentration of nutrients in leaves correlated with increased severity of attack by gall-forming insects. Conclusions Nutrient concentration in the soil had more influence, indirectly, on free-feeding insects than did composition of Q. parviflora leaves. However, gall-forming insects are affected

more by leaf quality, attacking fewer sclerophyllous leaves, with larger nutrient but smaller tannin concentrations.

Record 22 of 593 - AGRICOLA 1998-2004/09
AU: Desaeger,-J.; Csinos,-A.; Timper,-P.; Hammes,-G.; Seebold,-K.
TI: Soil fumigation and oxamyl drip applications for nematode and insect control in vegetable plasticulture.
SO: Annals of applied biology. 2004, v. 145, no. 1 p. 59-70.

Record 23 of 593 - AGRICOLA 1998-2004/09
AU: Islam,-M.; Doyle,-M.P.; Phatak,-S.C.; Millner,-P.; Jiang,-X.
TI: Persistence of enterohemorrhagic Escherichia coli O157:H7 in soil and on leaf lettuce and parsley grown in fields treated with contaminated manure composts or irrigation water.
SO: Journal of food protection. 2004 July, v. 67, no. 7 p. 1365-1370.
AB: Outbreaks of enterohemorrhagic Escherichia coli O157:H7 infections associated with lettuce and other leaf crops have occurred with increasing frequency in recent years. Contaminated manure and polluted irrigation water are probable vehicles for the pathogen in many outbreaks. In this study, the occurrence and persistence of E. coli O157:H7 in soil fertilized with contaminated poultry or bovine manure composts or treated with contaminated irrigation water and on lettuce and parsley grown on these soils under natural environmental conditions was determined. Twenty-five plots, each 1.8 by 4.6 m, were used for each crop, with five treatments (one without compost, three with each of the three composts, and one without compost but treated with contaminated water) and five replication plots for each treatment. Three different types of compost, PM-5 (poultry manure compost), 338 (dairy manure compost), and NVIRO-4 (alkaline-stabilized dairy manure compost), and irrigation water were inoculated with an avirulent strain of E. coli O157:H7. Pathogen concentrations were 10(7) CFU/g of compost and 10(5) CFU/ml of water. Contaminated compost was applied to soil in the field as a strip at 4.5 metric tons per hectare on the day before lettuce and parsley seedlings were transplanted in late October 2002. Contaminated irrigation water was applied only once on the plants as a treatment in five plots for each crop at the rate of 2 liters per plot 3 weeks after the seedlings were transplanted. E. coli O157:H7 persisted for 154 to 217 days in soils amended with contaminated composts and was detected on lettuce and parsley for up to 77 and 177 days, respectively, after seedlings were planted. Very little difference was observed in E. coli O157:H7 persistence based on compost type alone. E. coli O157:H7 persisted longer (by >60 days) in soil covered with parsley plants than in soil from lettuce plots, which were bare after lettuce was harvested. In all cases, E. coli O157:H7 in soil, regardless of source or crop type, persisted for >5 months after application of contaminated compost or irrigation water.

Record 24 of 593 - AGRICOLA 1998-2004/09
AU: Olasantan,-F.O.; Bello,-N.J.
TI: Optimum sowing dates for okra (Abelmoschus esculentus) in monoculture and mixture with cassava (Manihot esculenta) during the rainy season in the south-west of Nigeria.
SO: Journal of agricultural science. 2004 Feb., v. 142, pt. 1 p. 49-58.

AB: Experiments to evaluate the optimum sowing date for okra (Abelmoschus esculentus) sown in monoculture or in mixed stands with cassava (Manihot esculenta) were sited on free-draining sandy loam soils in southwestern Nigeria. Okra was sown at the end of July, in mid-August and early September as a late-season crop in 1999 and at the end of May, in early June and at the end of June as an early-season crop in 2000. It was sown at seed rates sufficient to achieve final population densities of 33000 and 40000 plants/ha in late-season crops (1999) and early-season crops (2000), respectively. The late-season crops had shorter growth duration, received less rainfall, and experienced cooler temperatures during establishment and the early vegetative stage, and warmer temperatures during the reproductive phase than the early-season crops. Intercropping had no significant effect on the growth and tuber yields of cassava, or on phenology (i.e. time to vegetative growth, flowering and fruiting) and pod yield of okra in both seasons. However, it reduced weed growth by 35-57%, and kept both the soil and canopy environments of cassava cooler by 2.3-5.8 ÀC and more moist by 15-30 g/kg, compared with monoculture. The phenology and pod yields of the early- and late-season okra in both cropping systems were dependent on sowing date, indicating that okra production is only suitable at particular sowing dates in both seasons. July-sown okra in the 1999 late-season and May-sown crop in the 2000 early-season took progressively the longest time (i.e. 3-10 and 2-5 days, respectively) to flower and fruit, but these crops controlled weeds and modified the cassava environment better than the rest, and gave the highest fresh pod yields and economic returns. It took okra pods longer to reach marketable size in the late season than early season (i.e. 5-9 v 2. 6 days). It is concluded that the optimal sowing date to attain maximum pod yield and economic returns from late-season okra is July or August and from early-season crop is May or early June. Bearing in mind financial constraints and production costs, the optimal season target for maximum edible pods is the early season and for maximum economic returns is the late season.

Record 25 of 593 - AGRICOLA 1998-2004/09

AU: Papastylianou,-I.

TI: Effect of rotation system and N fertilizer on barley and vetch grown in various crop combinations and cycle lengths.

SO: Journal of agricultural science. 2004 Feb., v. 142, pt. 1 p. 41-48.

AB: Under rainfed Mediterranean conditions the dominant crops are cereals and legumes, with the most common crops being barley (Hordeum vulgare) and vetch (Vicia sativa). These two species are grown in rotation, where the cycle length depends on the productivity and the value of the products in the market. In order to study the productivity of cereals and legumes growing in various rotation combinations, an experiment was conducted during the 1982-2000 period, at Athalassa. The experimental site had a calcareous soil and is located in the central plane of Cyprus. The average rainfall is 250 mm per year. The rotation treatments tested were: (a) continuous barley, (b) continuous vetch, (c) vetch-barley, (d) vetch-barley-barley, (e) vetch-vetch-barley-barley and (f) vetch-vetch-vetch-barley-barley. Barley plots were equally

divided to accommodate two rates of N fertilizer (0 and 60 kg N/ ha) which were applied at seeding. Production of both vetch and barley was lower in monocultures than when the two species were grown in rotation. Vetch yield was similar in all rotations, irrespective of the position in the cycle. Productivity of barley was increased by nitrogen application only when grown as a second barley after vetch. However, in years with low productivity due to the rainfall amount and distribution, barley did not respond to nitrogen application. The first crop of barley after vetch gave maximum production without any nitrogen fertilizer application. Nitrogen fertilizer had a decreasing effect on the size and weight of barley grains. These results enable the farmers to select any of the rotation systems studied, based on the economics of the two species, without risking productivity. Nitrogen fertilizer should be applied only to the second crop after vetch in years with high rainfall.

Record 26 of 593 - AGRICOLA 1998-2004/09

AU: Gruber,-S.; Pekrun,-C.; Claupein,-W.

TI: Seed persistence of oilseed rape (Brassica napus): variation in transgenic and conventionally bred cultivars.

SO: Journal of agricultural science. 2004 Feb., v. 142, pt. 1 p. 29-40.

AB: Seeds of oilseed rape (Brassica napus L.) can persist in the soil over several years by becoming secondarily dormant and can then germinate to create volunteer plants in following crops. As well as agricultural impacts caused by volunteers, gene dispersal in time - particularly from genetically modified cultivars - can be another undesirable consequence. Conventionally bred and transgenic seeds were tested in 2001 and 2002 in laboratory experiments, and in a field experiment, by burying seeds in the soil to determine the variation in dormancy and persistence capacity. In the conventional group of cultivars tested in the laboratory, the level of dormancy was 13-76% in 2001, and 3-76% with an extended group in 2002. The transgenic group of cultivars was 1-31% dormant. In the burial experiments the number of viable seeds recovered in the conventionally bred cultivars ranged from 34-90% in 2001, and 7-68% in 2002. In the same studies the transgenic cultivars developed persistence levels from 12-79% in 2001, and 46-67% in 2002. Since dormancy levels of conventionally bred cultivars from 2 harvest years in the laboratory tests correlated significantly (r=0.71), it appears that there is a genetic background to secondary dormancy. There was also a significant correlation (r=0.61 in 2001 and 0.80 in 2002) between the results from laboratory and burial experiments. This indicates that the laboratory approach can simulate the situation in the field. Ageing over 6 months decreased the capacity for seed persistence to about a fifth of the level shown when freshly harvested. As a consequence of ageing and environmental impacts on persistence, only seeds from the same location and harvest year should be used for testing genetic variability. The high genetic variability among currently available rape seed cultivars gives breeding strategies a good chance of ideotyping low persistence genotypes and minimizing the risk of gene dispersal in time.

Record 27 of 593 - AGRICOLA 1998-2004/09

AU: Ayaz,-S.; McKenzie,-B.A.; Hill,-G.D.; McNeil,-D.L.
TI: Variability in yield of four grain legume species in a subhumid temperate environment. II. Yield components.
SO: Journal of agricultural science. 2004 Feb., v. 142, pt. 1 p. 21-28.
AB: The effects of plant population (one-tenth of the optimum to four times the optimum populations in 1998/99 and 10-400 plants/m2 in 1999/2000) and sowing depth (2, 5 and 10 cm) on yield and yield components of four grain-legumes (Cicer arietinum, Lens culinaris, Lupinus angustifolius and Pisum sativum) were studied. Seed yields were strongly positively correlated with the number of pods and seeds/m2 in both years in all species. The mean seed weight and number of branches/plant were inversely related to plant population. There was a nearly six-fold reduction in the number of branches/plant as plant population increased, which was due to restricted branching, and not to branch senescence. Generally, the variation in yield components was species dependent. However, for all species the number of pods/m2 and seeds/m2 could be used as primary criteria for selection in a breeding programme.

Record 28 of 593 - AGRICOLA 1998-2004/09
AU: Ayaz,-S.; McKenzie,-B.A.; Hill,-G.D.; McNeil,-D.L.
TI: Variability in yield of four grain legume species in a subhumid temperate environment. I. Yields and harvest index.
SO: Journal of agricultural science. 2004 Feb., v. 142, pt. 1 p. 9-19.
AB: In 1998/99 and 1999/2000, field trials were conducted to try to explain why grain legume yields and harvest index are more variable than many other crops. Treatments involved varying plant populations and sowing depths and were selected to maximize plant variability. Both yields and harvest index were variable. Total dry matter (TDM) production generally increased as plant population increased up to twice the optimum population. Increases ranged from 80 to 130% with lupins producing the highest yields of 878 and 972 g/m2 of TDM in 1998/99 and 1999/2000 respectively. While plants sown at 10 cm depth produced more TDM than did plants sown at 2 cm, the difference was only 3%. Seed yields followed similar trends to TDM, with maximum yields (mean of 403 g seed/m2) produced at twice the optimum population. Crop harvest index (CHI) was quite variable and ranged from 0.31 to 0.66. Crop HI was lowest (0.43) at the lowest population and increased to 0.55 at twice the optimum plant population. In both seasons, lentil had the highest CHI and lupin the lowest. While CHI was variable there were very close relationships between seed yield and TDM which suggested that maximum seed yield depends on maximizing TDM production. The results also suggest that growers should increase population by a factor of two to obtain maximum seed yields.

Record 29 of 593 - AGRICOLA 1998-2004/09
AU: Stieger,-P.A.; Meyer,-A.D.; Kathmann,-P.; Frundt,-C.; Niederhauser,-I.; Barone,-M.; Kuhlemeier,-C.
TI: The orf13 T-DNA gene of Agrobacterium rhizogenes confers meristematic competence to differentiated cells.
SO: Plant physiology. 2004 July, v. 135, no. 3 p. 1798-1808.
AB: Plant infections by the soil bacterium Agrobacterium rhizogenes

result in neoplastic disease with the formation of hairy roots at the site of infection. Expression of a set of oncogenes residing on the stably integrated T-DNA is responsible for the disease symptoms. Besides the rol (root locus) genes, which are essential for the formation of hairy roots, the open reading frame orf13 mediates cytokinin-like effects, suggesting an interaction with hormone signaling pathways. Here we show that ORF13 induced ectopic expression of KNOX (KNOTTED1-like homeobox) class transcription factors, as well as of several genes involved in cell cycle control in tomato (Lycopersicon esculentum). ORF13 has a retinoblastoma (RB)-binding motif and interacted with maize (Zea mays) RB in vitro, whereas ORF13, bearing a point mutation in the RB-binding motif (ORF13*), did not. Increased cell divisions in the vegetative shoot apical meristem and accelerated formation of leaf primordia were observed in plants expressing orf13, whereas the expression of orf13* had no influence on cell division rates in the shoot apical meristem, suggesting a role of RB in the regulation of the cell cycle in meristematic tissues. On the other hand, ectopic expression of LeT6 was not dependent on a functional RB-binding motif. Hormone homeostasis was only altered in explants of leaves, whereas in the root no effects were observed. We suggest that ORF13 confers meristematic competence to cells infected by A. rhizogenes by inducing the expression of KNOX genes and promotes the transition of infected cells from the G1 to the S phase by binding to RB.

Record 30 of 593 - AGRICOLA 1998-2004/09

AU: Inan,-G.; Zhang,-Q.; Li,-P.; Wang,-Z.; Cao,-Z.; Zhang,-H.; Zhang,-C.; Quist,-T.M.; Goodwin,-S.M.; Zhu,-J.

TI: Salt cress. A halophyte and cryophyte Arabidopsis relative model system and its applicability to molecular genetic analyses of growth and development of extremophiles.

SO: Plant physiology. 2004 July, v. 135, no. 3 p. 1718-1737.

AB: Salt cress (Thellungiella halophila) is a small winter annual crucifer with a short life cycle. It has a small genome (about 2 x Arabidopsis) with high sequence identity (average 92%) with Arabidopsis, and can be genetically transformed by the simple floral dip procedure. It is capable of copious seed production. Salt cress is an extremophile native to harsh environments and can reproduce after exposure to extreme salinity (500 mM NaCl) or cold to -15ÀC. It is a typical halophyte that accumulates NaCl at controlled rates and also dramatic levels of Pro (>150 mM) during exposure to high salinity. Stomata of salt cress are distributed on the leaf surface at higher density, but are less open than the stomata of Arabidopsis and respond to salt stress by closing more tightly. Leaves of salt cress are more succulent-like, have a second layer of palisade mesophyll cells, and are frequently shed during extreme salt stress. Roots of salt cress develop both an extra endodermis and cortex cell layer compared to Arabidopsis. Salt cress, although salt and cold tolerant, is not exceptionally tolerant of soil desiccation. We have isolated several ethyl methanesulfonate mutants of salt cress that have reduced salinity tolerance, which provide evidence that salt tolerance in this halophyte can be significantly affected by individual genetic loci. Analysis of salt cress expressed sequence tags provides evidence for the presence of paralogs, missing in the Arabidopsis genome, and for genes with abiotic stress-relevant functions.

Hybridizations of salt cress RNA targets to an Arabidopsis whole-genome oligonucleotide array indicate that commonly stress-associated transcripts are expressed at a noticeably higher level in unstressed salt cress plants and are induced rapidly under stress. Efficient transformation of salt cress allows for simple gene exchange between Arabidopsis and salt cress. In addition, the generation of T-DNA-tagged mutant collections of salt cress, already in progress, will open the door to a new era of forward and reverse genetic studies of extremophile plant biology.

Record 31 of 593 - AGRICOLA 1998-2004/09
AU: Elstein,-D.
TI: Plants' natural friend.
SO: Agricultural research. 2004 May, v. 52, no. 5 p. 7.

Record 32 of 593 - AGRICOLA 1998-2004/09
AU: Potter,-K.J.B.; Ireson,-J.E.; Allen,-G.R.
TI: Soil characteristics in relation to the long-term efficacy of the biological control agent, the ragwort flea beetle (Longitarsus flavicornis (Coleoptera: Chrysomelidae)) in Australia.
SO: Biological control theory and applications in pest management. 2004 Sept., v. 31, no. 1 p. 49-56.
AB: The root-feeding flea beetle, Longitarsus flavicornis, was released in Australia in 1979 for the biological control of ragwort, Senecio jacobaea. Although the agent has since become well established at many sites, its impact on ragwort populations is noted to vary between years, geographic locations, and under different land-management techniques. This paper addresses the possibility that these variations in efficacy are related to basic soil and climate features of the sites. Soil characteristics and climate were compared between sites where the flea beetle had controlled ragwort and sites where it has had minimal impact on ragwort populations. The only factors that varied significantly between successful and unsuccessful sites were salinity and the abundance of plant roots in the A1 soil horizon. Unsuccessful sites were found to have a higher average salinity and a lower abundance of plant roots compared to successful sites. Multivariate ordination revealed no pattern grouping successful and unsuccessful sites.

Record 33 of 593 - AGRICOLA 1998-2004/09
AU: Lodge,-G.M.
TI: Seed dormancy, germination, seedling emergence, and survival of some temperate perennial pasture grasses in northern New South Wales.
SO: Australian journal of agricultural research. 2004, v. 55, no. 3 p. 345-355.

Record 34 of 593 - AGRICOLA 1998-2004/09
AU: Kirkegaard,-J.A.; Simpfendorfer,-S.; Holland,-J.; Bambach,-R.; Moore,-K.J.; Rebetzke,-G.J.
TI: Effect of previous crops on crown rot and yield of durum and bread wheat in northern NSW.
SO: Australian journal of agricultural research. 2004, v. 55, no. 3 p. 321-334.

Record 35 of 593 - AGRICOLA 1998-2004/09
AU: Krysan,-P.
TI: Ice-cap. A high-throughput method for capturing plant tissue samples for genotype analysis.
SO: Plant physiology. 2004 July, v. 135, no. 3 p. 1162-1169.
AB: High-throughput genotype screening is rapidly becoming a standard research tool in the post-genomic era. A major bottleneck currently exists, however, that limits the utility of this approach in the plant sciences. The rate-limiting step in current high-throughput pipelines is that tissue samples from living plants must be collected manually, one plant at a time. In this article I describe a novel method for harvesting tissue samples from living seedlings that eliminates this bottleneck. The method has been named Ice-Cap to reflect the fact that ice is used to capture the tissue samples. The planting of seeds, growth of seedlings, and harvesting of tissue are all performed in a 96-well format. I demonstrate the utility of this system by using tissue harvested by Ice-Cap to genotype a population of Arabidopsis seedlings that is segregating a previously characterized mutation. Because the harvesting of tissue is performed in a nondestructive manner, plants with the desired genotype can be transferred to soil and grown to maturity. I also show that Ice-Cap can be used to analyze genomic DNA from rice (Oryza sativa) seedlings. It is expected that this method will be applicable to high-throughput screening with many different plant species, making it a useful technology for performing marker assisted selection.

Record 36 of 593 - AGRICOLA 1998-2004/09
AU: Fine,-P.V.A.; Mesones,-I.; Coley,-P.D.
TI: Herbivores promote habitat specialization by trees in Amazonian forests.
SO: Science. 2004 July 30, v. 305, no. 5684 p. 663-665.
AB: In an edaphically heterogeneous area in the Peruvian Amazon, clay soils and nutrient-poor white sands each harbor distinctive plant communities. To determine whether a trade-off between growth and antiherbivore defense enforces habitat specialization on these two soil types, we conducted a reciprocal transplant study of seedlings of 20 species from sixgenera of phylogenetically independent pairs of edaphic specialist trees and manipulated the presence of herbivores. Clay specialist species grew significantly faster than white-sand specialists in both soil types when protected from herbivores. However, when unprotected, white-sand specialists dominated in white-sand forests and clay specialists dominated in clay forests. Therefore, habitat specialization in this system results from an interaction of herbivore pressure with soil type.

Record 37 of 593 - AGRICOLA 1998-2004/09
AU: Asrar,-J.; Ding,-Y.; La-Monica,-R.E.; Ness,-L.C.
TI: Controlled release of tebuconazole from a polymer matrix microparticle: release kinetics and length of efficacy.
SO: Journal of agricultural and food chemistry. 2004 July 28, v. 52, no. 15 p. 4814-4820.
AB: Preparation and characterization of microencapsulated tebuconazole, its release kinetics in water, and the bioefficacy of these formulations in controlling wheat rust in spring wheat

is described herein. Controlled-release (CR) formulations based on matrix microparticles were prepared by the oil-in-water emulsion process. Polymer-based matrix was prepared from poly(methyl methacrylate) (PMMA) and poly(styrene-co-maleic anhydride) (PSMA). Modification of the matrix was achieved by the use of different low molecular weight or polymeric additives. These additives were found to lower the glass transition temperature of the matrix and enhance the release rate of tebuconazole in water, under infinite sink conditions. Release of tebuconazole from matrix microparticles was found to be diffusion controlled. CR formulations were found to be very efficacious in controlling wheat rust. Soil-applied CR formulations prepared from a PMMA or PSMA matrix, modified with poly(vinyl acetate), were as effective in controlling wheat rust (Puccinia recondita) as foliar-applied tebuconazole, Raxil, from Bayer AG. Results suggest that CR formulations with a systemic fungicide, such as tebuconazole, applied as either a soil or seed treatment, may provide control of foliar diseases, possibly eliminating or reducing the need for traditional foliar applications.

Record 38 of 593 - AGRICOLA 1998-2004/09

AU: Singh,-M.P.; Lee,-F.N.; Counce,-P.A.; Gibbons,-J.H.

TI: Mediation of partial resistance to rice blast through anaerobic induction of ethylene.

SO: Phytopathology. 2004 Aug., v. 94, no. 8 p. 819-825.

AB: The correlation between anaerobic soil conditions and increased resistance to rice blast disease has long been observed without benefit of an adequate explanation. We researched flood depth, dissolved oxygen (DO), and ethylene relative to expression of partial blast resistance in cvs. M-201, Newbonnet, LaGrue, Mars, and Cypress. Cultivar blast index (BI) and flood DO decreased with increasing flood depth. BIs were positively correlated with DO. Total leaf blast lesions were 3.4 and 3.2 times greater in cvs. M-201 and LaGrue growing in a 5.0-microliter liter-1 DO nutrient solution than when growing in a 0.1-microliter liter-1 DO solution. Treatment with 0.25 mM ethephon, which releases ethylene, lowered BIs of Newbonnet, LaGrue, and Cypress growing upland when applied drench, foliar, or foliar-drench. If flooded, BIs of ethephon-treated cultivars were decreased by drench and foliar-drench applications only. BIs of upland plants were unchanged, whereas BIs of analogous flooded plants increased following treatment with 0.31 mM aminoethoxyvinylglycine (AVG), an ethylene biosynthesis inhibitor. We hypothesize that varying anaerobic conditions mediate production of phytohormones, particularly ethylene, which modify expression of inherent partial blast resistance in these rice cultivars.

Record 39 of 593 - AGRICOLA 1998-2004/09

AU: Chen,-L.M.; Li,-K.Z.; Miwa,-T.; Izui,-K.

TI: Overexpression of a cyanobacterial phosphoenolpyruvate carboxylase with diminished sensitivity to feedback inhibition in Arabidopsis changes amino acid metabolism.

SO: Planta. 2004 July, v. 219, no. 3 p. 440-449.

AB: Phosphoenolpyruvate carboxylase (EC 4.1.1.31) from Synechococcus vulcanus (SvPEPC) is a unique enzyme, being almost insensitive to feedback inhibition at neutral pH. In order to assess its usefulness in metabolic engineering of plants, SvPEPC was

expressed in Arabidopsis thaliana (L.) Heynh. under the control of the cauliflower mosaic virus 35S promoter. About one-third of the transformants of the T1 generation showed severe visible phenotypes such as leaf bleaching and were infertile when grown on soil. However, no such phenotype was observed with Arabidopsis transformed with Zea mays L. PEPC (ZmPEPC) for C4 photosynthesis, which is normally sensitive to a feedback inhibitor, l-malate. For the SvPEPC transformants of the T2 generation, which had been derived from fertile T1 transformants, three kinds of phenotype were observed when plants were grown on an agar medium containing sucrose: Type-I plants showed poor growth and a block in true leaf development; Type-II plants produced a few true leaves, which were partially bleached; Type-III plants were apparently normal. In Type-I plants, total PEPC activity was increased about 2-fold over the control plant but there was no such increase in Type-III plants. The phenotypes of Type-I plants were rescued when the sucrose-containing agar medium was supplemented with aromatic amino acids. Measurement of the free amino acid content in whole seedlings of Type-I transformants revealed that the levels of the aromatic amino acids Phe and Tyr were lowered significantly as compared with the control plants. In contrast, the levels of several amino acids of the aspartic and glutamic families, such as Asn, Gln and Arg, were markedly enhanced (4- to 8-fold per plant fresh weight). However, when the medium was supplemented with aromatic amino acids, the levels of Asn, Gln, and Arg decreased to levels slightly higher than those of control plants, accompanied by growth recovery. Taken together, it can be envisaged that SvPEPC is capable of efficiently exerting its activity in the plant cell environment so as to cause imbalance between aromatic and non-aromatic amino acid syntheses. The growth inhibition of Type-I plants was presumed to be primarily due to a decreased availability of phosphoenolpyruvate, one of the precursors for the shikimate pathway for the synthesis of aromatic amino acids and phenylpropanoids. The possible usefulness of SvPEPC as one of the key components for installing the C4-like pathway is proposed.

Record 40 of 593 - AGRICOLA 1998-2004/09

AU: DiDonato,-R.J.-Jr.; Roberts,-L.A.; Sanderson,-T.; Eisley,-R.B.; Walker,-E.L.

TI: Arabidopsis Yellow Stripe-Like2 (YSL2): a metal-regulated gene encoding a plasma membrane transporter of nicotianamine-metal complexes.

SO: Plant journal. 2004 Aug., v. 39, no. 3 p. 403-414.

AB: The Yellow Stripe-Like (YSL) family of proteins has been identified based on sequence similarity to maize Yellow Stripe1 (YS1), the transporter responsible for the primary uptake of iron from the soil. YS1 transports iron that is complexed by specific plant-derived Fe(III) chelators called phytosiderophores (PS). Non-grass species of plants neither make nor use PS, yet YSL family members are found in non-grass species (monocot, dicot, gymnosperm, and moss species) including Arabidopsis thaliana. YSLs in non-grasses have been hypothesized to transport metals complexed by nicotianamine (NA), an iron chelator that is structurally similar to PS and which is found in all higher plants . Here we show that Arabidopsis YSL2 (At5g24380) transports iron and copper when these metals are chelated by NA. YSL2 is

expressed in many cell types in both roots and shoots, suggesting that diverse cell types obtain metals as metal-NA complexes. YSL2 transcription is regulated by the levels of iron and copper in the growth medium. Based on its expression pattern, a major function of the YSL2 appears to be in the lateral movement of metals in the vasculature.

Record 41 of 593 - AGRICOLA 1998-2004/09

AU: Joobeur,-T.; King,-J.J.; Nolin,-S.J.; Thomas,-C.E.; Dean,-R.A.

TI: The fusarium wilt resistance locus Fom-2 of melon contains a single resistance gene with complex features.

SO: Plant journal. 2004 Aug., v. 39, no. 3 p. 283-297.

AB: The soil-borne fungus Fusarium oxysporum f.sp. melonis causes significant losses in the cultivated melon, a key member of the economically important family, the Cucurbitaceae. Here, we report the map-based cloning and characterization of the resistance gene Fom-2 that confers resistance to race 0 and 1 of this plant pathogen. Two recombination events, 75 kb apart, were found to bracket Fom-2 after screening approximately 1324 gametes with PCR-based markers. Sequence analysis of the Fom-2 interval revealed the presence of two candidate genes. One candidate gene showed significant similarity to previously characterized resistance genes. Sequence analysis of this gene revealed clear polymorphisms between resistant and susceptible materials and was therefore designated as Fom-2. Analysis of susceptible breeding lines (BL) presenting a haplotype very similar to the resistant cultivar MR-1 indicated that a gene conversion had occurred in Fom-2, resulting in a significant rearrangement of this gene. The second candidate gene which shared high similarity to an essential gene in Arabidopsis, presented an almost identical sequence in MR-1 and BL, further supporting Fom-2 identity. The gene conversion in Fom-2 produced a truncated R gene, revealing new insights into R gene evolution. Fom-2 was predicted to encode an NBS-LRR type R protein of the non-TIR subfamily. In contrast to most members of this class a coiled-coil structure was predicted within the LRR region rather than in the N-terminal. The Fom-2 physical region contained retroelement-like sequences and truncated genes, suggesting that this locus is complex.

Record 42 of 593 - AGRICOLA 1998-2004/09

AU: Gough,-C.M.; Seiler,-J.R.

TI: Belowground carbon dynamics in loblolly pine (Pinus taeda) immediately following diammonium phosphate fertilization.

SO: Tree physiology. 2004 July, v. 24, no. 7 p. 845-851.

AB: Forest soils store an immense quantity of labile carbon (C) and a may be a large potential sink for atmospheric C. Forest management practices such as fertilization may enhance overall C storage in soils, yet changes in physiological processes following nutrient amendments have not been widely investigated. We intensively monitored belowground C dynamics for nearly 200 days following diammonium phosphate fertilization of pot-grown loblolly pine (Pinus taeda L.) seedlings in an effort to examine the short-term effects of fertilization on processes involved in soil C sequestration. Soil respiration rates initially increased in fertilized pots relative to controls, followed by a brief reversal in this trend and then a final sustained pattern of elevated rates of soil respiration in the fertilized treatment.

Patterns in soil respiration rates over time reflected changes in autotrophic (root) and heterotrophic (microbial) components of soil respiration. Root respiration rates were greater in the fertilized treatment 49 days following fertilization and returned to control rates by the end of the study. In contrast, microbial respiration rates and microbial activity per soil C concentration remained depressed over the same time period. Compared with control seedlings, total root biomass was 27% greater in fertilized seedlings harvested at the end of the study, indicating that the elevated soil respiration rates observed toward the end of the study were a result of increased respiring root biomass. We conclude that fertilization, at least over the short-term, may increase soil C sequestration by increasing belowground biomass production and reducing microbial driven C turnover.

Record 43 of 593 - AGRICOLA 1998-2004/09

AU: Mukherjee,-P.K.; Latha,-J.; Hadar,-R.; Horwitz,-B.A.

TI: Role of two G-protein alpha subunits, TgaA and TgaB, in the antagonism of plant pathogens by Trichoderma virens.

SO: Applied and environmental microbiology. 2004 Jan., v. 70, no. 1 p. 542-549.

AB: G-protein subunits are involved in transmission of signals for development, pathogenicity, and secondary metabolism in plant pathogenic and saprophytic fungi. We cloned two G-protein subunit genes, tgaA and tgaB, from the biocontrol fungus Trichoderma virens. tgaA belongs to the fungal Gi class, while tgaB belongs to the class defined by gna-2 of Neurospora crassa. We compared loss-of-function mutants of tgaA and tgaB with the wild type for radial growth, conidiation, germination of conidia, the ability to overgrow colonies of Rhizoctonia solani and Sclerotium rolfsii in confrontation assays, and the ability to colonize the sclerotia of these pathogens in soil. Both mutants grew as well as the wild type, sporulated normally, did not sporulate in the dark, and responded to blue light by forming a conidial ring. The tgaA mutants germinated by straight unbranched germ tubes, while tgaB mutants, like the wild type, germinated by wavy and highly branched germ tubes. In confrontation assays, both tgaA and tgaB mutants and the wild type overgrew, coiled, and lysed the mycelia of R. solani, but tgaA mutants had reduced ability to colonize S. rolfsii colonies. In the soil plate assay, both mutants parasitized the sclerotia of R. solani, but tgaA mutants were unable to parasitize the sclerotia of S. rolfsii. Thus, tgaA is involved in antagonism against S. rolfsii, but neither G protein subunit is involved in antagonism against R. solani. T. virens, which has a wide host range, thus employs a G-protein pathway in a host-specific manner.

Record 44 of 593 - AGRICOLA 1998-2004/09

AU: Pena-Rojas,-K.; Aranda,-X.; Fleck,-I.

TI: Stomatal limitation to CO2 assimilation and down-regulation of photosynthesis in Quercus ilex resprouts in response to slowly imposed drought.

SO: Tree physiology. 2004 July, v. 24, no. 7 p. 813-822.

AB: Holm oak (Quercus ilex L.) is native to hot, dry Mediterranean forests where limited water availability often reduces photosythesis in many species, and forest fires are frequent.

Holm oaks resprout after a disturbance, with improved photosynthetic activity and water relations compared with unburned plants. To better understand the role of water availability in this improvement, watering was withheld from container-grown plants, either intact (controls) or resprouts after excision of the shoot, to gradually obtain a wide range of soil water availabilities. At high water availability, gas exchange rates did not differ between controls and resprouts. At moderate soil dryness, net photosynthesis of control plants decreased as a result of increased stomatal limitation, whereas gas exchange rates of resprouts, which had higher midday and predawn leaf water potentials, were unchanged. Under severe drought, resprouts showed a less marked decline in gas exchange than controls and maintained photosystem II integrity, as indicated by chlorophyll fluorescence measurements. Photosynthesis was down-regulated in both plant types in response to reduced CO2 availability caused by high stomatal limitation. Lower non-stomatal limitations in resprouts than in control plants , as evidenced by higher carboxylation velocity and the capacity for ribulose-1,5-bisphosphate regeneration, conferred greater drought resistance under external constraints similar to summer conditions at midday.

Record 45 of 593 - AGRICOLA 1998-2004/09

AU: Thornley,-J.H.M.; Cannell,-M.G.R.

TI: Long-term effects of fire frequency on carbon storage and productivity of boreal forests: a modeling study.

SO: Tree physiology. 2004 July, v. 24, no. 7 p. 765-773.

AB: Climate change is predicted to shorten the fire interval in boreal forests. Many studies have recorded positive effects of fire on forest growth over a few decades, but few have modeled the long-term effects of the loss of carbon and nitrogen to the atmosphere. We used a process-based, dynamic, forest ecosystem model, which couples the carbon, nitrogen and water cycles, to simulate the effects of fire frequency on coniferous forests in the climate of Prince Albert, Saskatchewan. The model was calibrated to simulate observed forest properties. The model predicted rapid short-term recovery of net primary productivity (NPP) after fire, but in the long term, supported the hypotheses that (1) current NPP and carbon content of boreal forests are lower than they would be without periodic fire, and (2) any increase in fire frequency in the future will tend to lower NPP and carbon storage. Lower long-term NPP and carbon storage were attributable to (1) loss of carbon on combustion, equal to about 20% of NPP over a 100-200 year fire cycle, (2) loss of nitrogen by volatilization in fire, equal to about 3-4 kg N ha-1 year-1 over a 100-200 year fire cycle, and (3) the fact that the normal fire cycle is much shorter than the time taken for the forest (especially the soil) to reach an equilibrium carbon and nitrogen content. It was estimated that a shift in fire frequency from 200 to 100 years over 1000 Mha of boreal forest would release an average of about 0.1 Gt C year-1 over many centuries.

Record 46 of 593 - AGRICOLA 1998-2004/09

AU: Hutchings,-M.J.; John,-E.A.

TI: The effects of environmental heterogeneity on root growth and root/shoot partitioning.

SO: Annals of botany. 2004 July, v. 94, no. 1 p. 1-8.
AB: Aims The purpose of this Botanical Briefing is to stimulate reappraisal of root growth, root/shoot partitioning, and analysis of other aspects of plant growth under heterogeneous conditions. Scope Until recently, most knowledge of plant growth was based upon experimental studies carried out under homogeneous conditions. Natural environments are heterogeneous at scales relevant to plants and in forms to which they can respond. Responses to environmental heterogeneity are often localized rather than plant-wide, and not always predictable from traditional optimization arguments or from knowledge of the ontogenetic trends of plants growing under homogeneous conditions. These responses can have substantial impacts, both locally and plant-wide, on patterns of resource allocation, and significant effects on whole-plant growth. Results from recent studies are presented to illustrate responses of plants, plant populations and plant communities to nutritionally heterogeneous conditions. Conclusions Environmental heterogeneity is a constant presence in the natural world that significantly influences plant behaviour at a variety of levels of complexity. Failure to understand its effects on plants prevents us from fully exploiting aspects of plant behaviour that are only revealed under patchy conditions. More effort should be invested into analysis of the behaviour of plants under heterogeneous conditions.

Record 47 of 593 - AGRICOLA 1998-2004/09
AU: Sliwinski,-M.K.; Goodman,-R.M.
TI: Comparison of crenarchaeal consortia inhabiting the rhizosphere of diverse terrestrial plants with those in bulk soil in native environments.
SO: Applied and environmental microbiology. 2004 Mar., v. 70, no. 3 p. 1821-1826.
AB: To explore whether the crenarchaeal consortium found in the rhizosphere is distinct from the assemblage of crenarchaeotes inhabiting bulk soil, PCR-single-stranded-conformation polymorphism (PCR-SSCP) profiles were generated for 76 plant samples collected from native environments. Divergent terrestrial plant groups including bryophytes (mosses), lycopods (club mosses), pteridophytes (ferns), gymnosperms (conifers), and angiosperms (seed plants) were collected for this study. Statistical analysis revealed significant differences between rhizosphere and bulk soil PCR-SSCP profiles (Hotelling paired T2 test, $P < 0.0001$), suggesting that a distinct crenarchaeal consortium is associated with plants. In general, phylotype richness increased in the rhizosphere compared to the corresponding bulk soil, although the range of this increase was variable. Examples of a major change in rhizosphere (versus bulk soil) PCR-SSCP profiles were detected for all plant groups, suggesting that crenarchaeotes form associations with phylogenetically diverse plants in native environments. In addition, examples of minor to no detectable difference were found for all terrestrial plant groups, suggesting that crenarchaeal associations with plants are mediated by environmental conditions.

Record 48 of 593 - AGRICOLA 1998-2004/09

AU: Conn,-V.M.; Franco,-C.M.M.
TI: Analysis of the endophytic actinobacterial population in the roots of wheat (Triticum aestivum L.) by terminal restriction fragment length polymorphism and sequencing of 16S rRNA clones.
SO: Applied and environmental microbiology. 2004 Mar., v. 70, no. 3 p. 1787-1794.
AB: The endophytic actinobacterial population in the roots of wheat grown in three different soils obtained from the southeast part of South Australia was investigated by terminal restriction fragment length polymorphism (T-RFLP) analysis of the amplified 16S rRNA genes. A new, validated approach was applied to the T-RFLP analysis in order to estimate, to the genus level, the actinobacterial population that was identified. Actinobacterium-biased primers were used together with three restriction enzymes to obtain terminal restriction fragments (TRFs). The TRFs were matched to bacterial genera by the T-RFLP Analysis Program, and the data were analyzed to validate and semiquantify the genera present within the plant roots. The highest diversity and level of endophytic colonization were found in the roots of wheat grown in a dark loam from Swedes Flat, and the lowest were found in water-repellent sand from Western Flat. This molecular approach detected a greater diversity of actinobacteria than did previous culture-dependent methods, with the predominant genera being Mycobacterium (21.02%) in Swedes Flat, Streptomyces (14.35%) in Red Loam, and Kitasatospora (15.02%) in Western Flat. This study indicates that the soil that supported a higher number of indigenous organisms resulted in wheat roots with higher actinobacterial diversity and levels of colonization within the plant tissue. Sequencing of 16S rRNA clones, obtained using the same actinobacterium-biased PCR primers that were used in the T-RFLP analysis, confirmed the presence of the actinobacterial diversity and identified a number of Mycobacterium and Streptomyces species.

Record 49 of 593 - AGRICOLA 1998-2004/09
AU: Brodhagen,-M.; Henkels,-M.D.; Loper,-J.E.
TI: Positive autoregulation and signaling properties of Pyoluteorin, an antibiotic produced by the biological control organism Pseudomonas fluorescens Pf-5.
SO: Applied and environmental microbiology. 2004 Mar., v. 70, no. 3 p. 1758-1766.
AB: Pseudomonas fluorescens Pf-5, a rhizosphere bacterium, produces a suite of secondary metabolites that are toxic to seed- and root-rotting plant pathogens. Among these are the polyketide compounds pyoluteorin and 2,4-diacetylphloroglucinol. We provide evidence that pyoluteorin production is influenced by positive autoregulation. Addition of pyoluteorin to liquid cultures of Pf-5 enhanced pyoluteorin production. In addition, pyoluteorin and 2,4-diacetylphloroglucinol mutually inhibit one another's production in Pf-5. For pyoluteorin, both positive autoregulation and negative influences on production by 2,4-diacetylphloroglucinol were demonstrated at the transcriptional level by measuring activity from transcriptional fusions of an ice nucleation reporter gene (inaZ) to three separate pyoluteorin biosynthetic genes. The occurrence of pyoluteorin autoregulation in the rhizosphere was assessed on cucumber seedlings in pasteurized soil with cross-feeding

experiments. In the rhizosphere, expression of a pyoluteorin biosynthesis gene by a pyoluteorin-deficient mutant of Pf-5 was enhanced by pyoluteorin produced by coinoculated cells of Pf-5. These data establish that the polyketide pyoluteorin is an autoregulatory compound and functions as a signal molecule influencing the spectrum of secondary metabolites produced by the bacterial cell.

Record 50 of 593 - AGRICOLA 1998-2004/09

AU: Chintu,-R.; Mafongoya,-P.L.; Chirwa,-T.S.; Kuntashula,-E.; Phiri,-D.; Matibini,-J.

TI: Propagation and management of Gliricidia sepium planted fallows in sub-humid eastern Zambia.

SO: Experimental agriculture. 2004 July, v. 40, no. 3 p. 341-352.

AB: Gliricidia sepium features prominently as a soil replenishment tree in planted coppicing fallows in eastern Zambia. Its usual method of propagation, through nursery seedlings, is costly and may possibly hinder wider on-farm adoption. We compared fallows propagated by potted and bare root seedlings, direct seeding and stem cuttings, in terms of tree coppice biomass production, soil inorganic N availability and post-fallow maize yields under semi-arid conditions. We hypothesized that cutting fallows initially in May (off-season) would increase subsequent seasonal coppice biomass production as opposed to cutting them in November (at cropping). The tree survival and biomass order after two years was: potted = bare root > direct > cuttings. The post-fallow maize productivity sequence was: fertilized maize = potted = bare root > direct > cuttings = no-tree unfertilized controls, across seasons. However, farmers may prefer directly seeded fallows owing to their cost effectiveness. Soil inorganic N and maize yield were significantly higher in May-cut than in November-cut fallows. Preseason topsoil inorganic N and biomass N input correlated highly with maize yields. This implies that bothparameters may be used to predict post-fallow crop yields.

Record 51 of 593 - AGRICOLA 1998-2004/09

AU: Carsky,-R.J.; Toukourou,-M.A.

TI: Cassava leaf litter estimation in on-farm trials.

SO: Experimental agriculture. 2004 July, v. 40, no. 3 p. 315-326.

AB: Cassava (Manihot esculenta) returns organic matter and nutrients to the soil through leaf litter and these amounts need to be quantified to help understand and design sustainable cropping systems. Our objectives were to estimate dry matter and nutrient contents in cassava leaf litter and to derive relationships between litter fall and easily measurable cassava yield components. Litter traps (1 m2) were placed in farmers' fields for monthly monitoring during a three year period. Maximum monthly leaf litter production ranged from 0.5 to 1.0 t ha-1, and occurred at the end of the first rainy season and at the onset of the next rainy season. In the first year, the mean dry matter of leaves collected during 12 months of growth was 3.4 t ha-1 for the unamended treatment, and 4.1 t ha-1 when N-P-K fertilizer was applied. The totals were 2.4 and 3.0 t ha-1 in 2000-2001 and 1.6 and 2.5 t ha-1 in 2001-2002, respectively. Annual differences were apparently related to rainfall. The relationship with fresh root yield was best described using one slope and yearly intercepts giving an r2 of 0.63. This relationship can be

exploited for estimating litter dry matter in agronomic experiments when rough estimates are sufficient, keeping in mind that the relationship may not be the same for cultivars of differing architecture. Otherwise, the use of litter traps gives the best estimate of annual litter production.

Record 52 of 593 - AGRICOLA 1998-2004/09

AU: Schiere,-J.B.; Joshi,-A.L.; Seetharam,-A.; Oosting,-S.J.; Goodchild,-A.V.; Deinum,-B.; Keulen,-H.-van

TI: Grain and straw for whole plant value: implications for crop management and genetic improvement strategies.

SO: Experimental agriculture. 2004 July, v. 40, no. 3 p. 277-294.

AB: Straws and stovers are often called 'by-products' of grain production even though they are increasingly important, e.g. for animal feed, thatching, soil improvement, mushroom production and industrial use. As a result, plant breeders, agronomists, economists and animal nutritionists have to pay more attention than before to the total value of crops, i.e. whole plant value in which straws and grain both play a part. This paper reviews literature about the technical potential of breeding and/or management for more or better straw. It then discusses issues of the economic value (EV) and nutritional value (NV) of straw and stovers for livestock feed to guide research and development in cereal breeding and management. It is mainly based on experiences from the Indian subcontinent and semi-arid regions of the Near and Middle East. The paper shows that the quantity and quality of straw produced has changed considerably over recent decades as a result of breeding policies, new cultivation patterns and choice of cultivars. Both EV and NV depend on type of grain, animal production system and access to other feeds. A classification of these factors is provided and suggests that the EV of straw is particularly important in low-input systems with stovers from coarse grains.

Record 53 of 593 - AGRICOLA 1998-2004/09

AU: Emechebe,-A.M.; Ellis-Jones,-J.; Schulz,-S.; Chikoye,-D.; Douthwaite,-B.; Kureh,-I.; Tarawali,-G.; Hussaini,-M.A.; Kormawa,-P.; Sanni,-A.

TI: Farmers' perception of the Striga problem and its control in northern Nigeria.

SO: Experimental agriculture. 2004 Apr., v. 40, no. 2 p. 215-232.

AB: The parasitic angiosperms, Striga hermonthica and S. gesnerioides, obligate root parasites endemic in sub-Saharan Africa, constitute severe constraints to cereal and legume production in West and Central Africa. Over the years, a range of effective component technologies has been identified for Striga control in Africa. The potential of these technologies has been demonstrated under researcher-managed conditions. To promote farmer testing of the technologies, community workshops were conducted in 42 rural communities in Kaduna State, northern Nigeria. These revealed that agriculture was the main source of livelihood for most households. The three most important crops, maize, sorghum and pearl millet are attacked by S. hermonthica, regarded as the major constraint to crop production, often causing 70-100% crop loss. Farmers recognised two types of Striga damage (underground and aboveground), with greater damage being caused by underground Striga. Farmers attributed increasing

incidence and severity of Striga damage to lack of capital, poor soil fertility, infestation of previously uninfested land by Striga seeds, and continuous cropping of host crops. The most widely used among the 15 existing Striga control techniques identified by the farmers were hoe weeding and hand pulling, application of inorganic fertilizer and manure, crop rotations, fallowing, and early planting. In assessing possible control measures farmers considered increased crop yield, reduced Striga reproduction and Striga emergence, greater crop vigour, and increased soil fertility as positive attributes. Negative attributes comprised increased labour requirement, higher costs, increased risk of crop damage or yield reduction, and lower quantity and quality of produce. Overall, a legume-cereal rotation was the most highly rated control option for S. hermonthica management evaluated by the farmers. The implications of these results are examined with respect to farmers' adoption and adaptation of Striga control options beyond the experimental plots.

Record 54 of 593 - AGRICOLA 1998-2004/09
AU: Kanton,-R.A.L.; Dennett,-M.D.
TI: Water uptake and use by morphologically contrasting maize/pea cultivars in sole and intercrops in temperate conditions.
SO: Experimental agriculture. 2004 Apr., v. 40, no. 2 p. 201-214.
AB: Growth and water use of sole crops and intercrops of morphologically contrasting maize and pea cultivars were measured in two years. The maize cultivars were Nancis with erectophile and Sophy with planophile leaves and the pea cultivars Maro a leafy pea and Princess a semi-leafless pea. In the first part of the season water use was lower for sole maize but intercrops and sole pea used similar amounts of water. By 90 days after sowing, when peas had matured, all crops had used similar amounts of water. Maize had slightly greater water use efficiency than peas. Cultivars Nancis and Princess tended to have greater water use efficiency than Sophy and Maro respectively. Intercrops produced more dry matter than sole crops and therefore had consistently greater water use efficiencies.

Record 55 of 593 - AGRICOLA 1998-2004/09
AU: Yang,-Z.; Midmore,-D.J.
TI: Experimental assessment of the impact of defoliation on growth and production of water-stressed maize and cotton plants.
SO: Experimental agriculture. 2004 Apr., v. 40, no. 2 p. 189-199.
AB: In this study, different levels of defoliation were imposed on a determinate species (maize) and a relatively indeterminate species (cotton). The aim was to quantify the effects of defoliation on plant growth and production, under either optimum or water-stressed conditions. Under well-watered conditions, 33% defoliation twice (conducted 28 and 35 days after emergence) resulted in a 16% reduction in grain yield of maize while 67% defoliation once (conducted 28 days after emergence) had no significant effect on yield. Under water stress, the grain yields of maize plants with 33% (twice) and 67% defoliation were 13.5% and 25% greater than that of non-defoliated control plants, respectively. For cotton, the reproductive yields (seed and lint) with 33% and 67% defoliation (conducted 43 days after emergence) were reduced, under well-watered conditions, by 28% and 37% of

that of the non-defoliated control, respectively. Defoliated cotton plants lost less fruiting forms (squares and young bolls) than non-defoliated plants during water stress. Therefore, under water stress the harvestable product of cotton plants with 67% defoliation was double that of non-defoliated control plants. In non-defoliated cotton plants, a second flush of flowering after release from water-stress permitted further compensatory fruit set and boll harvest. Defoliated plants did not show such levels of compensation. Defoliation significantly reduced water use by maize and cotton. The relative yield advantage of defoliated plants under water-stress conditions can be attributed to defoliation-induced improvement in water status as reflected in measures of photosynthetic rate and stomatal conductance. Under anticipated drought stress, defoliation could be an important management practice to reduce drought-induced yield decrease, but this needs to be tested under field conditions.

Record 56 of 593 - AGRICOLA 1998-2004/09

AU: Nixon,-D.J.; Simmonds,-L.P.

TI: The impact of fallowing and green manuring on soil conditions and the growth of sugarcane.

SO: Experimental agriculture. 2004 Jan., v. 40, no. 1 p. 127-138.

AB: There are currently concerns within some sugar industries that long-term monoculture has led to soil degradation and consequent yield decline. An investigation was conducted in Swaziland to assess the effects of fallowing and green manuring practices, over a seven-month period, on sugarcane yields and the physical properties of a poorly draining clay soil. In the subsequent first sugarcane crop after planting, yields were improved from 129 t ha-1 under continuous sugarcane to 141-144 t ha-1 after fallowing and green manuring, but there were no significant responses in the first and second ratoon crops. Also, in the first crop after planting, root length index increased from 3.5 km m-2 under continuous sugarcane to 5.2-6.8 km m-2 after fallowing, and improved rooting was still evident in the first ratoon crop where there had been soil drying during the fallow period. Soil bulk density, total porosity and water-holding capacity were not affected by the fallowing practices. However, air-filled porosity increased from 11 % under continuous sugarcane to 16% after fallowing, and steady state ponded infiltration rates were increased from 0.61 mm h-1 to 1.34 mm h-1, but these improvements were no longer evident after a year back under sugarcane. Levels of soil organic matter were reduced in all cases, probably as a result of the tillage operations involved. In the plant crop, root length was well correlated with air-filled porosity, indicating the importance of improving belowground air supply for crop production on poorly draining clay soils.

Record 57 of 593 - AGRICOLA 1998-2004/09

AU: Bonneau,-X.; Husni,-M.; Philippe,-R.; Somchit,-N.; Jourdan,-C.; Lubis,-N.

TI: Discovery of a factor limiting yields in a coconut plantation on peat: the insect pest Sufetula spp.

SO: Experimental agriculture. 2004 Jan., v. 40, no. 1 p. 53-64.

AB: On a large coconut plantation planted on a deep peat soil in Sumatra, Indonesia, hybrid coconut yields are stabilizing at

values well below their potential, even in plots where known production factors have been mastered since the outset: land preparation, water control, and mineral fertilization. To explain this situation, five hypotheses have been proposed. They were tested one by one in field trials. The authors have demonstrated that the main reason for stabilized yields was the Lepidoptera root pest Sufetula spp. and conclude by considering lines of research for controlling this pest in the context of rehabilitation and replanting.

Record 58 of 593 - AGRICOLA 1998-2004/09

AU: Kuntashula,-E.; Mafongoya,-P.L.; Sileshi,-G.; Lungu,-S.

TI: Potential of biomass transfer technologies in sustaining vegetable production in the wetlands (dambos) of eastern Zambia.

SO: Experimental agriculture. 2004 Jan., v. 40, no. 1 p. 37-51.

AB: Farmers grow vegetables widely during the dry season in wetlands known locally as dambos in southern Africa. Declining soil fertility is one of the major factors limiting smallholder vegetable production in the dambos of eastern Zambia. An experiment was initiated with 43 farmers with the objective of assessing the agronomic and economic feasibility of foliar biomass of gliricidia (Gliricidia sepium) and leucaena (Leucaena leucocephala) for production of cabbage, onion and a subsequent maize crop during the dry season. The treatments were, on a dry-matter basis, 8 and 12 t ha-1 gliricidia, 12 t ha-1 leucaena and 10 t ha-1 manure+half the recommended fertilizer rate, inorganic fertilizer at recommended rate, and a control without any inputs. Direct field measurements and informal enquiries were used for evaluating the effects of different treatments. The highest cabbage and onion yields were obtained from manure+half-rate fertilizer application. The gliricidia biomass transfer technology produced cabbage, onion and maize yields comparable with the full fertilizer application. In both cabbage and onion, manure+fertilizer gave generally higher net incomes. Biomass transfer also recorded higher net incomes than the control, and required lower cash inputs than the fully fertilized crop. Net incomes of the biomass treatments were substantially reduced by the labour costs for pruning and incorporation of the biomass. The results indicate that the gliricidia biomass transfer technology could be used as an alternative to inorganic fertilizers for vegetable production in dambos.

Record 59 of 593 - AGRICOLA 1998-2004/09

AU: Murungu,-F.S.; Chiduza,-C.; Nyamugafata,-P.; Clark,-L.J.; Whalley,-W.R.

TI: Effect of on-farm seed priming on emergence, growth and yield of cotton and maize in a semi-arid area of Zimbabwe.

SO: Experimental agriculture. 2004 Jan., v. 40, no. 1 p. 23-36.

AB: The effects of on-farm seed priming (i.e. seed soaking) on the emergence, growth and yield of cotton and maize were studied in the field in the south-eastern lowveld of Zimbabwe. Experiments were conducted on both crops in the 1999/2000 and 2000/2001 seasons and, in the 2001 winter season, on maize only. The interaction of priming with tillage (ox-drawn ploughing or hand-hoeing) and simulated sowing rainfall regimes (irrigations of 15 mm, 30 mm or 45 mm at planting) was studied. Priming usually increased the rate of emergence in maize, but always

decreased final percent emergence in cotton. In the 2000/2001 season, there was an interaction between priming and simulated sowing rainfall regimes such that the 15 mm treatment gave a smaller adverse effect of priming in cotton than the 30 and 45 mm treatments. In maize, however, the 15 mm treatment gave an adverse rather than a positive effect of priming on emergence. There was little effect of tillage on emergence or growth. Priming did not affect the relative growth rate of cotton or maize, although plants grown from primed maize seed were consistently larger at any given date throughout the 2001 winter season. Plants from primed seed also flowered and matured earlier in the winter 2001 season. There were no significant effects of priming on yield, except in the 1999/2000 season, where priming decreased yield in cotton. It was concluded that the effect of priming can depend on crop species.

Record 60 of 593 - AGRICOLA 1998-2004/09

AU: Seghers,-D.; Wittebolle,-L.; Top,-E.M.; Verstraete,-W.; Siciliano,-S.D.

TI: Impact of agricultural practices on the Zea mays L. endophytic community.

SO: Applied and environmental microbiology. 2004 Mar., v. 70, no. 3 p. 1475-1482.

AB: Agricultural practices are known to alter bulk soil microbial communities, but little is known about the effect of such practices on the plant endophytic community. We assessed the influence of long-term applications (20 years) of herbicides and different fertilizer types on the endophytic community of maize plants grown in different field experiments. Nested PCR-denaturing gradient gel electrophoresis (DGGE) analyses targeting general bacteria, type I or II methanotrophs, actinomycetes, and general fungi were used to fingerprint the endophytic community in the roots of Zea mays L. Low intraplant variability (reproducible DGGE patterns) was observed for the bacterial, type I methanotroph, and fungal communities, whereas the patterns for endophytic actinomycetes exhibited high intraplant variability. No endophytic amplification product was obtained for type II methanotrophs. Cluster and stability analysis of the endophytic type I methanotroph patterns differentiated maize plants cultivated by using mineral fertilizer from plants cultivated by using organic fertilizer with a 100% success rate. In addition, lower methanotroph richness was observed for mineral-fertilized plants than for organically fertilized plants. The use of herbicides could not be traced by fingerprinting the endophytic type I methanotrophs or by evaluating any other endophytic microbial group. Our results indicate that the effect of agrochemicals is not limited to the bulk microbial community but also includes the root endophytic community. It is not clear if this effect is due to a direct effect on the root endophytic community or is due to changes in the bulk community, which are then reflected in the root endophytic community.

Record 61 of 593 - AGRICOLA 1998-2004/09

AU: Alcantara,-F.A.-de; Buurman,-P.; Curi,-N.; Furtini-Neto,-A.E.; Lagen,-B.-van; Meijer,-E.L.

TI: Changes in soil organic matter composition after introduction of

riparian vegetation on shores of hydroelectric reservoirs (southeast of Brazil).

SO: Soil biology and biochemistry. 2004 Sept., v. 36, no. 9 p. 1497-1508.

AB: This work is part of a research program with the general objective of evaluating soil sustainability in areas surrounding hydroelectric reservoirs, which have been planted with riparian forest. The specific aims were: (i) to assess if and how the soil organic matter (SOM) chemical composition has changed in such areas, and (ii) to contribute to the knowledge of SOM chemistry in Brazil. To this end, we sampled litter and soil (Anionic Acrustox) in two adjacent areas: one under native vegetation and another forested with riparian species in 1992. The native vegetation was Brazilian savannah orcerrado. In this case, it was a 'grassy cerrado', dominated by grasses with few shrubs. Litter was collected and humic substances were extracted from soil by an alkaline solution. Both were characterised by a combination of cross-polarisation-magic angle spinning (CPMAS) solid state 13C nuclear magnetic resonance (NMR) spectroscopy and pyrolysis-gas-chromatography/mass-spectrometry (Py-GC/MS). Eight years after forestation, the addition of the forest litter had changed SOM chemical composition. The C input pattern exerted a key role on the observed alterations. In the grassy cerrado, litter addition is predominantly below-ground and the litter is richer in carbohydrate-derived compounds and poorer in lignin moieties. In the forested area, C input is largely above-ground and grass litter has been partially replaced by a relatively more recalcitrant material. As a result, topsoil under forest was chemically strongly different from that under cerrado. Factor analysis indicated that the largest differences were between topsoil under forest and deepest subsoil under cerrado, where there is influence of remaining cerrado-derived C. Both semi-quantification and factor analysis of pyrolysis data gave further insight on the extent of alterations, but more research on such a quantitative approach should be developed to detail its application in SOM studies.

Record 62 of 593 - AGRICOLA 1998-2004/09

AU: Garbeva,-P.; Voesenek,-K.; Elsas,-J.D.-van

TI: Quantitative detection and diversity of the pyrrolnitrin biosynthetic locus in soil under different treatments.

SO: Soil biology and biochemistry. 2004 Sept., v. 36, no. 9 p. 1453-1463.

AB: The prevalence of antibiotic production loci in soil is a key issue of current research aimed to unravel the mechanisms underlying the suppressiveness of soil to plant pathogens. Pyrrolnitrin (PRN) is a key antibiotic involved in the suppression of a range of phytopathogenic fungi. Therefore, field soils from different agricultural regimes, including permanent grassland, arable land under common agricultural rotation and arable land under maize monoculture, were investigated in respect of the prevalence of pyrrolnitrin biosynthetic loci. Primers for detection of the prnD gene were used for initial PCR/ hybridisation-based assessments. By this method, evidence was obtained for the contention that PRN production loci were most prevalent in grasslands, however, robust quantitative data were not achieved. To quantify the prevalence of PRN biosynthetic

loci, we designed a TaqMan PCR system based on the prnD gene for the real-time quantitative detection of this production locus in soil. The system was found to be specific for prnD sequences from Pseudomonas, Serratia and Burkholderia species. Using pure culture DNA, the prnD gene was detectable down to a level of 60 fg, or approximately 10 gene copies, per amplification reaction. Application of the system to soil DNA spiked with different levels of the target DNA indicated that, in a soil DNA background, specific amplification could be obtained to about the same level of sensitivity. Field soil samples obtained from the different agricultural regimes were then screened for the prevalence of prnD with the real-time PCR system. The quantitative data obtained suggested a strongly enhanced presence of prnD genes in grassland or grassland-derived plots, as compared to the prevalence of this biosynthetic locus in the arable land plots. The implications of these findings are placed in the context of the suppressiveness of soil to phytopathogens, notably Rhizoctonia solani AG3.

Record 63 of 593 - AGRICOLA 1998-2004/09

AU: Waldrop,-M.P.; Zak,-D.R.; Sinsabaugh,-R.L.

TI: Microbial community response to nitrogen deposition in northern forest ecosystems.

SO: Soil biology and biochemistry. 2004 Sept., v. 36, no. 9 p. 1443-1451.

AB: The productivity of temperate forests is often limited by soil N availability, suggesting that elevated atmospheric N deposition could increase ecosystem C storage. However, the magnitude of this increase is dependent on rates of soil organic matter formation as well as rates of plant production. Nonetheless, we have a limited understanding of the potential for atmospheric N deposition to alter microbial activity in soil, and hence rates of soil organic matter formation. Because high levels of inorganic N suppress lignin oxidation by white rot basidiomycetes and generally enhance cellulose hydrolysis, we hypothesized that atmospheric N deposition would alter microbial decomposition in a manner that was consistent with changes in enzyme activity and shift decomposition from fungi to less efficient bacteria. To test our idea, we experimentally manipulated atmospheric N deposition (0, 30 and 80 kg NO3--N) in three northern temperate forests (black oak/white oak (BOWO), sugar maple/red oak (SMRO), and sugar maple/basswood (SMBW)). After one year, we measured the activity of ligninolytic and cellulolytic soil enzymes, and traced the fate of lignin and cellulose breakdown products (13C-vanillin, catechol and cellobiose). In the BOWO ecosystem, the highest level of N deposition tended to reduce phenol oxidase activity (131«13 versus 104«5 micromol h-1 g-1) and peroxidase activity (210«26 versus 190«21 micromol h-1 g-1) and it reduced 13C-vanillin and 13C-catechol degradation and the incorporation of 13C into fungal phospholipids ($p<0.05$). Conversely, in the SMRO and SMBW ecosystems, N deposition tended to increase phenol oxidase and peroxidase activities and increased vanillin and catechol degradation and the incorporation of isotope into fungal phospholipids ($p<0.05$). We observed no effect of experimental N deposition on the degradation of 13C-cellulose, although cellulase activity showed a small and marginally significant increase ($p<0.10$). The ecosystem-specific response of microbial

activity and soil C cycling to experimental N addition indicates that accurate prediction of soil C storage requires a better understanding of the physiological response of microbial communities to atmospheric N deposition.

Record 64 of 593 - AGRICOLA 1998-2004/09

AU: Fagan,-W.F.; Bishop,-J.G.; Schade,-J.D.

TI: Spatially structured herbivory and primary succession at Mount St Helens: field surveys and experimental growth studies suggest a role for nutrients.

SO: Ecological entomology. 2004 Aug., v. 29, no. 4 p. 398-409.

AB: 1. The 1980 eruption of Mount St Helens (Washington, U.S.A.) created a 60-km2 region of primary successional habitat. Since colonising in 1981, the spatial spread of the legume Lupinus lepidus at Mount St Helens, Washington, U.S.A., has afforded intriguing opportunities to study the effect of trophic dynamics on primary succession. Insect herbivory on this lupine has exhibited striking spatial structure for over a decade, with inverse density-dependent damage patterns occurring over both small (10-100 m) and large (1-10 km) spatial scales. Hypothesising that lupine nutritional chemistry might underlie the spatial patterns in herbivory, the distribution of elemental macronutrients (nitrogen, phosphorus) across the landscape was characterised. 4. Samples of soil and lupine tissue (roots and leaves) were collected from sites along both local and regional gradients in lupine density. On both large and small spatial scales, lupine leaves from low-density conditions were significantly more nutrient rich. In addition, in a laboratory growth study native lepidopteran herbivores that specialise on lupines (Gelechiidae: Filatima sp.) performed better when fed leaves from low-density, high-nutrient lupines than on diets of low-nutrient lupine leaves from high-density areas a few metres away. These data suggest that spatial heterogeneity in lupine nutrient chemistry may underlie the remarkable herbivory gradients witnessed at Mount St Helens.

Record 65 of 593 - AGRICOLA 1998-2004/09

AU: Kimura,-M.; Murase,-J.; Lu,-Y.

TI: Carbon cycling in rice field ecosystems in the context of input, decomposition and translocation of organic materials and the fates of their end products (CO2 and CH4).

SO: Soil biology and biochemistry. 2004 Sept., v. 36, no. 9 p. 1399-1416.

AB: Rice fields are intensively managed, unique agroecosystems, where soil flooding is general performance for rice cultivation. Flooding the field results in reductive soil conditions, under which decomposition of organic materials proceeds during the period of rice cultivation. A large variety of organic materials are incorporated into rice soils according to field management. In this review, the kind and abundance of organic materials entering carbon cycling in the rice field ecosystem are evaluated first. Then, decomposition of plant residues and soil organic matter in rice fields is reviewed quantitatively. Decomposition of plant residues is shown to be the active process in carbon cycling in rice fields. Rice releases photosynthates into the rhizosphere (rhizodeposition), and they follow a different avenue of decomposition in soil from that of plant residues.

Incorporation of rhizodeposition into microbial biomass and soil organic matter during the period of rice cultivation, and their fates after harvesting are evaluated quantitatively from 13C pulse labeled experiments. Percolating water transports inorganic and organic carbon from the plow layer to the subsoil layer. The amounts of their transport and accumulation in the subsoil layer are evaluated in relation to the amounts of soil organic C in the plow layer. Not only CO2 but also CH4 are produced in the decomposition process of organic materials in flooded rice fields. CH4 evolution from rice fields is of global concern from the viewpoint of global warming. Origins of CH4 evolved from rice fields are estimated first, followed by the fates of CH4 in rice field ecosystems. Rhizodeposition is shown to be the main origin of CH4 evolved from rice fields. Evolution to the atmosphere is not the sole pathway of CH4 produced in rice fields. The amounts of CH4 retained in soil, percolated to the subsoil layer and decomposed in soil are evaluated in the context of the amounts of CH4 efflux. Thus, this review focuses on carbon cycling in the rice field ecosystem from the viewpoints of input, decomposition, and translocation of organic materials and the fates of their end products (CO2 and CH4).

Record 66 of 593 - AGRICOLA 1998-2004/09

AU: Karbozova-Saljnikov,-E.; Funakawa,-S.; Akhmetov,-K.; Kosaki,-T.

TI: Soil organic matter status of Chernozem soil in North Kazakhstan: effects of summer fallow.

SO: Soil biology and biochemistry. 2004 Sept., v. 36, no. 9 p. 1373-1381.

AB: In North Kazakhstan there is concern about the degradation of Chernozem soil and agricultural sustainability by the inclusion and frequency of summer fallows in crop rotations in terms of their influence on the changes of soil organic matter (SOM) quality and quantity. We examined five fallow-wheat (Triticum aestivum L.) cropping systems with different frequencies of the fallow phase in Chernozem soil of North Kazakhstan; continuous wheat (CW), 6-y rotation (6R), 4-y rotation (4R), 2-y rotation (2R) and continuous fallow (CF). Soil samples were collected from the two phases of each rotation, pre- and post-fallow, and analyzed for potentially mineralizable C (PMC) and N (PMN), ' light fraction' organic matter (LF-OM), C (LF-C) and N (LF-N). Potentially mineralizable C was inversely proportional to the frequency of fallow and was highest in CW. Mineral N (min-N) and PMN were more responsive to rotation phase than other indices of SOM. Mineral N was higher in the post-fallow phase while PMN was higher in the pre-fallow phase. Light fraction organic matter was negatively correlated to the frequency of fallow and was higher in the pre-fallow than in the post-fallow phase in a rotation. The results suggested that the yearly input of plant residue in a less frequently fallowed system built up more PMC, whereas PMN was closely correlated to recent inputs of substrate added with plant residues. We conclude that a frequent fallow system may deplete SOM via accelerated mineralization. Also that LF-OM, PMC and PMN are more sensitive to detect subtle changes in SOM quality than total SOM. Our results may provide prediction of SOM response to fallow frequency in wheat-based rotation systems in Chernozem soils of semi-arid regions.

Record 67 of 593 - AGRICOLA 1998-2004/09

AU: Cheng,-Y.; Howieson,-J.G.; O'Hara,-G.W.; Watkin,-E.L.J.; Souche,-G.; Jaillard,-B.; Hinsinger,-P.

TI: Proton release by roots of Medicago murex and Medicago sativa growing in acidic conditions, and implications for rhizosphere pH changes and nodulation at low pH.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1357-1365.

AB: Medicago murex nodulates faster and produces more nodules than Medicago sativa in acidic sandy soils. Experiments using a 'root mat' approach and videodensitometry examined pH changes in the rhizospheres of nitrate-fed plants of M. murex and M. sativa. Using the 'root mat' approach with soil disks of pH 4.49, M. sativa cv. Aquarius acidified its rhizosphere by approximately 0.2-0.4 pH-units within 4 d, while M. murex cv. Zodiac did not acidify its rhizosphere. Rates of H+ release were higher from M. sativa than from M. murex. Videodensitometry of roots embedded in agarose of pH 4.5 showed that the mature parts of the tap-root of both species exuded OH- ions, but was approximately twofold more in M. murex than in M. sativa. Consequently, young parts of the M. sativa rhizosphere were less alkaline than that of M. murex. It is suggested that the difference in nodulation response between the two species at low pH may be related to the different patterns of rhizosphere acidification: the stronger rhizosphere acidification of M. sativa being less favourable for survival and growth of Sinorhizobium medicae. The higher rate of rhizosphere acidification by M. sativa roots may be related to its genetic characteristics including greater relative root growth rate and greater sensitivity to acidity in comparison to M. murex.

Record 68 of 593 - AGRICOLA 1998-2004/09

AU: Ballard,-R.A.; Charman,-N.; McInnes,-A.; Davidson,-J.A.

TI: Size, symbiotic effectiveness and genetic diversity of field pea rhizobia (Rhizobium leguminosarum bv. viciae) populations in South Australian soils.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1347-1355.

AB: Field pea (Pisum sativum L.) is widely grown in South Australia (SA), often without inoculation with commercial rhizobia. To establish if symbiotic factors are limiting the growth of field pea we examined the size, symbiotic effectiveness and diversity of populations of field pea rhizobia (Rhizobium leguminosarum bv. viciae) that have become naturalised in South Australian soils and nodulate many pea crops. Most probable number plant infection tests on 33 soils showed that R. l. bv. viciae populations ranged from undetectable (six soils) to 32 x 10(3) rhizobia g-1 of dry soil. Twenty-four of the 33 soils contained more than 100 rhizobia g-1 soil. Three of the six soils in which no R. l. bv. viciae were detected had not grown a host legume (field pea, faba bean, vetch or lentil). For soils that had grown a host legume, there was no correlation between the size of R. l. bv. viciae populations and either the time since a host legume had been grown or any measured soil factor (pH, inorganic N and organic C). In glasshouse experiments, inoculation of the field pea cultivar Parafield with the commercial Rhizobium strain SU303 resulted in a highly effective symbiosis. The SU303 treatment produced as much shoot dry weight as the mineral N treatment and

more than 2.9 times the shoot dry weight of the uninoculated treatment. Twenty-two of the 33 naturalised populations of rhizobia (applied to pea plants as soil suspensions) produced prompt and abundant nodulation. These symbioses were generally effective at N2 fixation, with shoot dry weight ranging from 98% (soil 21) down to 61% (soil 30) of the SU303 treatment, the least effective population of rhizobia still producing nearly double the growth of the uninoculated treatment. Low shoot dry weights resulting from most of the remaining soil treatments were associated with delayed or erratic nodulation caused by low numbers of rhizobia. Random amplified polymorphic DNA (RAPD) polymerase chain reaction (PCR) fingerprinting of 70 rhizobial isolates recovered from five of the 33 soils (14 isolates from each soil) showed that naturalised populations were composed of multiple (5-9) strain types. There was little evidence of strain dominance, with a single strain type occupying more than 30% of trap host nodules in only two of the five populations. Cluster analysis of RAPD PCR banding patterns showed that strain types in naturalised populations were not closely related to the current commercial inoculant strain for field pea (SU303, > = 75% dissimilarity), six previous field pea inoculant strains (> = 55% dissimilarity) or a former commercial inoculant strain for faba bean (WSM1274, > = 66% dissimilarity). Two of the most closely related strain types (< =15% dissimilarity) were found at widely separate locations in SA and may have potential as commercial inoculant strains. Given the size and diversity of the naturalised pea rhizobia populations in SA soils and their relative effectiveness, it is unlikely that inoculation with a commercial strain of rhizobia will improve N2 fixation in field pea crops, unless the number of rhizobia in the soil is very low or absent (e.g. where a legume host has not been previously grown and for three soils from western Eyre Peninsula). The general effectiveness of the pea rhizobia populations also indicates that reduced N2 fixation is unlikely to be the major cause of the declining field pea yields observed in recent times.

Record 69 of 593 - AGRICOLA 1998-2004/09

AU: Slattery,-J.F.; Pearce,-D.J.; Slattery,-W.J.

TI: Effects of resident rhizobial communities and soil type on the effective nodulation of pulse legumes.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1339-1346.

AB: Communities of resident rhizobia capable of effective nodulation of pulse crops were found to vary considerably over a range of soil environments. These populations from soils at 50 sites in Southern Australia were evaluated for nitrogen fixing effectiveness in association with Pisum sativum, Vicia faba, Lens culinaris, Vicia sativa, Cicer arietinum and Lupinus angustifolius. The values for nitrogen fixing effectiveness could be related to soil pH as determined by soil type and location. It was found that 33% of paddocks had sufficient resident populations of Rhizobium leguminosarum bv viciae for effective nodulation of faba bean, 54% for lentils, 55% for field pea and 66% for the effective nodulation of the vetch host plant. Mesorhizobium cicer populations were very low with only 7% of paddocks surveyed having sufficient resident populations for effective nodulation. Low resident rhizobial populations (<10

rhizobia g-1 soil) of R. leguminosarum bv viciae and M. cicer were found in acid soil conditions. In contrast, Bradyrhizobium populations increased as soil pH decreased. Inoculation increased faba bean yields from 0.34 to 4.4 t ha-1 and from 0.47 to 2.37 t ha-1 for chickpeas on acid soils. On alkaline soils, where resident populations were large there was no consistent response to inoculation. Observations at experimental field sites confirmed the findings from the survey data, stressing the importance of rhizobial inoculation, especially on the acid soils in south-eastern Australia.

Record 70 of 593 - AGRICOLA 1998-2004/09

AU: Charman,-N.; Ballard,-R.A.

TI: Burr medic (Medicago polymorpha L.) selections for improved N2 fixation with naturalised soil rhizobia.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1331-1337.

AB: Burr medic (Medicago polymorpha L.) is an annual pasture legume that is widely distributed in southern Australian farming systems. Burr medic is nodulated by rhizobia (Sinorhizobium meliloti and Sinorhizobium medicae) that reside in many Australian soils, but the symbioses that develop are often sub-optimal in their rate of N2 fixation. We attempted to identify burr medic lines, which are able to form effective symbioses with the naturalised Sinorhizobium in Australian field soils, as potential parents for a breeding program. There were three glasshouse experiments. Initially, 222 lines (including the M. polymorpha cvv. Santiago, Serena and Circle Valley) were inoculated with extracts of two soils that had been collected near Waikerie (soil S109) and Lochiel (soil S142) in South Australia. These soils were used because they contained numerically large communities of naturalised Sinorhizobium spp. that produced sub-optimal rates of N2 fixation with cv. Santiago. None of the 222 lines of burr medic were able to form an effective symbiosis with the rhizobia from soil S109. However, when nodulated by the rhizobia from soil S142, some lines (e.g. SA8194) formed a very effective symbiosis, producing up to double the shoot dry matter (DM) of Santiago and eight times the DM of uninoculated plants. Seven promising lines were selected for further testing (with extracts of nine soils). Subsequently, two lines (SA20056 and SA8194) were selected and their symbiotic performance compared with that of Santiago, using extracts from 28 soils. While soil treatment had a major effect on mean shoot DM (soil N103=120 mg, soil N105=17 mg), the three medic lines performed similarly. Santiago, SA20056 and SA8914 all formed ineffective symbioses with the rhizobia in at least half of the 28 soils, even though >95% of the plants were nodulated. These experiments confirm that ineffective symbioses are common between burr medics and the rhizobia that have become naturalised in many Australian soils. Although some lines of burr medic were identified that were able to form more effective symbioses with the rhizobia in individual soils, none were able to form effective symbioses with a wide range of soil rhizobia. If a plant breeding approach is to be used to improve symbiotic performance of burr medic we propose that its hybridisation with other medic species, that have less specific rhizobial needs, will be required.

Record 71 of 593 - AGRICOLA 1998-2004/09

AU: Yates,-R.J.; Howieson,-J.G.; Nandasena,-K.G.; O'Hara,-G.W.

TI: Root-nodule bacteria from indigenous legumes in the north-west of Western Australia and their interaction with exotic legumes.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1319-1329.

AB: Bacteria were isolated from root-nodules collected from indigenous legumes at 38 separate locations in the Gascoyne and Pilbara regions of Western Australia. Authentication of cultures resulted in 31 being ascribed status as root-nodule bacteria based upon their nodulation of at least one of eight indigenous legume species. The authenticated isolates originated from eight legume genera from 19 sites. Isolates were characterised on the basis of their growth and physiology; 20 isolates were fast-growing and 11 were slow-growing (visible growth within 3 and 7 d, respectively). Fast-growers were isolated from Acacia, Isotropis, Lotus and Swainsona, whilst slow-growers were from Muelleranthus, Rhynchosia and Tephrosia. Indigofera produced one fast-growing isolate and seven slow-growing isolates. Three indigenous legumes (Swainsona formosa, Swainsona maccullochiana and Swainsona pterostylis) nodulated with fast-growing isolates and four species (Acacia saligna, Indigofera brevidens, Kennedia coccinea and Kennedia prorepens) nodulated with both fast- and slow-growing isolates. Swainsona kingii did not form nodules with any isolates. Fast-growing isolates were predominantly acid-sensitive, alkaline- and salt-tolerant. All slow-growing isolates grew well at pH 9.0 whilst more than half grew at pH 5.0, but all were salt-sensitive. All isolates were able to grow at 37 ÀC. The fast-growing isolates utilised disaccharides, whereas the slow-growing isolates did not. Symbiotic interactions of the isolates were assessed on three annual, one biennial and nine perennial exotic legume species that have agricultural use, or potential use, in southern Australia. Argyrolobium uniflorum, Chamaecytisus proliferus, Macroptilium atropurpureum, Ononis natrix, Phaseolus vulgaris and Sutherlandia microphylla nodulated with one or more of the authenticated isolates. Hedysarum coronarium, Medicago sativa, Ornithopus sativus, Ornithopus compressus, Trifolium burchellianum, Trifolium polymorphum and Trifolium uniflorum did not form nodules. Investigation of the 31 authenticated isolates by polymerase chain reaction with three primers resulted in the RPO1 primer distinguishing 20 separate banding patterns, while ERIC and PucFor primers distinguished 26 separate banding patterns. Sequencing the 16S rRNA gene for four fast- and two slow-growing isolates produced the following phylogenetic associations; WSM1701 and WSM1715 (isolated from Lotus cruentus and S. pterostylis, respectively) displayed 99% homology with Sinorhizobium meliloti, WSM1707 and WSM1721 (isolated from Sinorhizobium leeana and Indigofera sp., respectively) displayed 99% homology with Sinorhizobium terangae, WSM1704 (isolated from Tephrosia gardneri) shared 99% sequence homology with Bradyrhizobium elkanii, and WSM1743 (isolated from Indigofera sp.) displayed 99% homology with Bradyrhizobium japonicum.

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AU: Nandasena,-K.G.; O'Hara,-G.W.; Tiwari,-R.P.; Yates,-R.J.;

Kishinevsky,-B.D.; Howieson,-J.G.
TI: Symbiotic relationships and root nodule ultrastructure of the pasture legume Biserrula pelecinus L.--a new legume in agriculture.
SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1309-1317.
AB: Biserrula pelecinus is a pasture legume species new to Australian agriculture. The potential N benefit from B. pelecinus pastures in agricultural systems may not be realised if its symbiotic interactions with Mesorhizobium spp. are not well understood. This study evaluated the symbiotic interactions of four strains of Biserrula root-nodule bacteria (WSM1271, WSM1283, WSM1284, WSM1497) with four genotypes of B. pelecinus (cv. Casbah, 93GRC4, 93ITA33, IFBI1) and with a range of related legumes, including species known to be nodulated by strains of Mesorhizobium loti and other Mesorhizobium spp. Structures of root nodules were studied using light and electron microscopy enabling the ultrastructure of effective and ineffective nodules to be compared. B. pelecinus always formed typical indeterminate, finger-like nodules. The number of bacteroids inside symbiosomes varied between host7strain combinations, however, nodules formed by ineffective associations had well developed peribacteroid membranes and abundant bacteroids. Considerable variation was found in N2-fixing effectiveness of strains isolated from B. pelecinus on the four B. pelecinus genotypes. Strains WSM1271, WSM1284 and WSM1497 nodulated Astragalus membranaceus, only strains WSM1284 and WSM1497 nodulated Astragalus adsurgens. Strain WSM1284 also nodulated Dorycnium rectum, Dorycnium hirsutum, Glycyrrhiza uralensis, Leucaena leucocephala, Lotus edulis, Lotus glaber, Lotus maroccanus, Lotus ornithopodioides, Lotus pedunculatus, Lotus peregrinus, Lotus subbiflorus and Ornithopus sativus. The four strains from B. pelecinus did not nodulate Amorpha fruticosa, Astragalus sinicus, Cicer arietinum, Hedysarum spinosissimum, Lotus parviflorus, Macroptilium atropurpureum or Trifolium lupinaster. M. loti strain SU343 nodulated all four genotypes of B. pelecinus. However, M. loti strain CC829 only nodulated B. pelecinus genotypes 93ITA33 and IFBI1 and the nodules were ineffective. The root nodule isolates from H. spinosissimum (E13 and H4) nodulated B. pelecinus cv. Casbah whereas the commercial inoculant strain for Cicer (CC1192) could not nodulate any genotype of B. pelecinus. These results indicate that strains WSM1271, WSM1283 and WSM1497 isolated originally from B. pelecinus have a specific host range while strain WSM1284 is promiscuous in its capacity to nodulate with a broad range of related species. As B. pelecinus can be nodulated by Mesorhizobium spp. from other agricultural legumes, particularly Lotus, there is an opportunity to utilise this trait in cultivar development.

Record 73 of 593 - AGRICOLA 1998-2004/09
AU: McInnes,-A.; Thies,-J.E.; Abbott,-L.K.; Howieson,-J.G.
TI: Structure and diversity among rhizobial strains, populations and communities--a review.
SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1295-1308.
AB: Published studies of rhizobial populations, communities and other strain collections were analysed to identify trends in strain

richness, strain dominance and genetic diversity within and between locations. For individual populations and communities, strain richness indices were calculated by dividing the number of strain types identified by the number of isolates recovered. Where possible, strain dominance (the proportion of rhizobial isolates represented by each strain type) was also calculated. Analysis of the genetic diversity of populations, communities and rhizobial strain collections originating from diverse legume hosts and locations, was confined to studies using multilocus enzyme electrophoresis (MLEE) so that diversity could be compared on the basis of published H values. Strain richness indices were highly variable (0.02-0.94) and were influenced by both the discriminatory power of the strain typing method and the type and number of legume species used to recover rhizobia from soil. The strain richness of populations recovered either directly from soil , or from the nodules of trap hosts inoculated with the same soil , was similar. Because the arithmetic relationship between the number of strain types and number of isolates varies between different populations and communities, strain richness curves are proposed as the most appropriate method for reporting rhizobial structural diversity. Comparison of over 50 rhizobial populations and communities from published studies showed that strain dominance patterns in nodules were often similar. Typically, a single strain type occupies more than 30% of nodules with the majority of strain types being recovered at low frequency (~75% of published populations and communities). Rhizobial populations and communities characterised by MLEE varied in their genetic diversity, with H values ranging from 0.06 to 0.78. In several studies, most of the genetic diversity within a site could be recovered from the nodules of a single plant. When hierarchical analyses were performed on populations within and between sites, the genetic diversity within sites was similar to the genetic diversity between sites. Similarly, the genetic diversity of strain collections originating from multiple hosts and locations was no more diverse than some individual populations and communities. Strain richness and genetic diversity measures were not always correlated for rhizobial populations. Populations with low strain richness were sometimes genetically diverse, and the relationship between the diversity measures varied for different legume species at the same location. We suggest that both strain richness and genetic diversity measures are required to fully describe rhizobial population and community diversity.

Record 74 of 593 - AGRICOLA 1998-2004/09

AU: Hartley,-E.; Gemell,-L.G.; Herridge,-D.F.

TI: Lime pelleting inoculated serradella (Ornithopus spp.) increases nodulation and yield.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1289-1294.

AB: Lime pelleting of the inoculated seed is recommended for most pasture legume species to improve survival of the rhizobia on the seed and to counter deleterious effects of soil or fertiliser acidity on rhizobial numbers. Except for New South Wales, lime pelleting is specifically not recommended for serradella (Ornithopus spp.). Our objectives were to evaluate effects of lime pelleting on bradyrhizobial numbers on seed, and nodulation and growth of the serradella plants. Three experiments are reported

at two acid-soil sites in northern New South Wales involving four cultivars of yellow serradella (Ornithopus compressus) and Bradyrhizobium sp. (Lupinus) strains WSM471 (current inoculant strain) and WU425 and WSM480. Lime pelleting increased bradyrhizobial numbers on seed, 24 h after inoculation, by an average of 90%. Similarly, lime pelleting increased nodulation and shoot dry matter of the inoculated plants by an average of 57 and 28%, respectively. The three strains were similar in effects on plant growth. Relative values for shoot dry weight, averaged over sites, were 100 for WSM471 and 98 for both WU425 and WSM480. Our results confirmed previous research that lime pelleting inoculated serradella seed was not deleterious to survival of the bradyrhizobial inoculum, and showed that it could result in enhanced symbiotic activity of the inoculum in some instances. We recommend lime pelleting of serradella and that WSM471 remain the inoculant strain.

Record 75 of 593 - AGRICOLA 1998-2004/09

AU: Howieson,-J.; Ballard,-R.

TI: Optimising the legume symbiosis in stressful and competitive environments within southern Australia--some contemporary thoughts.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1261-1273.

AB: In the managed agricultural ecosystems of southern Australia, if an edaphic environment is not stressful to root-nodule bacteria (hereafter rhizobia), it is likely to become a competitive environment for nodulation (although not always detrimentally so) soon after the introduction of an inoculated legume. We suggest that stressful environments limit rhizobial communities to less than 100 cells g-1 soil at some time during the season. This overview puts forward the hypothesis that in perturbed ecosystems (i.e. those that are intensively managed) such as in the 25 million ha of the southern Australian grain and grazing belts, the rhizobial community is still substantially immature in an evolutionary sense. The rhizobial community is representative of only a few species, primarily those of Mediterranean origin that were accidentally introduced, or have been fostered by legume development programs, or remnants of the populations associated with native legumes. We consider there is little inter-specific competition for substrates because of this relative immaturity, but suggest that intra-specific competition for nodulation is commonplace wherever abiotic stress is absent. We nominate two primary abiotic stresses that are permanently present that have limited rhizobial colonization or legume nodulation for some species in southern Australia and four secondary (temporary) abiotic stresses. We believe that selection of adapted symbioses, or where warranted adapted elite rhizobial strains or legume host genotypes, can overcome these stress factors. We emphasise that where several abiotic stress factors are present they may act synergistically, but that this net effect is still likely to be symbiosis-specific. We acknowledge that genetic transformation in situ is providing new strain variability with which we must contend. We also put forward the suggestion that opportunities exist for the managed introduction of selected genotypes of agricultural legumes that effectively interact with rhizobial communities to achieve optimal N-fixation. In doing so, we give

more precise definition to the widely used terms 'exclusive', ' selective' and 'promiscuous' nodulation.

Record 76 of 593 - AGRICOLA 1998-2004/09

AU: Bowman,-A.M.; Smith,-W.; Brockwell,-J.

TI: Forecasting lucerne productivity under dryland farming conditions in central-western and western New South Wales.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1253-1260.

AB: Possibilities for growing dryland lucerne (Medicago sativa L.) productively in drier parts of central-western and western New South Wales (NSW) were investigated by consideration of meteorological records. Annual rainfall data and estimated evapotranspiration data for 1995-1999 were compiled to calculate lucerne growing days and N2-fixing days at Condobolin, Trangie, Cobar and Wentworth. This information was used in conjunction with seasonal indices of dry matter production and nitrogen fixation derived from the work of Bowman et al. [Aust J Exp Agric 42 (2002) 439] at Trangie to estimate yearly biomass production and N2 fixation for the four locations. It was concluded that (i) there are good prospects for growing lucerne productively on suitable soils located in that extensive region of central-western and western NSW between the 450 and 300 mm isohyets if it is feasible to develop techniques for establishment and management to maintain stands at an acceptable densitynot less than eight plants/m2, (ii) there are only poor prospects for growing lucerne in those western parts of the state where annual rainfall averages less 300 mm, and (iii) annual rainfall, irrespective of other factors such as erratic distribution, is a rough guide to potential lucerne production. In addition, there were indications that, were the threshold for cessation of lucerne N2 fixation reduced by 2 ÀC (say from 10 to 8 ÀC), annual N2 fixation would be enhanced by more than 20%.

Record 77 of 593 - AGRICOLA 1998-2004/09

AU: Pereg-Gerk,-L.

TI: Expression of flcA, a gene regulating differentiation and plant interaction in Azospirillum.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1245-1252.

AB: Azospirillum brasilense strains benefit field crops by excreting plant growth factors, promoting root proliferation and enhancing water uptake. FlcA protein is a transcriptional response regulator of the LuxR-UhpA family, which controls flocculation of A. brasilense cells in solution and plant root surface colonisation by A. brasilense. The expression of the flcA gene, studied here using a lacZ fusion controlled by the flcA promoter, was found to be partially constitutive in rich media. However, it could be further induced 3-4 fold by high ratios of C to N in the surrounding medium when transferred to minimal medium supplemented with fructose. Such conditions also induced flocculation by wild-type strains of A. brasilense in liquid media. Relatively high expressions of flcA were detected in root-associated cells, suggesting a positive effect of plant exudates on flcA expression. Although flocculation conditions increased the expression of flcA in wild-type A. brasilense strain Sp7 during the first 4-5 h of growth, the expression was

reduced to low levels with the initiation of flocculation. Moreover, flcA expression in wild-type strain producing FlcA, was found to be significantly lower (3.5-5.5 fold in rich medium and 3-4 fold in flocculation-inducing conditions) than its expression in flcA- Tn5 induced mutant strains Sp72001/2/4, which lack the FlcA protein in their cells. Similar to the wild-type strain Sp7, the mutants Sp72001/2/4 also showed 3-4 fold induction of flcA expression in minimal media containing high fructose to N ratio. However, in contrast to the wild-type strain, the mutants did not flocculate in any stage of their growth and the expression of flcA continued to rise after 6 h of growth. Therefore, it seems highly likely that flcA expression is negatively autoregulated by its own product, FlcA. Such regulation may be either direct, via transcriptional regulation of the flcA gene or indirect, by controlling the activity of other genes and proteins that may be involved in the differentiation process of A. brasilense from vegetative to cyst-like cells. A model for self-regulation of flcA is presented.

Record 78 of 593 - AGRICOLA 1998-2004/09

AU: Kennedy,-I.R.; Choudhury,--A.T.M.A.; Kecskes,-M.L.

TI: Non-symbiotic bacterial diazotrophs in crop-farming systems: can their potential for plant growth promotion be better exploited.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1229-1244.

AB: Biological N2 fixation (BNF) by associative diazotrophic bacteria is a spontaneous process where soil N is limited and adequate C sources are available. Yet the ability of these bacteria to contribute to yields in crops is only partly a result of BNF. A range of diazotrophic plant growth-promoting rhizobacteria participate in interactions with C3 and C4 crop plants (e.g. rice, wheat, maize, sugarcane and cotton), significantly increasing their vegetative growth and grain yield. We review the potential of these bacteria to contribute to yield increases in a range of field crops and outline possible strategies to obtain such yield increases more reliably. The mechanisms involved have a significant plant growth-promoting potential, retaining more soil organic-N and other nutrients in the plant-soil system, thus reducing the need for fertiliser N and P. Economic and environmental benefits can include increased income from high yields, reduced fertiliser costs and reduced emission of the greenhouse gas, N2O (with more than 300 times the global warming effect of CO2), as well as reduced leaching of NO3--N to ground water. Obtaining maximum benefits on farms from diazotrophic, plant growth promoting biofertilisers will require a systematic strategy designed to fully utilise all these beneficial factors, allowing crop yields to be maintained or even increased while fertiliser applications are reduced.

Record 79 of 593 - AGRICOLA 1998-2004/09

AU: Crews,-T.E.; Brockwell,-J.; Peoples,-M.B.

TI: Host-rhizobia interaction for effective inoculation: evaluation of the potential use of the ureide assay to monitor the symbiotic performance of tepary bean (Phaseolus acutifolius A. Gray).

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1223-1228.

AB: Domesticated and wild-type tepary beans (Phaseolus acutifolius A.

Gray) were grown with or without inoculation with rhizobia in pots under bacteriologically controlled conditions in a temperature-controlled glasshouse. Seeds were inoculated with a mixture of seven strains isolated from nodules collected from domesticated field-grown tepary bean in Arizona, USA, or with a commercial inoculant strain for Phaseolus vulgaris (CC511). Different degrees of plant reliance upon N2 fixation for growth were generated by supplying the inoculated plants throughout growth with nutrients containing a range of concentrations of 15N-labeled NO3 (0, 1, 2, 5 or 10 mM). An uninoculated treatment that received 10 mM 15N-labeled NO3 was included to provide data for plants solely dependent upon NO3 for growth. Six weeks after sowing, shoots were harvested for dry matter determination and subsequent 15N analysis, root-bleeding xylem sap was collected, and nodulation assessed. With regard to shoot biomass production, domesticated lines were more responsive to inoculation, but less responsive to applied N than wild types. All inoculated plants were nodulated, but the field isolates from tepary bean were more effective in N2 fixation than strain CC511. It was concluded that tepary bean requires a specific inoculant to benefit from fixation of atmospheric N2. Xylem sap samples were analysed for ureides (allantoin and allantoic acid), amino acid content (alpha-amino-N), and NO3 concentration. The amount of ureide-N present in xylem sap was expressed as a percentage of total solute N, described as the relative abundance of ureide-N (RUN), for each N treatment and was compared to the proportion of plant N derived from N2 fixation (%Ndfa) calculated using a 15N dilution technique. The RUN values ranged from 8% for saps collected from uninoculated plants provided with 10 mM NO3 in the nutrient solution (%Ndfa=0) to 86-91% for nodulated plants grown in the absence of externally supplied NO3 (%Ndfa=100). These data indicated that ureides were the principal product of N2 fixation exported from the nodules to the shoot in xylem sap. Since RUN values were closely related to %Ndfa, it was proposed that N-solute analysis of xylem sap could provide a valuable analytical tool to monitor the symbiotic performance of tepary bean.

Record 80 of 593 - AGRICOLA 1998-2004/09

AU: Ridley,-A.M.; Mele,-P.M.; Beverly,-C.R.

TI: Legume-based farming in southern Australia: developing sustainable systems to meet environmental challenges.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1213-1221.

AB: Development of legume-based farming systems has resulted in Australian agriculture being globally competitive. There is now political pressure for agriculture to become accountable for 'off-site' environmental consequences. Farming systems relying on annual species are unsustainable because of a mismatch between the supply and demand of water and N, resulting in N leakage to streams or groundwater. Rainfall in excess of plant requirements coupled with N build-up, permeable soils, limited opportunities for reduction and proximity to surface or groundwater present risks for leakage of NO3-N. We present examples of N leakage from legume systems in southern Australia, where rainfall exceeds 450 mm yr-1, and the evidence suggesting that leakage contributes to stream and groundwater pollution. N build-up in autumn through

mineralisation of organic-N from legume-based systems often exceeds 100 kg N ha-1 and N leakage losses can be 15-35 kg N ha-1 yr-1. Stream and groundwater N pollution issues are emerging. Surface water quality problems are already apparent in Victoria although the contribution from legumes, N fertilisers and point sources remains unresolved. Examples of groundwater problems where legumes are a contributing factor have been recorded in New South Wales (NSW), South Australia (SA), Western Australia (WA) and Victoria. In Victoria, areas at risk of N groundwater contamination are found along the Great Dividing Range and in southern Victoria. Groundwater pollution causes concern because once problems are found they take decades to reverse. Stores of N in the unsaturated zone combined with limited N monitoring in groundwater suggests that early detection is unlikely. Solutions for reducing off-site consequences are outlined and include management to prevent water and N leakage happening, capture of N before it reaches waterways or groundwater and low input systems including land retirement. For scientists interested in N fixation and biological mediation, future research areas include increasing the proportion of perennials in farming systems, better control of N supply and demand through improved technology and us of N fertiliser, use of nitrification inhibitors and studies of the potential for N immobilisation and reduction through denitrification, both within and below the root zone. Integrated management strategies that address environmental implications from point/micro-scale to paddock and catchment scales are needed as are considerations of other environmental consequences. Research priorities will change from maximising N fixation for profitability towards balancing profitability and environmental goals for more sustainable systems.

Record 81 of 593 - AGRICOLA 1998-2004/09

AU: Chen,-W.; McCaughey,-W.P.; Grant,-C.A.

TI: Pasture type and fertilization effects on N2 fixation, N budgets and external energy inputs in western Canada.

SO: Soil biology and biochemistry. 2004 Aug., v. 36, no. 8 p. 1205-1212.

AB: A grazing experiment was conducted in Brandon, Manitoba, Canada. The objectives were to examine the effects of including alfalfa and fertilizer management on N2 fixation by alfalfa and plant N dynamics, and to compare N budgets in the four contrasting pasture systems and external energy inputs between fertilizer-N-based and legume-based pasture systems. Estimates of annual amounts of N2 fixed, based on shoot herbage production in grazed mixed alfalfa/grass pastures, ranged from 40 to 118 kg N ha-1 y-1. The amounts would be in the range of 52Æ153 kg N ha-1 y-1, if the amounts of fixed N stored in the roots, were included. Compared to grass-only pastures, total amounts of N2 fixed in the mixed pastures should be sufficient to improve total external N inputs, replace N fertilizer and sustain plant protein for grazing. The reliance of alfalfa (Medicago sativa L.) on N2 fixation for growth was high (70-95%), and %N derived from the atmosphere by alfalfa (%Ndfa) was not affected by P fertilizer management. Thus, the amounts of N2 fixed were predominantly regulated by alfalfa dry matter productivity. The data also indicated that alfalfa fixed 27 kg N t-1 dry matter produced. In mixed alfalfa/grass pastures, high soil mineral N uptake by

companion grasses, was essential to effectively utilize N that was fixed by alfalfa and returned to soils through the decomposition of alfalfa litter and roots. Compared to grass-only pastures with or without N fertilizer, alfalfa-based pastures could supply sufficient plant protein for grazing animals through N2 fixation, and at same time, sustain animal productivity with only 28% of the external energy input of the grass-only pasture with N fertilizer.

Record 82 of 593 - AGRICOLA 1998-2004/09
AU: Manni,-A.; Massacci,-P.; Piga,-L.; Serranti,-S.
TI: Screening and thermal desorption for remediation of a sediment polluted by the mercury of a chlor-alkaly plant.
SO: Soil and sediment contamination. 2004, v. 13, issue 4 p. 391-404.

Record 83 of 593 - AGRICOLA 1998-2004/09
AU: Lochman,-J.; Sery,-O.; Mikes,-V.
TI: The rapid identification of European Armillaria species from soil samples by nested PCR.
SO: FEMS microbiology letters Federation of European Microbiological Societies. 2004 Aug. 1, v. 237, no. 1 p. 105-110.
AB: New specific primers AR1 and AR2 were successfully used for the amplification of a specific part of internal transcribed spacer (ITS) of rDNA of Armillaria isolated from soil samples. DNA was isolated from 0.5 g of forest soil and ITS region was amplified by nested PCR reaction with external primers ITS1 and ITS4 and internal primers AR1 and AR2. The individual species were distinguished by restriction fragment length polymorphisms (RFLPs) analysis with restriction endonuclease HinfI. The fragments were analysed by ion-exchange HPLC that is more sensible and more rapid than electrophoresis. The amplicons were sequenced to improve the discrimination between the species. The method enables the identification of Armillaria species within one day directly from soil samples without the need for previous isolation and cultivation of mycelium of Armillaria.

Record 84 of 593 - AGRICOLA 1998-2004/09
AU: Sokolov,-I.M.; Carlton,-C.; Cornell,-J.F.
TI: Review of Anillinus, with descriptions of 17 new species and a key to soil and litter species (Coleoptera: Carabidae: Trechinae: Bembidiini).
SO: Coleopterists bulletin. 2004 June, v. 58, no. 2 p. 185-233.

Record 85 of 593 - AGRICOLA 1998-2004/09
AU: Vakalounakis,-D.J.; Chalkias,-J.
TI: Survival of Fusarium oxysporum f. sp. radicis-cucumerinum in soil .
SO: Crop protection. 2004 Sept., v. 23, no. 9 p. 871-873.
AB: The survival of F. oxysporum f. sp. radicis-cucumerinum, causing root and stem rot of greenhouse cucumber, in soil was studied under greenhouse and laboratory conditions. Inoculated soil and plant residues infected by the fungus were enclosed in fibreglass mesh bags and buried in a greenhouse or incubated in growth chambers at various temperatures. Results showed F. oxysporum f. sp. radicis-cucumerinum could persist in soil, since isolation was possible even after 13 months. Persistence decreased at a higher temperature.

Record 86 of 593 - AGRICOLA 1998-2004/09

AU: Hancock,-J.H.; Wilkerson,-J.B.; Moody,-F.H.; Newman,-M.A.

TI: Seed-specific placement of in-furrow fungicides for control of seedling disease in cotton.

SO: Crop protection. 2004 Sept., v. 23, no. 9 p. 789-794.

AB: Fungicides are often applied as in-furrow sprays during planting to control cotton seedling disease. To be effective, the fungicide product should cover each seed and the surrounding soil , thus forming a zone of protection for each emerging seedling. Traditional practice has been to apply the product as a solid band along the length of the furrow. However, limiting fungicide application to an area near the cottonseed, and minimizing the amount of chemical applied between seeds, could reduce fungicide inputs significantly while maintaining an acceptable level of disease control. To this end, a seed-specific applicator has been developed to apply discrete pulses of liquid chemical to individual seeds and the surrounding soil at planting. The concept of seed-specific fungicide application was evaluated during 2002 and 2003 using side-by-side, field comparisons of seed-specific and conventional applications of PCNB and etridiazole in plots inoculated with Pythium spp. and Rhizoctonia solani. Cotton was planted at 9.8 seeds m-1, and seed-specific treatments were applied as spray bands 5.1 cm in length such that fungicide savings of 50% were realized where seed-specific applications were implemented. Seedling disease pressure was present in both years of the study. Stands in the untreated plots averaged less than 25% of that in treated plots. Stand counts in all plots receiving an in-furrow fungicide treatment were significantly greater (P=0.05) than in untreated plots. There were no significant differences in either year among the seed-specific and conventional treatments. In these tests, seed-specific fungicide applications provided seedling disease control comparable to conventional application while reducing fungicide use by 50%. Seed-specific application equipment has potential to help cotton growers reduce input costs and increase production efficiency.

Record 87 of 593 - AGRICOLA 1998-2004/09

AU: Trewavas,-A.

TI: A critical assessment of organic farming-and-food assertions with particular respect to the UK and the potential environmental benefits of no-till agriculture: a review.

SO: Crop protection. 2004 Sept., v. 23, no. 9 p. 757-781.

AB: There is currently considerable discussion about the merits of particular forms of agriculture. The discussion has been generated by excess food production in the EC, continuing public disquiet over the use of chemicals in food production and political agitation. Much of the debate concerns the merits or otherwise of organic agriculture which is often seen by the public as producing food free of chemicals and being more environmentally friendly. This article examines these notions critically dealing with each of the individual claims frequently made for organic agriculture. The article concludes that in the UK, at least, when problems with agriculture emerge they usually hinge around poor management not mode of agriculture. In environmental terms no-till farming currently seems to be better

than others. The benefits of holistic thinking by farmers are indicated.

Record 88 of 593 - AGRICOLA 1998-2004/09

AU: Koopmans,-G.F.; Chardon,-W.J.; Willigen,-P.-de; Riemsdijk,-W.H.-van

TI: Phosphorus desorption dynamics in soil and the link to a dynamic concept of bioavailability.

SO: Journal of environmental quality. 2004 July-Aug, v. 33, no. 4 p. 1393-1402.

AB: Soils under intensive livestock farming and heavily fertilized with animal manure may have elevated soil phosphorus (P) contents. We determined P desorption kinetics in batch experiments using soils from a pot experiment where grass was cropped on a P-rich noncalcareous sandy soil without P addition, to lower the soil P content. A diffusion model was used to describe P desorption kinetics from a spherical aggregate. The model was calibrated with data from the batch experiments. Simulation results show that in the pot experiment, P desorption from the solid phase of the inner layers was initially far from equilibrium with the rest of the aggregate, but desorption came closer to equilibrium as the soil P content decreased further. A simple tool is presented, referred to as the dynamic bioavailability index (DBI), to determine whether kinetics of P desorption limits plant uptake. This tool is the dimensionless ratio of the modeled maximal diffusive flux from soil aggregates to solution and the plant uptake rate measured in the pot experiment. The DBI was initially much larger than one; the maximal possible P desorption rate exceeded the uptake rate, so uptake was not limited by desorption. The DBI stabilized at a value somewhat larger than one after a while, due to soil transport limitations. This decrease coincided with a large decrease of the P content in the grass to a value (far) below what is considered as optimal; the supply rate of P from soil to the root cannot meet the demand needed for optimal P uptake. The DBI could be seen as a promising onset to a new dynamic approach of bioavailability.

Record 89 of 593 - AGRICOLA 1998-2004/09

AU: Wang,-Z.Y.; Kelly,-J.M.; Kovar,-J.L.

TI: In situ dynamics of phosphorus in the rhizosphere solution fo five species.

SO: Journal of environmental quality. 2004 July-Aug, v. 33, no. 4 p. 1387-1392.

AB: Root activity can modify the chemistry of the rhizosphere and alter phosphorus (P) availability and uptake. However, until recently, relatively little was known about the dynamics of soil solution P at the root surface because of our inability to measure in situ changes in solution P at the plant root. A mini-rhizotron experiment with corn (Zea mays L. cv. Stine 2250), soybean [Glycine max (L.) Merr. cv. Pioneer 3563), cottonwood (Populus deltoids L.), smooth brome (Bromus inermis Leyss.), and switchgrass (Panicum virgatum L.) was conducted to measure the spatial and temporal dynamics of P in the rhizosphere solution of a fine silty, P-rich calcareous soil (solid-phase total P concentration = 62 mg kg-1, pH = 7.68) from western Iowa. Micro-suction cups were used to collect samples of soil solution from

defined segments of the rhizosphere, and capillary electrophoresis (CE) was used to determine the P concentration of the soil solution. At the end of 10 d, a decreasing P concentration gradient in soil solution toward the root was observed in corn, cottonwood, and smooth brome. No clear rhizosphere effect was observed for soybean and switchgrass. Statistical analysis indicated significantly lower solution P concentrations in the rhizospheres of corn ($p = 0.05$), cottonwood ($p = 0.01$), and smooth brome ($p = 0.01$) compared with bulk soil solution. Results indicate that P depletion from rhizosphere soil solution depends on plant species. Under the conditions of this study, corn, cottonwood, and smooth brome were more effective in depleting solution P than soybean and switchgrass.

Record 90 of 593 - AGRICOLA 1998-2004/09

AU: Gupta,-S.; Munyankusi,-E.; Moncrief,-J.; Zvomuya,-F.; Hanewall,-M.

TI: Tillage and manure application effects on mineral nitrogen leaching from seasonally frozen soils.

SO: Journal of environmental quality. 2004 July-Aug, v. 33, no. 4 p. 1238-1246.

AB: Land application of manure is a common practice in the Upper Midwest of the United States. Recently, there have been concerns regarding the effect of this practice on water quality, especially when manure is applied during winter over frozen soils . A study undertaken on a Rozetta silt loam (fine-silty, mixed, superactive, mesic Typic Hapludalfs) at Lancaster, WI, evaluated the effects of tillage and timing of manure application on surface and subsurface water quality. The daily scrape and haul liquid dairy manure was applied either in the fall (before snow) or in winter (over snow with frozen soil underneath) to be compared with no manure under two tillage systems (no-till and chisel-plowing). In this paper, we report results on the effects of the above treatments on mineral N leaching. Percolation and mineral N leaching during the nongrowing season were, respectively, 72 and 78% of the annual losses, mainly because of the absence of plant water and N uptake. Percolation was generally higher from no-till compared with chisel-plow but there was no significant effect of tillage on mineral N concentration of the leachate or mineral N losses via leaching. Mineral N leaching was statistically higher from the manure-applied vs. no-manure treatment, but there was no difference between winter-applied manure and no-manure treatments. There were significant tillage by manure interactions with fall manure application followed by chisel-plowing resulting in highest N leaching losses. Averaged over the two years, N leaching rates were 52, 38, and 28 kg N ha-1 yr-1 from fall-applied, winter-applied, and no-manure treatments, respectively. These results show that there is substantial N leaching from these soils even when no fertilizer or manure is applied. Furthermore, fall-applied manure followed by fall tillage significantly increases N leaching due to enhanced mineralization of both soil and manure organic N.

Record 91 of 593 - AGRICOLA 1998-2004/09

AU: Sharpe,-R.R.; Schomberg,-H.H.; Harper,-L.A.; Endale,-D.M.; Jenkins,-M.B.; Franzluebbers,-A.J.

TI: Ammonia volatilization from surface-applied poultry litter under

conservation tillage management practices.
SO: Journal of environmental quality. 2004 July-Aug, v. 33, no. 4 p. 1183-1188.
AB: Land application of poultry litter can provide essential plant nutrients for crop production, but ammonia (NH3) volatilization from the litter can be detrimental to the environment. A multiseason study was conducted to quantify NH3 volatilization rates from surface-applied poultry litter under no-till and paraplowed conservation tillage managements. Litter was applied to supply 90 to 140 kg N ha-1. Evaluation of NH3 volatilization was determined using gas concentrations and the flux-gradient gas transport technique using the momentum balance transport coefficient. Ammonia fluxes ranged from 3.3 to 24% of the total N applied during the winter and summer, respectively. Ammonia volatilization was rapid immediately after litter application and stopped within 7 to 8 d. Precipitation of 17 mm essentially halted volatilization, probably by transporting litter N into the soil matrix. Application of poultry to conservation-tilled cropland immediately before rainfall events would reduce N losses to the atmosphere but could also increase NO3 leaching and runoff to streams and rivers.

Record 92 of 593 - AGRICOLA 1998-2004/09
AU: Park,-D.S.; Peterson,-C.; Zhao,-S.; Coats,-J.R.
TI: Fumigation toxicity of volatile natural and synthetic cyanohydrins to stored-product pests and activity as soil fumigants.
SO: Pest management science. 2004 Aug., v. 60, issue 8 p. 833-838.
AB: Insecticidal fumigation toxicity of natural and synthetic cyanohydrins was evaluated with four stored-product pests: the lesser grain borer, Rhyzopertha dominica (F), the red flour beetle, Tribolium castaneum Herbst, the saw-toothed grain beetle Oryzaephilus surinamensis L, the maize weevil, Sitophilus zeamais (Motsch) and the house fly, Musca domestica L. The fumigation LC50 values were calculated by probit analysis. For house flies, all but one of the cyanohydrins tested were more potent than 1,3-dichloropropene (Telone). Three were as efficacious as chloropicrin. For the lesser grain borer, all cyanohydrins tested were more insecticidal than dichloropropene, and all but one were more potent than chloropicrin. Four were as insecticidal as dichlorvos. The acetate of 1-cyano-1-hydroxy-2-propene (CHP-ace) was also tested in soil for antifungal and antibacterial activity, and inhibition of weed seed germination. CHP-ace reduced the total soil bacterial and fungal counts significantly, and was effective in inhibiting the germination of weed seeds in soil, indicating a broad spectrum of activity as a soil fumigant.

Record 93 of 593 - AGRICOLA 1998-2004/09
AU: Bajwa,-S.G.; Bajcsy,-P.; Groves,-P.; Tian,-L.F.
TI: Hyperspectral image data mining for band selection in agricultural applications.
SO: Transactions of the ASAE. 2004 May-June, v. 47, no. 3 p. 895-907.
AB: Hyperspectral remote sensing produces large volumes of data, quite often requiring hundreds of megabytes to gigabytes of memory storage for a small geographical area for one-time data collection. Although the high spectral resolution of hyperspectral data is quite useful for capturing and

discriminating subtle differences in geospatial characteristics of the target, it contains redundant information at the band level. The objective of this study was to identify those bands that contain the most information needed for characterizing a specific geospatial feature with minimal redundancy. Band selection is performed with both unsupervised and supervised approaches. Five methods (three unsupervised and two supervised) are proposed and compared to identify hyperspectral image bands to characterize soil electrical conductivity and canopy coverage in agricultural fields. The unsupervised approach includes information entropy measure and first and second derivatives along the spectral axis. The supervised approach selects hyperspectral bands based on supplemental ground truth data using principal component analysis (PCA) and artificial neural network (ANN) based models. Each hyperspectral image band was ranked using all five methods. Twenty best bands were selected by each method with the focus on soil and plant canopy characterization in precision agriculture. The results showed that each of these methods may be appropriate for different applications. The entropy measure and PCA were quite useful for selecting bands with the most information content, while derivative methods could be used for identifying absorption features. ANN measure was the most useful in selecting bands specific to a target characteristic with minimum information redundancy. The results also indicated that a combination of wavebands with different bandwidths will allow use of fewer than 20 bands used in this study to represent the information contained in the top 20 bands, thus reducing image data dimensionality and volume considerably.

Record 94 of 593 - AGRICOLA 1998-2004/09

AU: Li,-X.; Ambrose,-R.B.; Araujo,-R.

TI: Modeling mineral nitrogen export from a forest terrestrial ecosystem to streams.

SO: Transactions of the ASAE. 2004 May-June, v. 47, no. 3 p. 727-739.

AB: Terrestrial ecosystems are major sources of N pollution to aquatic ecosystems. Predicting N export to streams is a critical goal of nonpoint-source modeling. This study was conducted to assess the effect of terrestrial N cycling on stream N export using long-term monitoring data from Hubbard Brook Experimental Forest (HBEF) in New Hampshire. The field-scale DAYCENT model was used to quantify N pools and long-term annual streamflow and mineral N export for six subwatersheds at the HBEF. By combining DAYCENT with the Soil and Water Assessment Tool (SWAT) watershed model, mineral N export simulations were extended to the watershed scale. Our study indicated that only 13% of external N input was exported to streams during 1951-2000 at HBEF. As much as 4763 kg/ha of N was stored in forest litter, soil organic matter (SOM), and living plant biomass. Net N mineralization of SOM and forest litter contributed 93% of total available N for export within the HBEF ecosystem. The Nash-Sutcliffe coefficient (Ens) evaluating model performance of DAYCENT at six subwatersheds ranged from 0.72 to 0.82 for simulating annual streamflow (1964-2000) and from 0.48 to 0.67 for annual mineral N export (1971-1995), indicating reasonable simulated values. DAYCENT successfully predicted the effect of ecosystem disturbance such as forest cut and insect invasion on stream mineral N export. The watershed-scale simulation suggested that soil spatial

variability affects stream N export in addition to the accepted controls of land cover, external N input, climate, and ecosystem disturbance.

Record 95 of 593 - AGRICOLA 1998-2004/09
AU: Thompson,-A.M.; Wilson,-B.N.; Hansen,-B.J.
TI: Shear stress partitioning for idealized vegetated surfaces.
SO: Transactions of the ASAE. 2004 May-June, v. 47, no. 3 p. 701-709.
AB: Vegetation and other surface roughness materials partition the shear force of flowing water into a portion acting on the vegetation (vegetal shear) and the remainder acting on the intervening soil surface (particle shear). The fraction acting on the soil surface is directly involved in subsequent particle detachment. The purpose of this study was to directly measure the components of shear stress and to quantify the shear partition for various densities of idealized elements representative of non-submerged rigid vegetation in overland flow. Insight into the magnitude of particle shear and vegetal shear is necessary for understanding the role of vegetation in reducing particle shear and, consequently, reducing potential erosion. Circular cylinders and idealized elements with differences in the rate of change in upstream frontal area with flow depth were used to model vegetation. Detailed spatial and temporal particle shear measurements were made using a unique hydraulic flume and hot-film anemometry. Drag force was measured on individual elements within test arrays. This combination of measurements allowed for direct determination of the shear partition. The tests were conducted on three uniform element densities at discharges of 0.005 and 0.01 m3/s. Element width-to-spacing ratios ranged from 0.04 to 0.20. Over the range of densities studied, particle shear accounted for 13% to 89% of the total shear, indicating that complete surface coverage is not required to significantly reduce the shear stress acting on soil particles. Existing shear partitioning theory, in which the partition is a function of the ratio of element to surface drag coefficients and the roughness density, was found to represent the observed partition reasonably well (mean squared error = 0.036). The results from this study are important for selecting appropriate plant species and densities for erosion control systems.

Record 96 of 593 - AGRICOLA 1998-2004/09
AU: Anken,-T.; Weisskopf,-P.; Zihlmann,-U.; Forrer,-H.; Jansa,-J.; Perhacova,-K.
TI: Long-term tillage system effects under moist cool conditions in Switzerland.
SO: Soil and tillage research. 2004 Aug., v. 78, issue 2 p. 171-183.

Record 97 of 593 - AGRICOLA 1998-2004/09
AU: Lapen,-D.R.; Topp,-G.C.; Gregorich,-E.G.; Curnoe,-W.E.
TI: Least limiting water range indicators of soil quality and corn production, eastern Ontario, Canada.
SO: Soil and tillage research. 2004 Aug., v. 78, issue 2 p. 151-170.

Record 98 of 593 - AGRICOLA 1998-2004/09
AU: Undabeytia,-T.; Sanchez-Verdejo,-T.; Morillo,-E.; Maqueda,-C.
TI: Effect of organic amendments on the retention and mobility of imazaquin in soils.

SO: Journal of agricultural and food chemistry. 2004 July 14, v. 52, no. 14 p. 4493-4500.
AB: The influence of two organic amendments consisting of an urban waste compost (SUW) and a commercial amendment from olive mill wastes (OW) was assessed on the sorption properties and leaching of the ionizable herbicide imazaquin on four soils with different physicochemical characteristics. A loamy sand soil (CR), a loam soil (P44), a silt loam soil (AL), and a clay soil (TM), with low-medium organic matter contents, were chosen. Sorption-desorption experiments were performed on the original soils and on a mixture of these soils with the organic amendments at a rate of 6.25% (w/w). These mixtures were used just after preparation and after aging for 3 months. Imazaquin adsorption was higher on AL soil because of its high content of amorphous iron oxides, whereas it was related to the soils' organic matter (OM) contents on TM and CR soils and to acid pH on P44 soil. Addition of exogenous OM to soils caused a decrease in the adsorption of the herbicide with the only exception of CR soil, due to blocking of adsorptive surfaces and/or equilibrium pH rise. The extent of this decrease was dependent only on the nature of the added amendment on AL soil. The adsorbed amounts of imazaquin on aged organic fertilized soils were usually fairly close to that on original soils. Results of soil column experiments indicate that addition of exogenous organic matter cannot be considered as a regular practice for retarded movement of imazaquin.

Record 99 of 593 - AGRICOLA 1998-2004/09
AU: Odendaal,-J.P.; Reinecke,-A.J.
TI: Bioaccumulation of cadmium and zinc, and field validation of a histological biomarker in terrestrial isopods.
SO: Bulletin of environmental contamination and toxicology. 2004 Apr., v. 72, no. 4 p. 769-776.

Record 100 of 593 - AGRICOLA 1998-2004/09
AU: Egamberdiyeva,-D.; Qarshieva,-D.; Davranov,-K.
TI: The use of Bradyrhizobium to enhance growth and yield of soybean in calcareous soil in Uzbekistan.
SO: Journal of plant growth regulation. 2004 Mar., v. 23, no. 1 p. 54-57.
AB: In this work the effect of inoculation with Bradyrhizobium japonicum S2492 on soybean (Glycine max (L) Merr) growth, nodulation and yield in nitrogen-deficient soil of Uzbekistan was studied. The field experiments were carried out in Tashkent Province of Uzbekistan in a randomized complete block design with four replicates of each treatment. The results revealed positive effects on growth, nodule number and yields of soybean after inoculation with B. japonicum S2492. The yield of soybean varieties was 48% higher for inoculated than for uninoculated plants. The effect of the inoculation was specific for variety but not for growth type. The protein and oil contents of seeds also increased after inoculation. It was concluded that B. japonicum S2492 can be considered as a biofertilizer for increasing the productivity of soybean in nitrogen-deficient soils in Uzbekistan.

Record 101 of 593 - AGRICOLA 1998-2004/09
AU: Katiyar,-V.; Goel,-R.

TI: Siderophore mediated plant growth promotion at low temperature by mutant of fluorescent pseudomonad.
SO: Plant growth regulation. 2004 Mar., v. 42, no. 3 p. 239-244.
AB: A cold resistant mutant of Pseudomonas fluorescens ATCC 13525 was developed, which could grow equally well at 25 and 10ÀC and its effect on plant growth promotion under in vitro and in situ conditions was observed. Siderophore estimation revealed it to be a siderophore-overproducing mutant (17-fold increase) when compared to its wild type counterpart. A gnotobiotic root elongation assay indicated that the mutant (CRPF9) promoted growth more than its wild type both at 25 and 10ÀC, indicating its effectiveness at low temperature. Further, root colonization studies showed that CRPF9 was an efficient rhizosphere colonizer, inducing a significant increase in root (35%) and shoot length (28%) of mung bean plants in unsterilized soil system. The persistence and stability of the mutant was evident in rhizospheric soil. A sand culture experiment showed that ferric citrate was better than Fe(OH)3 as an iron source for plant growth, but in the presence of CRPF9 both salts were comparable. This study demonstrates the potential of chemical mutagenesis for improving the plant growth promoting properties of a P. fluorescens strain and its stimulating impact on plant growth promotion at low temperature both under in vitro and in situ conditions.

Record 102 of 593 - AGRICOLA 1998-2004/09
AU: Wagner,-D.; Jones,-J.B.
TI: The contribution of harvester ant nests, Pogonomyrmex rugosus (Hymenoptera, Formicidae), to soil nutrient stocks and microbial biomass in the Mojave Desert.
SO: Environmental entomology. 2004 June, v. 33, no. 3 p. 599-607.
AB: The distribution of soil nutrients in deserts is heterogeneous, with high concentrations of organic and inorganic nutrients occurring under shrubs and near animal dwellings. Attention has focused on shrubs in creating "fertile islands." In this study, we compare the effects of the harvester ant Pogonomyrmex rugosus Emery (Hymenoptera: Formicidae) and shrubs on soil composition in the Mojave Desert. Soil organic matter, total N, mineral N, and available P were significantly more concentrated in the nests of P. rugosus than under the dominant vegetation and in sparsely vegetated interspaces between shrubs and ant nests. Ant nests also contained high concentrations of total C, organic C, and soluble organic C and N relative to other microhabitat types. On an areal basis, ant nests stored 3% of mineral N and 0.7-1.6% of organic matter, total N, and available P on the landscape while covering 0.5% of the surface. At field moisture, microbial biomass C and N were significantly more concentrated in ant nests at one of two study sites. When moistened, ant nest soils had a higher capacity for microbial growth than soils from other microhabitats. As a result of ant activities, ant nests accumulated surface materials at an average rate 3.5 mm/yr faster than the surrounding soil. We conclude that P. rugosus nests impact arid ecosystems by creating highly concentrated patches of soil nutrients and microflora on the landscape that could affect biogeochemical cycling rates and plant community dynamics.

Record 103 of 593 - AGRICOLA 1998-2004/09

AU: Martha,-G.B.-Jr.; Corsi,-M.; Trivelin,-P.C.O.; Alves,-M.C.
TI: Nitrogen recovery and loss in a fertilized elephant grass pasture.
SO: Grass and forage science the journal of the British Grassland Society. 2004 Mar., v. 59, no. 1 p. 80-90.
AB: Limited information is available regarding the recovery and loss of fertilizer nitrogen (N) applied to intensively managed tropical grass pastures. An experiment was carried out in Brazil to determine the fertilizer-N recovery and ammonia volatilization loss in an elephant grass (Pennisetum purpureum, Schum.) pasture fertilized with 100 kg N ha-1 as urea or ammonium sulphate, labelled with 15N, in late summer (LS) or in mid-autumn (MA). Herbage mass was highest and litter mass was lowest in LS ($P < 0.05$). The N concentration of herbage was highest in autumn ($P < 0.05$) and the total N content in soil was lower in LS than in MA ($P < 0.05$), reflecting the high N uptake capacity of the grass. Proportionately higher 15N recovery in litter mass ($P < 0.05$) was observed in autumn (0.094) than in LS (0.0397) and the 15N recovery in herbage was 0.046 higher for ammonium sulphate-fertilized pastures ($P < 0.05$; proportionately 0.243 for ammonium sulphate and 0.197 for urea). Around 0.60 of the fertilizer-15N recovered was retained in soil and in non-harvestable fractions of the plant. The NH3 volatilization loss was higher in LS and most of the N loss occurred soon after fertilizer application. Urea and ammonium sulphate fertilizers were equally effective in sustaining herbage dry matter yield in the short term. However, the use of ammonium sulphate, rather than urea, would be preferable for LS applications when the objective is to reduce NH3 volatilization losses.

Record 104 of 593 - AGRICOLA 1998-2004/09
AU: Kelm,-M.; Wachendorf,-M.; Trott,-H.; Volkers,-K.; Taube,-F.
TI: Performance and environmental effects of forage production on sandy soils. III. Energy efficiency in forage production from grassland and maize for silage.
SO: Grass and forage science the journal of the British Grassland Society. 2004 Mar., v. 59, no. 1 p. 69-79.
AB: Based on experimental data gathered in a research project on nitrogen fluxes in intensive dairy farming in Northern Germany, an analysis of fossil energy input and energy efficiency in forage production from permanent grassland and maize for silage was conducted. Field experiments comprised different defoliation systems and different rates of mineral N fertilizer and slurry application. Each change from grazing to cutting in grassland systems reduced the energy efficiency. Energy efficiency consistently decreased with increasing rates of mineral N application. In the production of maize for silage, maximum energy efficiency was obtained with an application of 50 kg N ha-1 from slurry only. Net energy yields of maize for silage were much higher than that of grassland when compared at the same level of fossil energy and nitrogen fertilizer input. Considering both nitrate-leaching losses and a necessary minimum quantity of grass herbage in a well-balanced ration, it is suggested that a high proportion of maize for silage in combination with N-unfertilized grass/clover swards used in a mixed cutting/ grazing system represents a good trade-off between the leaching of nitrates and energy efficiency.

Record 105 of 593 - AGRICOLA 1998-2004/09

AU: Dodd,-M.B.; Barker,-D.J.; Wedderburn,-M.E.

TI: Plant diversity effects on herbage production and compositional changes in New Zealand hill country pastures.

SO: Grass and forage science the journal of the British Grassland Society. 2004 Mar., v. 59, no. 1 p. 29-40.

AB: A small-plot field experiment on grazed hill country pastures in the North Island of New Zealand was conducted to examine the productivity and compositional characteristics of swards in response to variation in pasture species diversity. The balanced incomplete factorial design incorporated variation in location, slope, soil fertility and combinations of eight plant functional groups (C4 grasses, annual grasses, annual legumes, perennial C3 grasses, perennial legumes, perennial forbs, ryegrass and browntop). Net herbage accumulation and botanical composition were measured at 18 months (spring) and 24 months (autumn) after oversowing following application of a systemic herbicide. Analysis of variance indicated a significant positive relationship between the number of functional groups sown and herbage accumulation of the sown species in spring, but not with total herbage accumulation. Regression analysis showed that herbage accumulation was also affected by the identity of the functional groups. However, the statistical models indicated that pasture productivity was most strongly influenced by site factors. There was a significant negative relationship between both the number and herbage accumulation of unsown species and the number of functional groups sown, indicating a positive relationship between diversity and resistance to invasion by unsown species. A comparison of the vegetation between the plots before and after oversowing showed that those more diverse prior to sowing returned to their initial composition more rapidly, evidence that diverse vegetation was more resilient in the face of disturbance.

Record 106 of 593 - AGRICOLA 1998-2004/09

AU: Kong,-C.; Liang,-W.; Xu,-X.; Hu,-F.; Wang,-P.; Jiang,-Y.

TI: Release and activity of allelochemicals from allelopathic rice seedlings.

SO: Journal of agricultural and food chemistry. 2004 May 19, v. 52, no. 10 p. 2861-2865.

AB: 3-Isopropyl-5-acetoxycyclohexene-2-one-1 (1), momilactone B (2), and 5,7,4'-trihydroxy-3',5'-dimethoxyflavone (3) were isolated and identified from an allelopathic rice accession PI312777. These three compounds at low concentrations could inhibit the growth of weeds Echinochloa crusgalli and Cyperus difformis associated with rice, especially mixtures of the compounds had stronger inhibitory activity than did individual compounds. Studies with hydroponic culture, continuous root exudates trapping system (CRETS), and direct resin adsorption methods showed that a total of 7.6 n moles 1, 2, and 3 were exuded from living roots of each seedling into the environment at 10 days after seedlings were transplanted. Furthermore, 1, 2, and 3 were found in the soil growing PI312777 seedlings at day 15 after seedlings emergence and reached a total of 39.5 g/g soil at day 30. The results indicated that PI 312777 seedlings could release sufficient quantities of 1, 2, and 3 into the environment to act

as allelochemicals inhibiting the growth of associated weeds. Investigations on the distribution of 1, 2, and 3 in PI 312777 plant, and its root exudates showed that the levels of 1, 2, and 3 were significantly higher in the shoots and root exudates than in the roots, and only trace 1 was observed in the roots. The results suggest that the roots of rice seedlings are not major site of synthesis or accumulation 1, 2, and 3, but a pathway for their release into the environment. The levels of 1, 2, and 3 in the root exudates were over 2-folds higher under direct resin adsorption than under hydroponic culture and CRETS, and hence, it is the preferred method to collect and identify active allelochemicals in rice exudates in future studies on rice allelopathy.

Record 107 of 593 - AGRICOLA 1998-2004/09

AU: Zheljazkov,-V.D.; Warman,-P.R.

TI: Application of high-Cu compost to dill and peppermint.

SO: Journal of agricultural and food chemistry. 2004 May 5, v. 52, no. 9 p. 2615-2622.

AB: A controlled environment experiment was conducted to determine the effect of amending soil with various rates of high-Cu compost (0, 20, 40, and 60% compost/soil by volume) on dill (Anethum graveolens L.) and peppermint (Mentha X piperita L.) yields, on fractionation of Cu and Zn in soils, on elemental composition of soil and tissue, and on the essential oils. The compost contained about 2000 mg kg-1 of Cu. Dill yields were greatest in the 20 or 40% treatments, but peppermint yields were greatest in the 20% treatment. Compost additions increased soil pH and electrical conductivity (EC), HNO3 extractable soil B, Ca, K, Mg, Mn, P, S, Na, and Pb. Additions of high-Cu compost to soil increased tissue P, S, and Na in both crops and Mn, Mo, and Zn in dill but decreased tissue Ca, Cd, and Fe in both crops and Mn, Mo, and Zn in peppermint, increased Cu in all soil fractions including exchangeable, and increased tissue Cu of dill and peppermint as compared to unamended soil. Addition of 60% of high-Cu compost to soil resulted in 760-780 mg kg-1 Cu in the growth medium. Nevertheless, Cu content in both crops reached only 12 mg kg-1 DW in the 60% compost treatment, which is below the toxicity levels for plants and below the upper chronic dietary exposure for animals. The application of high-Cu compost altered chemical composition of dill and peppermint essential oils, but oils were free of Cu, Zn, Cd, Ni, Cr, and Pb. Results from this study suggest that mature composts with concentrations of Cu and Zn of 2008 and 321 mg/kg, respectively, can be used as a soil conditioner without risk for phytotoxicity or risk of increasing the normal range of Cu and Zn in crop tissue. However, the long-term effect of the accumulation of heavy metals in soils following repeated compost applications needs to be carefully considered.

Record 108 of 593 - AGRICOLA 1998-2004/09

AU: Zhou,-L.; Bailey,-K.L.; Derby,-J.

TI: Plant colonization and environmental fate of the biocontrol of fungus Phoma macrostoma.

SO: Biological control theory and applications in pest management. 2004 July, v. 30, no. 3 p. 634-644.

AB: Several isolates of the fungus Phoma macrostoma demonstrated

bioherbicidal activity against dandelion seedlings when applied to soil. Weed control ranged from 36 to 100% depending on the isolates and the doses applied. Using microbiological and molecular genetic techniques, the ability of these isolates to colonize target, and nontarget plants and to disperse and persist in soil were determined. PCR primers highly specific to the biocontrol isolates of P. macrostoma, were used to detect the isolates at rates of application between 4 and 1000 g/m2. Based on the results from representative isolates tested, it was concluded that P. macrostoma colonized root tissues of both resistant and susceptible crop species and a susceptible weed species grown in treated soil, and the frequency of fungal isolation declined with time. It was occasionally detected on untreated plant tissues, which may have resulted from either natural occurrences on seed, or contamination of soil. The biocontrol fungus appeared to have limited mobility in the soil since it was not often detected away from the area where it was placed. It persisted in the soil at detectable levels for up to 4 months, but then its presence declined with time. One year post application, P. macrostoma was either not present or significantly reduced in both soil and plant samples depending on the year of sampling. The results suggested that the isolates of P. macrostoma used for biological weed control would have minimal environmental impact due to its ubiquitous nature, limited mobility, and weak persistence over seasons.

Record 109 of 593 - AGRICOLA 1998-2004/09
AU: Parra,-C.; Martinez-Barajas,-E.; Acosta,-J.; Coello,-P.
TI: Phosphate deficiency responses of bean genotypes contrasting in their efficiency capacity to grow in low-phosphorus soils.
SO: Agrociencia. 2004 Mar-Apr, v. 38, no. 2 p. 131-139.

Record 110 of 593 - AGRICOLA 1998-2004/09
AU: Zou,-L.; Stout,-M.J.; Ring,-D.R.
TI: Density-yield relationships for rice water weevil on rice for different varieties and under different water management regimes.
SO: Crop protection. 2004 June, v. 23, no. 6 p. 543-550.
AB: The rice water weevil, Lissorhoptrus oryzophilus Kuschel, is the most destructive insect pest of rice in the United States. Two years of field experiments were conducted to quantify relationships between densities of immature rice water weevils and yields for two rice varieties under early and delayed flooding regimes. Larval densities during earlier stages of rice growth were more strongly correlated with yield losses than were larval densities later in the growing season. Slopes of regression models were more negative for early-flood than for delayed-flood plots, and more negative for 'Bengal' than for ' Cocodrie'. The results of these experiments confirm that short delays in flooding reduce yield losses from the rice water weevil and that 'Bengal' is less tolerant of weevil feeding than ' Cocodrie'. Estimates of yield loss caused by each weevil provide a key parameter for the calculation of economic injury levels under different management regimes. Data from this study suggest that it is possible to integrate the use of insecticides, cultural practices and host plant resistance in a management system for the rice water weevil.

Record 111 of 593 - AGRICOLA 1998-2004/09
AU: Hess,-D.E.; Dodo,-H.
TI: Potential for sesame to contribute to integrated control of Striga hermonthica in the West African Sahel.
SO: Crop protection. 2004 June, v. 23, no. 6 p. 515-522.
AB: Striga hermonthica is an important constraint to the production of pearl millet, a staple cereal in many parts of sub-Saharan Africa. Sesame is an important oilseed crop well adapted to the sandy soils of the West African Sahel. Intercropping of sesame and pearl millet has been reported to reduce emerged striga numbers, but formal research into the potential for sesame to contribute to control of the parasite is lacking. Field trials were undertaken to evaluate the potential of sesame grown in rotation with pearl millet to reduce striga infestation of the cereal. Emerged striga numbers and striga fruiting were strongly reduced on pearl millet following sesame compared to sole millet. To maximize cereal yield, soil fertility enhancement and water conservation are indispensable elements of integrated striga control. The results can guide future research at a time where sesame is being promoted to diversify agricultural production in the Sahel.

Record 112 of 593 - AGRICOLA 1998-2004/09
AU: Aubertot,-J.N.; Pinochet,-X.; Dore,-T.
TI: The effects of sowing date and nitrogen availability during vegetative stages on Leptosphaeria maculans development on winter oilseed rape.
SO: Crop protection. 2004 July, v. 23, no. 7 p. 635-645.
AB: Phoma stem canker, caused by Leptosphaeria maculans (anamorph Phoma lingam), is one of the most serious diseases of oilseed rape world-wide. However, little is known about the effects of cultural practices on phoma stem canker development. We carried out a field experiment, in 2000/2001 and 2001/2002, at Grignon Experimental Unit (Paris Basin, France) to assess the effects of sowing date and nitrogen availability during vegetative stages on phoma stem canker development on two winter oilseed rape cultivars. We studied eight treatments corresponding to the combination of two sowing dates--early (beginning of August) and typical (beginning of September)--two levels of nitrogen availability during vegetative stagesapplication of 0 or 250 kg N ha-1 before the end of autumn, subsequent spring nitrogen fertilizer application being adjusted according to the needs of the crop--and two cultivars--Bristol (susceptible to phoma stem canker) and Pollen (slightly susceptible). Early sowing resulted in smaller crown cankers, whereas high nitrogen availability during the vegetative stage favoured crown canker development. Significant interactions between cultivar susceptibility and cultural practices were observed in the second year of the experiment. Crown canker development was more strongly limited by early sowing for Pollen than for Bristol. Similarly, high nitrogen availability during the vegetative stage increased crown canker development more strongly for Pollen than for Bristol. The results presented here should facilitate integration of the risk of phoma stem canker development into the choice of the sowing date and nitrogen management within the cropping system.

Record 113 of 593 - AGRICOLA 1998-2004/09

AU: MacLeod,-A.; Head,-J.; Gaunt,-A.
TI: An assessment of the potential economic impact of Thrips palmi on horticulture in England and the significance of a successful eradication campaign.
SO: Crop protection. 2004 July, v. 23, no. 7 p. 601-610.
AB: Thrips palmi has not become established in England, yet its potential introduction represents a continuous threat to glasshouse ornamental and vegetable crops. The first outbreak of T. palmi in England occurred at a site of chrysanthemum production in southern England during 2000. The statutory eradication of the pest imposed significant financial costs on both the producer and Defra Plant Health Service. The use of additional insecticides, methyl bromide soil sterilisation, imidacloprid-treated compost, plastic sheeting to cover the growing media and associated additional labour costs during the eradication campaign resulted in a six-fold increase of expenditure on pest control. The estimated eradication costs for the grower exceeded ¹56,000 for the period April 2000 to July 2001. If eradication had not been achieved, T. palmi may have spread to establish in protected cultivation throughout England. The net present value of the economic impact of T. palmi over 10 years is estimated to be between ¹16.9 and ¹19.6 M depending upon the rate of pest spread. Impacts include yield and quality losses, additional research, plant health certification costs and loss of exports. Although there is uncertainty as to whether revenue from exports liable to carry T. palmi would be lost, if they were lost they would be the most significant contributor to the overall economic impact. Without loss of exports, impacts fall to between ¹0.6 and ¹3.3 M over 10 years. Benefit:cost ratios for eradicating the outbreak and maintaining an exclusion policy towards T. palmi range from 4:1 to 19:1 if there is no loss of exports, and from 95:1 to 110:1 if significant export losses did result from T. palmi establishment.

Record 114 of 593 - AGRICOLA 1998-2004/09
AU: Chaluvaraju,-G.; Basavaraju,-P.; Shetty,-N.P.; Deepak,-S.A.; Amruthesh,-K.N.; Shetty,-H.S.
TI: Effect of some phosphorous-based compounds on control of pearl millet downy mildew disease.
SO: Crop protection. 2004 July, v. 23, no. 7 p. 595-600.
AB: Pearl millet downy mildew (PDM) disease was decreased by di-potassium hydrogen phosphate, 2,3,5 Tri-iodo benzoic acid, phosphorous acid (PA) and its commercially available formulations, Akomon-40 and Potphos to a variable extent, the efficacy of which was consistent both under greenhouse and field conditions. The chemicals acted as growth stimulants under laboratory conditions by improving seed germination and seedling vigour. Foliar application of PA was combined with compost added to the soil and seed with a reduced dosage of metalaxyl. This had an additive effect against PDM on pearl millet plant growth and grain yield compared with full dosage of metalaxyl.

Record 115 of 593 - AGRICOLA 1998-2004/09
AU: Nico,-A.I.; Jimenez-Diaz,-R.M.; Castillo,-P.
TI: Control of root-knot nematodes by composted agro-industrial wastes in potting mixtures.
SO: Crop protection. 2004 July, v. 23, no. 7 p. 581-587.

AB: The use of composted dry cork, dry-grape marc (fruit residue after pressing) and a 1:1 mixture of dry-olive marc+dry-rice husk as an amendment to potting mixtures was assessed for the management of Meloidogyne species. Amending the potting mixture with composted dry cork at rates of 0%, 25%, 50%, 75% and 100% v/v, reduced the root galling and final populations of Meloidogyne incognita race 1 and M. javanica in tomato, and final nematode population in olive plants, compared with the control. In tomato, increasing the rate of that amendment exponentially reduced the root galling caused by Meloidogyne incognita race 1 (40.8%) and the final nematode population (81.9%). Similarly, increasing rates of the amendment exponentially reduced the root galling of tomato caused by M. javanica (51.3%) and the final population (82.6%). Infection of olive roots by M. incognita race 1 did not cause visible galling; however, amendment with dry cork reduced the final nematode population by 87.9%. Amending the potting mixture with dry-grape marc also reduced the root galling and final populations of M. incognita race 1 and M. javanica in tomato, though the reductions in root galling (24.4% and 25.6%, respectively) and final nematode populations (34.2% and 34.7%, respectively) were not enough for effective nematode management. Root galling and final nematode population were not reduced in potting mixture amended with the 1:1 mixture of composted dry-olive marc and dry-rice husk.

Record 116 of 593 - AGRICOLA 1998-2004/09
AU: Levine,-M.E.; Greller,-A.M.
TI: Ecological and floristic analyses of vascular plants along a gradient on disturbed serpentinite on opposing slopes in Staten Island, NY.
SO: Journal of the Torrey Botanical Society. 2004 Jan-Mar, v. 131, no. 1 p. 69-92.

Record 117 of 593 - AGRICOLA 1998-2004/09
AU: Adkison,-G.P.; Gleeson,-S.K.
TI: Forest understory vegetation along a productivity gradient.
SO: Journal of the Torrey Botanical Society. 2004 Jan-Mar, v. 131, no. 1 p. 32-44.

Record 118 of 593 - AGRICOLA 1998-2004/09
AU: Griffiths,-M.E.; Orians,-C.M.
TI: Salt spray effects on forest succession in rare coastal sandplain heathlands: evidence from field surveys and Pinus rigida transplant experiments.
SO: Journal of the Torrey Botanical Society. 2004 Jan-Mar, v. 131, no. 1 p. 23-31.

Record 119 of 593 - AGRICOLA 1998-2004/09
AU: Latha,-R.; Rao,-C.S.; Subramaniam,-H.M.S.; Eganathan,-P.; Swaminathan,-M.S.
TI: Approaches to breeding for salinity tolerance--a case study on Porteresia coarctata.
SO: Annals of applied biology. 2004, v. 144, no. 2 p. 177-184.

Record 120 of 593 - AGRICOLA 1998-2004/09
AU: Foulk,-J.A.; Akin,-D.E.; Dodd,-R.B.; Frederick,-J.R.
TI: Optimising flax production in the South Atlantic region of the

USA.
SO: Journal of the science of food and agriculture. 2004 June, v. 84, issue 8 p. 870-876.
AB: Worldwide the USA is the largest user of flax fibre, though very little is actually grown or produced in the USA. Ariane flax was grown in 1990-1991, 1991-1992 and 1998-1999 in South Carolina, USA and evaluated for production characteristics. Plots (15 m long and 2 m wide) in the fall of 1990 and 1991 generated dry matter plant yields ranging from 4510 (early harvest at a seeding rate of 67 kg ha-1) to 7340 (late harvest at a seeding rate of 134 kg ha-1) kg ha-1. Based on these results, seed was sown on a private farm using a drill in 19 cm rows at a seeding rate of 101 kg ha-1 in 1998-1999. Early harvest, selected for optimal fibre quality, produced a dry matter plant yield that averaged 4076 kg ha-1. Late harvest, selected to optimise seed plus fibre, produced a dry matter plant yield that averaged 5076 kg ha-1. Stubble remaining in the field after mowing at about 6.0-7.6 cm above the soil surface resulted in a fibre loss of about 3% of total plant dry matter or 10% of potential total fibre yield. Dry matter and fibre yields suggested that flax could be produced in the southeastern USA using traditional farming methods for the area.

Record 121 of 593 - AGRICOLA 1998-2004/09
AU: Tudoreanu,-L.; Phillips,-C.J.C.
TI: Empirical models of cadmium accumulation in maize, rye grass and soya bean plants.
SO: Journal of the science of food and agriculture. 2004 June, v. 84, issue 8 p. 845-852.
AB: Linear regression of published values for soil parameters and cadmium concentrations in plant tissues offers the opportunity to develop uptake coefficients that can be applied in a wide range of circumstances. A widespread literature search was performed which identified publications from the last 20 years containing information on cadmium uptake by maize and rye grass plants. After discarding experiments with inadequate data or parameters, 10 and eight papers were chosen for maize and rye grass respectively to develop linear models that related pH and cadmium concentration in the growth media (soil in pots or nutrient solution) to cadmium concentration in maize or rye grass plants (excluding roots). Cadmium concentrations in both maize and rye grass were positively correlated with soil cadmium concentration, and in the case of maize negatively correlated with soil pH. They were also negatively correlated with the product of soil cadmium concentration and soil pH, demonstrating that at high soil cadmium concentration a high soil pH reduced plant cadmium concentration. A further model of data generated from one experiment with soya beans demonstrated that other factors, such as soil temperature, can have a major influence on uptake.

Record 122 of 593 - AGRICOLA 1998-2004/09
AU: Clary,-J.; Save,-R.; Biel,-C.; Herralde,-F.-de
TI: Water relations in competitive interactions of Mediterranean grasses and shrubs.
SO: Annals of applied biology. 2004, v. 144, no. 2 p. 149-155.

Record 123 of 593 - AGRICOLA 1998-2004/09

AU: Turner,-N.C.
TI: Sustainable production of crops and pastures under drought in a Mediterranean environment.
SO: Annals of applied biology. 2004, v. 144, no. 2 p. 139-147.

Record 124 of 593 - AGRICOLA 1998-2004/09
AU: Peterson,-G.A.; Westfall,-D.G.
TI: Managing precipitation use in sustainable dryland agroecosystems.
SO: Annals of applied biology. 2004, v. 144, no. 2 p. 127-138.

Record 125 of 593 - AGRICOLA 1998-2004/09
AU: Nobel,-P.S.; De-la-Barrera,-E.
TI: CO2 uptake by the cultivated hemiepiphytic cactus, Hylocereus undatus.
SO: Annals of applied biology. 2004, v. 144, no. 1 p. 1-8.

Record 126 of 593 - AGRICOLA 1998-2004/09
AU: Jiao,-Y.; Grant,-C.A.; Bailey,-L.D.
TI: Effects of phosphorus and zinc fertilizer on cadmium uptake and distribution in flax and durum wheat.
SO: Journal of the science of food and agriculture. 2004 June, v. 84, issue 8 p. 777-785.
AB: Cadmium accumulation in crops presents a potential risk to human health. To understand the difference between dicotyledonous and monocotyledonous species in respect of Cd accumulation, and to develop fertilizer management practices to minimise Cd uptake, a growth chamber study was conducted to evaluate the interactive effects of Cd concentration in phosphate and Zn fertilizer on Cd uptake in flax (Linum usitatissimum L) and durum wheat (Triticum turgidum L). Cadmium concentration was higher in flax than durum wheat shoots. Cadmium concentration was lower and Zn concentration higher in the flax seed and durum wheat grain than in the root, shoot or straw of both species. These results suggest that flax has comparatively ineffective barriers discriminating against the transport of Cd from the root to the shoot via the xylem, and that both crops may restrict Cd translocation to the seed/grain via the phloem. Commercial grade monoammonium phosphate (NH4H2PO4) or triple superphosphate (Ca(H2PO4)2) produced higher seed Cd concentrations than did reagent grade P in flax but not in durum wheat. Application of P significantly decreased seed/grain Zn concentration and increased seed/grain Cd concentration. Zinc addition at 20 mg Zn kg-1 soil with P decreased seed/grain Cd concentration (average 42.2% for flax, 65.4% for durum wheat), Cd accumulation (average 37.2% for flax, 62.4% for durum wheat) and Cd translocation to the seed/ grain (average 20.0% for flax, 34.5% for durum wheat) in both crops. These results indicate that there is an antagonistic effect of Zn on Cd for root uptake and distribution within the plant.

Record 127 of 593 - AGRICOLA 1998-2004/09
AU: Lopez,-J.; Tejada,-I.; Vasquez,-C.; Dios-Garza,-J.-de; Shimada,-A.
TI: Condensed tannins in humid tropical fodder crops and their in vitro biological activity. 1.
SO: Journal of the science of food and agriculture. 2004 Mar., v. 84, issue 4 p. 291-294.
AB: A descriptive study was conducted in order to determine the

tannin profiles of tropical fodder crops. The following types of condensed tannins (CT) were determined (expressed as g kg-1 of dry matter): free (FCT), bound to protein (CTP), bound to fibre (CTF) and total (TCT). High FCT levels were found in Desmodium ovalifolium (228.4), Flemigia macrophylla (181.9), Guazuma ulmyfolia (129.7) and Leucaena leucocephala (129.5). The highest concentrations of CTP were detected in Gliricidia sepium (61.0), F macrophylla (23.3), and G ulmyfolia (21.1). CTF levels were the highest in G ulmyfolia (55.1), F macrophylla (46.7) and G sepium (41.5). Analyzed samples cultivated in vertisol and fluvisol soils showed different contents of tannins. It has been reported that plants with more than 60 g kg-1 FCT are less palatable and digestible than forages with lower concentrations of this chemical class, although there is more protein to bypass the rumen and higher nitrogen retention. Graminaceous plants showed higher concentrations of FCT and TCT concentrations were generally lower than legumes and other forage crops.

Record 128 of 593 - AGRICOLA 1998-2004/09

AU: Jablasone,-J.; Brovko,-L.Y.; Griffiths,-M.W.

TI: A research note: the potential for transfer of Salmonella from irrigation water to tomatoes.

SO: Journal of the science of food and agriculture. 2004 Feb., v. 84, issue 3 p. 287-289.

AB: The transmission of Salmonella Enteritidis from soil to fruit by contaminated irrigated water was studied using 20 patio tomato plants. In order to track the presence of Salmonella in the soil and plants a luminescent strain transformed with the full luxCDABE gene cassette from Photorhabdus luminescens was used. The tomato plants were irrigated every other day by direct application of water containing Salmonella Enteritidis (105 CFU ml-1) to the soil. Samples of soil, stem, leaf and fruit were taken weekly and assayed for Salmonella by plating onto Luria Bertani agar containing 50 microgram ml-1 ampicillin. There was a significant difference ($P < 0.05$) in Salmonella counts from soils sampled during the course of the study. No Salmonella were recovered from the leaf, stem, and fruit samples taken from the tomato plants. This indicates that, under these test conditions, watering with contaminated water directly into the soil does not result in the transmission of Salmonella, and possibly other pathogens, to tomatoes.

Record 129 of 593 - AGRICOLA 1998-2004/09

AU: Wheeler,-M.H.; Bruton,-B.D.; Puckhaber,-L.S.; Zhang,-J.; Stipanovic,-R.D.

TI: Identification of 1,8-dihydroxynaphthalene melanin in Monosporascus cannonballus and the analysis of hexaketide and pentaketide compounds produced by wild-type and pigmented isolates of the fungus.

SO: Journal of agricultural and food chemistry. 2004 June 30, v. 52, no. 13 p. 4113-4120.

AB: Monosporascus cannonballus causes root rot and vine decline in muskmelons and watermelons. Wild types of this fungus often undergo degenerative changes that have been associated with yellow to brown pigmentation, hypovirulence, dsRNA infection, and decreased production of perithecia. In this study, degenerate isolates that produced yellow to brown pigments and no perithecia

were obtained from wild-type cultures that had been stored for extended periods of time. Cultures of the degenerate isolates were found to accumulate five related hexaketides when grown on potato-dextrose agar (PDA). In contrast, these hexaketides were present only in minute amounts in wild-type cultures unless grown on NaCl-amended PDA. 1,8-Dihydroxynaphthalene melanin was established to be present in wild-type M. cannonballus and absent in the degenerate isolates. Various melanin-related metabolites, however, were produced by the variants. Tricyclazole in PDA cultures blocked melanin biosynthesis by the wild types but had little effect on hexaketide production by the degenerate isolates.

Record 130 of 593 - AGRICOLA 1998-2004/09
AU: Stipanovic,-R.D.; Zhang,-J.; Bruton,-B.D.; Wheeler,-M.H.
TI: Isolation and identification of hexaketides from a pigmented Monosporascus cannonballus isolate.
SO: Journal of agricultural and food chemistry. 2004 June 30, v. 52, no. 13 p. 4109-4112.
AB: Monosporascus cannonballus causes severe production losses to muskmelon and watermelon in the United States and other countries. Wild types of the fungus produce no pigments when grown on potato dextrose agar (PDA). After long-term storage on soil/oat hull mix, however, some isolates of the fungus produce yellow to brown pigments and no perithecia when grown on PDA. Five colored metabolites from pigmented cultures of M. cannonballus isolate TX923038 have now been identified. Two of these, monosporascone and dehydroxyarthrinone, have been isolated from other fungi, and three, demethylcerdarin, monosporascol A and azamonosporascone, have not previously been reported. The 1H NMR and 13C NMR of all five compounds are reported.

Record 131 of 593 - AGRICOLA 1998-2004/09
AU: Westphal,-A.; Robinson,-A.F.; Scott,-A.W.-Jr.; Santini,-J.B.
TI: Depth distribution of Rotylenchulus reniformis under crops of different host status and after fumigation.
SO: Nematology international journal of fundamental and applied nematological research. 2004, v. 6, pt. 1 p. 97-107.

Record 132 of 593 - AGRICOLA 1998-2004/09
AU: Karssen,-G.; Bolk,-R.J.; Aelst,-A.C.-van; Beld,-I.-van-den; Kox,-L.F.F.; Korthals,-G.; Molendijk,-L.; Zijlstra,-C.; Hoof,-R.-van; Cook,-R.
TI: Description of Meloidogyne minor n. sp. (Nematoda: Meloidogynidae), a root-knot nematode associated with yellow patch disease in golf courses.
SO: Nematology international journal of fundamental and applied nematological research. 2004, v. 6, pt. 1 p. 59-72.

Record 133 of 593 - AGRICOLA 1998-2004/09
AU: Kashaija,-I.N.; McIntyre,-B.D.; Ssali,-H.; Kizito,-F.
TI: Spatial distribution of roots, nematode populations and root necrosis in highland banana in Uganda.
SO: Nematology international journal of fundamental and applied nematological research. 2004, v. 6, pt. 1 p. 7-12.

Record 134 of 593 - AGRICOLA 1998-2004/09

AU: Yeh,-Z.Y.; Chen,-M.J.
TI: Notes on dictyostelid cellular slime molds from Taiwan. 2. Dictyostelium exiguum and its ITS-5.8S rDNA sequences.
SO: Mycotaxon. 2004 Apr-June, v. 89, no. 2 p. 489-496.

Record 135 of 593 - AGRICOLA 1998-2004/09
AU: Castaneda-Ruiz,-R.F.; Heredia,-G.P.; Arias,-R.M.; Saikawa,-M.; Minter,--D.W.; Stadler,-M.; Guarro,-J.; Decock,-C.
TI: Two new Hyphomycetes from rainforests of Mexico, and Briansuttonia, a new genus to accommodate Corynespora alternarioides.
SO: Mycotaxon. 2004 Apr-June, v. 89, no. 2 p. 297-305.

Record 136 of 593 - AGRICOLA 1998-2004/09
AU: Pildain,-M.B.; Vaamonde,-G.; Cabral,-D.
TI: Analysis of population structure of Aspergillus flavus from peanut based on vegetative compatibility, geographic origin, mycotoxin and sclerotia production.
SO: International journal of food microbiology. 2004 May 15, v. 93, no. 1 p. 31-40.
AB: Isolates of Aspergillus flavus obtained from a new growing peanut region in Argentina (Formosa province) were examined for aflatoxin types B and G and cyclopiazonic acid (CPA) production. Sclerotia diameters and the number of sclerotia produced per square centimetre were also determined for each isolate. They were tested by vegetative compatibility group analysis to investigate their genetic relatedness and correlate the results with vegetative compatibility groups previously described from the major peanut-growing area (Cordoba province) in our country. Two isolates were considered atypical because they simultaneously produce aflatoxins B and G and CPA. . A flavus population from Formosa province was very diverse genetically. Vegetative compatibility groups (VCGs) formed by typical isolations of A. flavus were different among agroecological sites. Formosa isolates could not be grouped to any of the Cordoba VCGs, while that one of the VCGs that contain atypical isolates included strains from the two geographical regions. Each VCG included isolates of the same mycotoxin and sclerotia production pattern. The two regions analysed have different climatic conditions, soil type, crop sequence history and also are in different latitude. These parameters may reflect different geographic adaptation between isolates from both sites.

Record 137 of 593 - AGRICOLA 1998-2004/09
AU: Martin,-P.A.W.; Blackburn,-M.; Shropshire,-A.D.S.
TI: Two new bacterial pathogens of Colorado potato beetle (Coleoptera: Chrysomelidae).
SO: Journal of economic entomology. 2004 June, v. 97, no. 3 p. 774-780.
AB: Other than Bacillus thuringiensis Berliner, few bacteria are lethal to the Colorado potato beetle (Leptinotarsa decemlineata [Say]), a major pest of potatoes and eggplant. Expanded use of biologicals for the control of Colorado potato beetle will improve resistance management, reduce pesticide use, and produce novel compounds for potential use in transgenic plants. Using freeze-dried, rehydrated artificial diet in pellet form to screen bacteria lethal to other insects, we determined that strains of

Photorhabdus luminescens killed Colorado potato beetle larvae. The LC50 for second instar larvae of strain HM5-1 was 6.4 « 1.87 x 10(7) cells per diet pellet. In an attempt to find additional naturally occurring P. luminescens strains toxic to Colorado potato beetle larvae, we recovered, from soil, bacteria that produced a purple pigment. This bacterial strain, identified as Chromobacterium sp. by 16S ribosomal DNA sequencing, was also toxic to Colorado potato beetle larvae within 3 d. The LC50 for second instar larvae for these bacteria was 2.0 « 0.79 x 10(8) cells per diet pellet, while the LC50 was approximately 1 log lower for third instar larvae. P. luminescens appeared to kill by means of a protein toxin that may be similar to the described lepidopteran protein toxins. Based on the heat and acid stability, the toxin or toxins that Chromobacterium sp. produces, while not fully characterized, do not appear to be typical proteins. In both bacteria, the toxins are made after exponential growth ceases.

Record 138 of 593 - AGRICOLA 1998-2004/09

AU: Limon,-M.C.; Chacon,-M.R.; Mejias,-R.; Delgado-Jarana,-J.; Rincon,-A.M.; Codon,-A.C.; Benitez,-T.

TI: Increased antifungal and chitinase specific activities of Trichoderma harzianum CECT 2413 by addition of a cellulose binding domain.

SO: Applied microbiology and biotechnology. 2004 June, v. 64, no. 5 p. 675-685.

AB: Trichoderma harzianum is a widely distributed soil fungus that antagonizes numerous fungal phytopathogens. The antagonism of T. harzianum usually correlates with the production of antifungal activities including the secretion of fungal cell walls that degrade enzymes such as chitinases. Chitinases Chit42 and Chit33 from T. harzianum CECT 2413, which lack a chitin-binding domain, are considered to play an important role in the biocontrol activity of this strain against plant pathogens. By adding a cellulose-binding domain (CBD) from cellobiohydrolase II of Trichoderma reesei to these enzymes, hybrid chitinases Chit33-CBD and Chit42-CBD with stronger chitin-binding capacity than the native chitinases have been engineered. Transformants that overexpressed the native chitinases displayed higher levels of chitinase specific activity and were more effective at inhibiting the growth of Rhizoctonia solani, Botrytis cinerea and Phytophthora citrophthora than the wild type. Transformants that overexpressed the chimeric chitinases possessed the highest specific chitinase and antifungal activities. The results confirm the importance of these endochitinases in the antagonistic activity of T. harzianum strains, and demonstrate the effectiveness of adding a CBD to increase hydrolytic activity towards insoluble substrates such as chitin-rich fungal cell walls.

Record 139 of 593 - AGRICOLA 1998-2004/09

AU: Li,-L.; Cheng,-X.; Ling,-H.Q.

TI: Isolation and characterization of Fe(III)-chelate reductase gene LeFRO1 in tomato.

SO: Plant molecular biology. 2004 Jan., v. 54, no. 1 p. 125-136.

AB: Tomato is a model plant for studying molecular mechanisms of iron uptake and metabolism in strategy I plants (dicots and

non-graminaceous monocots). Reduction of ferric to ferrous iron on the root surface is an obligatory process for iron acquisition from soil in these plants. LeFRO1 encoding an Fe(III)-chelate reductase protein was isolated from the tomato genome. We show that expression of LeFRO1 in yeast increases Fe(III)-chelate reductase activity. In a transient expression analysis we found that LeFRO1 protein was targeted on the plasma membrane. LeFRO1 transcript was detected in roots, leaves, cotyledons, flowers and young fruits by RT-PCR analysis. Abundance of LeFRO1 mRNA was much lower in young fruits than in other tissues. The transcription intensity of LeFRO1 in roots is dependent on the iron status whereas it is constitutively expressed in leaves. These results indicate that LeFRO1 is required in roots and shoots as well as in reproductive organs for iron homeostasis and that its transcription in roots and shoots is regulated by different control mechanisms. The expression of LeFRO1 was disrupted in the iron-inefficient mutants chloronerva and T3238fer, indicating that FER and CHLN genes are involved in the regulation of LeFRO1 expression in tomato roots. The differential expression of LeFRO1 and LeIRT1 (an iron-regulated metal transporter gene in tomato) in roots of T3238fer under iron-deficient and -sufficient conditions suggests that the FER gene may regulate expression of LeFRO1 more directly than that of LeIRT1 in tomato roots.

Record 140 of 593 - AGRICOLA 1998-2004/09

AU: Gray,-J.; Wardzala,-E.; Yang,-M.; Reinbothe,-S.; Haller,-S.; Pauli,-F.

TI: A small family of LLS1-related non-heme oxygenases in plants with an origin amongst oxygenic photosynthesizers.

SO: Plant molecular biology. 2004 Jan., v. 54, no. 1 p. 39-54.

AB: Conservation of Lethal-leaf spot 1 (Lls1) lesion mimic gene in land plants including moss is consistent with its recently reported function as pheophorbide a oxygenase (Pao) which catalyzes a key step in chlorophyll degradation (Pruzinska et al., 2003). A bioinformatics survey of complete plant genomes reveals that LLS1(PAO) belongs to a small 5-member family of non-heme oxygenases defined by the presence of Rieske and mononuclear iron-binding domains. This gene family includes chlorophyll a oxygenase (Cao), choline monooxygenase (Cmo), the gene for a 55 kDa protein associated with protein transport through the inner chloroplast membrane (Tic55) and a novel 52 kDa protein isolated from chloroplasts (Ptc52). Analysis of gene structure reveals that these genes diverged prior to monocot/dicot divergence. Homologues of LLS1(PAO), CAO, TIC55 and PTC52 but not CMO are found in the genomes of several cyanobacteria. LLS1(PAO), PTC52, TIC55 and a set of related cyanobacterial homologues share an extended carboxyl terminus containing a novel F/Y/W-x2-H-x3-C-x2-C motif not present in CAO. These proteins appear to have evolved during the transition to oxygenic photosynthesis to play various roles in chlorophyll metabolism. In contrast, CMO homologues are found only in plants and are most closely related to aromatic ring-hydroxylating enzymes from soil-dwelling bacteria, suggesting a more recent evolution of this enzyme, possibly by horizontal gene transfer. Our phylogenetic analysis of 95 extant non-heme dioxygenases provides a useful framework for the classification of LLS1(PAO)-related non-heme

oxygenases.

Record 141 of 593 - AGRICOLA 1998-2004/09

AU: Hipkin,-C.R.; Simpson,-D.J.; Wainwright,-S.J.; Salem,-M.A.

TI: Nitrification by plants that also fix nitrogen.

SO: Nature. 2004 July 1, v. 430, no. 6995 p. 98-101.

AB: Nitrification is a key stage in the nitrogen cycle; it enables the transformation of nitrogen into an oxidized, inorganic state. The availability of nitrates produced by this process often limits primary productivity and is an important determinant in plant community ecology and biodiversity. Chemoautotrophic prokaryotes are recognized as the main facilitators of this process, although heterotrophic nitrification by fungi may be significant under certain conditions. However, there has been neither biochemical nor ecological evidence to support nitrification by photoautotrophic plants. Here we show how certain legumes that accumulate the toxin, 3-nitropropionic acid, generate oxidized inorganic nitrogen in their shoots, which is returned to the soil in their litter. In nitrogen-fixing populations this 'new' nitrate and nitrite can be derived from the assimilation of nitrogen gas. Normally, the transformation of elemental nitrogen from the atmosphere into a fixed oxidized form (as nitrate) is represented in the nitrogen cycle as a multiphasic process involving several different organisms. We show how this can occur in a single photoautotrophic organism, representing a previously undescribed feature of this biogeochemical cycle.

Record 142 of 593 - AGRICOLA 1998-2004/09

AU: Zeng,-L.; Kwon,-T.R.; Liu,-X.; Wilson,-C.; Grieve,-C.M.; Gregorio,-G.B.

TI: Genetic diversity analyzed by microsatellite markers among rice (Oryza sativa L.) genotypes with different adaptations to saline soils.

SO: Plant science. 2004 May, v. 166, issue 5 p. 1275-1285.

Record 143 of 593 - AGRICOLA 1998-2004/09

AU: Chand,-S.; Singh,-A.K.

TI: Plant regeneration from encapsulated nodal segments of Dalbergia sissoo Roxb., a timber-yielding leguminous tree species.

SO: Journal of plant physiology. 2004 Feb., v. 161, no. 2 p. 237-243.

AB: One of the alternative methods adopted in recent years is to use biotechnological approaches for improving the tree species. The synthetic seeds offer several advantages, e.g., easy handling, storability, reduced size of propagules, and transportability. Germplasm can be effectively stored in the form of synthetic seeds. A protocol has been developed for plant regeneration from encapsulated nodal segments of Dalbergia sissoo Roxb. Nodal segments collected from basal sprouts of mature trees were encapsulated in calcium alginate beads. Inability of nodal segments entrapped in calcium alginate beads to form root was a major problem. To avoid this problem, an appropriate root induction treatment was given to nodal segments for 10 days, prior to encapsulation to allow formation of root primordia. For synthetic seeds production and subsequent conversion into plantlet, nodal segments with root primordia were encapsulated using sodium alginate and calcium chloride as gelling matrix. The

best gel complexation was achieved using 3 % sodium alginate and 75 mmol/L CaCl2 ¨ 2H2O. Maximum percentage response (85 %) for conversion of encapsulated nodal segments into plantlets was achieved on 1/2-MS medium without plant growth regulators, after 25 days of culture. The frequency of conversion of encapsulated nodal segments into plantlets affected by the concentration of sodium alginate, and the presence or absence of 1/2-MS nutrients in calcium alginate beads. Plantlets with well developed roots and shoots were transferred to pots containing autoclaved mixture of peat moss and soil (1 : 1). Plants were also established in pots. The conversion of encapsulated nodal segments into plantlets also occurred when calcium alginate beads having entrapped nodal segments were directly sown in autoclaved peat moss moistened with 1/2-MS0 medium. Out of 60 encapsulated nodal segments, in each experiments, stored at 4 ÀC for 30 days, 44 plants developed under in vitro conditions, and 27 on peat moss moistened with 1/2-MS0.

Record 144 of 593 - AGRICOLA 1998-2004/09

AU: Yu,-G.R.; Wang,-Q.F.; Zhuang,-J.

TI: Modeling the water use efficiency of soybean and maize plants under environmental stresses: application of a synthetic model of photosynthesis-transpiration based on stomatal behavior.

SO: Journal of plant physiology. 2004 Mar., v. 161, no. 3 p. 303-318.

AB: Understanding the variability of plant WUE and its control mechanism can promote the comprehension to the coupling relationship of water and carbon cycle in terrestrial ecosystem, which is the foundation for developing water-carbon coupling cycle model. In this paper, we made clear the differences of net assimilation rate, transpiration rate, and WUE between the two species by comparing the experiment data of soybean (Glycine max Merr.) and maize (Zea mays L.) plants under water and soil nutrient stresses. WUE of maize was about two and a half times more than that of soybean in the same weather conditions. Enhancement of water stresses led to the marked decrease of Am and Em of two species, but water stresses of some degree could improve WUE, and this effect was more obvious for soybean. WUE of the two species changed with psiL in a second-order curve relation, and the WUE at high fertilization was higher than that at low fertilization, this effect was especially obvious for maize. Moreover, according to the synthetic model of photosynthesis-transpiration based on stomatal behavior (SMPTSB) presented by Yu et al. (2001), the WUE model and its applicability were discussed with the data measured in this experiment. The WUE estimated by means of the model accorded well with the measured values. However, this model underestimated the WUE for maize slightly, thus further improvement on the original model was made in this study. Finally, by discussing some physiological factors controlling Am and WUE, we made clear the physiological explanation for differences of the relative contributions of stomata- and mesophyll processes to control of Am and WUE, and the applicability of WUE model between the two species. Because the requirement to stomatal conductance by unit change of net assimilation rate is different, the responses of opening-closing activity of stomata to environmental stresses are different between the two species. To obtain the same level of net assimilation rate, soybean has to open its stomata more

widely to keep small stomatal resistance, as compared with maize.

Record 145 of 593 - AGRICOLA 1998-2004/09
AU: Bush,-J.K.; Van-Auken,-O.W.
TI: Relative competitive ability of Helianthus paradoxus and its progenitors, H. annuus and H. petiolaris (Asteraceae), in varying soil salinities.
SO: International journal of plant sciences. 2004 Mar., v. 165, no. 2 p. 303-310.

Record 146 of 593 - AGRICOLA 1998-2004/09
AU: Brinkman,-M.A.; Gardner,-W.A.
TI: Red imported fire ant (Hymenoptera: Formicidae) control in nursery pots treated with Beauveria bassiana and bifenthrin.
SO: Journal of entomological science. 2004 Apr., v. 39, no. 2 p. 175-187.

Record 147 of 593 - AGRICOLA 1998-2004/09
AU: Le-Gouis,-J.; Devaux,-P.; Werner,-K.; Hariri,-D.; Bahrman,-N.; Beghin,-D.; Ordon,-F.
TI: rym15 from the Japanese cultivar Chikurin Ibaraki 1 is a new barley mild mosaic virus (BaMMV) resistance gene mapped on chromosome 6H.
SO: Theoretical and applied genetics. 2004 May, v. 108, no. 8 p. 1521-1525.
AB: Breeding for resistant cultivars is the only way to prevent high yield loss in barley caused by the soil-borne barley mild mosaic virus (BaMMV) complex. We have characterized the BaMMV resistance of barley cv. Chikurin Ibaraki 1. Doubled haploid lines were obtained from the F1 between the susceptible six-rowed winter barley cultivar, Plaisant, and Chikurin Ibaraki 1. Each line was tested for reaction to BaMMV by mechanical inoculation followed by DAS-ELISA. Of 44 microsatellites that covered the genome, 22 polymorphic markers were tested on one susceptible and one resistant bulk, each comprising 30 lines. Differential markers and additional microsatellite markers in the same region were then tested on the whole population. A bootstrap analysis was used to compute confidence intervals of distances and to test the orders of the resistance gene and the closest markers. A segregation of 84 resistant/98 susceptible lines fitted a 1:1 ratio (chi 2=1.08, P=0.30), which corresponds to a single gene in this DH lines population. The resistance gene was flanked by two markers near the centromeric region of chromosome 6HS--Bmag0173, at 0.6+/-1.2 cM, and EBmac0874, at 5.8 +/- 3.4 cM. We propose to name this new resistance gene rym15. This resistance gene and associated markers will increase the possibilities to breed efficiently for new cultivars resistant to the barley mosaic disease.

Record 148 of 593 - AGRICOLA 1998-2004/09
AU: Schlegel,-T.K.; Schonherr,-J.
TI: Mixing calcium chloride with commercial fungicide formulations results in very slow penetration of calcium into apple fruits.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 357-362.

Record 149 of 593 - AGRICOLA 1998-2004/09
AU: Jordan,-M.; Rodriguez,-E.
TI: Effect of solid residues from the cellulose industry on plant growth.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 351-356.

Record 150 of 593 - AGRICOLA 1998-2004/09
AU: Johansson,-E.; Prieto-Linde,-M.L.; Svensson,-G.
TI: Influence of nitrogen application rate and timing on grain protein composition and gluten strength in Swedish wheat cultivars.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 345-350.

Record 151 of 593 - AGRICOLA 1998-2004/09
AU: Vetterlein,-D.; Kuhn,-K.; Schubert,-S.; Jahn,-R.
TI: Consequences of sodium exclusion for the osmotic potential in the rhizosphere - comparison of two maize cultivars differing in Na+ uptake.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 337-344.

Record 152 of 593 - AGRICOLA 1998-2004/09
AU: Nordmeyer,-H.; Hausler,-A.
TI: Impact of soil properties on weed distribution within agricultural fields.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 328-336.

Record 153 of 593 - AGRICOLA 1998-2004/09
AU: Blume,-H.P.; Leinweber,-P.
TI: Plaggen soils: landscape history, properties, and classification.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 319-327.

Record 154 of 593 - AGRICOLA 1998-2004/09
AU: Schweigert,-P.; Pinter,-N.; Ploeg,-R.R.-van-der
TI: Regression analyses of weather effects on the annual concentrations of nitrate in soil and groundwater.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 309-318.

Record 155 of 593 - AGRICOLA 1998-2004/09
AU: Hartge,-K.H.; Bachmann,-J.
TI: Evaluation of the soil consolidation state by using data from penetration resistance probes.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 303-308.

Record 156 of 593 - AGRICOLA 1998-2004/09
AU: Bottcher,-J.
TI: Uncertainties of nonlinearly estimated parameters from incubations of soil organic matter.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 293-302.

Record 157 of 593 - AGRICOLA 1998-2004/09
AU: Buczko,-U.; Hopp,-L.; Berger,-W.; Durner,-W.; Peiffer,-S.; Scheithauer,-M.
TI: Simulation of chromium transport in the unsaturated zone for predicting contaminant entries into the groundwater.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 284-292.

Record 158 of 593 - AGRICOLA 1998-2004/09
AU: Borken,-W.; Matzner,-E.
TI: Nitrate leaching in forest soils: an analysis of long-term monitoring sites in Germany.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 277-283.

Record 159 of 593 - AGRICOLA 1998-2004/09
AU: John,-B.; Ludwig,-B.; Potthoff,-M.; Flessa,-H.
TI: Carbon and nitrogen mineralization after maize harvest between and within maize rows: a microcosm study using 13C natural abundance.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 270-276.

Record 160 of 593 - AGRICOLA 1998-2004/09
AU: Langer,-U.; Bohme,-L.; Bohme,-F.
TI: Classification of soil microorganisms based on growth properties: a critical view of some commonly used terms.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 267-269.

Record 161 of 593 - AGRICOLA 1998-2004/09
AU: Dilly,-O.
TI: Effects of glucose, cellulose, and humic acids on soil microbial eco-physiology.
SO: Journal of plant nutrition and soil science = Zeitschrift fur Pflanzenernahrung und Bodenkunde. 2004 June, v. 167, no. 3 p. 261-266.

Record 162 of 593 - AGRICOLA 1998-2004/09
AU: Panja,-B.N.; Chaudhuri,-S.
TI: Exploitation of soil arbuscular mycorrhizal potential for AM-dependent mandarin orange plants by pre-cropping with mycotrophic crops.
SO: Applied soil ecology a section of Agriculture, Ecosystems and Environment. 2004 July, v. 26, no. 3 p. 249-255.

Record 163 of 593 - AGRICOLA 1998-2004/09
AU: Wilson,-M.J.; Glen,-D.M.; Hamacher,-G.M.; Smith,-J.U.
TI: A model to optimise biological control of slugs using nematode parasites.
SO: Applied soil ecology a section of Agriculture, Ecosystems and Environment. 2004 July, v. 26, no. 3 p. 179-191.

Record 164 of 593 - AGRICOLA 1998-2004/09
AU: Zhao,-D.; Reddy,-K.R.; Kakani,-V.G.; Mohammed,-A.R.; Read,-J.J.; Gao,-W.
TI: Leaf and canopy photosynthetic characteristics of cotton (Gossypium hirsutum) under elevated CO2 concentration and UV-B radiation.
SO: Journal of plant physiology. 2004 May, v. 161, no. 5 p. 581-590.
AB: Increases in both atmospheric CO2 concentration ([CO2]) and ultraviolet-B (UV-B) radiation on the Earth's surface are features of current climate change patterns. An experiment was conducted in sunlit, controlled environment chambers known as Soil-Plant-Atmosphere-Research (SPAR) units to determine interactive effects of elevated [CO2] and UV-B radiation on leaf and canopy photosynthetic characteristics of cotton. Six treatments were comprised of two CO2 levels of 360 (ambient) and 720 (elevated) microliter L-1 and three levels of 0 (control), 8, and 16 kJ m-2 d-1 biologically effective UV-B radiation. Treatments were imposed for 66 days from crop emergence through three weeks after the first flower stage. Plants grown in elevated [CO2] had significantly greater leaf area, higher leaf and canopy net photosynthetic rates (PN), lower dark respiration rate (Rd), and lower light compensation point (LCP) than plants grown in ambient [CO2]. There was no difference in CO2 compensation point (gamma), maximum rate of Rubisco activity (Vcmax), or light-saturated rate of electron transport (Jmax) between ambient and elevated CO2 treatments. When plants were grown in 8 kJ m-2 d-1 UV-B radiation, most of the measured photosynthetic parameters did not differ from control plants. High UV-B (16 kJ) radiation, however, caused 47-50 % smaller leaf area, 38-44 % lower leaf PN, 72-74 % lower Vcmax, and 61-66 % lower Jmax compared to the control. There were no interactive effects of [CO2] and UV-B radiation on most of the photosynthetic parameters measured. From the results, it is concluded that decreased canopy photosynthesis due to enhanced UV-B radiation in cotton is associated with both smaller leaf area and lower leaf PN, and loss of Rubisco activity and electron transport are two major factors in UV-B inhibition of leaf PN.

Record 165 of 593 - AGRICOLA 1998-2004/09
AU: Swaileh,-K.M.; Hussein,-R.M.; Abu-Elhaj,-S.
TI: Assessment of heavy metal contamination in roadside surface soil and vegetation from the West Bank.
SO: Archives of environmental contamination and toxicology. 2004 July, v. 47, no. 1 p. 23-30.

Record 166 of 593 - AGRICOLA 1998-2004/09
AU: Fichtner,-E.J.; Benson,-D.M.; Diab,-H.G.; Shew,-H.D.
TI: Abiotic and biological suppression of Phytophthora parasitica in a horticultural medium containing composted swine waste.

SO: Phytopathology. 2004 July, v. 94, no. 7 p. 780-788.
AB: Horticultural potting media have been amended with compost to enhance biological suppression and with Al2(SO4)3 to enhance abiotic suppression of plant pathogens, but these factors have not been simultaneously incorporated into the same medium. In this study, the efficacy of aluminum (Al)-amended potting medium containing 20% composted swine waste (CSW) was assessed for control of Phytophthora parasitica (syn. P. nicotianae), a soilborne pathogen causing damping-off of many horticultural bedding plants. Steamed and unsteamed media were amended with no Al or Al at 0.0079 g of Al g-1 of medium with an Al2(SO4)3 solution at either pH 4 or pH 6. Infested leaf disks were buried for 2-day durations beginning 0, 6, 13, and 21 days after Al amendment. The number of sporangia produced on infested leaf disks was assessed. A similar experiment was conducted to determine the effect of steaming and Al amendments on pathogen populations. Medium treated with the pH 4 solution consistently reduced sporangia production between 38 and 65% on day 0, but no Al effect was noted at subsequent time points. The pH 6 amendment did not consistently affect sporangia production. Exchangeable Al levels decreased over time, and abiotic suppression was only observed at >2 micromolar Al g-1 of medium. Pathogen populations were occasionally affected by steaming and Al. Sporangia production in unsteamed medium was reduced by 50% on leaf disks buried on days 6, 13, and 21, but not on day 0. Al amendment of a 20% CSW potting medium enhanced suppression of P. parasitica and abiotic suppression occurred before biological suppression developed.

Record 167 of 593 - AGRICOLA 1998-2004/09
AU: Graae,-B.J.; Hansen,-T.; Sunde,-P.B.
TI: The importance of recruitment limitation in forest plant species colonization: a seed sowing experiment.
SO: Flora. 2004, v. 199, no. 3 p. 263-270.

Record 168 of 593 - AGRICOLA 1998-2004/09
AU: Eckstein,-R.L.; Otte,-A.
TI: Evidence for consistent trait-habitat relations in two closely related violets of contiguous habitat types from a fertilisation experiment.
SO: Flora. 2004, v. 199, no. 3 p. 234-246.

Record 169 of 593 - AGRICOLA 1998-2004/09
AU: Hardtle,-W.; Oheimb,-G.-von; Friedel,-A.; Meyer,-H.; Westphal,-C.
TI: Relationship between pH-values and nutrient availability in forest soils - the consequences for the use of ecograms in forest ecology.
SO: Flora. 2004, v. 199, no. 2 p. 134-142.

Record 170 of 593 - AGRICOLA 1998-2004/09
AU: Djurdjevic,-L.; Dinic,-A.; Pavlovic,-P.; Mitrovic,-M.; Karadzic,-B.; Tesevic,-V.
TI: Allelopathic potential of Allium ursinum L.
SO: Biochemical systematics and ecology. 2004 June, v. 32, no. 6 p. 533-544.
AB: Allium ursinum L. (wild garlic) represents a widely distributed plant species in beech and mixed beech-fir forests of Serbia. It

forms dense populations in which the other species are either sparsely present or absent. Its allelopathic influences were studied using both the seeds and seedlings of test plants (lettuce, amaranth and wheat) and by analyzing phenolic acids and total phenolics in the leaves, bulbs and soil. Aqueous extract and volatile compounds of the bulbs were stronger inhibitors of seed germination and seedling growth compared to those of the leaves. The soil and phenolic-containing fraction of the soil under Allium ursinum also inhibited seed germination and growth of test plant seedlings. The bulbs and the leaves were found to contain 2.30 mg/g and 3.24 mg/g (dry weight) of total free phenolics, respectively, and the same amount of bound phenol forms (1.0 mg/g). Among allelopathic matter in bulb and leaf extracts, p-coumaric, ferulic, p-hydroxybenzoic and vanillic acids as free and bound forms were identified (25.43-87.93 microgram/g). The soil contained 0.16 mg/g free and 1.61 mg/g total bound phenolics and p-coumaric, ferulic, p-hydroxybenzoic, vanillic and syringic acids as free (1.00-9.65 microgram/g) and bound forms (26.45-44.76 microgram/g) were found. These results suggest that A. ursinum influences other herbaceous plants in plant community via soil and volatile compounds which inhibit seed germination and plant growth.

Record 171 of 593 - AGRICOLA 1998-2004/09
AU: Lupwayi,-N.Z.; Harker,-K.N.; Clayton,-G.W.; Turkington,-T.K.; Rice,-W.A.; O'Donovan,-J.T.
TI: Soil microbial biomass and diversity after herbicide application.
SO: Canadian journal of plant science = Revue Canadienne de phytotechnie. 2004 Apr., v. 84, no. 2 p. 677-685.

Record 172 of 593 - AGRICOLA 1998-2004/09
AU: Jensen,-K.I.N.; Doohan,-D.J.; Specht,-E.G.
TI: Response of processing carrot to metribuzin on mineral soils in Nova Scotia.
SO: Canadian journal of plant science = Revue Canadienne de phytotechnie. 2004 Apr., v. 84, no. 2 p. 669-676.

Record 173 of 593 - AGRICOLA 1998-2004/09
AU: Hou,-S.W.; Jia,-J.F.
TI: Plant regeneration from protoplasts isolated from embryogenic calli of the forage legume Astragalus melilotoides Pall.
SO: Plant cell reports. 2004 May, v. 22, no. 10 p. 741-746.
AB: An efficient and reproducible protocol is described for the regeneration of Astragalus melilotoides protoplasts isolated from hypocotyl-derived embryogenic calli. Maximum protoplast yield (11. 74«0.6x10(5)/g FW) and viability (87.07«2.8%) were achieved using a mixture of 2% (w/v) Cellulase Onozuka R10, 0.5% (w/v) Cellulase Onozuka RS, 0.5% (w/v) Macerozyme R10, 0.5% (w/v) Hemicellulase, and 1% (w/v) Pectinase, all dissolved in a cell protoplast wash (CPW) salt solution with 13% (w/v) sorbitol. First divisions occurred 3-7 days following culture initiation. The highest division frequency (9.86«0.68%) and plating efficiency (1.68«0.05%) were obtained in solid-liquid medium (KM8P) supplemented with 1.0 mg/l 2,4-dichlorophenoxyacetic acid, 0.5 mg/l 6-benzylaminopurine (BA), 0.2 mg/l kinetin, 0.2 M glucose, 0.3 M mannitol and 500 mg/l casein hydrolysate. Upon transfer to MS medium with 0.5 mg/l alpha-naphthaleneacetic acid and 1-2 mg/l

BA, the protoplast-derived calli produced plantlets via somatic embryogenesis (56.3«4.1%) and organogenesis (21.6«0.6%). Somatic embryos or adventitious shoots developed into well-rooted plantlets on MS medium without any plant growth regulators or supplemented with 3.0 mg/l indole-3-butyric acid, respectively. About 81% of the regenerants survived in soil, and all were normal with respect to morphology and growth characters.

Record 174 of 593 - AGRICOLA 1998-2004/09

AU: Bowen,-P.A.; Bogdanoff,-C.P.; Estergaard,-B.

TI: Impacts of using polyethylene sleeves and wave-length-selective mulch in vineyards. I. Effects on air and soil temperatures and degree day accumulation.

SO: Canadian journal of plant science = Revue Canadienne de phytotechnie. 2004 Apr., v. 84, no. 2 p. 545-553.

Record 175 of 593 - AGRICOLA 1998-2004/09

AU: Cadle-Davidson,-L.; Bergstrom,-G.C.

TI: The effects of postplanting environment on the incidence of soilborne viral diseases in winter cereals.

SO: Phytopathology. 2004 May, v. 94, no. 5 p. 527-534.

AB: Soilborne wheat mosaic virus (SBWMV) and Wheat spindle streak mosaic virus (WSSMV) are putatively transmitted to small grains by the obligate parasite Polymyxa graminis, but little is known about environmental requirements for transmission and the resulting disease incidence. We planted susceptible wheat and triticale cultivars in field nurseries on different autumn dates in 3 years and observed the incidence of symptomatic plants in each following spring. Autumn postplanting environment explained most of the variation in disease caused by both viruses. Little apparent transmission, based on eventual symptom development, of either virus occurred after the average soil temperature dropped below 7ÀC for the remainder of the winter. To forecast disease, we tested an SBWMV transmission model in the field, based on laboratory results, that predicts opportunities for transmission based on soil temperature and soil moisture being simultaneously conducive. This model was predictive of soilborne wheat mosaic in 2 of 3 years. Zoospores of P. graminis have optimal activity at temperatures similar to those in the SBWMV transmission model. Furthermore, the matric potential threshold (as it relates to water-filled pore sizes) in the SBWMV transmission model fits well with P. graminis as vector given the size restrictions of P. graminis zoospores. Conditions optimal for SBWMV transmission in the laboratory were not conducive for WSSMV transmission in the laboratory or for wheat spindle streak mosaic development in the field. This differential response to environment after emergence, as indicated by disease symptoms, may be due to virus-specific environmental conditions required to establish systemic infection via the same vector. Alternatively, the differential response may have been due to the involvement of a different vector in our WSSMV nursery than in our SBWMV nursery. Our results suggest that, as a control tactic for SBWMV or WSSMV, earliness or lateness of planting is less important in determining virus transmission and disease than the specific postplanting environment. Improved models based on the postplanting environment might predict virus-induced losses of yield potential, and in some cases, growers might avoid purchase of

spring inputs such as pesticides and fertilizer for fields with greatly reduced yield potential.

Record 176 of 593 - AGRICOLA 1998-2004/09
AU: Narisawa,-K.; Usuki,-F.; Hashiba,-T.
TI: Control of Verticillium yellows in Chinese cabbage by the dark septate endophytic fungus LtVB3.
SO: Phytopathology. 2004 May, v. 94, no. 5 p. 412-418.
AB: Three hundred forty-nine fungal endophytes were obtained from a total of 1,214 root segments of eggplant, melon, barley, and Chinese cabbage grown as bait plants in a mixed soil made up of samples from different forest soils in Alberta and British Columbia, Canada. Three of the 349 isolates, when inoculated in axenically reared Chinese cabbage seedlings grown in petri dishes, almost completely suppressed the effects of a postinoculated and virulent strain of Verticillium longisporum. Two isolates effective against the pathogen were Phialocephala fortinii, which had been obtained from the roots of eggplant and Chinese cabbage. The third isolate was a dark septate endophytic (DSE) fungus obtained from barley roots. Hyphae of P. fortinii grew along the surface of the root and formed microsclerotia on or in the epidermal layer. Hyphae of the DSE fungus heavily colonized root cells of the cortex. Seedlings grown for 1 week in the presence of the endophytes were then challenged with the Verticillium pathogen. In DSE-treated roots, some of cell walls in the epidermal and cortical layers showed cell wall appositions and thickenings, which appeared to limit the ingress of the pathogen into adjacent cells. Such marked host reactions were not observed in the root cells colonized by P. fortinii. Chinese cabbage preinoculated with the above endophytes and, for comparison, a previously reported disease-suppressive fungal endophyte, Heteroconium chaetospira, were transplanted into the field and disease symptoms were assessed. The DSE could most effectively inhibit the development of Verticillium yellows, with reductions in the percentages of external and internal disease symptoms of 84 and 88%, respectively. The protective values against the disease are extremely high compared with those of other isolates. Most of the DSE-treated plants in the plots achieved marketable quality.

Record 177 of 593 - AGRICOLA 1998-2004/09
TI: Canopy management: tree growth regulator application methods.
SO: Arbor age. 2004 Feb., v. 24, no. 2 p. 32-33.

Record 178 of 593 - AGRICOLA 1998-2004/09
AU: Olson,-E.R.; Dively,-G.P.; Nelson,-J.O.
TI: Bioassay determination of the distribution of imidacloprid in potato plants: implications to resistance development.
SO: Journal of economic entomology. 2004 Apr., v. 97, no. 2 p. 614-620.
AB: Soil-applied imidacloprid exhibits exceptional efficacy as a systemic insecticide against the Colorado potato beetle, Leptinotarsa decemlineata (Say). An uneven distribution of the chemical within potato plants could result in differential concentrations, which may allow for discrimination between genotypes of varying susceptibility. In this study, susceptible and tolerant larvae were fed leaves from the lower, middle, and

upper canopy of treated and untreated plants to characterize within-plant distribution of imidacloprid at 4, 6, 8, 10, 12, and 14 wk after planting. Significant differences in larval mortality and development indicated that the concentration of imidacloprid was unevenly distributed in the potato foliage during 6-14 wk after planting. The concentration of imidacloprid was lowest in the younger tissues of the upper leaves and highest in the older, lower leaves. At 6 wk, a time when the postdiapause beetles are colonizing potato fields, the lower concentration in upper leaves was toxic to susceptible larvae but did not kill a substantial portion of the tolerant larvae. Results suggest that higher concentrations of imidacloprid in the lower canopy leaves may act as a toxic barrier to colonizing susceptible beetles but may allow more tolerant individuals to reach the upper canopy with lower concentrations. Possible scenarios of how different concentrations of the systemic insecticide could influence the rate of resistance development are discussed.

Record 179 of 593 - AGRICOLA 1998-2004/09
AU: Butterbach-Bahl,-K.; Kesik,-M.; Miehle,-P.; Papen,-H.; Li,-C.
TI: Quantifying the regional source strength of N-trace gases across agricultural and forest ecosystems with process based models.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 311-329.

Record 180 of 593 - AGRICOLA 1998-2004/09
AU: Cardoso,-I.M.; Boddington,-C.L.; Janssen,-B.H.; Oenema,-O.; Kuyper,-T.W.
TI: Double pot and double compartment: integrating two approaches to study nutrient uptake by arbuscular mycorrhizal fungi.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 301-310.

Record 181 of 593 - AGRICOLA 1998-2004/09
AU: Richardson,-A.D.
TI: Foliar chemistry of balsam fir and red spruce in relation to elevation and the canopy light gradient in the mountains of the northeastern United States.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 291-299.

Record 182 of 593 - AGRICOLA 1998-2004/09
AU: Rohyadi,-A.; Smith,-F.A.; Murray,-R.S.; Smith,-S.E.
TI: Effects of pH on mycorrhizal colonisation and nutrient uptake in cowpea under conditions that minimise confounding effects of elevated available aluminium.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 283-290.

Record 183 of 593 - AGRICOLA 1998-2004/09
AU: Gherardi,-M.J.; Rengel,-Z.
TI: The effect of manganese supply on exudation of carboxylates by roots of lucerne (Medicago sativa).
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 271-282.

Record 184 of 593 - AGRICOLA 1998-2004/09
AU: Webb,-J.; Ellis,-S.; Harrison,-R.; Thorman,-R.
TI: Measurement of N fluxes and soil N in two arable soils in the UK.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 253-270.

Record 185 of 593 - AGRICOLA 1998-2004/09

AU: Rasanen,-L.A.; Saijets,-S.; Jokinen,-K.; Lindstrom,-K.
TI: Evaluation of the roles of two compatible solutes, glycine betaine and trehalose, for the Acacia senegal-Sinorhizobium symbiosis exposed to drought stress.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 237-251.

Record 186 of 593 - AGRICOLA 1998-2004/09
AU: Chimner,-R.A.; Cooper,-D.J.
TI: Using stable oxygen isotopes to quantify the water source used for transpiration by native shrubs in the San Luis Valley, Colorado U.S.A.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 225-236.

Record 187 of 593 - AGRICOLA 1998-2004/09
AU: Bruckler,-L.; Lafolie,-F.; Doussan,-C.; Bussieres,-F.
TI: Modeling soil-root water transport with non-uniform water supply and heterogeneous root distribution.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 205-224.

Record 188 of 593 - AGRICOLA 1998-2004/09
AU: Kassem,-M.A.; Meksem,-K.; Kang,-C.H.; Njiti,-V.N.; Kilo,-V.; Wood,-A.J.; Lightfoot,-D.A.
TI: Loci underlying resistance to manganese toxicity mapped in a soybean recombinant inbred line population of 'Essex' x 'Forrest'.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 197-204.

Record 189 of 593 - AGRICOLA 1998-2004/09
AU: Ross,-D.J.; Newton,-P.C.D.; Tate,-K.R.
TI: Elevated [CO2] effects on herbage production and soil carbon and nitrogen pools and mineralization in a species-rich, grazed pasture on a seasonally dry sand.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 183-196.

Record 190 of 593 - AGRICOLA 1998-2004/09
AU: Romero,-P.; Botia,-P.; Garcia,-F.
TI: Effects of regulated deficit irrigation under subsurface drip irrigation conditions on vegetative development and yield of mature almond trees.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 169-181.

Record 191 of 593 - AGRICOLA 1998-2004/09
AU: Romero,-P.; Botia,-P.; Garcia,-F.
TI: Effects of regulated deficit irrigation under subsurface drip irrigation conditions on water relations of mature almond trees.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 155-168.

Record 192 of 593 - AGRICOLA 1998-2004/09
AU: Intrigliolo,-D.S.; Castel,-J.R.
TI: Continuous measurement of plant and soil water status for irrigation scheduling in plum.
SO: Irrigation science. 2004 May, v. 23, no. 2 p. 93-102.
AB: The usefulness of continuous measurement of soil and plant water status for automated irrigation scheduling was studied in a drip-irrigation experiment on plum (Prunus salicina Black Gold). Two levels of water restriction were imposed at different phenological periods (from pit-hardening to harvest, post-harvest) and compared with a well irrigated control

treatment. Soil matrix water potential (psisoil) was measured with granular matrix sensors (Watermark); and short-period trunk diameter variation (TDV) was measured with linear variable displacement transformers. The Watermark sensor readings were in reasonable agreement with the irrigation regime and showed a good indication of plant water status across the season (r2=0.62), although they were a better predictor of stem water potential (psistem) in the dry range of psisoil. Nonetheless, the most important drawback in their use was the high variability of readings (typical CV of 35-50%). From TDV measurements, maximum daily shrinkage (MDS) and trunk growth rate (TGR) were calculated. Their performance was also compared with psistem, which had the lowest variability (CV of 7%). During most of the fruit growth period, when TGR was minimum, MDS was higher in the less-irrigated treatment than in the control and correlated well (r2=0.89) with psistem. However, after harvest, when TGR was higher, this correlation decreased as the season progressed (r2=0. 73Æ0.52), as did the slope between MDS and psistem, suggesting tissue elasticity changes. Later in the season, TGR was better related to plant water status. These observations indicate some of the difficulties in obtaining reference values useful for irrigation scheduling based exclusively on plant water status measurements.

Record 193 of 593 - AGRICOLA 1998-2004/09
AU: Ruan,-H.H.; Zou,-X.M.; Scatena,-F.N.; Zimmerman,-J.K.
TI: Asynchronous fluctuation of soil microbial biomass and plant litterfall in a tropical wet forest.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 147-154.

Record 194 of 593 - AGRICOLA 1998-2004/09
AU: Jozefaciuk,-G.; Szatanik-Kloc,-A.
TI: Decrease in variable charge and acidity of root surface under Al treatment are correlated with A1 tolerance of cereal plants.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 137-145.

Record 195 of 593 - AGRICOLA 1998-2004/09
AU: Manlay,-R.J.; Masse,-D.; Chevallier,-T.; Russell-Smith,-A.; Friot, -D.; Feller,-C.
TI: Post-fallow decomposition of woody roots in the West African savanna.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 123-136.

Record 196 of 593 - AGRICOLA 1998-2004/09
AU: Himmelbauer,-M.L.; Loiskandl,-W.; Kastanek,-F.
TI: Estimating length, average diameter and surface area of roots using two different image analyses systems.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 111-120.

Record 197 of 593 - AGRICOLA 1998-2004/09
AU: Lesturgez,-G.; Poss,-R.; Hartmann,-C.; Bourdon,-E.; Noble,-A.; Ratana-Anupap,-S.
TI: Roots of Stylosanthes hamata create macropores in the compact layer of a sandy soil.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 101-109.

Record 198 of 593 - AGRICOLA 1998-2004/09

AU: Zhang,-F.; Shen,-J.; Li,-L.; Liu,-X.
TI: An overview of rhizosphere processes related with plant nutrition in major cropping systems in China.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 89-99.

Record 199 of 593 - AGRICOLA 1998-2004/09
AU: Liebersbach,-H.; Steingrobe,-B.; Claassen,-N.
TI: Roots regulate ion transport in the rhizosphere to counteract reduced mobility in dry soil.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 79-88.

Record 200 of 593 - AGRICOLA 1998-2004/09
AU: Shen,-J.; Tang,-C.; Rengel,-Z.; Zhang,-F.
TI: Root-induced acidification and excess cation uptake by N2-fixing Lupinus albus grown in phosphorus-deficient soil.
SO: Plant and soil. 2004 Mar., v. 260, no. 1-2 p. 69-77.