

No.	Records	Request
1	36103	SOIL
2	17590	SOILS
3	39097	SOIL or SOILS
4	32230	ANIMAL
5	14106	ANIMALS
6	1328	HUSBANDRY
7	1034	#3 and (ANIMAL or ANIMALS or HUSBANDRY)
8	16957	PY=2004
* 9	35	#7 and (PY=2004)

Record 1 of 35 - 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 RHGXRXR 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 2 of 35 - AGRICOLA 1998-2004/09

AU: Thayer,-M.K.; Ashe,-J.S.; Hanley,-R.S.

TI: Discovery of the remarkable larvae of Hoplandriini (Coleoptera: Staphylinidae: Aleocharinae).

SO: Annals of the Entomological Society of America. 2004 July, v. 97, no. 4 p. 624-634.

AB: A distinctive and highly modified but previously unassociated type of aleocharine staphylinid larva was shown by rearing to belong to *Hoplandria klimaszewskii* Genier, 1989, providing the first knowledge of any larva of the tribe Hoplandriini. Larvae of this species are described, with notes on their feeding and locomotory behavior. Their unique features are extremely large down-turned antennal sensory appendage; very elongate legs with two and one spatulate setae on each pro- and mesofemur, respectively; abdomen very elongate, with tergum and sternum of segment IX fused into a single sclerotized tube uniformly covered with short setae; meso- and metanota and abdominal terga and sterna without anterior cariniform lines; hypertrichous setal patterns (compared with other Aleocharinae) present on all but the head; extremely short urogomphi; and lack of pygopodial gripping structures. The field-collected last instar constructed

an apparently silken cocoon covered with soil particles within which it pupated, as known in other Aleocharinae. Along with the reared specimen, other material studied extends the range of *H. klimaszewskii* from far southern to northeastern Illinois (Cook County, new county record). Larvae from Mexico, Peru, Madagascar, and New Zealand very similar to *H. klimaszewskii* and presumably representing other hoplandriine taxa have also been seen, although Hoplandriini have not been recorded from New Zealand.

Record 3 of 35 - 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 4 of 35 - 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 5 of 35 - 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 52-153 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 (%N_d) 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 6 of 35 - 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 7 of 35 - AGRICOLA 1998-2004/09

AU: Xia,-K.; Jeong,-C.Y.

TI: Photodegradation of the endocrine-disrupting chemical 4-nonylphenol in biosolids applied to soil.

SO: Journal of environmental quality. 2004 July-Aug, v. 33, no. 4 p. 1568-1574.

AB: There is increasing concern about the environmental fate and impact of biosolids-associated anthropogenic organic chemicals, among which 4-nonylphenol (4-NP) is one of the most studied chemicals. This is primarily because 4-NP is an endocrine disruptor and has been frequently detected in environmental samples. Due to its high hydrophobicity, 4-NP has high affinity for biosolids. Land application of 4-NP-containing biosolids could potentially introduce large quantities of this chemical into the environment. A laboratory experiment was conducted to investigate the effect of artificial sunlight on 4-NP degradation in biosolids applied to soil. When exposed to artificial sunlight for 30 d, the top-5-mm layer of biosolids showed a 55% reduction of 4-NP, while less than 15% of the 4-NP was degraded when the biosolids were kept in the dark. Our results indicate that sensitized photolysis reaction plays an important role in reducing the levels of 4-NP in land-applied biosolids. Surface application rather than soil incorporation of biosolids could be effective in reducing biosolids-associated organic chemicals that can be degraded through photolysis reactions. However, the risks of animal ingestion, foliar deposition, and runoff should also be evaluated when biosolids are applied on the soil surface.

Record 8 of 35 - AGRICOLA 1998-2004/09

AU: Tarkalson,-D.D.; Mikkelsen,-R.L.

TI: Runoff phosphorus losses as related to phosphorus source, application method, and application rate on a Piedmont soil.

SO: Journal of environmental quality. 2004 July-Aug, v. 33, no. 4 p. 1424-1430.

AB: Land application of animal manures and fertilizers has resulted in an increased potential for excessive P losses in runoff to nutrient-sensitive surface waters. The purpose of this research was to measure P losses in runoff from a bare Piedmont soil in the southeastern United States receiving broiler litter or inorganic P fertilizer either incorporated or surface-applied at varying P application rates (inorganic P, 0-110 kg P ha⁻¹; broiler litter, 0-82 kg P ha⁻¹). Rainfall simulation was applied at a rate of 76 mm h⁻¹. Runoff samples were collected at 5-min intervals for 30 min and analyzed for reactive phosphorus (RP), algal-available phosphorus (AAP), and total phosphorus (TP). Incorporation of both P sources resulted in P losses not significantly different than the unfertilized control at all

application rates. Incorporation of broiler litter decreased flow-weighted concentration of RP in runoff by 97% and mass loss of TP in runoff by 88% compared with surface application. Surface application of broiler litter resulted in runoff containing between 2.3 and 21.8 mg RP L⁻¹ for application rates of 8 to 82 kg P ha⁻¹, respectively. Mass loss of TP in runoff from surface-applied broiler litter ranged from 1.3 to 8.5 kg P ha⁻¹ over the same application rates. Flow-weighted concentrations of RP and mass losses of TP in runoff were not related to application rate when inorganic P fertilizer was applied to the soil surface. Results for this study can be used by P loss assessment tools to fine-tune P source, application rate, and application method site factors, and to estimate extreme-case P loss from cropland receiving broiler litter and inorganic P fertilizers.

Record 9 of 35 - 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 10 of 35 - AGRICOLA 1998-2004/09

AU: Sommer, -S.G.; Hansen, -M.N.; Sogaard, -H.T.

TI: Infiltration of slurry and ammonia volatilisation.

SO: Biosystems engineering. 2004 July, v. 88, issue 3 p. 359-367.

AB: Volatilisation of ammonia (NH₃) from slurry applied in the field reduces the fertiliser value of the slurry and is liable to cause

a considerable uncertainty in the nitrogen (N) fertiliser efficiency. A better understanding of slurry-soil interactions is needed in order to develop reliable decision support systems for the use of animal slurry as manure. In this field study, infiltration of slurry in the soil was estimated by measuring chloride (Cl-) and ammonium (TAN=NH₃+NH₄⁺) concentrations at different depths from 0.5 to 7.5 cm below the soil surface. The NH₃ volatilisation was measured using micrometeorological methods and was related to infiltration. Slurry applied to sandy or clay-loam soils infiltrated to 2-2.5 cm. Ammonium and Cl- infiltration could not be related to slurry, soil and climatic variables because the measured infiltration rates were spatially variable. In spite of this spatial variability, the infiltration parameters of TAN explained a large proportion of the variation in NH₃ volatilisation. Therefore, reliable models that currently include, wind, soil surface temperature, TAN and pH of applied slurry as parameters for predicting NH₃ volatilisation may also benefit by including parameters for TAN infiltration. Models calculations using soil surface TAN concentration, pH and temperature during the volatilisation event are more precise than calculations using air temperature during the study and TAN concentration and pH in slurry at time of application.

Record 11 of 35 - AGRICOLA 1998-2004/09

AU: Kloot,-R.W.; Rickman,-J.D.; Evans,-W.M.
TI: Predicting the time required for CNMP development for swine farms using statistical methods and real data.
SO: Transactions of the ASAE. 2004 May-June, v. 47, no. 3 p. 865-870.
AB: Between June and December of 2002, a private company conducted a pilot project wherein it developed 40 comprehensive nutrient management plans (CNMPs) for confined swine operations in seven states. The time taken to develop a CNMP ranged from 45 to 262 h, with a mean of 130 h. Approximately 66% of these CNMPs took between 104 and 143 h to develop. Linear regression modeling, using site-specific operational variables for 29 of the swine operations, produced a number of equations that explained between 54% and 87% of the variability in CNMP development time. The regression modeling shows that while land-based variables (e.g., crop rotation, number of fields) tended to be better predictors than animal-based variables (e.g., number of head, animal units), the use of interaction terms (e.g., number of fields times animal units) was most successful in explaining variability in CNMP development time. The regression exercise and the resulting equations show that the relationship between single operational variables and CNMP development time is neither simple nor linear.

Record 12 of 35 - 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 13 of 35 - AGRICOLA 1998-2004/09

AU: Jing,-X.H.; Kang,-L.

TI: Seasonal changes in the cold tolerance of eggs of the migratory locust, *Locusta migratoria* L. (Orthoptera: Acrididae).

SO: Environmental entomology. 2004 Apr., v. 33, no. 2 p. 113-118.

AB: The migratory locust, *Locusta migratoria* L., has one to four generations per year in China, overwintering as eggs in the soil. In temperate Hebei province, this species has two generations per year, known as the summer and fall generations. In this study, locust populations occurring in different seasons were compared to investigate the adaptation of eggs to a cold environment. Large seasonal variations were observed in the supercooling point (SCP) and lower lethal temperature (Ltemp50, the temperature that causes 50% mortality in a population) of locust eggs. Mean SCP values of the fall population were $-26.0 \pm 0.1^{\circ}\text{C}$, while those of the summer and postwinter populations were -22.0 ± 0.8 and $-23.4 \pm 0.7^{\circ}\text{C}$, respectively. The fall population also had significantly lower Ltemp50 values (-14.2°C) than the summer (-4.8°C) and postwinter populations (-6.7°C). The survival ability of eggs at different development stages was also compared; 10-d-old eggs incubated at 25°C were more cold hardy than other stages. Prechilling at 5°C was effective in increasing the cold hardiness of eggs. These results confirm that eggs of the fall population are better conditioned for overwintering. The low mortality of overwintering eggs often leads to high population density and serious crop damage in the next season or following year.

Record 14 of 35 - AGRICOLA 1998-2004/09

AU: Wachendorf,-M.; Buchter,-M.; Trott,-H.; Taube,-F.

TI: Performance and environmental effects of forage production on sandy soils. II. Impact of defoliation system and nitrogen input on nitrate leaching losses.

SO: Grass and forage science the journal of the British Grassland Society. 2004 Mar., v. 59, no. 1 p. 56-68.

AB: A field experiment was conducted over a 4-year period to determine NO₃ leaching losses from grassland on a freely draining sandy soil. The experiment consisted of all combinations of five

defoliation systems; cutting-only (CO), rotational grazing (GO), mixed systems with one (MSI) or two silage cuts (MSII) plus subsequent rotational grazing, and simulated grazing (SG), four mineral nitrogen (N) application rates (0, 100, 200, and 300 kg N ha⁻¹ year⁻¹), and two slurry levels (0 and 20 m³ slurry ha⁻¹ year⁻¹). Due to the high N return by grazing animals, leaching losses in the rotational grazing systems generally were associated with NO₃-N concentrations which exceeded the EU limit for drinking water. NO₃ leaching losses in a rotational grazing system could be reduced by lowering the N fertilizer intensity and the inclusion of one or two silage cuts in spring. However, even in the unfertilized mixed systems, N fixation by white clover exceeded the amounts of N removed via animal products, which resulted in NO₃-N concentrations well above the EU limit for drinking water. In terms of leaching losses, the cutting-only system was the most advantageous treatment. NO₃ leaching losses on grassland could be predicted by the amount of soil mineral N at the end of the growing season and by the N surplus calculated from N balances at the field scale. From the results obtained a revised nitrogen fertilization policy and a reduced grazing intensity by integrating silage cuts are suggested.

Record 15 of 35 - 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 16 of 35 - AGRICOLA 1998-2004/09

AU: Ramallo,-R.; Wathelet,-J.P.; Le-Boulenge,-E.; Torres,-E.; Marlier,-M.; Ledent,-J.F.; Guidi,-A.; Larondelle,-Y.

TI: Glucosinolates in isano (*Tropaeolum tuberosum*) tubers: qualitative and quantitative content and changes after maturity.

SO: Journal of the science of food and agriculture. 2004 May, v. 84, issue 7 p. 701-706.

AB: Six varieties of isano (*Tropaeolum tuberosum*), an Andean edible tuber, were analysed. The aim was to characterise qualitatively and quantitatively their content of glucosinolates and to determine concentration changes of these compounds upon delayed harvest. Additionally, exploratory assays were carried out on the effect of postharvest cold storage of the tubers as well as of a drying process imposed on blanched tuber slices. Only one glucosinolate (p-methoxybenzyl glucosinolate) was found in the six domestic varieties analysed. Its concentration varied between 36.5 and 90.0 micromol g⁻¹ dry matter. This range is relatively high when compared with other edible glucosinolate-containing vegetables. Dark coloured tuber varieties showed higher levels than light coloured tuber varieties at normal harvest time. Of the two varieties on which the effect of delayed harvest was studied, one showed increasing and then decreasing changes until 44 days after maturity, while the other did not show any significant change with time. Postharvest cold stored samples showed similar changes to tubers kept in soil, and glucosinolate levels in dried blanched tubers did not differ significantly from those in fresh samples. Taken together, the data indicate that the glucosinolate content of isano is highly dependent on both the variety and the time of harvest. These parameters should be taken into account when considering isano as a promising food source with medicinal properties for humans and animals, but also with possible adverse biological effects, all related to the presence of glucosinolates.

Record 17 of 35 - 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 18 of 35 - AGRICOLA 1998-2004/09

AU: Cunha,-M.J.M.-da; Conceicao,-I.L.P.M.-da; Abrantes,-I.M.-de-O.; Evans,-K.; Santos,-M.S.N.-de-A.

TI: Characterisation of potato cyst nematode populations from Portugal.

SO: Nematology international journal of fundamental and applied nematological research. 2004, v. 6, pt. 1 p. 55-58.

Record 19 of 35 - 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 20 of 35 - AGRICOLA 1998-2004/09

AU: Hill,-K.K.; Ticknor,-L.O.; Okinaka,-R.T.; Asay,-M.; Blair,-H.; Bliss,-K.A.; Laker,-M.; Pardington,-P.E.; Richardson,-A.P.; Tonks,-M.

TI: Fluorescent amplified fragment length polymorphism analysis of *Bacillus anthracis*, *Bacillus cereus*, and *Bacillus thuringiensis* isolates.

SO: Applied and environmental microbiology. 2004 Feb., v. 70, no. 2 p. 1068-1080.

AB: DNA from over 300 *Bacillus thuringiensis*, *Bacillus cereus*, and *Bacillus anthracis* isolates was analyzed by fluorescent amplified fragment length polymorphism (AFLP). *B. thuringiensis* and *B. cereus* isolates were from diverse sources and locations, including soil, clinical isolates and food products causing diarrheal and emetic outbreaks, and type strains from the American Type Culture Collection, and over 200 *B. thuringiensis* isolates representing 36 serovars or subspecies were from the U.S. Department of Agriculture collection. Twenty-four diverse *B. anthracis* isolates were also included. Phylogenetic analysis of AFLP data revealed extensive diversity within *B. thuringiensis* and *B. cereus* compared to the monomorphic nature of *B. anthracis*. All of the *B. anthracis* strains were more closely related to each other than to any other *Bacillus* isolate, while *B. cereus* and *B. thuringiensis* strains populated the entire tree. Ten distinct branches were defined, with many branches containing both *B. cereus* and *B. thuringiensis* isolates. A single branch contained all the *B. anthracis* isolates plus an unusual *B. thuringiensis* isolate that is pathogenic in mice. In contrast, *B. thuringiensis* subsp. *kurstaki* (ATCC 33679) and other isolates used to prepare insecticides mapped distal to the *B. anthracis* isolates. The interspersions of *B. cereus* and *B. thuringiensis* isolates within the phylogenetic tree suggests that phenotypic traits used to distinguish between these two species do not reflect the genomic content of the different isolates and that horizontal gene transfer plays an important role in establishing the phenotype of each of these microbes. *B. thuringiensis* isolates of a particular subspecies tended to cluster together.

Record 21 of 35 - AGRICOLA 1998-2004/09

AU: Davies,-C.M.; Ferguson,-C.M.; Kaucner,-C.; Krogh,-M.; Altavilla,-N.; Deere,-D.A.; Ashbolt,-N.J.

TI: Dispersion and transport of *Cryptosporidium* oocysts from fecal pats under simulated rainfall events.

SO: Applied and environmental microbiology. 2004 Feb., v. 70, no. 2 p. 1151-1159.

AB: The dispersion and initial transport of *Cryptosporidium* oocysts from fecal pats were investigated during artificial rainfall events on intact soil blocks (1,500 by 900 by 300 mm). Rainfall events of 55 mm h⁻¹ for 30 min and 25 mm h⁻¹ for 180 min were applied to soil plots with artificial fecal pats seeded with approximately 10⁷ oocysts. The soil plots were divided in two, with one side devoid of vegetation and the other left with natural vegetation cover. Each combination of event intensity and duration, vegetation status, and degree of slope (5° and 10°)

was evaluated twice. Generally, a fivefold increase ($P < 0.05$) in runoff volume was generated on bare soil compared to vegetated soil, and significantly more infiltration, although highly variable, occurred through the vegetated soil blocks ($P < 0.05$). Runoff volume, event conditions (intensity and duration), vegetation status, degree of slope, and their interactions significantly affected the load of oocysts in the runoff. Surface runoff transported from 10(0.2) oocysts from vegetated loam soil (25-mm h⁻¹, 180-min event on 10° slope) to up to 10(4.5) oocysts from unvegetated soil (55-mm h⁻¹, 30-min event on 10° slope) over a 1-m distance. Surface soil samples downhill of the fecal pat contained significantly higher concentrations of oocysts on devegetated blocks than on vegetated blocks. Based on these results, there is a need to account for surface soil vegetation coverage as well as slope and rainfall runoff in future assessments of *Cryptosporidium* transport and when managing pathogen loads from stock grazing near streams within drinking water watersheds.

Record 22 of 35 - AGRICOLA 1998-2004/09

AU: Haubert,-D.; Haggblom,-M.M.; Scheu,-S.; Ruess,-L.

TI: Effects of fungal food quality and starvation on the fatty acid composition of *Protaphorura fimata* (Collembola).

SO: Comparative biochemistry and physiology Part B, Biochemistry and molecular biology. 2004 May, v. 138B, no. 1 p. 41-52.

AB: The lipid pattern of animals is influenced by species, life stage, environmental conditions and diet. We investigated the effects of food quality and starvation on the phospholipid (PLFA) and neutral lipid (NLFA) fatty acid pattern of the collembolan *Protaphorura fimata*. Collembolans were fed with two common soil fungi, *Agrocybe gibberosa* and *Chaetomium globosum*, of which the cellular lipid composition was analysed. *A. gibberosa* was grown on agar with different nitrogen contents, resulting in altered fatty acid patterns and C:N ratios, i.e. fungi of different food quality. Collembolans did not mirror the lipid composition of the fungal diet as the pattern of major NLFAs in *P. fimata* was vice versa. Presumably, altered food quality of fungi caused compensatory responses by the collembolans, thereby diminishing the fungal signal. In a further experiment *P. fimata* (previously maintained with *C. globosum*) was kept without food for up to 4 weeks. Starvation resulted in a decline in the total amount of NLFAs; however, it did not affect the fatty acid pattern, indicating that NLFAs were degraded indiscriminately. Generally, the PLFA profile of the collembolans changed only slightly due to variations in diet quality or starvation.

Record 23 of 35 - AGRICOLA 1998-2004/09

AU: Lammel,-G.; Schneider,-F.; Bruggemann,-E.; Gnauk,-T.; Rohrl,-A.; Wieser,-P.

TI: Aerosols emitted from a livestock farm in southern Germany.

SO: Water, air, and soil pollution. 2004 May, v. 154, no. 1-4 p. 313-330.

Record 24 of 35 - AGRICOLA 1998-2004/09

AU: Cherrier,-R.; Perrin-Ganier,-C.; Schiavon,-M.

TI: Degradation of sulcotrione in a brown soil amended with various organic matters.

SO: Agronomie. 2004 Jan.-Feb., v. 24, no. 1 p. 29-33.

Record 25 of 35 - AGRICOLA 1998-2004/09

AU: Peigne,-J.; Girardin,-P.

TI: Environmental impacts of farm-scale composting practices.

SO: Water, air, and soil pollution. 2004 Mar., v. 153, no. 1-4 p. 45-68.

Record 26 of 35 - AGRICOLA 1998-2004/09

AU: Zhao,-M.; Mo,-M.; Zhang,-K.

TI: Characterization of a neutral serine protease and its full-length cDNA from the nematode-trapping fungus *Arthrobotrys oligospora*.

SO: Mycologia. 2004 Jan.-Feb., v. 96, no. 1 p. 16-22.

Record 27 of 35 - AGRICOLA 1998-2004/09

AU: Unc,-A.; Goss,-M.J.

TI: Transport of bacteria from manure and protection of water resources.

SO: Applied soil ecology a section of Agriculture, Ecosystems and Environment. 2004 Jan., v. 25, no. 1 p. 1-18.

Record 28 of 35 - AGRICOLA 1998-2004/09

AU: Lopez-Hernandez,-D.; Araujo,-Y.; Lopez,-A.; Hernandez-Valencia,-I.; Hernandez,-C.

TI: Changes in soil properties and earthworm populations induced by long-term organic fertilization of a sandy soil in the Venezuelan Amazonia.

SO: Soil science. 2004 Mar., v. 169, no. 3 p. 188-194.

Record 29 of 35 - AGRICOLA 1998-2004/09

AU: Powell,-J.M.; Pearson,-R.A.; Hiernaux,-P.H.

TI: Crop-livestock interactions in the West African drylands.

SO: Agronomy journal. 2004 Mar.-Apr., v. 96, no. 2 p. 469-483.

AB: Many semiarid regions of Sub-Saharan Africa (SSA) are experiencing vast increases in human population pressure and urbanization. These augment the demand for agricultural products and have led to the expansion, intensification, and often closer integration of crop and livestock production systems. The transition of crop and livestock production from the current relatively extensive, low input/output modes of production to more intensive, higher input/output modes of production presents numerous challenges to the achievement of required long-term production increases from these farming systems. This paper provides an overview of the challenges facing agricultural production in semiarid SSA with a focus on West Africa. A description of mixed crop-livestock farming systems and their evolution is followed by an overview of the principal linkages between crops and livestock: income, animal power, feed, and manure. The most detailed discussions relate to nutrient cycling in these farming systems. Most livestock derive their feed almost exclusively from natural rangeland and crop residues, and livestock manure is a precious soil fertility amendment. However, most farmers have insufficient livestock and therefore manure to sustain food production. Nutrient harvests from cropland often exceed nutrient inputs, and soil nutrient depletion is a principal concern. The paper concludes with a discussion of strategies that may improve the productive capacity of these

mixed farming systems.

Record 30 of 35 - AGRICOLA 1998-2004/09

AU: Loecke,-T.D.; Liebman,-M.; Cambardella,-C.A.; Richard,-T.L.

TI: Corn response to composting and time of application of solid swine manure.

SO: Agronomy journal. 2004 Jan.-Feb., v. 96, no. 1 p. 214-223.

AB: Swine production in hoop structures is a relatively new husbandry system in which a mixture of manure and bedding accumulates. This manure/bedding pack can be applied to crop fields directly from a hoop structure or piled for composting. During 2000 and 2001, field experiments were conducted near Boone, IA, to determine the effects of form of solid swine manure (fresh or composted) and time of manure application (fall or spring) on corn (*Zea mays* L.) nutrient status and yield. Fresh and composted manure were applied at 340 kg total N ha⁻¹. Urea N fertilizer treatments of 0, 60, 120, and 180 kg N ha⁻¹ were used to determine N fertilizer equivalency values for the manure. In 2000, but not in 2001, fresh manure decreased corn emergence by 9.5% compared with the unamended, nonfertilized control treatment. No corn yield differences due to the form or the time of manure application were detected in 2000, but all treatments receiving manure produced more corn grain than the unamended control. In 2001, fall application of manure increased corn grain yield more than spring application, and composted manure increased yield more than fresh manure, with spring-applied fresh manure providing no yield response beyond the unamended control. Mean N supply efficiency, defined as the N fertilizer equivalency value as a percentage of the total N applied, was greatest for fall-applied composted manure (34.7%), intermediate for fall-applied fresh manure (24.3%) and spring-applied composted manure (25.0%), and least for spring-applied fresh manure (10.9%).

Record 31 of 35 - AGRICOLA 1998-2004/09

AU: Avendano,-F.; Pierce,-F.J.; Schabenberger,-O.; Melakeberhan,-H.

TI: The spatial distribution of soybean cyst nematode in relation to soil texture and soil map unit.

SO: Agronomy journal. 2004 Jan.-Feb., v. 96, no. 1 p. 181-194.

AB: Evidence suggests that variation in soil texture may be key to explain the variability of soybean cyst nematode (*Heterodera glycines* Ichinohe) population density within infested fields and may be important to the delineation of soybean cyst nematode (SCN) management zones. The purpose of this work was to assess the spatial structure of soil texture in two fields of known SCN population density and its relationship to published soil survey maps and to quantify the relationship between soil texture and SCN population density variability across fields and over time. Cysts were extracted by elutriation from single-core soil samples collected in a geostatistical sampling design. Soil texture analysis was performed using a modified hydrometer method. Classical and geostatistical tools were employed to characterize and map soil texture and correlate sand, silt, and clay with SCN population. Cyst population density was consistently higher in loamy sand than in sandy clay loam. Sand, clay, and silt in the soil were spatially structured and strongly correlated with SCN population density consistently over time. The number of eggs per cyst was not related to soil type or texture. This study

demonstrates the value of soil survey maps as indicators of where SCN can be expected in an infested field and how the addition of site-specific texture data can improve the spatial prediction of SCN. This study provides the basis for future experimentation to define soil texture tolerance limits for SCN and lays out foundations for new and integrated approaches to site-specific management of SCN.

Record 32 of 35 - AGRICOLA 1998-2004/09

AU: Hansen, -D.J.; Blackmer, -A.M.; Mallarino, -A.P.; Wuebker, -M.A.

TI: Performance-based evaluations of guidelines for nitrogen fertilizer application after animal manure.

SO: Agronomy journal. 2004 Jan.-Feb., v. 96, no. 1 p. 34-41.

AB: Nitrogen fertilizer needs for corn (*Zea mays* L.) in fields already treated with animal manure can be estimated by using general guidelines or soil testing for inorganic N. Although the soil-testing approach has been extensively evaluated for ability to predict yield responses to applied N under field conditions, the general-guideline approach has not been subjected to comparable performance-based evaluations. Fertilizer response trials were conducted in 205 manured fields to (i) compare the two approaches for ability to predict corn yield responses to fertilizer N applied after animal manure, (ii) identify reasons for differences in predictive ability, and (iii) explore the benefits of performance-based comparisons of the alternative approaches. Analyses showed that 34% of the observed variability in response could be explained by inorganic N concentrations whereas less than 5% of this variability could be explained by the general-guideline approach. The soil-testing approach, therefore, had greater ability to integrate the effects of all factors affecting yield responses across the range of conditions studied. Mean yield responses (0.55 Mg ha⁻¹) were smaller than are usually detectable in individual trials, but they were great enough to prompt farmers to fertilize. Results of this study indicate that the most commonly accepted approach to estimating N fertilizer needs is less reliable than generally believed and, therefore, that superior approaches are likely to remain unrecognized unless the performance of the commonly accepted approach is objectively evaluated under realistic field conditions.

Record 33 of 35 - AGRICOLA 1998-2004/09

AU: Burford, -M.A.; Lorenzen, -K.

TI: Modeling nitrogen dynamics in intensive shrimp ponds: the role of sediment remineralization.

SO: Aquaculture. 2004 Jan. 12, v. 229, no. 1-4 p. 129-145.

AB: A mathematical model is used to investigate the role of sedimentation and remineralization in the sediment on nitrogen (N) dynamics in intensive shrimp culture ponds. The model describes the key processes involved in N cycling that underpin the dynamics of total ammoniacal N (TAN), nitrate/nitrite (NOX) and chlorophyll a (CHL) concentrations and the sediment N pool. These parameters may, in high concentrations, impact negatively on the shrimp or the adjacent aquatic environment when water is discharged from ponds. The model was calibrated for an Australian commercial shrimp (*Penaeus monodon*) pond. Most N enters the pond system as TAN from shrimp excretion of dietary N and

decomposition of wasted feed, and is subsequently taken up by phytoplankton, which, on senescence, is sedimented and remineralized. Sediment remineralization is the dominant source of TAN in the water column for all but the beginning of the production cycle. The remineralization rate of sedimented N was estimated at 6% day⁻¹. Nonetheless, sediment acts as a net sink of N throughout the production cycle. The effect of management strategies, including increased stocking densities, water exchange and sludge (=sedimented material) removal, on water quality was examined. Model outputs show that using current shrimp farming techniques, with water exchange rates of 7% day⁻¹, an increase in stocking densities above 60 animals m⁻² would result in unacceptably high TAN concentrations. Both sludge removal and water exchange provide effective ways of reducing TAN and NOX concentrations and may allow substantially higher stocking densities. However, sludge removal may be the more acceptable option, given the need to meet strict regulatory requirements for discharge loads in some countries and the desire to reduce water intake to improve biosecurity.

Record 34 of 35 - AGRICOLA 1998-2004/09

AU: Mohanty,-R.K.; Verma,-H.N.; Brahmanand,-P.S.

TI: Performance evaluation of rice-fish integration system in rainfed medium land ecosystem.

SO: Aquaculture. 2004 Feb. 16, v. 230, no. 1-4 p. 125-135.

AB: This study was carried out for three successive years during 1999-2001 to evaluate growth and yield performance of fish, prawn and paddy under rice fish integration system in rainfed medium land ecosystem. Irrespective of stocking density, faster growth rate was recorded for *Catla catla* followed by *Cyprinus carpio*, *Cirrhinus mrigala*, *Labeo rohita* and *Macrobrachium rosenbergii*. *C. carpio* and *C. mrigala* performed better growth rate against that of *L. rohita* probably due to the fact that being bottom dwellers, *C. carpio* and *C. mrigala* are more tolerant to fluctuation of oxygen concentration. Productivity of fish and prawn was, however, higher ($p < 0.05$) in refuges with 10-cm weir height plots, irrespective of stocking density, while overall yield performance was good at stocking density of 25,000 ha⁻¹. It was observed that, even with supplemental feeding, with increase in stocking density, biomass yield increased up to an optimum and then decreased. An average minimum and maximum yield of 906.6-1282.3 kg ha⁻¹ of fish and prawn has been achieved, which was much higher than the earlier recorded productivity in a season under rice-fish integration system. Highest grain yield was recorded at 15-cm weir height plot (3629 kg ha⁻¹), probably contributed by higher number of panicles per square meter (235.5) and number of filled grains per panicle (121.7). Percentage increase in rice yield under rice-fish integration system was 7.9-8.6% against control, where paddy was cultivated without integration of fish and prawn probably due to better aeration of water, greater tillering effect and additional supply of fertilizer in form of leftover feed and fish excreta. Irrespective of stocking density, the overall rice equivalent yield (REY) of the system was high (4.22-4.55 tons ha⁻¹) at 12.5-cm weir height plots-cum-refuge, without using any pesticide, herbicide, etc.

Record 35 of 35 - AGRICOLA 1998-2004/09

AU: Adhikari,-S.; Ayyappan,-S.
TI: Behavioural role of zinc on primary productivity, plankton and growth of a freshwater teleost, *Labeo rohita* (Hamilton).
SO: Aquaculture. 2004 Mar. 5, v. 231, no. 1-4 p. 327-336.
AB: The role of zinc in biological production at three levels of zinc treatments was investigated. The three treatment levels were 10, 20 and 30 kg ZnSO₄/ha with each treatment using three different soil bases containing 0.45, 0.75 and 1.0 ppm diethylenetriamine pentaacetic acid (DTPA)-extractable zinc. All treatments showed an increase in both plankton and primary productivity ($p < 0.05$) over control (without zinc) and the maximum increase was at 10, 20 and 30 kg ZnSO₄/ha for 1.0, 0.75 and 0.45 ppm DTPA-extractable zinc, respectively. In the same experiment, *Labeo rohita* fingerlings were stocked after 15 days of zinc treatment. All the treatments showed an increase in growth of fish ($p < 0.05$) as compared with the control. Overall, maximum growth was obtained in the 30 kg ZnSO₄/ha-0.45 ppm DTPA-extractable zinc, second highest followed by 10 kg-1.0 ppm, followed by third highest growth in the 20 kg-0.75 ppm treatment. Zinc from the soil was fractionated into different forms and the distribution of various forms in the soil was found in the order of water-soluble < organically bound < complexed < occluded < residual. The major portion of total zinc in the soil existed in the residual form. The amount of water-soluble, exchangeable and complexed forms of zinc diminished due to plankton and fish removal while the addition of zinc to soil increased these three forms considerably. The contents of occluded and residual zinc in soil did not change due to plankton and fish growth or due to addition of zinc. Water-soluble, organically bound and to a less extent, the exchangeable form of zinc principally contributed to the pool of available zinc in this soil.