1. Title:Effect of soil amendments on bacterial wilt incidence and yield of potatoes in southwestern Uganda
View Article: African Crop Science Journal. 2001. 9 (1). 267-278
CD Volume:352
Print Article: Pages: 267-278
Author(s):Lemaga B Siriri D Ebanyat P
Author Affiliation:PRAPACE, P.O.Box 22274, Kampala, Uganda
Conference Title:Fifth Triennial Congress of the African Potato Association, 28 May-2 June 2000, Kampala, Uganda
Language:English
Language of Summary:french
Abstract:Potato bacterial wilt caused by Ralstonia solanacearum is a major threat to potato production in sub-Saharan Africa. It is believed that yield losses due to bacterial wilt increase with decreasing soil fertility. A soil amendment experiment was therefore conducted for 3 consecutive seasons, 1998A, 1998B and 1999A at Kachwekano (at an altitude of 2200 metres) in southwestern Uganda. Organic materials, Sesbania sesban and Leucaena diversifolia, were applied in amounts sufficient to supply 100 kg N ha-1 either singly or combined with P and PK. Also added were NP and NPK from inorganic sources. The organic materials were incorporated into soil one week before planting, while the inorganic fertilizers were side-dressed at planting at rates that would supply 100 kg ha-1 of N, P and K. N in the form of urea was split-applied at planting and one month after. Bacterial wilt incidence differed with treatments and seasons. Disease incidence was lowest with treatments NP and S + PK and highest with the control. Application of organic manures alone did not necessarily result in reduced wilt incidence except in a few cases. Both marketable and total tuber yields were consistently highest with S + PK and differed significantly from the control in all seasons. A combined analysis over the three seasons showed that the treatment S + PK gave a significantly higher yield (20.8 ha-1) than all other treatments, while the control yielded significantly lower (9.7 ha-1) than the other treatments. S. sesban as an organic manure performed better than L. diversifolia, and K was found to be a useful nutrient for crop performance. When K was applied with NP, LP and SP, it brought about marketable yield increases of 11, 23 and 37%, respectively. Generally, the rate of wilt development, expressed in wilt incidence per unit time, was highest at early stage of growth, thereafter, it declined and stabilised during much of the tuber bulking stage. The interaction between soil fertility and bacterial wilt incidence merits further studies in different environments
Descriptors:application-rates. crop-yield. nitrogen-fertilizers. organic-fertilizers. phosphorus-fertilizers. plant-diseases. plant-pathogenic-bacteria. plant-pathogens. potassium-fertilizers. potatoes. soil-amendments. soil-fertility. sulfur-fertilizers
Geographic Locator:Uganda
Organism Descriptors:Leucaena-diversifolia. Ralstonia-solanacearum. Sesbania-sesban. Solanum-tuberosum
Supplemental Descriptors:Leucaena. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Ralstonia. Burkholderiaceae. Gracilicutes. bacteria. prokaryotes. Sesbania. Papilionoideae. East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Solanum. Solanaceae. Solanales
Subject Codes:FF005. FF100. FF610. JJ600. JJ700
Supplementary Info:39 ref
ISSN:1021-9730

Year:2001
Journal Title:African Crop Science Journal
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2. Title:Effect of mulching cabbage with banana residues on cabbage yield, soil nutrient and moisture supply, soil biota and weed biomass
View Article: African Crop Science Journal. 2001. 9 (3). 499-506
CD Volume:352
Print Article: Pages: 499-506
Author(s):Lekasi J Woomer P Tenywa J Bekunda M
Author Affiliation:National Agricultural Research Centre, KARI-Muguga, P.O. Box 30148, Nairobi, Kenya
Language:English
Language of Summary:English. French
Abstract:Banana (Musa spp.) residues were examined as organic inputs for cabbage (Brassica oleracea L.) production in Uganda with respect to yield and soil biological activities. Cabbage, cultivar Copenhagen, was cultivated on a Ferralsol of low inherent fertility, with (15 t ha-1 dw) or without banana residues and hand-weeding. Two additional treatments included application of fertiliser (100 kg N, 50 kg P and 100 kg K ha-1) with weeding and surface mulching with black polythene (no nutrient inputs). Rankings of cabbage yields by management practice were consistent in both seasons, following the order of fertilised + weeded > banana mulched + weeded > plastic mulched > weeded > banana mulched > unmulched + unweeded. Hand-weeding increased yields by 9.3 t ha-1 (fresh weight). Combined banana mulching and hand-weeding resulted in an additional 12.5 t ha-1, but this increase was 15.1 t ha-1 less than that from application of fertiliser. Surface mulching with banana residues was not effective in weed suppression or moisture conservation but increased earthworm population densities. Banana pseudostems decayed more rapidly than leaves, and excluding soil macrofauna from both decaying tissues delayed decomposition. Plastic mulching increased cabbage yields by 14.9 t ha-1 over the unweeded treatment and improved soil moisture status, but this material is not widely available to smallholder farmers in Uganda. Farmers who seek to improve vegetable production can utilise banana residues as nutrient inputs only in combination with effective weeding; although the nutrients applied through banana mulch may not be utilised effectively compared to chemical fertilisers
Geographic Locator:Uganda
Organism Descriptors:Musa-spp. Brassica-oleracea
Supplemental Descriptors:East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
ISSN:1021-9730
Year:2001
Journal Title:African Crop Science Journal

3. Title:Evaluation of selected legume cover crops for biomass production, dry season survival and soil fertility improvement in a moist Savanna location in Nigeria
View Article: African Crop Science Journal. 2001. 9 (4). 615-627
CD Volume:352
Print Article: Pages: 615-627
Author(s):Abayomi Y Fadayomi O Babatola J Tian G
Author Affiliation:Department of Crop Production, University of Ilorin, P.M.B. 1515, Kwara State, Nigeria
Language:English

Language of Summary:English. French
Abstract:The growth and development of eighteen legume cover crop species were evaluated at the University of Ilorin Teaching and Research Farm (8 degrees 29'N, 4 degrees 35'E) in the southern Guinea savanna zone during the 1993 - 1996 cropping seasons. Field establishment, ground cover,above ground biomass production, and seed yields of the legume species were monitored during each cropping season. This was followed by an in-situ bioassay to determine the residual effect of the sown legume on maize (Zea mays L.) production in the absence of added nitrogen at the end of one season of legume growth each year. The results show that field establishment was generally poor (<30%) for most of the legume species, particularly the small seeded species. This resulted in a significant correlation between seed size and percent germination (r=0.89). Similarly, seed production was poor in most of the species with the exception of Mucuna pruriens, Cajanus cajan and Crotalaria ochroleuca. On the other hand, majority of the legume species gave satisfactory ground cover, biomass production, and N contribution to the succeeding non-legume crop. Using the rank summation index, the order of adaptation of the legume species to the study location on the basis of their ground cover, biomass production, seed yield, dry season survival and N contribution to the soil was as follows: Cajanus cajan > Aeschynomene histrix > Stylosanthes guianensis > S. scabra > Crotalaria ochroleuca > C. verrucosa > Clitorea tarnatea > S. hamata > Psuedovigna argentea > Centrosema pascuorum > Pueraria phaseoloides > Lablab purpureus > Psophocarpus palustris > Chamaecrista rotundifolia > Macroptilium atropurpureum. Management practices aimed at ameliorating the poor field establishment and seed yield are suggested
Geographic Locator:Nigeria
Organism Descriptors:Zea-mays L. Cajanus-cajan. Aeschynomene- histrix. Stylosanthes-guianensis. S-scabra. Crotalaria-ochroleuca. C-verrucosa. Clitorea-tarnatea. S-hamata. Psuedovigna- argentea. Centrosema-pascuorum. Pueraria- phaseoloides. Lablab-purpureus. Psophocarpus- palustris. Chamaecrista-rotundifolia. Macroptilium-atropurpureum. Mucuna-pruriens. Crotalaria-ochroleuca
Supplemental Descriptors:West-Africa.Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
ISSN:1021-9730
Year:2001
Journal Title:African Crop Science Journal

4. Title:Legumes in soil fertility management: the case of pigeonpea in smallholder farming systems of Zimbabwe
View Article: African Crop Science Journal. 2001. 9 (4). 629-644
CD Volume:352
Print Article: Pages: 629-644
Author(s):Mapfumo P Campbell B Mpepereki S Mafongoya P
Author Affiliation:Department of Soil Science and Agricultural Engineering, University of Zimbabwe, P.O. Box MP 167, Mt. Pleasant, Harare, Zimbabwe
Language:English
Language of Summary:English. French
Abstract:We investigated the current use of legumes in soil fertility management and the feasibility of promoting use of pigeonpea in smallholder farming systems of a Communal Area in Northeast of Zimbabwe. Participatory rural appraisal methods were used to establish farmer management strategies and perceptions on major constraints to crop productivity. Soil fertility parameters were evaluated through

farmer participatory experiments. The study revealed limited cultivation of legumes for both human nutrition and soil fertility management. Legumes were generally regarded as women's crops, and therefore minor, because of men's domination over women in the household decision-making process. Balancing gender interests in terms of allocation of inputs and distribution of benefits at household level was identified as a major challenge to the implementation of legume technologies. Poor extension thrusts with respect to legume production, and poor agronomic practices were identified as major production constraints. Over-emphasis on maize in the current extension packages led to the relegation of legumes to the status of 'minor crops'. Participatory experiments suggested that pigeonpea can be successfully grown by farmers under poor soil fertility conditions. The crop yielded about 3 to 9 t ha-1 of shoot biomass in a single cropping season, and up to 23 t ha-1 after two seasons of growth. High amounts leaf litter released by the crop in one season (up to 3 t ha-1) are considered a potentially viable source of nutrients for subsequent crops, as confirmed by a 22% maize yield increase obtained from a field that was previous cultivated with pigeonpea

Geographic Locator:Zimbabwe
Organism Descriptors:Cajanus-cajan
Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. SADC-Countries. Anglophone-Africa
ISSN:1021-9730
Year:2001
Journal Title:African Crop Science Journal

5. Title:Rotational effects of grain legumes on maize performance in the Rift Valley Highlands of Kenya
View Article: African Crop Science Journal. 2001. 9 (4). 667-676
CD Volume:352
Print Article: Pages: 667-676
Author(s):Cheruiyot E Mumera L Nakhone L Mwonga S
Author Affiliation:Egerton University, Department of Agronomy, P.O. Box 536, Njoro, Kenya
Language:English
Language of Summary:English. French
Abstract:High fertiliser costs and declining soil fertility are among the key factors contributing to low crop yields in Kenya. The contribution of five legumes grown in the short-rains season to soil nitrogen status and performance of a succeeding maize (Zea mays L.) was studied in an experiment at Njoro and Rongai within the Rift Valley Highlands of Kenya, from 1997 to 1999. Treatments included a weedy fallow, five grain legumes and maize (H513) grown during short-rains season followed by maize in the April-August long-rains season. The legumes were chickpea (Cicer arietinum L.), field bean (Phaseolus vulgaris L.), soybean [Glycine Max (L.) Merril], garden pea (Pisum sativum L.), dolichos [Lablab purpureus (L.) Sweet]. The crop residues and vegetation of the weedy fallow were incorporated in the soil during seedbed preparation for the long rains season. The maize test crop was supplied with three levels of nitrogen, 0, 30, and 60 kg ha-1 as main factor whilst fallow management options were allocated as sub-factors in a split-plot treatment arrangement of a randomised complete block design replicated three times. Results show improved soil N status following legumes, with dolichos giving highest available N. Grain yield in maize succeeding legumes was 24-68% higher than maize succeeding weed fallow. In the absence of N

fertiliser input, maize succeeding dolichos gave 20-40% higher yield than maize after weed fallow treated with recommended 60 kg N ha-1 fertiliser rate. The study has demonstrated that the use of grain legumes, particularly dolichos in rotation with maize, is a viable and preferable option to weedy fallows and maize-maize sequences
Geographic Locator:Kenya
Organism Descriptors:Phaseolus-vulgaris. Gylcine-max. Zea-mays. Cicer-arietinium-L. Pisum-sativium-L. Lablab-purpureus
Supplemental Descriptors:East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
ISSN:1021-9730
Year:2001
Journal Title:African Crop Science Journal

6. Title:Structural adjustment and soil degradation in Tanzania: a CGE model approach with endogenous soil productivity
View Article: Agricultural Economics. 2001. 24 (3). 263-287
CD Volume:358
Print Article: Pages: 263-287
Author(s):Wiig H Aune J B Glomsrod S Iversen V
Author Affiliation:Section for International Economics, Norwegian Institute of International Affairs, P.O. Box 8159 Dep., N-0033 Oslo, Norway
Language:English
Abstract:In this paper, a model of the nitrogen cycle in the soil is incorporated in a computable general equilibrium model of the Tanzanian economy, thus establishing a two-way link between the environment and the economy. For a given level of natural soil productivity, profit-maximizing farmers choose input levels (and hence production volumes) which in turn influence soil productivity in the following years through the recycling of nitrogen from the residues of roots and stover and the degree of erosion. The model is used to simulate the effects of typical structural adjustment policies like a reduction in agrochemicals' subsidies, reduced implicit export tax rate, etc. After 10 years, the result of a joint implementation is a 9% higher gross domestic product (GDP) level compared to the baseline scenario. The effect of soil degradation is found to represent a reduction in the GDP level of more than 5% for the same time period
Descriptors:economic-growth. economic-impact. gross-national-product. nitrogen. productivity. soil-degradation. soil-fertility. structural-adjustment
Geographic Locator:Tanzania
Supplemental Descriptors:East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. SADC-Countries. Anglophone-Africa
Subject Codes:EE110. EE115. JJ600. PP400
Supplementary Info:32 ref
ISSN:0169-5150
Year:2001
Journal Title:Agricultural Economics

7. Title:Measuring soil quality dynamics: a role for economists, and implications for economic analysis
View Article: Agricultural Economics. 2001. 25 (1). 13-26
CD Volume:368
Print Article: Pages: 13-26
Author(s):Kim KwanSoo Barham B L Coxhead I

Author Variant:Kim-K-S
Author Affiliation:Department of Agricultural and Applied Economics, University of Wisconsin-Madison, Taylor Hall, 427 Lorch Street, Madison, WI 53706, USA
Language:English
Abstract:This paper develops and demonstrates a dynamic econometric model for explaining current soil productivity in terms of past management choices, and for predicting its evolution under future choices. The presentation of the dynamic structural model is prefaced with a more standard approach to analysing yield response to nitrogen fertilizer and rotations, namely a random coefficients model. The dynamic model is estimated using data from a long-run study of yields of economically important crops under a legume-cereal rotation at the University of Wisconsin's Lancaster Research Station (Wisconsin, USA). Estimates from the models are then used to evaluate the speed at which soil quality returns to base levels under alternative management regimes following a period of intensive grain cultivation. Some applications and implications of the methodology and findings for the analysis of the economic implications of land degradation and the soil quality implications of agricultural policies are discussed
Descriptors:agricultural-policy. cereals. crop-yield. dynamic-models. econometric-models. economic-analysis. legumes. nitrogen-fertilizers. rotations. soil-degradation. soil-fertility. soil-management
Geographic Locator:USA. Wisconsin
Organism Descriptors:Fabaceae
Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries. East-North-Central-States-of-USA. North-Central-States-of-USA. USA. Lake-States-of-USA. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:EE110. FF005. FF150. JJ600. JJ700. JJ900. ZZ100
Supplementary Info:27 ref
ISSN:0169-5150
Year:2001
Journal Title:Agricultural Economics

8. Title:Impacts of cropping systems on soil nitrogen storage and loss
View Article: Agricultural Systems. 2001. 68 (3). 253-268
CD Volume:354
Print Article: Pages: 253-268
Author(s):Poudel D D Horwath W R Mitchell J P Temple S R
Author Affiliation:Department of Renewable Resources, University of Louisiana at Lafayette, Lafayette, LA 70504, USA
Language:English
Abstract:Organic and low-input cropping systems that use more C inputs are alternatives to conventional systems for sustaining long-term soil fertility. An understanding of the impacts of these cropping systems on N balance (N applied minus N removed in harvested plant material), storage and loss is necessary to improve long-term soil fertility and minimize the risk of environmental pollution. An evaluation of 4-year rotations of organic (N from legumes and composted manures), low-input (N from legumes and reduced amounts of synthetic fertilizers), and conventional (conv-4, N from synthetic fertilizers) and a conventional 2-year rotation (conv-2, N from synthetic fertilizers) on N balance, storage and loss was conducted from 1989 to 1998 (California, USA). Compared to the conv-2 system, the organic and conv-4 systems showed 119 and 8% greater cumulative N balance, respectively, over the duration of the study. However, N balance in

the low-input system was 19% less than in conv-2 system. After 10 years of differential management, total N in the top 15 cm of soil was 1.46 g kg-1 in the organic, 1.26 g kg-1 in the low-input, 1.13 g kg-1 in the conv-4, and 1.1 g kg-1 in the conv-2 system. Compared to the conv-2 system, cumulative N losses for the organic, low-input and conv-4 systems were lower by 80, 92, and 10%, respectively. These findings suggest that organic and low-input cropping systems that add C to soil have the potential for storing N and making it available for future crop use, while minimizing the risk of environmental pollution

Descriptors:cropping-systems. losses-from-soil. low-input-agriculture. nitrogen-balance. organic-nitrogen. soil. soil-fertility. nitrogen-fertilizers

Geographic Locator:California. USA

Supplemental Descriptors:Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries

Subject Codes:FF150. JJ600. JJ700. JJ900. JJ100

Supplementary Info:52 ref

ISSN:0308-521X

Year:2001

Journal Title:Agricultural Systems

9. Title:Assessing sustainability of low-external-input farm management systems with the nutrient monitoring approach: a case study in Kenya

View Article: Agricultural Systems. 2001. 69 (1/2). 99-118

CD Volume:354

Print Article: Pages: 99-118

Author(s):Jager A de Onduru D Wijk M S van Vlaming J Gachini G N

Author Variant:de-Jager-A. van-Wijk-M-S

Author Affiliation:Agricultural Economics Research Institute (LEI-DLO), PO Box 29703, 2502 LS Den Haag, Netherlands

Language:English

Abstract:In the search for integrated nutrient management practices in response to the widely observed soil fertility decline in Sub-Saharan Africa, the potential of low-external-input and organic farming remains to be systematically examined. The nutrient monitoring concept was used to assess the impact of technologies on nutrient flows and economic performance at activity and farm household level in Machakos district, Kenya. The nutrient flows and balances and economic performance indicators of farms practising low-external input agriculture (LEIA) technologies for a number of years were compared with a group of farms practising conventional farm management. Based upon monitoring two farming seasons, it is concluded that both subsistence-oriented farm management systems result in serious N-depletion and that 60-80% of farm income is based upon nutrient mining. No significant differences could be found between the LEIA and conventional farm management group. Only if LEIA farm management reduces nutrient losses through leaching and gaseous losses can a positive impact on nutrient balance be expected. Off-farm income plays a crucial role, especially in the conventional management group, in keeping farm household income levels above the poverty line. High-level compost application treatments in maize are attractive if labour and organic inputs are available

Descriptors:case-studies. farm-management. farmers'-income. low-input-agriculture. maize. nutrient-balance. organic-farming. soil-exhaustion. soil-fertility. soil-management. sustainability

Geographic Locator:Africa-South-of-Sahara. Kenya

Organism Descriptors:Zea-mays

Supplemental Descriptors:Africa. East-Africa. Africa-South-of-Sahara. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:EE110. EE950. FF005. FF150. JJ600. JJ900
Supplementary Info:28 ref
ISSN:0308-521X
Year:2001
Journal Title:Agricultural Systems
Copyright:Copyright CAB International

10. Title:Advances in farming systems analysis and intervention
View Article: Agricultural Systems. 2001. 70 (2/3). 555-579
CD Volume:354
Print Article: Pages: 555-579
Author(s):Keating B A McCown R L
Author Affiliation:APSRU/CSIRO Sustainable Ecosystems, 120 Meiers Road, Indooroopilly, Brisbane 4068, Australia
Language:English
Abstract:In this paper, we recognize two key components of farming systems: the biophysical 'Production System' of crops, pastures, animals, soil and climate, together with certain physical inputs and outputs; and, the 'Management System', made up of people, values, goals, knowledge, resources, monitoring opportunities, and decision making. Utilizing upon these constructs, we review six types of farming systems analysis and intervention that have evolved over the last 40 years: (1) economic decision analysis based on production functions; (2) dynamic simulation of production processes; (3) economic decision analysis linked to biophysical simulation; (4) decision support systems; (5) expert systems; and, (6) simulation-aided discussions about management in an action research paradigm. Biophysical simulation modelling features prominently in this list of approaches and considerable progress has been made in both the scope and predictive power of the modelling tools. We illustrate some more recent advances in increasing model comprehensiveness in simulating farm production systems via reference to our own group's work with the Agricultural Production Systems Simulator. Two case studies are discussed: broad-scale commercial agriculture in north-eastern Australia; and, resource poor small-holder farmers in Africa. We conclude by considering future directions for systems analysis efforts directed at farming systems. We see the major challenges and opportunities lying at the interface of 'hard', scientific approaches to the analysis of biophysical systems and 'soft', approaches to intervention in social management systems
Descriptors:arid-zones. case-studies. decision-making. dry-farming. farm-management. farming-systems. simulation. simulation-models. soil-fertility
Geographic Locator:Africa. Australia
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:EE110. FF150. PP500. ZZ100
Supplementary Info:many ref
ISSN:0308-521X
Year:2001
Journal Title:Agricultural Systems
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11. Title:Influence of subsurface drainage on crop production and soil quality in a low-lying acid sulphate soil

View Article: Agricultural Water Management. 2001. 47 (3). 191-209
CD Volume:354
Print Article: Pages: 191-209
Author(s):Mathew E K Panda R K Madhusudan Nair
Author Variant:Nair-M
Author Affiliation:AICRP on Agricultural Drainage, Karumady, Alleppey, Kerala 688564, India
Language:English
Abstract:Kuttanad, the low-lying tract in Kerala State of south-west India, is a place where drainage problems have caused the agricultural production to remain low. The problem is more severe in the acid sulfate soils of Kuttanad. Besides the problems inherent to acid sulfate soils, the area also experiences problems of flooding, lack of fresh water and intrusion of saline water from the Arabian Sea. A subsurface drainage system consisting of 10 cm diameter clay tiles, each of 60 cm length, was installed at a depth of 1 m with two different spacings of 15 and 30 m for evaluating its influence in improving soil quality and crop production. Many of the critical crop growth parameters in the subsurface drained area, particularly the grain yield and 100 grain weight, were significantly superior to that of the ill-drained areas. Drain spacings up to 30 m was found to significantly improve the productivity of the area. The overall increase in rice yield due to subsurface drainage was 1.36 t/ha. It was also found that subsurface drainage could remove the chemical heterogeneity of soil which is the root cause for patchy crop growth and uneven ripening of rice crop in the area. Acidity in the subsurface drained area was always lower throughout the cropping season. The salinity in the soil could be controlled considerably by subsurface drainage. The iron transformations were not serious enough to cause concern for rice cultivation when subsurface drainage was adopted. Accumulation of sulfates in insoluble form occurred during drainage due to the oxidation of pyrite. Subsurface drainage was also very efficient in leaching sodium, calcium and magnesium. Chloride content in soil decreased drastically during drainage
Descriptors:acid-sulfate-soils. calcium. chloride. crop-yield. iron. leaching. magnesium. mineral-content. rice. sodium. soil. soil-fertility. soil-salinity. soil-types. spacing. subsurface-drainage. sulfates. tile-drainage
Geographic Locator:India. Kerala
Identifiers:soil quality
Organism Descriptors:Oryza. Oryza-sativa
Supplemental Descriptors:South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India. Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF100. JJ600. JJ800. JJ200
Supplementary Info:28 ref
ISSN:0378-3774
Year:2001
Journal Title:Agricultural Water Management

12. Title:Comparison of a modified statistical-dynamic water balance model with the numerical model WAVES and field measurements
View Article: Agricultural Water Management. 2001. 48 (1). 21-35
CD Volume:354
Print Article: Pages: 21-35
Author(s):Huang MingBin Shao MinGan Li YuShan
Author Variant:Huang-M-B. Shao-M-G. Li-Y-S

Author Affiliation:The State-key Laboratory of Soil Erosion and Dryland Farming on the Loess Plateau, The Institute of Soil and Water Conservation, Chinese Academy of Sciences, Ministry of Water Resources, Yangling, Shaanxi, 712100, China
Language:English
Abstract:A modified statistical-dynamic model is presented and evaluated to describe surface hydrology by comparing it to a more advanced numerical model and to field measurements. Our model is developed by making specific modifications to the Eagleson statistical-dynamic water balance model. Specific modifications to the earlier model include: the addition of precipitation periods that can account for seasonal variations in precipitation and water balance, a change on how soil water properties and flow are computed, and how a limited water supply influences plant transpiration so that transpiration rates can be less than the potential transpiration rates. Mass conservation and a step by step prediction-correction algorithm are used to calculate the mean water balance and its partitioning as well as the average soil moisture in the precipitation periods. All of these modifications improve the statistical-dynamic model and make it more flexible and potentially useful. Comparisons of the modified model are made with numerical simulations of the WAVES model and with 10-year (1986-95) field measurements from an eco-hydrological system on the Loess Plateau in Gansu province, China. The data from a long-term fertility experiment of winter wheat at Changwu Agro-ecological Station on the Loess Plateau are used to test the modified statistical-dynamic water balance model. In both comparisons, the correspondence is remarkably good. The modified statistical-dynamic water balance model accurately predicts the mean water balance components and the dynamic processes of the mean soil moisture for specific wheat-fertility-productivity conditions. The statistical-dynamic water balance model is simple to use, fast and efficient, requires less input than complex numerical models, and is shown to be quite accurate in predicting dynamic soil moisture storage
Descriptors:comparisons. hydrology. loess. mathematical-models. measurement. models. plateaux. precipitation. soil-fertility. soil-water-balance. soil-water-content. transpiration. wheat
Geographic Locator:China. Gansu
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:East-Asia. Asia. Developing-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-Western-China. China
Subject Codes:FF062. JJ300. PP200. ZZ100. ZZ900. FF005
Supplementary Info:34 ref
ISSN:0378-3774
Year:2001
Journal Title:Agricultural Water Management

13. Title:Use of saline-sodic waters through phytoremediation of calcareous saline-sodic soils
View Article: Agricultural Water Management. 2001. 50 (3). 197-210
CD Volume:354
Print Article: Pages: 197-210
Author(s):Qadir M Ghafoor A Murtaza G
Author Affiliation:Department of Soil Science, University of Agriculture, Faisalabad 38040, Pakistan
Language:English
Abstract:Use of poor-quality groundwater has become inevitable for irrigation to compensate rapidly increasing water demands in many arid and semiarid

regions. Salinity and sodicity are the principal soil and water quality concerns in such areas. Many saline-sodic and sodic soils have saline or saline-sodic subsurface drainage waters. Amelioration of these soils needs a source of calcium (Ca2+) that can replace the excess exchangeable sodium (Na+). Most of these soils, however, contain calcite (CaCO3) of extremely low solubility. The native calcite does not supply adequate levels of Ca2+ for soil amelioration as do other chemical amendments. Phytoremediation may help ameliorate such soils through cultivation of certain crops tolerant to ambient soil salinity and sodicity. This amelioration strategy works through plant root action to help dissolve CaCO3 to supply adequate Ca2+ without the application of an amendment. During a 3-year field experiment conducted under irrigated conditions in the Fourth Drainage Project Area near Faisalabad, Pakistan, we evaluated phytoremediation against soil application of gypsum and farm manure, and water treatment with sulfuric acid on a calcareous saline-sodic soil (pHs=8.0-8.4, ECe=24-32 dS m-1, SAR=57-78, CaCO3=45-50 g kg-1 for the top 0.15 m depth; Calcic Haplosalids). A saline-sodic water (EC = 2.9-3.4 dS m-1, SAR=12.0-19.4, RSC=4.6-10.0 mmolc l-1, SARadj=15.6-18.4) was used to irrigate the rice (Oryza sativa) and wheat (Triticum aestivum) crops grown in rotation. Active desalinization and desodication processes were observed in all the treatments. After the final wheat crop, the 1.2 m soil profile ECe was 7 plus or minus 0.5 dS m-1 and SAR was 15 plus or minus 2 with non-significant treatment differences, indicating comparable soil amelioration effect of phytoremediation with other treatments. Better crop yields were obtained from the manure-treated plots, owing to its annual addition to the soil that possibly improved soil fertility. Phytoremediation needed minimum capital input because no initial investment was made to purchase the amendments

Descriptors:crop-yield. desalinization. farmyard-manure. gypsum. nonclay-minerals. rice. saline-sodic-soils. soil-fertility. wheat

Geographic Locator:Pakistan

Identifiers:phytoremediation. soil amelioration

Organism Descriptors:Oryza. Oryza-sativa. Triticum. Triticum-aestivum

Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. Triticum

Subject Codes:FF005. FF100. JJ600. JJ700. XX100

Supplementary Info:32 ref

ISSN:0378-3774

Year:2001

Journal Title:Agricultural Water Management

14. Title:Organic inputs for soil fertility management in tropical agroecosystems: application of an organic resource database

View Article: Agriculture, Ecosystems & Environment. 2001. 83 (1/2). 27-42

CD Volume:375

Print Article: Pages: 27-42

Author(s):Palm C A Gachengo C N Delve R J Cadisch G Giller K E

Author Affiliation:Tropical Soil Biology and Fertility Programme, TSBF, UNESCO, UN Complex, PO Box 30592, Gigiri, Nairobi, Kenya

Language:English

Abstract:Organic resources play affect both short-term nutrient availability and longer-term maintenance of soil organic matter in most smallholder farming systems in the tropics. An organic resource database (ORD) is introduced that contains information on organic resource quality parameters including macronutrient, lignin and polyphenol contents of

fresh leaves, litter, stems and/or roots from almost 300 species found in tropical agroecosystems. Data on the soil and climate from where the material was collected are also included, as are decomposition and nutrient release rates of many of the organic inputs. Examples of uses of ORD are provided in the paper: (1) nutrient contents (including median values and ranges) and other resource quality parameters of farmyard manure and crop residues are compared to that of alternative nutrient sources such as different plant parts and plant types; (2) nutrient stocks found in farm boundary hedges are estimated and evaluated as a source of nutrients for soil fertility management; (3) hypotheses regarding the indices and critical values of N, lignin, and polyphenol contents for predicting N release rates are tested; (4) organic materials for soil fertility management experiments are selected. This database, when coupled with models and decision support tools, will help advance organic matter management for soil fertility improvement from an empirical to a predictive practice

Descriptors:decomposition. release. nutrients. animal-manures. sandy-soils. nitrogen. phosphorus. potassium. cattle-manure. sheep-manure. crusts. application-rates. crop-residues. losses

Geographic Locator:Niger. Sahel

Identifiers:goat manure

Supplemental Descriptors:West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa

Subject Codes:JJ700. XX100. JJ400. XX200

Supplementary Info:41 ref

ISSN:0167-8809

Year:2001

Journal Title:Agriculture, Ecosystems & Environment

15. Title:Soil phosphorus availability and fine root proliferation in Amazonian agroforests 6 years following forest conversion

View Article: Agriculture, Ecosystems & Environment. 2001. 83 (3). 271-284

CD Volume:375

Print Article: Pages: 271-284

Author(s):McGrath D A Duryea M L Cropper W P

Author Affiliation:School of Forest Resources & Conservation, University of Florida, Gainesville, FL 32611, USA

Language:English

Abstract:In the Amazon Basin, where deforestation rates are among the highest in the world, raising land productivity with perennial crop-based agroforestry systems may allow small farmers to meet economic demands with less forest clearing. Although tree-based agroecosystems may cycle nutrients more efficiently than other agricultural systems, difficulties maintaining phosphorus (P) availability to plants growing in tropical Ultisols and Oxisols may threaten the long-term sustainability of Amazonian agroforests. To determine how soil nutrient dynamics are altered when primary forest is converted to perennial crops, soils from eight 6-year-old peach palm (Bactris gasipaes Kunth)-cupuassu (Theobroma grandiflora [T. grandiflorum]) plantation agroforests were compared to those of adjacent native forests in Acre, Brazil. The response of fine roots to P microsite enrichment by agroforest and native forest plants on eight farms was measured using a root ingrowth bioassay to determine if a P-limitation already threatened agroforest sustainability. Localized root proliferation by individual agroforest species was also examined as a component of interspecific competition. The impact of agroforest

adoption by small farmers on forest clearing was qualitatively examined through interviews and focus groups held with farmers participating in the field studies. Six years after establishment on sites initially occupied by native terra firme forest, exchangeable base cations, ECEC and pH were greater in agroforest soils than in those of adjacent forests. Extractable inorganic P was 30-50% lower in agroforest soil, suggesting that P uptake by the aggrading agroecosystem outpaced its restoration in the soil solution by other P pools. After 100 days, cupuassu root length and mass were greater in P-treated cores buried in agroforest alleys, but not in cores buried in rows. While a P deficiency in any of the agroforest components could not be inferred using the root ingrowth technique, the study of root proliferation demonstrated both the potential for interspecific competition among peach palm and other agroforest components, as well as opportunities for alleviating the impact of competition through management practices. Discussions with farmers revealed that this type of commercial plantation agroforest, unless managed to maintain productivity, may actually contribute to more forest clearing on small farms because of a lack of farmer confidence in the future of the system. Thus, despite more efficient nutrient cycling in tree-based agroecosystems, the decline in agroforest soil P following establishment must be addressed through management practices if plantation agroforests are to remain a sustainable land use in Amazonia

Descriptors:agroforestry. forests. oxisols. phosphorus. plantations. rain-forests. root-systems. soil-fertility. tropical-forests. ultisols

Identifiers:Theobroma grandiflorum

Organism Descriptors:Bactris-gasipaes. Theobroma

Supplemental Descriptors:Bactris. Arecaceae. Arecales. monocotyledons. angiosperms. Spermatophyta. plants. Theobroma. Sterculiaceae. Malvales. dicotyledons

Subject Codes:KK100. JJ200. JJ600. KK600

Supplementary Info:66 ref

ISSN:0167-8809

Year:2001

Journal Title:Agriculture, Ecosystems & Environment

16. Title:Impact of agroforestry intervention on soil fertility and farm income under the subsistence farming system of the middle hills, Nepal

View Article: Agriculture, Ecosystems & Environment. 2001. 84 (2). 157-167

CD Volume:375

Print Article: Pages: 157-167

Author(s):Neupane R P Thapa G B

Author Affiliation:School of Environment, Resources and Development, Asian Institute of Technology, P.O. Box 4, Klong Luang, Pathumthani 12120, Thailand

Language:English

Abstract:Practices that minimize the rate of soil degradation, improve soil fertility, increase crop yield and raise farm income are the keys to sustaining agricultural productivity in the hills of Nepal. The impact of an agroforestry intervention project on soil fertility and farm income was examined based on a sample of subsistence farm households in Dhading district. The project was implemented in 1993-94 to increase fodder production through the promotion of agroforestry. A total of 223 households (82 project and 141 non-project) were interviewed during May 1998-October 1998 to collect information on production and farmers' perceptions toward agroforestry's impact on soil fertility. Soil samples (Cambisols)

taken from both project and non-project areas were also analysed to examine agroforestry's impact on various soil nutrients. Soil analysis revealed that differences in amount of organic matter, nitrogen, phosphorus and potassium observed between the soils under agroforestry system and the conventional system were not significant at the 0.05 level. The benefit-cost analysis showed that the agricultural system with agroforestry was more profitable than the conventional system. Results also showed that the introduction of multipurpose trees, such as mulberry (Morus alba), for sericulture could further enhance the profitability of agroforestry-based system. Thus in the hills, agroforestry has potential for enhancing food production and farmers' economic conditions in a sustainable manner through its positive contributions to soil fertility and household income

Descriptors:agroforestry. Cambisols. cost-benefit-analysis. crop-yield. farm-income. food-production. Inceptisols. mulberries. multipurpose-trees. nitrogen. organic-matter. phosphorus. potassium. soil-degradation. soil-fertility. soil-types. subsistence-farming. sustainability. trees

Geographic Locator:Nepal

Organism Descriptors:Morus. Morus-alba

Supplemental Descriptors:Morus. Moraceae. Urticales. dicotyledons. angiosperms. Spermatophyta. plants. South-Asia. Asia. Least-Developed-Countries. Developing-Countries

Subject Codes:EE115. FF100. JJ600. KK600

Supplementary Info:50 ref

ISSN:0167-8809

Year:2001

Journal Title:Agriculture, Ecosystems & Environment

17. Title:Implications of livestock feeding management on soil fertility in the smallholder farming systems of sub-Saharan Africa

View Article: Agriculture, Ecosystems & Environment. 2001. 84 (3). 227-243

CD Volume:375

Print Article: Pages: 227-243

Author(s):Delve R J Cadisch G Tanner J C Thorpe W Thorne P J Giller K E

Author Affiliation:Wye College, University of London, Wye, Ashford, Kent, TN25 5AH, UK

Language:English

Abstract:The role of livestock in nitrogen cycling in mixed crop-livestock farming systems was studied in 1997-1998 at Muguga Research Station, Kenya. Cattle were fed a range of diets to investigate the effects on partitioning of nitrogen between urine and faeces and on the chemical composition of the manures produced. The trade-offs in efficiency between using the feed resources as a direct soil amendment for crop production compared with feeding to livestock and use of the manure as a fertilizer are discussed. Increased dry matter (DM) and nitrogen intake of a poor quality basal diet (barley straw) was achieved by supplementation with 15 and 30% of DM offered as Calliandra calothyrsus, Macrotyloma axillare or poultry manure. Urinary-N excretion for the basal diet (0.5 mg kg-1 liveweight (W) per day) was similar to C. calothyrsus at 15 and 30% supplementation (1.3 and 0.8 mg kg-1 W per day, respectively) and M. axillare at 15 and 30% supplementation (0.4 and 0.6 mg kg-1 W per day, respectively). In contrast, feeding poultry manure, a supplement containing highly degradable N, resulted in larger excretions of excess rumen ammonia as N in the urine, 17.5 and 23.2 mg kg-1 W per day for 15 and 30% supplementation, respectively. Diets containing

the largest rate of C. calothyrsus supplementation had the lowest digestibility of N in the acid detergent fibre (ADF) and neutral detergent fibre (NDF) fractions. This was reflected in faeces from cattle fed diets supplemented with C. calothyrsus, which had substantially greater amounts of N bound to fibre (ADF and NDF) fractions than faeces from the other diets. When incubated in leaching tubes prunings of C. calothyrsus showed net N mineralization from week 2, whereas barley straw, M. axillare and poultry manure immobilized N for >28, 24 and >28 weeks, respectively. Faeces derived from supplementation with C. calothyrsus and M. axillare resulted in shorter nitrogen immobilization in leaching tubes (16 weeks) than supplementation with poultry manure (24 weeks) when compared with faeces derived from animals fed straw only (28 weeks). Similarly, reduced N uptake from 10-week-old maize plants was observed in pots to which faeces had been added compared with the control treatment. A second crop of maize had increased N uptake. Feeding poor quality crop residues like barley straw to animals produces manures with a decreased capacity to immobilize mineral N in the soil. This was shown with faeces derived from feeding ruminants a diet of only barley straw, which had a faster N mineralization rate than fresh barley straw, a shorter and smaller N immobilization stage in leaching tubes and gave greater N uptake in maize grown in pots. These results indicated that N losses in urine from livestock may be less important than previously thought. Most of the N is excreted in the faeces, which must be conserved and managed to maximize nutrient cycling

Descriptors:barley. barley-straw. cattle-manure. chemical-composition. crop-production. cycling. diets. dry-matter. faeces. farming-systems. intake. livestock-feeding. maize. mineralization. nitrogen. nutrients. plant-composition. poultry-manure. small-farms. soil-amendments. soil-fertility. straw. uptake. urine

Geographic Locator:Africa-South-of-Sahara. Kenya

Organism Descriptors:Calliandra-calothyrsus. cattle. Macrotyloma-axillare. Zea-mays

Supplemental Descriptors:Calliandra. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Bos. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates. Macrotyloma. Papilionoideae. Africa. Zea. Poaceae. Cyperales. monocotyledons. East-Africa. Africa-South-of-Sahara. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa

Subject Codes:FF007. FF100. FF150. JJ600. JJ700. KK600. XX100. JJ200. FF061. RR300

Supplementary Info:51 ref

ISSN:0167-8809
Year:2001
Journal Title:Agriculture, Ecosystems & Environment

18. Title:A dynamic simulation model of land-use changes in Sudano-sahelian countries of Africa (SALU)

View Article: Agriculture, Ecosystems & Environment. 2001. 85 (1/3). 145-161
CD Volume:375
Print Article: Pages: 145-161

Author(s):Stephenne N Lambin E F
Author Affiliation:Department of Geography, University of Louvain, Place Louis Pasteur 3, B-1348 Louvain-la-Neuve, Belgium

Language:English

Abstract:This paper presents a simulation model to project land-cover changes at a national scale for Sudano-sahelian countries. The aim of this study is to better understand the driving forces of land use change and to reconstruct past changes. The structure of our model is heavily determined by its spatially aggregated level. This model represents, in a dynamic way, a simplified version of our current understanding of the processes of land-use change in the Sudano-sahelian region of Africa. For any given year, the land demand is calculated under the assumption that there should be an equilibrium between the production and consumption of basic resources derived from different land uses. The exogenous variables of the model are human population (rural and urban), livestock, rainfall and cereals imports. The output are the areas allocated to fuelwood extraction, crops, fallow and pasture for every year. Pressure indicators are also generated endogenously by the model (rate of overgrazing and land degradation, labour productivity, average household "budget"). The parameters of the model were derived on the basis of a comprehensive review of the literature, mostly of local scale case studies of land-use changes in the Sahel. In agreement with farming system research, the model simulates two processes of land use change: agricultural expansion at the most extensive technological level, followed by agricultural intensification once some land threshold is reached. The model was first tested at a national scale using data from Burkina Faso. Results simulate land-use changes at two time frequencies: high frequency, as driven by climatic variability; and low frequency, as driven by demographic trends. The rates of cropland expansion predicted by the model are consistent with rates measured for several case studies, based on fine spatial resolution remote sensing data
Descriptors:agricultural-land. deforestation. demand. desertification. family-budgets. farm-inputs. fuelwood. intensification. labour-productivity. land-degradation. land-use. pastures. simulation-models. soil-fertility
Geographic Locator:Burkina-Faso. Sahel
Supplemental Descriptors:West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa
Subject Codes:EE110. EE115. EE900. JJ600. KK100. PP100. PP300. PP350. PP400. PP600. ZZ100
Supplementary Info:74 ref
ISSN:0167-8809
Year:2001
Journal Title:Agriculture, Ecosystems & Environment

19. Title:Assessment of interactions between land use change and carbon and nutrient fluxes in Ecuador
View Article: Agriculture, Ecosystems & Environment. 2001. 85 (1/3). 269-279
CD Volume:375
Print Article: Pages: 269-279
Author(s):Priess J A Koning G H J de Veldkamp A
Author Variant:de-Koning-G-H-J
Author Affiliation:Laboratory of Soil Science and Geology, Wageningen University, PO Box 37, 6700 AA Wageningen, Netherlands
Language:English
Abstract:Changes in land use affect input and output fluxes of nutrients and carbon in soils and vegetation. This can lead to changing soil fertility, which in turn will affect biomass production and human decisions in land management. Next to a local impact on land quality, changing biogeochemical cycles can also have a global impact through

the emission of greenhouse gases. The drivers and processes of land use change related nutrient and carbon fluxes are scale-dependent. In this paper, a conceptual dynamic approach (CLUE-Nuts) is proposed for the modelling of the interaction between land use change and nutrient and carbon fluxes. It is based on the integration of a spatially explicit multi-scale land use change model (CLUE) with a nutrient monitoring approach (NUTMON). Near future changes in the areas of agricultural crops and natural vegetation can be modelled in scenarios and their effects on soil nutrient and carbon status estimated. Feedback mechanisms for major crops can be included, taking into account that matter fluxes can alter carbon and nutrient stocks considerably. The feasibility of the new approach is illustrated with data from a case study for Ecuador. From these preliminary results it is concluded that CLUE-Nuts is a powerful tool to predict crop specific near future land use and related nutrient fluxes. The suggested feedback mechanisms are suitable for major crops with excellent data representation, and are subject of further refinement and research

Descriptors:assessment. carbon. human-activity. land-management. land-resources. land-use. models. nutrient-availability. nutrients. soil-fertility

Geographic Locator:Ecuador

Identifiers:fluxes

Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Andean-Group. Latin-America

Subject Codes:FF061. JJ600. JJ200. PP300. ZZ100. ZZ900

Supplementary Info:37 ref

ISSN:0167-8809

Year:2001

Journal Title:Agriculture, Ecosystems & Environment

20. Title:Carbon sequestration in perennial bioenergy, annual corn and uncultivated systems in southern Quebec

View Article: Agriculture, Ecosystems & Environment. 2001. 86 (2). 135-144

CD Volume:375

Print Article: Pages: 135-144

Author(s):Zan C S Fyles J W Girouard P Samson R A

Author Affiliation:Department of Natural Resource Sciences, Macdonald Campus, McGill University, 21,111 Lakeshore Road, Ste-Anne-de-Bellevue, Que. H9X 3V9, Canada

Language:English

Abstract:The conversion of relatively undisturbed ecosystems such as forests and grasslands to intensively managed agroecosystems has had major impacts on global carbon (C) cycling largely as a result of land clearing, cultivation, and replacement of perennial vegetation by annual crops. Numerous studies have demonstrated the ability of fast-growing perennial plant species dedicated to bioenergy production to sequester substantial amounts of C. Thus, the conversion of conventionally managed agricultural land to perennial bioenergy crops can be expected to increase C stored in above- and belowground biomass and in soil organic matter because of their perennial nature and greater root biomass. In this study, C storage was compared among five ecosystems in southwestern Quebec, Canada, including two perennial crops, switchgrass (Panicum virgatum) and willow (Salix alba x glatfelteri), and an annual maize (Zea mays) crop at two sites of differing soil fertility, a 20-year-old abandoned field, and a mature hardwood forest. After 4 years of production, maize had significantly higher levels of aboveground C than willow at the less

fertile site, but no significant differences were detected at the more fertile site. Both perennial systems had significantly higher root C than the maize system but switchgrass had significantly higher root C levels below 30 cm compared with willow and maize. Soil organic C under willow at the more fertile site was higher than under the other managed or unmanaged systems, including willow at the less fertile site. The results of this study suggest that perennial energy crops, grown on relatively fertile soils, have the potential to substantially increase soil C levels compared with conventional agricultural systems or unmanaged systems

Descriptors:bioenergy. carbon-cycle. carbon-sequestration. ecosystems. field-experimentation. forests. maize. soil-fertility

Geographic Locator:Canada. Quebec

Identifiers:soil organic chemistry

Organism Descriptors:Panicum-virgatum. Salix. Salix-alba. Zea-mays

Supplemental Descriptors:North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Panicum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Canada. Salix. Salicaceae. Salicales. dicotyledons. Zea

Subject Codes:FF005. FF007. JJ900. KK100. ZZ331. PP350. JJ200

Supplementary Info:29 ref

ISSN:0167-8809

Year:2001

Journal Title:Agriculture, Ecosystems & Environment

22. Title:Use of microbial parameters to assess treatment methods of municipal sewage sludge applied to grey forest soils of Tatarstan

View Article: Agriculture, Ecosystems & Environment. 2001. 86 (2). 145-153

CD Volume:375

Print Article: Pages: 145-153

Author(s):Selivanovskaya S Y Latypova V Z Kiyamova S N Alimova F K

Author Affiliation:Applied Ecology Department, Kazan State University, Kremlyevskaya Str. 18, 420008 Kazan, Tatarstan, Russia

Language:English

Abstract:The benefits and limitation of sewage sludge application as an organic fertilizer need to be investigated for various procedures of sludge treatment. For this purpose, three types of municipal sewage sludge of the city of Kazan (Tatarstan, Russia), i.e., anaerobically digested, composted and untreated, were added to field plots of a grey forest soil (Haplic Greyzem) and planted to spring barley (Hordeum distichum [H. vulgare]). Soil microbial biomass carbon, respiration and N2-fixing activity as indicators of soil fertility, as well as plant yield and the metal content in soils and plants, were measured to determine the most suitable type of sludge as organo-mineral fertilizer. Sludge additions resulted in significant increases of metal contents in the soil, although the maximum metal concentrations found remained lower than the current critical limits established for Russia. The application of composted sludge to soils was followed by an increase in microbial biomass (about 1.9-4.4-fold), basal respiration (about 2.3-6.3-fold) and in N2-fixing activity (about 2.1-35-fold) in comparison with the parameters found for control soil without any sludge addition. The application of anaerobically digested sludge had no significant effects on microbial biomass and activity. In the case of untreated sludge application, a significant decrease in N2-fixing activity was noted. Beneficial effects on microbial biomass and activity were greater in plots that had received composted sludge. In the absence of any detrimental effect on crop quality, this study lends support to using this type

of sludge as the organo-mineral fertilizer for grey forest soil of Tatarstan
Descriptors:barley. crop-yield. grey-forest-soils. heavy-metals. microbial-activities. nitrogen-fixation. organic-fertilizers. respiration. sewage-sludge. soil-biology. soil-fertility. soil-types
Geographic Locator:Russia
Identifiers:microbial biomass
Organism Descriptors:Hordeum-vulgare
Supplemental Descriptors:Hordeum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Asia. Central-Europe. Europe. Developed-Countries
Subject Codes:FF005. FF100. JJ100. JJ700. XX300. JJ600
Supplementary Info:34 ref
ISSN:0167-8809
Year:2001
Journal Title:Agriculture, Ecosystems & Environment

23. Title:Farmers' management strategies to maintain soil fertility in a remote area in northwest Nigeria
View Article: Agriculture, Ecosystems & Environment. 2001. 86 (3). 263-275
CD Volume:375
Print Article: Pages: 263-275
Author(s):Hoffmann I Gerling D Kyiogwom U B Mane Bielfeldt A
Author Affiliation:Department of Livestock Ecology, Justus Liebig University, Ludwigstrasse 21, D-35390 Giessen, Germany
Language:English
Abstract:Farmers play a key role in nutrient cycling within agricultural areas. This study describes an indigenous system of soil fertility management in the Zamfara Forest Reserve, northwest Nigeria. Data were collected between 1996 and 2000, combining qualitative and quantitative methods. Methods applied include transect walks, qualitative and semi-structured interviews with farmers and key respondents, and chemical soil analyses with standard methods. Results showed that farmers combine crop planting pattern and the application of organic and mineral fertilizers in an effective way to maintain the fertility of their soils. Intercropping of legumes and cereals is the dominant cropping pattern. The Hausa farmers keep an average of 4.4 tropical livestock units which contribute significantly to the farmyard manure. Ingredients of the farmyard manure are animal droppings, feed left-overs, litter, grass, kitchen residues, and ash. Farmers ranked the quality of livestock faeces as fertilizers: cattle > small ruminants > donkey. The average quantity of farmyard manure brought to the fields exceeds by far the amount provided directly by livestock (7.5 vs. 1 tonne ha-1). From all organic and inorganic sources, 87 kg N, 33 kg P and 120 kg K ha-1 are deposited annually on the fields. Soil analyses revealed a satisfactory nutrient status with 0.28 g N and 3.4 g C kg-1, a C : N ratio of 13, 40 mg kg-1 available P and 69 mg kg-1 available K in the topsoil. The impact of manuring on the nutrient status of the soil is more pronounced for P and K than for N and C. Farmer strategies and management make use of and develop diversity
Descriptors:carbon. carbon-nitrogen-ratio. cereals. farmyard-manure. grazing. intercropping. legumes. nitrogen. organic-fertilizers. phosphorus. soil-fertility. topsoil
Geographic Locator:Nigeria
Organism Descriptors:Fabaceae
Supplemental Descriptors:West-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations.

Anglophone-Africa. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF150. JJ600. JJ700. XX100
Supplementary Info:37 ref
ISSN:0167-8809
Year:2001
Journal Title:Agriculture, Ecosystems & Environment

24. Title:A method of energy balancing in crop production and its application in a long-term fertilizer trial
View Article: Agriculture, Ecosystems & Environment. 2001. 86 (3). 303-321
CD Volume:375
Print Article: Pages: 303-321
Author(s):Hulsbergen K J Feil B Biermann S Rathke G W Kalk W D Diepenbrock W
Author Affiliation:Institute of Agronomy and Crop Science, Martin-Luther-University Halle-Wittenberg, Ludwig-Wucherer-Str. 2, D-06099 Halle/Saale, Germany
Language:English
Abstract:Data of a 32-year field experiment (1967-98), conducted on a fertile sandy loess in the Hercynian dry region of central Germany near Leipzig, Saxony, were used to (i) demonstrate the methodological basis of energy balancing in a long-term trial and (ii) identify time trends of various energetic parameters, as affected by the rate and form of nitrogen (N) application. Five of 16 fertilizer regimes were selected to represent the broad range of N supply conditions: no N, mineral N, farmyard manure N, high input of mineral + farmyard manure N, and moderate input of the two forms of N. The crop rotation included various cereals (such as winter wheat and barley), sugarbeets, and potatoes. The input of energy associated with mineral N fertilization declined markedly with duration of the experiment, while that associated with chemical plant protection increased. The input of energy was highly variable, ranging from 8.9 to 36.9 GJ ha-1 per year in the last crop rotation, depending on the N regime and crop. Due to high soil fertility, the average biomass yield of all the crops grown within a rotation was as high as 13.5 t dry matter (DM) ha-1 per year; the output of energy was as high as 215 GJ ha-1 per year. On the fertilized plots, net energy output (energy content of the grains minus energy input) and energy utilization improved with time. Winter wheat, fertilized with moderate amounts of mineral and farmyard manure N, showed an increase in net energy output of 86% from 1972 to 1995. During the same period, the energy intensity (input of fossil energy per grain equivalent) declined by 45%, and the output:input ratio increased by 67%. Energy output and net energy output are the crucial parameters when the demand for plant products cannot be met because of the limited area for growing crops. Energy intensity and energy output/input ratio are integrative indicators of the environmental effects of crop production, which can be used to formulate recommendations for fertilization, which are optimum as far as the environment is concerned
Descriptors:application-rates. barley. dry-matter. energy-balance. energy-consumption. energy-requirements. farmyard-manure. nitrogen. nitrogen-fertilizers. potatoes. rotations. sugarbeet. wheat. winter-wheat
Geographic Locator:Germany. Saxony
Organism Descriptors:Beta-vulgaris-var.-saccharifera. Hordeum-vulgare. Solanum-tuberosum. Triticum. Triticum-aestivum
Supplemental Descriptors:Beta-vulgaris. Beta. Chenopodiaceae. Caryophyllales. dicotyledons. angiosperms. Spermatophyta. plants. Western-Europe.

Europe. Developed-Countries. European-Union-Countries. OECD-Countries. Hordeum. Poaceae. Cyperales. monocotyledons. Germany. Solanum. Solanaceae. Solanales. Triticum
Subject Codes:FF005. FF060. FF150. JJ700
Supplementary Info:Many ref
ISSN:0167-8809
Year:2001
Journal Title:Agriculture, Ecosystems & Environment

25. Title:Growth and biomass production in Azadirachta indica seedlings in response to nutrients (N and P) and moisture stress
View Article: Agroforestry Systems. 2001. 51 (1). 57-68
CD Volume:374
Print Article: Pages: 57-68
Author(s):Puri S Swamy S L
Author Affiliation:Department of Forestry, Indira Gandhi Agricultural University, Raipur, M.P. 492 012, India
Language:English
Abstract:Production of quality seedlings is an important aspect of successful tree planting. No information is available on the effect of nutrients and water on the growth and development of the seedlings of neem (Azadirachta indica), an important component of many tropical agroforestry systems. In an experiment in central India, the growth and nutrient-use efficiency of neem seedlings grown at various levels of light, nutrients (N and P), and water stress were determined. Seedlings were given light (diffused and complete) and nutrient (N and P) treatments comprising either high N-high P, high N-low P, low N-high P, or low N-low P. Seedlings grown in complete light (800 micro mol m-2 s-1) had 4 times more biomass than those grown in diffused light (200 micro mol/m-2 s-1). Significant increase in seedling biomass was observed with nitrogen application, while phosphorus had no effect on biomass. Leaves contributed maximum biomass, followed by roots and stem. Nutrient use efficiency decreased with an increase in the supply of nutrients. In another experiment, containerized and bare rooted seedlings were subjected to 5 watering treatments, viz., watering twice a week, watering weekly, watering every alternate week, watering every third week, and natural precipitation. Plant moisture stress affected both growth and survival of neem seedlings. Only 50% of seedlings survived in severe drought treatment, whereas 90-95% of seedlings showed growth in all other treatments. Plant moisture stress in severe drought treatment averaged -21 bar while in other treatments it ranged from -9 to -12 bar. Shoot-root ratio was higher in bare rooted seedlings than in containerized seedlings. Containerized seedlings showed better drought resistance than bare rooted seedlings. The results suggest that neem seedlings adjust their nutrient use efficiency and can be grown even under limited available resources. It is also inferred that the species can tolerate soil resource depletion caused by competitor species
Descriptors:seedlings. seedling-growth. agroforestry-systems. planting-stock. nutrients. use-efficiency. light-intensity. nutrient-availability. nitrogen. phosphorus. plant-nutrition. water-stress. plant-water-relations. irrigation. drought-resistance. root-shoot-ratio. survival. bare-rooted-stock. container-grown-plants. soil-fertility. plant-competition. India. ornamental-plants
Geographic Locator:India
Identifiers:neem
Organism Descriptors:Azadirachta-indica. plants

Supplemental Descriptors:Azadirachta. Meliaceae. Sapindales. dicotyledons. angiosperms. Spermatophyta. plants. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:KK110. KK600. FF160. FF062. FF061. PP500
Supplementary Info:28 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems
Copyright:Copyright CAB International

26. Title:Estimates of above-ground biomass and nutrient accumulation in Mimosa scabrella fallows in southern Brazil
View Article: Agroforestry Systems. 2001. 51 (2). 77-84
CD Volume:374
Print Article: Pages: 77-84
Author(s):Somarriba E Kass D
Author Affiliation:P.O. Box 108, CATIE, Turrialba 7170, Costa Rica
Language:English
Abstract:Naturally regenerated stands of bracatinga (Mimosa scabrella) are harvested for firewood after six to eight years of unregulated growth, debris burnt and the area planted to one cycle of intercropped maize (Zea mays) and beans (Phaseolus vulgaris). Burning breaks dormancy of M. scabrella seed (>80% germination) marking the onset of a new fallow-crop cycle. This production system has been practiced for nearly 100 years in southern Brazil, in an area of some 60 000 ha comprising 3000 small farms. An estimation of aboveground biomass and nutrient accumulation was made using literature data on stand age, population numbers, tree sizes, tree biomass partitioning and concentration of major nutrients in tree tissues. A simple simulation model, used to quantify aboveground nutrient pathways and their temporal dynamics, confirmed that six to eight years is the optimal rotation length. Biomass and nutrients deposited onto the soil, peak at stand age six years, which may result in significant soil fertility improvement prior to crop planting. At year six, estimated total aboveground biomass amounts to 83 tonnes ha-1; 44 tonnes ha-1 available as firewood and 39 tonnes ha-1 to be returned to the soil. Roughly half the amount of nutrients fixed in the aboveground M. scabrella biomass would be exported in firewood and subsequent grain crops
Descriptors:biomass. controlled-burning. cropping-systems. fallow-systems. fire. fuelwood. maize. nutrient-availability. nutrients. simulation-models. soil-fertility. stand-age
Geographic Locator:Brazil
Organism Descriptors:Mimosa-scabrella. Phaseolus-vulgaris. Zea-mays
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Mimosa. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Phaseolus. Papilionoideae. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF150. JJ600. KK110. KK600. KK130. KK540
Supplementary Info:42 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems
Copyright:Copyright CAB International

27. Title:Decomposition and nutrient loss from prunings of different contour hedgerow species in tea plantations in the sloping highlands of Sri Lanka
View Article: Agroforestry Systems. 2001. 51 (3). 201-211

CD Volume:374
Print Article: Pages: 201-211
Author(s):Costa W A J M de Atapattu A M L K
Author Variant:de-Costa-W-A-J-M
Author Affiliation:Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Peredeniya 20400, Sri Lanka
Language:English
Abstract:Contour hedgerows of multipurpose tree species in the sloping tea lands of Sri Lanka are expected to reduce soil erosion and also add significant amounts of plant nutrients to the soil via periodic prunings. The objective of this experiment was to characterize the biomass decomposition pattern and quantify the amount of nutrients added through prunings of six tree species (Calliandra calothyrsus, Senna spectabilis, Euphatorium innulifolium [Eupatorium inulaefolium], Flemingia congesta [F. macrophylla], Gliricidia sepium and Tithonia diversifolia) currently being used in hedgerows associated with tea. The study was conducted from May to October 1998 in Sri Lanka. Withered leaf and stem prunings (50 g) were enclosed in 2-mm litter bags, placed at 5-cm depth and retrieved after one, three, six, nine and 12 weeks. Loss of initial dry weight, N, P and K were measured. Single exponential decay function adequately described both dry weight and nutrient loss. Tree species differed significantly in their rate of breakdown with decomposition constants (k) varying from 0.0299 to 0.2006 week-1 for leaves and from 0.0225 to 0.0633 week-1 for stems. Gliricidia showed the highest k for leaves with the rest in the following descending order: Senna > Tithonia more than or equal to Euphatorium > Calliandra > Flemingia. A similar pattern was observed for loss of all nutrients with Calliandra and Flemingia always having lower k values than the rest. Although N immobilization was not observed, immobilization of P and K was observed, during the first week of incubation in some species, particularly in stem prunings. Annual biomass of prunings differed significantly between tree species in the following descending order: Calliandra > Senna > Flemingia > Tithonia > Gliricidia > Euphatorium. Calliandra added the greatest amount of nutrients annually to the soil with Euphatorium adding the least. Calliandra prunings provided the annual total K requirement and 49% of the N requirement of mature tea. However, none of the species provided more than 5% of the P requirement. It is concluded that among the tree species tested, Calliandra and Flemingia are the most suitable tree species for contour hedgerows in tea plantations of this agroclimatic region because of their higher soil nutrient enrichment capacity and slower decomposition rates which could minimize leaching losses
Descriptors:agroforestry-systems. agrosilvicultural-systems. alley-cropping. biomass. decomposition. enrichment. erosion. erosion-control. hedgerow-trees. highlands. immobilization. leaching. leaves. litter-(plant). losses-from-soil. multipurpose-trees. nitrogen. nutrient-requirements. phosphorus. plant-residues. plantations. potassium. pruning-trash. senna. soil-fertility. soil-types. stems. tea. trees
Geographic Locator:Sri-Lanka
Identifiers:Senna spectabilis. tea soils
Organism Descriptors:Calliandra-calothyrsus. Camellia-sinensis. Eupatorium-inulaefolium. Flemingia-macrophylla. Gliricidia-sepium. Tithonia-diversifolia
Supplemental Descriptors:Calliandra. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Camellia. Theaceae. Theales. Eupatorium. Asteraceae. Asterales. Flemingia.

Papilionoideae. Gliricidia. Senna. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. Tithonia
Subject Codes:FF003. FF150. JJ100. JJ200. JJ600. JJ700. KK600. PP400
Supplementary Info:25 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems

28. Title:Litter and biomass production from planted and natural fallows on a degraded soil in southwestern Nigeria
View Article: Agroforestry Systems. 2001. 51 (3). 239-251
CD Volume:374
Print Article: Pages: 239-251
Author(s):Salako F K Tian G
Author Affiliation:Soil Fertility Unit, Resource and Crop Management Division, International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria
Language:English
Abstract:To rehabilitate a degraded Alfisol at Ibadan, southwestern Nigeria, Senna siamea (non-N2-fixing legume tree), Leucaena leucocephala, and Acacia leptocarpa (N2-fixing legume trees) were planted in 1989, and A. auriculiformis (N2-fixing legume tree) in 1990. Pueraria phaseoloides (a cover crop) and natural fallow were included as treatments. Litterfall and climatic variables were measured during 1992-93 and 1996-97 while biomass production and nutrient concentrations were measured in 1993 and 1995. Total litter production from the natural and planted fallows was similar, with means ranging from 10.0 (L. leucocephala) to 13.6 t ha-1 year-1 (natural fallow) during the 1996-97 collection. Leaves constituted 73% (L. leucocephala) to 96% (A. auriculiformis) of total litterfall. A. auriculiformis grew most quickly but S. siamea produced the highest aboveground biomass which was 127 t ha-1 accumulated over four years, and 156 t ha-1 accumulated over six years of establishment. The aboveground biomass of P. phaseoloides and natural fallow was only 6 to 9 t ha-1 at six years after planting. Nitrogen concentration in the leaves/twigs was 2.5% for L. leucocephala, and 2% for other planted species and natural fallow. P. phaseoloides had concentrations of P, K, Ca and Mg comparable to levels in the leaves/twigs of the tree species. Through PATH analysis, it was found that maximum temperature and minimum relative humidity had pronounced direct and indirect effects on litterfall. The effects of these climatic variables in triggering litterfall were enhanced by other variables, such as evaporation, wind, radiation, and minimum temperature. Improvement in chemical properties by fallows was observed in the degraded soil
Descriptors:Alfisols. biomass-production. calcium. climatic-factors. cover-crops. disturbed-soils. evaporation. fallow. forest-litter. leaves. legumes. magnesium. nitrogen. nitrogen-fixing-trees. nutrient-content. phosphorus. potassium. rehabilitation. soil-types. trees
Geographic Locator:Nigeria
Identifiers:Senna siamea
Organism Descriptors:Acacia-auriculiformis. Acacia-leptocarpa. Fabaceae. Leucaena-leucocephala. Pueraria-phaseoloides
Supplemental Descriptors:Acacia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Leucaena. West-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Pueraria. Papilionoideae. Senna

Subject Codes:JJ400. KK600. PP400. JJ200. FF061. FF150
Supplementary Info:28 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems

29. Title:Fodder grass productivity and soil fertility changes under four grass+tree associations in Kerala, India
View Article: Agroforestry Systems. 2001. 52 (2). 91-106
CD Volume:374
Print Article: Pages: 91-106
Author(s):Kumar B M George S J Suresh T K
Author Affiliation:College of Forestry, Kerala Agricultural University, KAU P.O., Thrissur 680656, India
Language:English
Abstract:Adapted tree+grass combinations make a valuable contribution to forage production in the Indian peninsula, but knowledge of the interactive effects between trees and grasses on their production is limited. We, therefore, conducted a field experiment in Kerala, India, involving combinations of four trees and grasses, besides monospecific grass controls, for seven years, to investigate grass productivity in association with leguminous and non-leguminous multipurpose trees (MPTs) having disparate canopy architecture, and to assess the end-of-rotation soil fertility changes. Post rotation changes in herbage productivity were evaluated by growing teosinte (Zea mexicana) for three years. The four MPTs were Acacia auriculiformis, Ailanthus triphysa, Casuarina equisetifolia and Leucaena leucocephala. Grasses included Pennisetum purpureum (hybrid napier), Brachiaria ruziziensis (congo signal), Panicum maximum (guinea grass) and teosinte. Lower tree branches were pruned from fifth year. Understorey herbage production increased until three years in all tree+grass combinations, but declined subsequently, as tree crowns expanded. Overall, casuarina among MPTs, and hybrid napier and guinea grass among forage crops, were more productive than others. Pruning MPTs generally favoured greater herbage production. Understorey light levels for acacia, ailanthus, casuarina and leucaena were 17, 60, 55 and 55%, respectively, in the open at five years. During the post-rotation phase, MPT plots were characterized by higher soil nutrient capital and consequently teosinte yields were higher than in the treeless control treatment. All previous tree-grass combinations showed an increasing trend till two years after MPT felling. Yield levels declined subsequently, despite at variable rates. Careful selection of the tree and grass components is, therefore, crucial for optimizing herbage productivity in silvopastoral systems
Descriptors:agroforestry-systems. agropastoral-systems. crop-yield. fodder-crops. light. soil-fertility. understorey
Geographic Locator:India. Kerala
Organism Descriptors:Acacia-auriculiformis. Ailanthus-triphysa. Brachiaria-ruziziensis. Casuarina-equisetifolia. Leucaena-leucocephala. Panicum-maximum. Pennisetum-purpureum. plants. Poaceae. Zea-mexicana
Supplemental Descriptors:Acacia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Ailanthus. Simaroubaceae. Sapindales. Brachiaria. Poaceae. Cyperales. monocotyledons. Casuarina. Casuarinaceae. Casuarinales. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India. Leucaena. Panicum. Pennisetum. Zea
Subject Codes:JJ600. KK600. FF007
Supplementary Info:25 ref

ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems
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30. Title:Tithonia diversifolia: variations in leaf nutrient concentration and implications for biomass transfer
View Article: Agroforestry Systems. 2001. 52 (3). 199-205
CD Volume:374
Print Article: Pages: 199-205
Author(s):George T S Gregory P J Robinson J S Buresh R J Jama B A
Author Affiliation:Department of Soil Science, The University of Reading, PO Box 233, Whiteknights, Reading RG6 6DW, UK
Language:English
Abstract:Green leaf biomass of Tithonia diversifolia is high in nutrients and recognized as a potential source of nutrients for crops. We conducted a field survey in western Kenya to determine the variation in leaf nutrient concentrations in T. diversifolia grown in naturalized hedges and agricultural fields, and to examine whether leaf nutrient concentrations were related to soil nutrient status. Leaf P and K concentrations were higher in naturalized hedges (3.2 g P kg-1 and 35 g K kg-1) than in unfertilized fields (2.2 g P kg-1 and 23 g K kg-1). The critical level of 2.5 g P kg-1 for net P mineralization was exceeded by >90% of the leaves from hedges, but by only 14% from unfertilized fields. Leaf P and K concentration increased linearly with increasing natural logarithm of anion resin extractable soil P and exchangeable soil K, respectively. However, at the same levels of soil available P and K, field-grown T. diversifolia consistently produced lower leaf P and K concentrations than that grown in hedges. This study indicates that biomass from T. diversifolia planted on nutrient-depleted soils would be a less effective source of P and K, via biomass transfer, than T. diversifolia from naturalized hedges
Descriptors:biomass. chemical-composition. cycling. exchangeable-potassium. hedgerow-plants. hedges. leaves. mineralization. nutrient-availability. nutrient-content. phosphorus. plant-nutrition. potassium. soil-composition. soil-fertility
Geographic Locator:Kenya
Organism Descriptors:plants. Tithonia-diversifolia
Supplemental Descriptors:East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Tithonia. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF061. JJ200. JJ600. KK600
Supplementary Info:18 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems
Copyright:Copyright CAB International

31. Title:Forest patches in Imperata grassland and prospects for their preservation under agricultural intensification in Northeast Luzon, The Philippines
View Article: Agroforestry Systems. 2001. 52 (3). 207-217
CD Volume:374
Print Article: Pages: 207-217
Author(s):Snelder D J
Author Affiliation:Cagayan Valley Program on Environment and Development, Centre of Environmental Science, P.O. Box 9518, 2300 RA Leiden, Netherlands
Language:English

Abstract:Frequent burning and grazing and cultivation of cash crops increasingly threaten forest patches in hilly grassland in Northeast Luzon, Philippines, yet their importance as a resource with multiple environmental functions and forest products persists. The aim of this study, which was conducted in 1997 and early 1998, is to identify different types of forest patches, and their condition under present land use intensification, and discuss prospects for their integration into sustainable local farming systems. Five types of forest patches are distinguished, both natural and planted ones, including rows of trees, woody patches, gallery forests, hill-slope forests and homegarden conglomerations. Natural woody patches and gallery forests in Imperata grassland are subject to degradation and land use conversion under conditions of agricultural intensification. Woody patches in grassland affected by frequent burning and grazing cover small areas (66% below 50 m2 as opposed to 28% in protected grassland) and contain relatively few woody plant species (25 woody species in total as opposed to 82 where protected). Yet where well managed, they may provide a variety of products for sale and subsistence, covering emergency needs and giving off-season cash income to rural communities. Moreover, they serve like the gallery forests' various ecological functions, carrying valuable indigenous tree species, retaining soil base nutrients, providing a continuous supply of organic matter and intercepting fine earth soil particles removed from bare surfaces. It is suggested that forest-patch management systems may be developed, taking into account both patch diversity and the diverse needs of rural communities, and to strengthen existing and undervalued functions of forest patches as permanent elements in an agricultural landscape
Descriptors:biodiversity. environmental-degradation. farming-systems. forest-fragmentation. forests. grassland-management. grasslands. home-gardens. humid-tropics. land-use. nature-conservation. riparian-forests. soil-chemical-properties. soil-fertility. soil-organic-matter. species-richness. vegetation-types
Geographic Locator:Philippines
Organism Descriptors:Imperata
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries
Subject Codes:FF150. KK100. KK600. PP350. PP720. ZZ331
Supplementary Info:20 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems

32. Title:Separating the effects of trees on crops: the case of Faidherbia albida and millet in Niger
View Article: Agroforestry Systems. 2001. 52 (3). 219-238
CD Volume:374
Print Article: Pages: 219-238
Author(s):Kho R M Yacouba B Yaye M Katkore B Moussa A Iktam A Mayaki A
Author Affiliation:International Centre for Research in Agroforestry (ICRAF), P.O. Box 30677, Nairobi, Kenya
Language:English
Abstract:Faidherbia albida is an important tree species of the scattered tree or parkland systems in the Sahel. The improved crop growth under its canopy is well known, and has been attributed to various components notably: higher soil fertility, improved microclimate and better soil physical properties. The relative contributions of each of these

components are not known, but knowledge about this is essential for making proper decisions concerning management options. The overall tree effect on crop production (expressed as fraction of the sole crop production) is analysed here as a weighted sum of (positive and negative) relative net tree effects on the resources for crop growth. In this sum, the weights reflect the degree of limitation of the resources in the environment at the tree-crop interface. The paper shows how the relative net tree effects and the accompanying weights can be estimated from field experiments. In an on-farm field experiment in Niger, pearl millet production under the F. albida canopy was approx equal to 36% higher than in the open field. The nitrogen availability under trees was estimated to be more than 200% higher than in the open causing a 26% production increase. The phosphorus availability was estimated to be almost 30% higher and because of its high limitation causing a production increase of 13%. The net effect via other resources (notably light and water) was negligible (3% production reduction) and not significant

Descriptors:crop-yield. interactions. nitrogen. nutrient-availability. pearl-millet. phosphorus. plant-interaction. soil-chemical-properties. soil-fertility

Geographic Locator:Niger

Organism Descriptors:Faidherbia-albida. Pennisetum-glaucum

Supplemental Descriptors:Faidherbia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa. Pennisetum. Poaceae. Cyperales. monocotyledons

Subject Codes:FF005. FF100. JJ200. JJ600. KK600

Supplementary Info:31 ref

ISSN:0167-4366

Year:2001

Journal Title:Agroforestry Systems

33. Title:Sewage sludge fertilisation of a silvopastoral system with pines in northwestern Spain

View Article: Agroforestry Systems. 2001. 53 (1). 1-10

CD Volume:374

Print Article: Pages: 1-10

Author(s):Mosquera Losada M R Lopez Diaz L Rigueiro Rodriguez A

Author Affiliation:Departamento de Produccion Vegetal, Escuela Politecnica Superior, Universidad de Santiago de Compostela, 27002-Lugo, Spain

Language:English

Abstract:The use of municipal sewage sludge as a fertilizer could be a more adequate means of disposal of this residue than to transport it to the dump. The objective of this experiment, which was conducted during 1996-98 in Pol, Spain, was to evaluate the effects of different doses of sludge and sowing a mixture of cocksfoot (Dactylis glomerata) and clover (Trifolium repens) on pasture production, botanical composition of the pasture, forage quality, and changes in soil chemical properties. Treatments applied were: (1) no fertilizer application (L0), (2) fertilizer application with 26 tonnes ha-1 of sewage sludge with no sowing (L40), (3) fertilizer application with 26 tonnes ha-1 of sewage sludge and sowing with 25 kg of Dactylis glomerata cv. Artabro (Dg) and 3 kg Trifolium repens cv. Huia per hectare and (4) 52 tonnes ha-1 of sewage sludge with no herbage sowing (L80). Plots were established in a silvopastoral system with Pinus radiata at a density of 1666 trees ha-1 (3x2 m). The improvement of soil fertility due to organic fertilizer application

and the use of Dactylis glomerata increased the production and quality of pasture as well as reduced the risk of fire and erosion, as grasses dominated shrubs. Fertilizer application with sewage sludge in soils of acid origin increased the concentration of copper in the pasture and, if cocksfoot was not sown, the levels of this element exceeded the maximum tolerable dietary levels for sheep. On the other hand, fertilizer application also increased the levels of zinc in pasture, but values were not above toxic limits for sheep, horses and cattle

Descriptors:agroforestry-systems. application-rates. botanical-composition. copper. crop-quality. organic-fertilizers. sewage-sludge. silvopastoral-systems. soil-chemical-properties. soil-fertility. zinc

Geographic Locator:Spain

Organism Descriptors:Dactylis-glomerata. Pinus-radiata. Trifolium-repens

Supplemental Descriptors:Dactylis. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Pinus. Pinaceae. Pinopsida. gymnosperms. Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons

Subject Codes:FF007. JJ200. JJ600. JJ700. KK600. XX300

Supplementary Info:27 ref

ISSN:0167-4366

Year:2001

Journal Title:Agroforestry Systems

34. Title:Farmer assessment and economic evaluation of shrub fallows in the humid lowlands of Cameroon

View Article: Agroforestry Systems. 2001. 53 (1). 11-19

CD Volume:374

Print Article: Pages: 11-19

Author(s):Degrande A

Author Affiliation:International Center for Research in Agroforestry, ICRAF - Cameroon, P.O. Box 2067, Yaounde, Cameroon

Language:English

Abstract:Food crop production in highly populated areas around major cities of the humid lowlands of Cameroon is highly dependent on a fallow system (two-four years duration) mainly of Chromolaena odorata. Where such fallows have been in use for some time, problems of soil fertility with declining crop yields and higher incidence of weeds were reported. Although improved fallows have been widely adopted in sub-humid zones, there is no evidence of successful adoption of agroforestry-based technologies for soil fertility improvement in the humid forest areas. In response, ICRAF has developed a short fallow system with Cajanus cajan for soil fertility improvement in the humid lowlands of West Africa. Farmers' response to these cajanus fallows is positive. Benefits reported are higher crop yields after cajanus fallows compared to natural fallows, clearing of cajanus is easier and the shrubs shade out the weeds. Women particularly appreciate the technology for its low labour demand and for the fact that these shrubs can be planted on land with less secure tenure. Economic analysis of cajanus fallows compared to natural fallow over six years shows that cajanus fallows are profitable under most tested scenarios, both in terms of returns to land and to labour. It seems that improved fallows with Cajanus cajan are a good response to shortening natural fallows for households in the humid lowlands of Cameroon with land constraints. However, wider dissemination of the technology requires a targeted extension approach and adequate seed

supply strategies, which should be based on joint efforts between farmers, extension services and research
Descriptors:assessment. crop-yield. economic-analysis. humid-zones. improved-fallow. pigeon-peas. profitability. shrubs. soil-fertility
Geographic Locator:Cameroon
Organism Descriptors:Cajanus-cajan. Chromolaena-odorata
Supplemental Descriptors:Cajanus. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Central-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Francophone-Africa. Chromolaena. Asteraceae. Asterales
Subject Codes:FF005. JJ600. KK600. FF150
Supplementary Info:16 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems

35. Title:Plant-soil interactions in multistrata agroforestry in the humid tropics
View Article: Agroforestry Systems. 2001. 53 (2). 85-102
CD Volume:374
Print Article: Pages: 85-102
Author(s):Schroth G Lehmann J Rodrigues M R L Barros E Macedo J L V
Author Affiliation:Biological Dynamics of Forest Fragments Project, National Institute for Research in the Amazon (INPA), C.P. 478, 69011-970 Manaus, AM, Brazil
Document Editor:Muschler-R-Beer-J
Conference Title:Multistrata agroforestry systems with perennial crops. Selected papers from an international symposium held at CATIE, Turrialba, Costa Rica, 22-27 Febrary 1999
Language:English
Abstract:Multistrata agroforestry systems with tree crops comprise a variety of land use systems ranging from plantations of coffee, cacao or tea with shade trees to highly diversified home gardens and multistorey tree gardens. Research on plant-soil interactions has concentrated on the former. Tree crop-based land use systems are more efficient in maintaining soil fertility than annual cropping systems. Certain tree crop plantations have remained productive for many decades, whereas home gardens have existed in the same place for centuries. However, cases of fertility decline under tree crops, including multistrata agroforestry systems, have also been reported, and research on the causal factors (both socioeconomic and biophysical) is needed. Plantation establishment is a critical phase, during which the tree crops require inputs but do not provide economic outputs. In larger plantations, tree crops are often established together with a leguminous cover crop, whereas in smallholder agriculture, the initial association with food crops and short-lived cash crops can have both socioeconomic and biological advantages. Fertilizers applied to, and financed by, such crops can help to recapitalize soil fertility and improve the development conditions of the young tree crops. Favourable effects on soil fertility and crop nutrition have been observed in associations of tree crops with N2-fixing legume trees, especially under N-deficient conditions. Depending on site conditions, the substitution of leguminous trees with fast-growing timber trees may lead to problems of competition for nutrients and water, which may be alleviated through appropriate planting designs. The reduction of nutrient leaching and the recycling of subsoil nutrients are ways to increase the availability of nutrients in multistrata systems, and at the same time, reduce negative

environmental impacts. These processes are optimized through fuller occupation of the soil volume by roots, allowing a limited amount of competition between associated species. The analysis of temporal and spatial patterns of water and nutrient availability within a system helps to optimize the use of soil resources, e.g., by showing where more plants can be added or fertilizer rates reduced. Important research topics in multistrata agroforestry include plantation establishment, plant arrangement and management for maximum complementarity of resource use in space and time, and the optimization of soil biological processes, such as soil organic matter build-up and the stabilization and improvement of soil structure by roots, fauna and microflora

Descriptors:agroforestry. agroforestry-systems. cropping-systems. cycling. fruit-trees. home-gardens. humid-tropics. land-use. multistorey-cropping. nutrient-availability. nutrient-uptake. shade-trees. soil-fertility. soil-management. spatial-variation. sustainability. temporal-variation. trees

Subject Codes:FF003. FF060. FF150. JJ600. KK100. KK600. PP300

Supplementary Info:many ref

ISSN:0167-4366

Year:2001

Journal Title:Agroforestry Systems

36. Title:Inorganic and organic soil phosphorus and sulfur pools in an Amazonian multistrata agroforestry system

View Article: Agroforestry Systems. 2001. 53 (2). 113-124

CD Volume:374

Print Article: Pages: 113-124

Author(s):Lehmann J Gunther D Mota M S da Almeida M P de Zech W Kaiser K

Author Variant:da-Mota-M-S. de-Almeida-M-P

Author Affiliation:Institute of Soil Science and Soil Geography, University of Bayreuth, Germany

Document Editor:Muschler-R-Beer-J

Conference Title:Multistrata agroforestry systems with perennial crops. Selected papers from an international symposium held at CATIE, Turrialba, Costa Rica, 22-27 Febrary 1999

Language:English

Abstract:In the central Amazon basin (Brazil), the effects of secondary vegetation and primary forest on inorganic and organic P and S pools were compared with those of different fruit and timber tree species (i.e., Theobroma grandiflorum, Bactris gasipaes, Bertholletia excelsa, Bixa orellana, Pueraria phaseoloides, a spontaneous gramineous vegetation, Vismia sp., Eschweilera sp., and Oenocarpus bacaba) in a multistrata agroforestry system. The soils (Xanthic Ferralsols) were low in readily available P and S. Fertilizer applications increased the less accessible nutrient pools more than the plant available pools. For example, dilute-acid extractable P increased substantially (from 2 to 76 mg P kg-1), whereas Mehlich P (plant available) increased less (from 3 to 19 mg P kg-1). In contrast, the recalcitrant soil P pools, such as the residual P, did not increase on the short term, but only after more than six years following application. The proportion of less available ester-sulfate S was significantly higher in fertilized sites than in unfertilized sites, in contrast to soluble inorganic sulfate S or carbon-bonded S. The marked increase of successively available soil P and S pools through fertilizer application was advantageous with respect to the long-term effect of nutrient applications. Soil nutrient availability was not only related to the amount of nutrients applied but was also

influenced by tree species. Nutrient return by litterfall and litter quality played an important role in soil P and S dynamics. Incorporation of applied nutrients into successively available organic nutrient pools will decrease potential P fixation and S losses by leaching and increase long-term nutrient availability. Therefore, tree species with rapid above ground nutrient cycling and high quality litter (such as annato (Bixa orellana) and peach palm (Bactris gasipaes)) should constitute the majority of crops in multistrata agroforestry systems on infertile soils to ensure adequate medium to long term availability of P and S

Descriptors:agroforestry. agroforestry-systems. Brazil-nuts. cycling. Ferralsols. fertilizers. multistorey-cropping. nutrient-availability. nutrient-content. phosphorus. soil-fertility. soil-types. sulfur

Geographic Locator:Brazil

Identifiers:Theobroma grandiflorum

Organism Descriptors:Bactris-gasipaes. Bertholletia-excelsa. Bixa-orellana. Eschweilera. Oenocarpus-bacaba. Pueraria-phaseoloides. Theobroma. Vismia

Supplemental Descriptors:Bactris. Arecaceae. Arecales. monocotyledons. angiosperms. Spermatophyta. plants. Bertholletia. Lecythidaceae. Lecythidales. dicotyledons. Bixa. Bixaceae. Violales. South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Oenocarpus. Pueraria. Papilionoideae. Fabaceae. Fabales. Sterculiaceae. Malvales. Theobroma. Clusiaceae. Theales

Subject Codes:FF003. JJ200. JJ600. KK600. JJ700

Supplementary Info:36 ref

ISSN:0167-4366

Year:2001

Journal Title:Agroforestry Systems

37. Title:Phosphorus availability under annual cropping, alley cropping, and multistrata agroforestry systems

View Article: Agroforestry Systems. 2001. 53 (2). 125-132

CD Volume:374

Print Article: Pages: 125-132

Author(s):Szott L T Melendez G

Author Affiliation:Soil Science Department, P.O. Box 7619, North Carolina State University, Raleigh, NC 27695-7619, USA

Document Editor:Muschler-R-Beer-J

Conference Title:Multistrata agroforestry systems with perennial crops. Selected papers from an international symposium held at CATIE, Turrialba, Costa Rica, 22-27 Febrary 1999

Language:English

Abstract:The hypothesis that agroforestry systems conserve P in forms that are more crop-available than those found in annual cropping systems was tested on two tropical sites: an Ultisol in Yurimagas, Peru, and a volcanically-derived Inceptisol in Turrialba, Costa Rica. In both sites, the Hedley P fractions were compared in annual cropping, alley cropping, multistrata agroforestry and old forest systems. On the Ultisol, the effect of P fertilizer application on the soil P fractions was also examined. Under non-fertilized conditions, the multistrata and forest systems maintained more and a greater proportion of P in plant-available resin form than the annual or alley cropping systems. Greater resin P was associated with greater amounts and percentages of P in bicarbonate fractions and less P in residual fractions. The latter may be caused by greater and more temporally constant organic matter additions, less mineralization of

labile soil organic matter fractions due to lower soil temperatures, and the long-term mobilization of residual P due to P immobilization in the biomass of the multistrata or forest systems. With P fertilizer application, resin P was related to inorganic P fractions. However, resin P increased even more when inorganic P fertilizers were combined with organic residue additions
Descriptors:agroforestry. agroforestry-systems. alley-cropping. cropping-systems. forests. Inceptisols. multistorey-cropping. nutrient-availability. old-growth-forests. phosphorus. phosphorus-fertilizers. soil-fertility. soil-organic-matter. soil-types. Ultisols
Geographic Locator:Costa-Rica. Peru
Supplemental Descriptors:Central-America. America. Developing-Countries. Threshold-Countries. CACM. Latin-America. South-America. Andean-Group
Subject Codes:FF150. JJ200. JJ600. JJ700. KK100. KK600
Supplementary Info:23 ref
ISSN:0167-4366
Year:2001
Journal Title:Agroforestry Systems
Copyright:Copyright CAB International

38. Title:A long-term chemical and infrared spectroscopy study on a soil amended with municipal sewage sludge
View Article: Agronomie. 2001. 21 (2). 169-178
CD Volume:375
Print Article: Pages: 169-178
Author(s):Gigliotti G Giusquiani P L Businelli D
Author Affiliation:Dipartimento di Scienze Agroambientali e della Produzione Vegetale dell'Universita di Perugia, Borgo XX Giugno, 72-06121 Perugia, Italy
Language:English
Language of Summary:french
Abstract:A long-term field experiment was carried out on a silt loam soil near Ravenna, central Italy, to evaluate the effect of a seven-year soil amendment with municipal sewage sludge on chemical fertility, soil enzyme activities and the changes in the composition of humic substances. The amended soil showed an increase in total and NaOH soluble organic C, available P and K. The heavy metals contained in the sludge did not affect soil phosphatases (alkaline phosphomonoesterase [alkaline phosphatase] and phosphodiesterase), arylsulfatase or L-asparaginase activity, even if the concentration of total and available Cu, Ni and Zn increased in the arable layer of soil. The fulvic acids FT-IR spectra showed that amended soil contains a higher concentration of carboxylic and aliphatic groups and polysaccharides compared to unamended soil. The polysaccharide increase in the seven-year amended soil is attributable to the humification process since only a small amount of polysaccharides were present in the sludge. The humic acids FT-IR spectra showed that amended soil contained a higher concentration of aliphatic and N-containing groups and a lower concentration of polysaccharides than unamended soil. The humification parameters (i.e. humification ratio, humification index and degree of humification) highlighted the differences in the humification status between sludge humic-like substances and humus from soil, but were unable to show the differences between unamended and amended soils
Descriptors:alkaline-phosphatase. arylsulfatase. asparaginase. enzyme-activity. fulvic-acids. heavy-metals. humification. humus. phosphodiesterase-

I. sewage-sludge. silt-loam-soils. soil-composition. soil-enzymes. soil-fertility
Geographic Locator:Italy
Supplemental Descriptors:Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:JJ700. JJ100. JJ600
Supplementary Info:43 ref
ISSN:0249-5627
Year:2001
Journal Title:Agronomie
Copyright:Copyright CAB International

39. Title:Soil: environmental effects on allelochemical activity
View Article: Agronomy Journal. 2001. 93 (1). 79-84
CD Volume:338
Print Article: Pages: 79-84
Author(s):Inderjit
Author Affiliation:Dep. of Botany, Panjab Univ., Chandigarh 160014, India
Conference Title:Second World Congress on Allelopathy, "Allelopathy in Natural and Managed Ecosystems," held at Lakehead University, Thunder Bay, Canada, 9-13 Aug. 1999
Language:English
Abstract:Studies on the significance of the soil environment on plant allelochemical activity are reviewed. The effects of mineral content, texture, organic and inorganic properties, ion exchange capacity, and biotic components (soil microorganisms) of soils on allelochemicals are discussed. The changes in phytotoxic levels of allelochemicals in soils are also discussed
Descriptors:allelochemicals. conferences. environmental-factors. ion-exchange-capacity. phytotoxicity. soil. soil-biology. soil-chemistry. soil-fertility. soil-physical-properties. soil-texture
Subject Codes:FF040. JJ100. JJ200. JJ400. JJ600
Supplementary Info:50 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

40. Title:Potassium fertilization effects on alfalfa in a Mediterranean climate
View Article: Agronomy Journal. 2001. 93 (1). 139-143
CD Volume:338
Print Article: Pages: 139-143
Author(s):Lloveras J Ferran J Boixadera J Bonet J
Author Affiliation:UdL-IRTA, Av. Rovira Roure 177, 25198, Lleida, Spain
Language:English
Abstract:The objective of this research was to evaluate the effects of potassium fertilizer on lucerne (Medicago sativa) in areas of high soil exchangeable K levels and long growing seasons. A field experiment was established under irrigation from 1993 to 1997 in the Mediterranean environment of the Ebro Valley (Spain) on a silty clay loam soil. The treatments were five annual rates of K (0, 41.5, 83, 166 and 332 kg K ha-1) and two rates of K (166 and 332 kg K ha-1) applied prior to sowing of two lucerne cultivars, Aragon and P5929. The average annual dry matter (DM) yield was 21.5 Mg ha-1 and showed a small linear response to K fertilization (Pr > F = 0.0589). Total K removal in the herbage increased linearly with each rate of K and reached 1728 kg K ha-1 with the application of 332 kg K ha-1 yr-1, compared with 1546 kg K ha-1 without K fertilization. At the end of the experiment, soil ammonium acetate extractable K (Ke) increased

little with K rates, and the differences were observed only in the first 30 cm of depth. Despite the uptake of 1546 kg K ha-1, soil Ke values did not change appreciably, suggesting that much of the K uptake was derived from the fertilizer and from nonexchangeable soil K fractions. Although K fertilization slightly increased lucerne DM yields in this high testing Mediterranean soil, the economic benefit of this limited response does not justify the expense
Descriptors:application-rates. crop-yield. dry-matter. exchangeable-potassium. lucerne. mineral-uptake. nutrient-uptake. plant-nutrition. potassium. potassium-fertilizers. soil-fertility
Geographic Locator:Spain
Organism Descriptors:Medicago. Medicago-sativa
Supplemental Descriptors:Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:FF007. FF061. FF100. JJ600. JJ700
Supplementary Info:36 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

41. Title:Residue decomposition and soil nitrogen are affected by mowing and fertilization of marigold
View Article: Agronomy Journal. 2001. 93 (1). 207-215
CD Volume:338
Print Article: Pages: 207-215
Author(s):Ball Coelho B R Reynolds L B Back A J Potter J W
Author Affiliation:Agric. and Agri-Food Canada, S. Crop Protection and Food Res. Cent., Box 186, Delhi, ON N4B 2W9, Canada
Language:English
Abstract:To suppress root-lesion nematodes (Pratylenchus penetrans), marigold (Tagetes sp.) is grown as a rotation crop; however, little is known about its decomposition. The timing of N release to soil affects both the nutrition of the subsequent crop and also the environment, which could possibly be altered by biocides produced by marigold. Decomposition was quantified in monitoring residues of marigold (T. erecta cv. Crackjacker or T. patula cv. Creole) and cereal rye (Secale cereale), a common rotation crop, over time in litter bags subjected to different conditions in a field experiment conducted in Ontario, Canada, during 1995-98. Marigold decomposition proceeded normally and without toxic effects on decomposers. In the fall of rotation years, topsoil NO3 concentration was usually higher under marigold (1.1 mg kg-1) than under rye rotation (0.3 mg kg-1), but this depended on the method of marigold management. In marigold plots, fall NO3 levels were greatest where plants were moved early (August) or fertilized with 90 kg N ha-1 and lowest where plants were left standing over winter. In plots where marigold was moved in September or left standing, fall NO3 levels were sometimes no higher than in rye plots. Overwinter N release from bags of marigold shoots (stems and leaves) on the soil surface (39 kg ha-1) was less than that from buried bags (119 kg ha-1). Together, these results suggest that a marigold rotation may be a viable alternative to rye, but to minimize N loss, marigold crops should be left standing over winter and preplant fertilized with 45 kg N ha-1
Descriptors:crop-residues. decomposition. leaves. mowing. nitrate. nitrogen. nitrogen-fertilizers. rotations. rye. shoots. soil-fertility. stems
Geographic Locator:Canada. Ontario

Organism Descriptors:Pratylenchus-penetrans. Secale-cereale. Tagetes-erecta. Tagetes-patula
Supplemental Descriptors:North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada. Pratylenchus. Pratylenchidae. Nematoda. invertebrates. animals. Secale. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Tagetes. Asteraceae. Asterales. dicotyledons
Subject Codes:FF003. FF005. FF150. JJ100. JJ200. JJ700
Supplementary Info:31 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

42. Title:Paper pellets as a mulch for dryland grain sorghum production
View Article: Agronomy Journal. 2001. 93 (2). 349-357
CD Volume:338
Print Article: Pages: 349-357
Author(s):Unger P W
Author Affiliation:USDA-ARS, Conservation and Production Research Laboratory, P.O. Drawer 10, Bushland, TX 79012, USA
Language:English
Abstract:Some landfills no longer accept waste paper for disposal; thus, alternative means are needed. One would be to apply pelleted paper to cropland as a mulch. This field study was conducted in Texas, USA during 1995-99 to determine effects of a paper pellet mulch on soil water storage and grain sorghum (Sorghum bicolor) yield. Mulch rates were 0 (control), 5, 10 and 15 Mg/ha. Wheat (Triticum aestivum) residue condition (retained or removed) and tillage (sweep or no-tillage) treatments were included. Pellet applications did not affect water storage or sorghum yields, apparently because pellets absorbed precipitation, which resulted in similar evaporation from bare and mulched soils. Residue and tillage treatments had little effect on water storage and sorghum yield. Soil C concentrations were greater in mulched than bare soil in one case, but some pellet material remained, suggesting further decomposition could increase soil C. Pellet applications resulted in greater aggregate mean weight diameters and lower percentages of small aggregates. These improved conditions could improve the soil's long term productivity. Because crop productivity was not harmed, waste paper (e.g., pellets as used in this study) can be disposed of on cropland. However, shallow paper incorporation may be a better practice than surface applications because it should hasten its decomposition and, thereby, more rapidly improve soil conditions
Descriptors:carbon. crop-yield. evaporation. mulches. mulching. paper. pellets. precipitation. soil-fertility. sweep. waste-paper. water-storage
Geographic Locator:Texas. USA
Organism Descriptors:Sorghum-bicolor
Supplemental Descriptors:Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA
Subject Codes:FF005. FF100. JJ200. JJ900. XX200
Supplementary Info:23 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

43. Title:Effect of soybean plant populations in a soybean and maize rotation
View Article: Agronomy Journal. 2001. 93 (2). 396-403
CD Volume:338
Print Article: Pages: 396-403
Author(s):Ennin S A Clegg M D
Author Affiliation:Crops Res. Inst., P.O. Box 3785, Kumasi, Ghana
Language:English
Abstract:Plant population of soyabeans (Glycine max) may influence the residual N contribution to a cropping system and yield benefits to the following cereals. Field studies were conducted from 1994 to 1996 on a N-depleted Sharpsburg silty clay loam soil at Mead, Nebraska, USA to: (i) determine soyabean yield at different plant populations; (ii) investigate residual N, chlorophyll-N-yield relations, and yield benefits from different soyabean populations following maize (Zea mays) crop; (iii) and compare N credits from soyabeans assessed with fallow and cereal plots as references. Eight soyabean populations from 14 000 to 544 000 plants/ha in narrow 50 cm rows, a fallow plot, and a maize plot were followed by maize in a rotation study. Soyabean yield was highest at populations of more than or equal to 129 000 plants/ha. Maize grain yields were highest following fallow and soyabean populations <20 000 plants/ha, intermediate following higher soyabean populations, and least in continuous maize. This is most likely due to N uptake as indicated by chlorophyll and N accumulation of maize. Nitrogen credits to maize were 16 to 46 kg N/ha when calculated as Nitrogen Fertilizer Replacement Values. This is probably overestimating the potential N contribution from soyabean because N credits from soyabean populations assessed with fallow instead of maize as references were negative. A net positive N balance due to soyabean reached a maximum of 17 kg N/ha, but soil N was depleted at populations <20 000 plants/ha. We conclude that yield increases of maize in rotation with soyabean may be due to N from reduced N immobilization, N added to the soil from N2 fixation, and possibly from non-N rotation effects such as water use efficiency
Descriptors:chlorophyll. crop-density. crop-yield. depletion. fallow. maize. mineral-uptake. nitrogen. nitrogen-balance. nutrient-uptake. rotations. soil-fertility. soyabeans
Geographic Locator:Nebraska. USA
Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Zea-mays
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF100. FF150. JJ600
Supplementary Info:38 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

44. Title:Mineral composition of swards containing forage chicory
View Article: Agronomy Journal. 2001. 93 (2). 468-475
CD Volume:338
Print Article: Pages: 468-475
Author(s):Belesky D P Turner K E Fedders J M Ruckle J M
Author Affiliation:USDA-ARS, Appalachian Farming Systems Res. Cent., 1224 Airport Road, Beaver, WV 25813, USA

Language:English
Abstract:Chicory (Cichorium intybus), a highly productive forage under midsummer conditions in the eastern USA, often has higher concentrations of minerals relative to grasses and legumes. Low concentrations of minerals in herbage could reduce production efficiency or create metabolic disorders in livestock. Information on the mineral composition of chicory is limited, but it is needed to improve our understanding of nutritive value and inputs required to sustain chicory production, especially where high rates of N are applied. We conducted field experiments for 3 years (1994-96) on a Ramsey soil (Loamy, siliceuos, subactive, mesic Lithic Dystrudept) in southern West Virginia, USA to determine (i) response to increasing fertilizer N and (ii) production of chicory as a component of swards, including grass and legume as a function of clipping frequency. Mineral concentrations and uptake in available herbage generally increased as N rate increased and were influenced by the botanical composition of the sward. As chicory content decreased in the sward, so did mineral concentrations and uptake. Changes in sward composition associated with chicory influenced important mineral ratios such as N/S, Ca/P and K/(Ca + Mg) cation equivalent ratio that have significant bearing on livestock health and production efficiency. Clipping frequency and N inputs influenced chicory persistence and ultimately the mineral composition of the sward. Active accumulation of minerals indicates the need for high nutrient input to sustain production, especially on soils with marginal fertility. Health problems associated with mineral nutrient concentrations probably would be minimal in livestock grazing swards that include chicory
Descriptors:calcium. cations. chemical-composition. chicory. clipping. crop-yield. grass-sward. herbage. magnesium. mineral-content. mineral-uptake. N-S-ratio. nitrogen. nitrogen-fertilizers. nutrient-content. nutrient-uptake. phosphorus. plant-composition. potassium. sulfur
Geographic Locator:USA. West-Virginia
Organism Descriptors:Cichorium-intybus
Supplemental Descriptors:Cichorium. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. Appalachian-States-of-USA. Southern-States-of-USA. USA. South-Atlantic-States-of-USA
Subject Codes:FF007. FF061. FF100. JJ700
Supplementary Info:32 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

45. Title:Subsurface drain losses of water and nitrate following conversion of perennials to row crops
View Article: Agronomy Journal. 2001. 93 (3). 477-486
CD Volume:338
Print Article: Pages: 477-486
Author(s):Huggins D R Randall G W Russelle M P
Author Affiliation:USDA-ARS, Land Management and Water Conserv. Res. Unit, 215 Johnson Hall, Washington State Univ., Pullman, WA 99164-6421, USA
Language:English
Abstract:Nitrate losses through subsurface drains in agricultural fields pose a serious threat to surface water quality. Substantial reductions in drainage losses of NO3-N can occur with lucerne (Medicago sativa) or perennial grasses as used in Conservation Reserve Programme (CRP) plantings. Conversion of perennials to annual row crops, however,

could have rapid, adverse affects on water quality. We evaluated water and N use efficiency of row crops following perennials, and losses of water and NO3-N to subsurface drains. Four cropping systems: continuous maize (Zea mays), a maize-soyabean (Glycine max) rotation, lucerne (ALF), and CRP, were established in 1988 in Minnesota, USA. The ALF and CRP were converted to a maize-maize-soyabean sequence from 1994 through 1996 while continuous maize (C-C) and maize-soyabean (C-S) rotations were maintained. Following CRP, maize yield was 14% and water use efficiency (WUE) 20% greater compared with C-C. Yield was 19% and WUE 21% greater for soyabean following maize in CRP and ALF compared with C-S. Residual soil NO3-N (RSN) increased 125% in first year maize following CRP and was 32% greater than C-C by 1996. High N uptake efficiencies of maize following lucerne slowed the buildup of RSN, but levels were equal to row crop systems after 2 years. Nitrate losses in drainage water remained low during the initial year of conversion, but were similar to row crop systems during the subsequent 2 years. Beneficial effects of perennials on subsurface drainage characteristics were largely negated following 1 to 2 years of maize cropping

Descriptors:crop-yield. cropping-systems. leaching. lucerne. maize. nitrate. nutrient-uptake. rotation. sequential-cropping. soil-fertility. soyabeans. subsurface-drainage. water. water-use-efficiency

Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Medicago. Medicago-sativa. Zea-mays

Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Medicago. Zea. Poaceae. Cyperales. monocotyledons

Subject Codes:FF005. FF061. FF062. FF100. FF150. JJ600. FF007

Supplementary Info:52 ref

ISSN:0002-1962

Year:2001

Journal Title:Agronomy Journal

46. Title:Potassium placement and tillage system effects on corn response following long-term no till

View Article: Agronomy Journal. 2001. 93 (3). 487-495

CD Volume:338

Print Article: Pages: 487-495

Author(s):Vyn T J Janovicek K J

Author Affiliation:Dep. of Agron., Purdue Univ., West Lafayette, IN 47907-1150, USA

Language:English

Abstract:Stratification of immobile nutrients in long term no-till (NT) fields may reduce maize (Zea mays) yield potential. Five field studies were conducted from 1995 to 1998 in Ontario (near Kirkton and Belmont), Canada to evaluate maize response to different K placements and rates when fields with a NT cropping history were either fall zone-tilled (ZT), fall mouldboard-ploughed (conventional till age (CT)), or continued in the NT system. The silt loam to silty clay loam soils had medium or high soil-test K (0-15 cm) ratings with varying degrees of K stratification to the 30-cm depth. Fall-applied K at rates of 0, 42 and 84 kg/ha was surface-broadcast in the NT system, deep-banded to 15-cm depth in the ZT system, and surface-broadcast and incorporated in the CT system. Potassium was also shallow-banded with the planter at rates of either 0 to 8 kg/ha (low) or 42 to 50 kg/ha (high). Average concentrations of maize ear-leaf K near silking increased from 10.9 g/kg (with no K) to 15.2 g/kg with highest fall plus spring K rates on the three sites with soil-test K levels of

<100 mg/kg. For these same sites, ear-leaf K concentrations averaged 1.2 g/kg higher in CT compared with NT or ZT. On four of the five field sites, maize yields in the NT and ZT systems were maximized by applying the high rate of starter K, even when no K fertilizer was applied the previous fall. On long-term NT soils with medium soil-test K, maize producers may derive most K fertility benefit from shallow banding at planting
Descriptors:application-rates. maize. mineral-uptake. nutrient-uptake. potassium-fertilizers. tillage
Organism Descriptors:Zea-mays
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF062. JJ700. JJ900
Supplementary Info:18 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

47. Title:Extraction of subsoil nitrogen by alfalfa, alfalfa-wheat, and perennial grass systems
View Article: Agronomy Journal. 2001. 93 (3). 495-503
CD Volume:338
Print Article: Pages: 495-503
Author(s):Entz M H Bullied W J Forster D A Gulden R Vessey J K
Author Affiliation:Dep. of Plant Sci., Univ. of Manitoba, Winnipeg, MB R3T 2N2, Canada
Language:English
Abstract:The role of lucerne (Medicago sativa cv. OAC Minto) in extracting NO3-N from deep soils of areas with cold, short growing seasons, such as western Canada, is not well understood. A study was established in 1990 in Manitoba, Canada to determine NO3-N extraction ability to 300 cm; initial soil NO3-N concentrations were high (>8 mg/kg). Systems included continuous lucerne; annual rotations of spring wheat (Triticum aestivum cv. Katepwa), field pea (Pisum sativum cv. Victoria), and barley (Hordeum vulgare cv. Heartland); a native-grass system (big bluestem (Andropogon gerardi) and western wheatgrass (Agropyron smithii [Elymus smithii])); and continuous fallow. The annual rotation effectively lowered NO3-N to <2.3 mg/kg in the 30- to 90-cm depth. By the fourth year, lucerne had reduced NO3-N concentrations to <3.8 mg/kg for the 30- to 240-cm increment. The greatest NO3-N extraction benefits of lucerne were realized in the fourth year at a maximum soil depth of 270 cm. Subsoil NO3-N concentration increased in the continuous lucerne between the fourth and sixth year. Greater NO3-N extraction occurred with the native-grass treatment compared with continuous alfalfa in the 0- to 120-cm soil depth. However, similar extraction patterns existed below 120 cm. A system involving 4 years of cropping with lucerne followed by cropping with two types of wheat resulted in the lowest subsoil NO3-N concentration, even lower than the continuous lucerne and native-grass systems. It was concluded that subsoil NO3-N extraction with lucerne was maximized when lucerne was rotated with annual crops
Descriptors:barley. lucerne. nitrogen. rotation. sequential-cropping. soil-depth. soil-fertility. wheat
Geographic Locator:Canada. Manitoba
Organism Descriptors:Andropogon-gerardii. Elymus-smithii. Hordeum-vulgare. Medicago. Medicago-sativa. Pisum-sativum. Triticum. Triticum-aestivum

Supplemental Descriptors:Andropogon. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Elymus. Hordeum. Canada. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. Pisum. Triticum
Subject Codes:FF005. FF007. FF150. JJ400. JJ600
Supplementary Info:42 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

48. Title:Weed community as an indicator of summer crop yield and site quality
View Article: Agronomy Journal. 2001. 93 (3). 524-530
CD Volume:338
Print Article: Pages: 524-530
Author(s):Suarez S A Fuente E B de la Ghersa C M Leon R J C
Author Variant:de-la-Fuente-E-B
Author Affiliation:Dep. Ciencias Nat., Facultad Ciencias Exactas Fisico-Quimicas y Nat., Univ. de Rio Cuarto, Ruta 36, km 601, 5800 Rio Cuarto Cba., Argentina
Language:English
Abstract:We studied relationships between weed community characteristics and management practices, soil degradation (reductions of the A horizon, organic matter, total N, and available P) levels, and soyabean (Glycine max) and maize (Zea mays). Our objective was to provide a scale based on floristic information that could be used to evaluate sites in terms of summer crop yields and agroecosystem degradation. Weed surveys were carried out in 1995 and 1999 in maize and soyabean fields in Rio de Plata, Argentina. Cluster analysis and canonical correspondence analysis (CCA) were used with data from 1995. Regional or gamma diversity, local or alpha diversity, and exchange of species between habitats or beta diversity of weed communities were estimated as well as changes in origin, morphotype, and life cycle for data from both surveys. Four weed communities related to crops and yields were identified. In both maize and soyabean fields, the potential for high crop yield (low soil degradation) may be indicated by the presence of the weed groups identifying the weed community of a crop species. Sowing date, agronomic index, mechanical control, and the use of grass herbicide also accounted for weed community structure. Sites with higher than average yield had the highest alpha diversity. The number of native species in the community was related to soil degradation levels. Soil degradation proved to be more important than type of crop in determining the structure of a weed community
Descriptors:biodiversity. chemical-control. crop-yield. environmental-control. habitats. herbicides. horizons. life-cycle. maize. origin. soil-degradation. soil-fertility. soil-organic-matter. sowing-date. soyabeans. weed-control. weeds
Geographic Locator:Argentina
Identifiers:site quality
Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Zea-mays
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF100. FF500. HH200. HH405. JJ600. ZZ331
Supplementary Info:37 ref
ISSN:0002-1962

Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

49. Title:Statistical methods for predicting responses to applied nitrogen and calculating optimal nitrogen rates
View Article: Agronomy Journal. 2001. 93 (3). 531-539
CD Volume:338
Print Article: Pages: 531-539
Author(s):Makowski D Wallach D Meynard J M
Author Affiliation:unite d'agronomie, INRA, B.P. 27, 31326 Castanet-Tolosan Cedex, France
Language:English
Abstract:Models of response to applied N can be useful for deriving improved N dose recommendations. Here, we show how response model parameters can be estimated and how model predictions and model N dose recommendations can be evaluated. For parameter estimation, we use a statistical approach based on random parameter models. Two methods for evaluating models are applied. The first method is to calculate mean squared error of prediction (MSEP) by cross validation, and the second is to perform nonparametric regressions to evaluate the profitability of calculated optimal N rates. The proposed methods are used with a data set consisting of 37 winter wheat (Triticum aestivum) experiments. Different functions taking into account end-of-winter mineral soil N are evaluated. The results show that the different functions all have similar MSEP values for predictions of yield and grain protein content and lead to N recommendations of similar profitability. However, there are substantial differences in MSEP for residual mineral N at harvest. One of these models is then compared with a model that does not include any site-year characteristic and with a model that does not have random parameters. We find that using the model without a site-year characteristic leads to predictions that are less accurate and optimal N rates that are less profitable by F 17 to F 105/ha. Another result is that the gross margin obtained with the optimal N rates calculated using the model without random parameters is lower by F 438 to F 550/ha
Descriptors:application-rates. crop-yield. errors. mathematical-models. nitrogen-fertilizers. profitability. protein-content. soil-fertility. statistical-analysis. wheat
Organism Descriptors:Triticum-aestivum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:EE110. FF005. JJ600. JJ700. ZZ100
Supplementary Info:30 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

50. Title:Row spacing, plant density, and nitrogen effects on corn silage
View Article: Agronomy Journal. 2001. 93 (3). 597-602
CD Volume:338
Print Article: Pages: 597-602
Author(s):Cox W J Cherney D J R
Author Affiliation:Dep. of Crop and Soil Sci., Cornell Univ., Ithaca, NY 14853, USA
Language:English
Abstract:Dairy producers in the northeastern USA who grow maize (Zea mays) forage in narrow rows plant at 125 000 plants/ha and apply N

fertilizers at 225 kg N/ha because they believe narrow-row maize yields are best at high plant densities and N rates. We evaluated maize in 1996 and 1997 in New York, USA at two row spacings (0.38 and 0.76 m), two harvest densities (80 000 and 116 000 plants/ha), and six N rates (0, 50, 100, 150, 200, and 250 kg/ha) to determine if row spacing x plant density x N rate interactions existed for dry matter (DM) and calculated milk yields. No interactions existed for DM yield, forage quality characteristics, and milk yields. Maize had greater DM and milk yields at 0.38-(20.3 and 16.1 Mg/ha, respectively) vs. 0.76-m spacing (18.9 and 15.2 Mg/ha, respectively). Dry matter and milk yields had quadratic-plus-plateau responses to N rates with maximum yields (20.6 and 17.1 Mg/ha, respectively) at an N rate of 150 kg/ha. Nitrogen accumulation at harvest, which had a row spacing x N rate interaction, had a linear response to N rates at 0.38-m spacing and a quadratic response at 0.76-m spacing. Dairy farmers in the northeastern USA can produce corn silage at similar plant densities and N fertility, regardless of row spacing. Dairy producers who have excess animal waste could apply slightly more N to narrow-row maize silage because it accumulates more N at harvest

Descriptors:application-rates. crop-quality. crop-yield. dry-matter. maize. maize-silage. nitrogen-fertilizers. plant-density. row-spacing. silage

Geographic Locator:New-York. USA

Organism Descriptors:Zea-mays

Supplemental Descriptors:Middle-Atlantic-States-of-USA. Northeastern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. FF100. JJ700. FF007

Supplementary Info:18 ref

ISSN:0002-1962

Year:2001

Journal Title:Agronomy Journal

51. Title:Simulation of maize grain yield variability within a surface-irrigated field

View Article: Agronomy Journal. 2001. 93 (4). 773-782

CD Volume:338

Print Article: Pages: 773-782

Author(s):Cavero J Playan E Zapata N Faci J M

Author Affiliation:Dep. Genetica y Produccion Vegetal, Estacion Experimental de Aula Dei (CSIC), Apdo. 202, 50080 Zaragoza, Spain

Language:English

Abstract:Spatial variability of crop yield within a surface-irrigated field is related to spatial variability of available water due to non-uniform irrigation and soil characteristics, among other factors (e.g., soil fertility). The infiltrated depth at each location within the field can be estimated by measurements of opportunity time and infiltration rate or simulated with irrigation models. We investigated the use of the crop growth model EPICphase to simulate the spatial variability of maize grain yield within a level basin (in Spain) using estimated or simulated (with the irrigation model B2D) infiltrated depth. The relevance of the spatial variability of infiltration rate, opportunity time, and soil surface elevation in the simulation of grain yield spatial variability was also investigated. The measured maize grain yields at 73 locations within the level basin, ranging from 3.16 to 11.54 t ha-1 (SD = 1.79 t ha-1), were used for comparison. Estimated infiltrated depth considering uniform

infiltration rate resulted in poor simulation of the spatial variability of grain yield (SD = 0.59 t ha-1, root mean square error (RMSE) = 1.98 t ha-1). Simulated infiltrated depth with the irrigation model considering uniform infiltration rate and soil surface elevation resulted in grain yield simulations with lower variability than measured (SD = 0.64 t ha-1, RMSE = 1.58 t ha-1). Introducing both sources of spatial variability in the irrigation model resulted in the best simulation of grain yield spatial variability (SD = 1.68 t ha-1, RMSE = 1.16 t ha-1; regression of calculated vs. measured yields: slope = 0.74, r2 = 0.56)
Descriptors:crop-yield. maize. simulation-models. surface-irrigation
Geographic Locator:Spain
Organism Descriptors:Zea-mays
Supplemental Descriptors:Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF060. FF062. FF100. JJ800. ZZ100
Supplementary Info:47 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

52. Title:Weed suppression by seven clover species
View Article: Agronomy Journal. 2001. 93 (4). 820-827
CD Volume:338
Print Article: Pages: 820-827
Author(s):Ross S M King J R Izaurralde R C O'Donovan J T
Author Affiliation:Dep. of Agric. Food and Nutritional Sci., 410 Agric.-Forestry Cent., Univ. of Alberta, Edmonton, AB T6G 2P5, Canada
Language:English
Abstract:Used as cover crops, clover species may differ in their ability to suppress weed growth. Field trials were conducted in Alberta, Canada during 1996 and 1997 to measure the growth of brown mustard [Indian mustard] (Brassica juncea), in mowed and nonmowed production, as influenced by alsike (Trifolium hybridum), balansa (T. michelianum var. balansae), berseem (T. alexandrinum), crimson (T. incarnatum), Persian (T. resupinatum), red (T. pratense), and white Dutch (T. repens) clover and fall rye (Secale cereale). In 1997, clovers reduced mustard biomass in nonmowed treatments by 29% on a high-fertility soil (Typic Cryoboroll) at Edmonton and by 57% on a low-fertility soil (Typic Cryoboralf) at Breton. At Edmonton, nonmowed mustard biomass was reduced by alsike and berseem clover in 1996 and by alsike, balansa, berseem, and crimson clover in 1997. At Breton, all seven clover species suppressed weed biomass. A negative correlation was noted among clover and mustard biomass at Edmonton but not at Breton. The effects of mowing varied with location, timing, and species. Mowing was beneficial to crop/weed proportion at Edmonton but not at Breton. Mowing at early flowering of mustard produced greater benefit than mowing at late flowering. With early mowing, all clover species suppressed mustard growth at Edmonton. Clovers reduced mustard regrowth (g plant-1) and the number of mustard plants producing regrowth. The characteristics of berseem clover (upright growth, long stems, high biomass, and late flowering) would support its use as a cover crop or forage in north-central Alberta
Descriptors:cover-crops. cultural-control. flowering. Indian-mustard. mowing. pest-control. physical-control. rye. weed-control

Geographic Locator:Alberta. Canada
Identifiers:Trifolium michelianum
Organism Descriptors:Brassica-juncea. Secale-cereale. Trifolium-alexandrinum. Trifolium-hybridum. Trifolium-incarnatum. Trifolium-pratense. Trifolium-repens. Trifolium-resupinatum
Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Secale. Poaceae. Cyperales. monocotyledons. Trifolium. Papilionoideae. Fabaceae. Fabales
Subject Codes:FF005. FF500. HH200. JJ900
Supplementary Info:42 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

53. Title:Plant materials for soil fertility management in subhumid tropical areas
View Article: Agronomy Journal. 2001. 93 (4). 929-935
CD Volume:338
Print Article: Pages: 929-935
Author(s):Kayuki K C Wortmann C S
Author Affiliation:Kawanda Agric. Res. Inst., P.O. Box 7065, Kampala, Uganda
Language:English
Abstract:Lantana camara, Senna hirsuta, Tithonia diversifolia and Aspilia kotschyi occur naturally in eastern and central Uganda. Trimmings of these species were evaluated for effectiveness in improving soil productivity. The plant trimmings varied for N (13-30 g kg-1), P (1.1-1.8 g kg-1), lignin (11-16%), and polyphenol (1.3-2.5%) concentration. Decomposition rates were higher for incorporation than for surface placement, but placement did not affect maize (Zea mays) and bean (Phaseolus vulgaris) yield. Decomposition rates were similar for all species with the same placement method. Potassium and Mg were generally mineralized most and least rapidly, respectively, with intermediate rates for N, P, and Ca. Maize and bean yield increased with application of 4 tonnes ha-1 dry weight trimmings of L. camara, S. hirsuta, and T. diversifolia, but only maize eventually responded to A. kotschyi. Yields per units of N and P applied were more and less, respectively, with inorganic than with organic treatments but plant trimmings supplied less P than fertilizer. At the end of the trial period, available soil P was more for the full rate of fertilizer than for the mean of the plant materials. Combining L. camara and fertilizer at 50% rates, resulted in an average of 0.22 tonnes ha-1 more yield than expected from more additive effects of the organic and inorganic resources. The value of plant materials may be enhanced by balancing nutrient supply with inorganic fertilizers
Descriptors:application-rates. calcium. crop-yield. decomposition. fertilizers. incorporation. magnesium. magnesium. maize. nitrogen. phosphorus. placement. plant-residues. potassium. soil-fertility. tropics
Geographic Locator:Uganda
Identifiers:Aspilia kotschyi. Senna hirsuta
Organism Descriptors:Asteraceae. Fabaceae. Lantana-camara. Phaseolus-vulgaris. Tithonia-diversifolia. Zea-mays
Supplemental Descriptors:Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Fabales. Lantana. Verbenaceae. Lamiales. Phaseolus. Papilionoideae. Fabaceae. Tithonia. Asteraceae. East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries.

Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF100. JJ100. JJ600. JJ700. XX200. KK600
Supplementary Info:35 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

54. Title:Tillage system, fertilizer nitrogen rate, and timing effect on corn yields in the Texas Blackland Prairie
View Article: Agronomy Journal. 2001. 93 (5). 1119-1124
CD Volume:338
Print Article: Pages: 1119-1124
Author(s):Torbert H A Potter K N Morrison J E Jr
Author Affiliation:USDA-ARS Grassland, Soil and Water Research Lab., 808 East Blackland Rd., Temple, TX 76502, USA
Language:English
Abstract:New N management and conservation tillage systems are needed to improve agricultural sustainability on the Blackland Prairie of Texas, USA. An experiment was conducted during 1994-97 to determine plant response to fertilizer rate and timing within three different tillage systems. A split plot experiment with four replications was established on a Houston Black clay (fine, smectitic, thermic Udic Haplusterts) soil. The main plots were chisel tillage system without beds (conventional for the area), chisel tillage system with raised wide beds, and no-tillage system with raised wide beds. The subplots were seven fertility treatments: four fertility rates (0, 56, 112, and 168 kg N/ha applied at planting and three timing treatments (N applied in the fall, at planting, and split between at planting and 30 days later)). The crop rotation was wheat (Triticum aestivum), maize (Zea mays), and sorghum (Sorghum bicolor). The experimental treatments were imposed on maize each year for 4 years. Plant samples were collected for grain yield, biomass production, and N uptake. Grain yield ranged from 150 to 8435 kg/ha. In wet years, grain yields and N uptake increased with N fertilizer up to 168 kg N/ha, and fall application reduced yields by 30% compared with fertilizer application at planting. The highest yields were observed with the no-tillage. Results from this study indicate that application of fertilizer in the fall may result in lost yield potential and that conservation in the fall may result in lost yield potential and that conservation tillage system may be the most reliable in the Texas Blackland Prairie
Descriptors:application-date. application-rates. biomass-production. crop-yield. cropping-systems. maize. mineral-uptake. nitrogen-fertilizers. rotations. tillage. wheat
Geographic Locator:Texas. USA
Organism Descriptors:Sorghum-bicolor. Triticum. Triticum-aestivum. Zea-mays
Supplemental Descriptors:Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA. Triticum. Zea
Subject Codes:FF005. FF100. FF150. JJ700
Supplementary Info:22 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

55. Title:Tillage and nitrogen fertilization influences on grain and soil nitrogen in a spring wheat-fallow system
View Article: Agronomy Journal. 2001. 93 (5). 1130-1135
CD Volume:338
Print Article: Pages: 1130-1135
Author(s):Halvorson A D Wienhold B J Black A L
Author Affiliation:USDA-ARS, P.O. Box E, Fort Collins, CO 80522, USA
Language:English
Abstract:Spring wheat (Triticum aestivum) is generally produced in the northern Great Plains using tillage and a crop-fallow system. This study evaluated the influence of tillage system (conventional-till (CT), minimum-till (MT), and no-till (NT)) and N fertilizer rate (0, 22, and 45 kg N/ha) on grain N, grain N removal from cropping system, and changes in residual postharvest soil NO3-N during six rotation cycles (from 1985 to 1996) of a dryland spring wheat-fallow (SW-F) cropping system in a field experiment conducted in North Dakota, USA. Grain N concentration increased with increasing N rate and was higher with CT (33.3 g/kg) at 45 kg N/ha. Grain N removal per crop was greater with CT (70 kg N/ha) and MT (68 kg N/ha) than with NT (66 kg N/ha) than with NT (66 kg N/ha) and tended to increase with increasing N rate, but varied with rotation cycle. Total grain N removal in six rotation cycles was in the order: CT > MT > NT. Total grain N removal by six SW crops was increased by N fertilizer application, with only 21 and 17% of the applied N removed in the grain for the 22 and 45 kg N/ha, respectively. Postharvest soil NO3-N levels in the 150-cm profile varied with N rate and rotation cycle, with residual NO3-N increasing during consecutive dry crop cycles. In contrast, some leaching of NO3-N below the SW root zone may have occurred during wetter crop cycles. Soil profile NO3-N levels tended to be greater with CT and MT than with NT. Variation in precipitation during rotation cycles and N fertilization impacted grain N removal and residual soil NO3-N levels are more than tillage system within this SW-F cropping system
Descriptors:application-rates. chemical-composition. cropping-systems. fallow. nitrogen-fertilizers. plant-composition. rotations. soil-fertility. tillage. wheat
Geographic Locator:North-Dakota. USA
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF040. FF100. FF150. JJ600. JJ700
Supplementary Info:27 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

56. Title:Bread-making wheat and soil nitrate as affected by nitrogen fertilization in irrigated Mediterranean conditions
View Article: Agronomy Journal. 2001. 93 (6). 1183-1190
CD Volume:338
Print Article: Pages: 1183-1190
Author(s):Lloveras J Lopez A Ferran J Espachs S Solsona J
Author Affiliation:Centre UdL-IRTA, Rovira Roure 177, 25198 Lleida, Spain
Language:English

Abstract:Mediterranean areas are suitable for the production of high quality breadmaking wheat because of the high temperatures during grain filling. Wheat quality is also influenced by variety and can be enhanced through the use of N fertilizers. However, N fertilizer application can increase residual soil NO3- after harvest. The purpose of this study was to evaluate the effect of supplemental top dressed N fertilizers on quality and production of high quality breadmaking wheat and on residual soil NO3- under irrigated Mediterranean conditions. Field experiments were conducted at two sites during two growing seasons (1996-97 and 1997-98) on Calcixeroclic Xerochrept soils of the Ebro Valley (Spain). Five N treatments (100, 200 and 300 kg N/ha applied at the end of tillering and 150 or 250 kg N/ha at the end of tillering plus 50 kg/ha foliar-applied N at the end of the boot stage) were imposed on two cultivars (Gazul and Rinconada). Top dressed N increased yields, when increasing from 100 kg N/ha to higher rates only, in soils with low residual NO3-. However, N fertilizer application increased grain protein contents for all locations and years and bread quality parameters but with a greater effect in soils with low soil NO3-. Residual soil NO3- after harvest increased little with increasing N rates. Grain protein, yield and quality varied depending mainly on the year and amount of precipitation during grain filling. A top dress N rate of 200 kg N/ha would be the most appropriate way to produce high quality breadmaking wheat and minimize the risk of NO3- leaching
Descriptors:application-rates. breadmaking. chemical-composition. crop-quality. nitrogen-fertilizers. plant-composition. protein-content. soil-fertility. top-dressings. wheat
Geographic Locator:Spain
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF040. JJ700. JJ800. QQ050. QQ500
Supplementary Info:32 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

57. Title:Verticillium wilt of potato: a model of key factors related to disease severity and tuber yield in Southeastern Idaho
View Article: American Journal of Potato Research. 2001. 78 (4). 291-300
CD Volume:368
Print Article: Pages: 291-300
Author(s):Davis J R Huisman O C Everson D O Schneider A T
Author Affiliation:Department of Plant, Soil, and Entomological Sciences, University of Idaho, Aberdeen Research and Extension Center, Aberdeen, ID 83210, USA
Language:English
Abstract:In three years (1994, 1995 and 1996), a total of 100 commercial potato fields in southeastern Idaho, USA were surveyed for soil variables, severity of Verticillium wilt, soil inoculum density of Verticillium dahliae and Colletotrichum coccodes, colonization of stems, root and tubers by V. dahliae and C. coccodes, and tuber yield, size and quality. As a generalization, factors related to soil integrity (organic matter, organic nitrogen and increased nutrient availability) were most closely related to wilt suppression and

higher tuber yields, whereas factors related to loss of soil integrity (sodium and reduced nutrient availability) were related to increased wilt and lower tuber yields. In a multiple regression analysis, three independent variables, feeder-root infections by V. dahliae, sodium content in soil and soil organic content, were significant predictors of tuber yield. With these three factors, this model accounted for 49%, 53% and 62% of the field variability related to total yield in 1994, 1995 and 1996, respectively. Throughout this investigation, V. dahliae root infections had the most direct effect on tuber yield, which emphasizes the importance of quantifying root infections in epidemiological studies of Verticillium wilt. Based on these results, organic matter may be one factor that can be manipulated for suppression of Verticillium wilt without reducing soil populations of the pathogen

Descriptors:crop-quality. crop-yield. fungal-diseases. nutrient-availability. organic-matter. plant-diseases. plant-pathogenic-fungi. plant-pathogens. potatoes. soil-fertility

Geographic Locator:Idaho. USA

Organism Descriptors:Colletotrichum-coccodes. Solanum-tuberosum. Verticillium-dahliae

Supplemental Descriptors:Colletotrichum. Deuteromycotina. Eumycota. fungi. Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Solanum. Solanaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants. Verticillium

Subject Codes:FF005. FF100. FF610

Supplementary Info:25 ref

ISSN:1099-209x

Year:2001

Journal Title:American Journal of Potato Research

58. Title:Food-feed systems in Asia: review

View Article: Asian-Australasian Journal of Animal Sciences. 2001. 14 (5). 733-745

CD Volume:379

Print Article: Pages: 733-745

Author(s):Devendra C Sevilla C Pezo D

Author Affiliation:International Livestock Research Institute (ILRI), P. O. Box, 30709, Nairobi, Kenya

Language:English

Abstract:This review discusses the relevance and potential importance of food-feed systems in Asian agricultural systems, and in particular the role and contribution of legumes to these systems. A food-feed system is one that maintains, if not increases, the yield of food crops, sustains soil fertility, and provides dietary nutrients for animals. It involves a cropping pattern within which the feed crop has many beneficial effects without competing for land, soil nutrients and water with the food crops. The agricultural environment is described with reference to the priority agro-ecological zones and prevailing mixed farming systems in Asia. Within these systems, animal production is severely hampered by critical feed shortages which can however, be alleviated by the integration of suitable leguminous forages into the cropping systems. The review also focuses on the role and potential importance of leguminous forages in terms of biodiversity, their uses in farming systems, beneficial effects on animal performance, and draws attention to six case studies in different countries that clearly demonstrate many benefits of developing such food-feed systems. Considerable opportunities exist

for widening the use of forage legumes in the development of systems with several complementary advantages (e.g. fenceline, cover crops, fodder banks, forage source and erosion control) to improve the development of sustainable crop-animal systems in Asia
Descriptors:animal-nutrition. biodiversity. crop-yield. cropping-systems. farming-systems. legumes. mixed-cropping. reviews
Geographic Locator:Asia
Organism Descriptors:Fabaceae
Supplemental Descriptors:Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF007. LL180. LL500
Supplementary Info:68 ref
ISSN:1011-2367
Year:2001
Journal Title:Asian-Australasian Journal of Animal Sciences

59. Title:Crop responses to lime in long-term pasture-crop rotations in a high rainfall area in south-eastern Australia
View Article: Australian Journal of Agricultural Research. 2001. 52 (3). 329-341
CD Volume:338
Print Article: Pages: 329-341
Author(s):Li G D Helyar K R Conyers M K Cullis B R Cregan P D Fisher R P Castleman L J C Poile G J Evans C M Braysher B
Author Affiliation:NSW Agriculture, Wagga Wagga Agricultural Institute, Wagga Wagga, NSW 2650, Australia
Language:English
Abstract:A long-term trial, known as 'managing acid soils through efficient rotations' (MASTER), commenced in 1992 to develop and demonstrate a cropping system that is economically viable on the highly acid soils of the traditional permanent pasture region in south-eastern Australia, and which improves and sustains soil fertility. There were 2 permanent pasture systems and 2 pasture-crop rotations, each with and without lime. This paper reports the effect of lime on crop production over the first cycle (6 years). On annual pasture-crop rotations, lime significantly increased the dry matter production at anthesis and grain yields of wheat (cv. Dollarbird) compared with the unlimed treatments. Averaged across years from 1992 to 1997 (excluding the severe drought year 1994), wheat crops produced 1.6 t/ha more grain on the limed treatments than on the unlimed treatments (3.6 v. 2.0 t/ha). On perennial pasture-crop rotations, the lime effects varied with crops grown at each phase and year. For example, despite being tolerant of acidity, oats (cv. Yarran) responded to lime in 1996. Likewise, triticale (cv. Abacus) responded to lime in 1997. Wheat (cv. Dollarbird) that is moderately tolerant to acidity responded to lime in phase 6 from 1992 to 1997 excluding 1994 (3.5 v. 1.7 t/ha). Acid-tolerant wheat varieties, triticale, and narrow-leaf lupins (Lupinus angustifolius) are considered the most viable crops for the soil and climatic conditions encountered in this high rainfall (500-800 mm per annum) area of south-eastern Australia
Descriptors:acid-soils. acidification. crop-production. crop-yield. cropping-systems. dry-matter. lime. oats. responses. rotations. soil-amendments. soil-types. triticale. wheat
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Avena-sativa. Lupinus-angustifolius. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Avena. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Lupinus.

Papilionoideae. Fabaceae. Fabales. dicotyledons. Triticum. Australia
Subject Codes:FF005. FF100. JJ200. JJ700. FF150
Supplementary Info:40 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

60. Title:The role of trees in enhancing soil nutrient availability for native perennial grasses in open eucalypt woodlands of north-east Queensland
View Article: Australian Journal of Agricultural Research. 2001. 52 (3). 377-386
CD Volume:338
Print Article: Pages: 377-386
Author(s):Jackson J Ash A J
Author Affiliation:CSIRO Tropical Agriculture, Private Bag PO, Aitkenvale, Qld 4814, Australia
Language:English
Abstract:The effects of shade, moisture stress, and tree altered soil fertility on the growth of 2 common native pasture species, Chrysopogon fallax and Heteropogon contortus, of open eucalypt woodlands of northeastern Queensland, Australia were investigated to determine whether trees enhanced soil nutrient levels beneath their canopies and whether such changes affect pasture productivity and quality. The grasses were grown in a glasshouse in soil collected in August 1993 under tree canopies of eucalypts (Eucalyptus xanthoclada and E. drepanophylla) and from inter-canopy areas that differed in soil fertility. These soils were collected from a high fertility and a low fertility site. Chemical analyses showed that nutrient levels were higher in under-canopy soils. Plants grown in under-canopy soil produced 63% more biomass than those grown in outside-canopy soil from the low fertility site, whereas the increase was 32% in soil from the high fertility site. Leaf quality, in terms of N and P concentration and dry matter digestibility (DMD), was generally higher in plants in under-canopy soil. Shaded plants were 22% taller ($P < 0.001$) but had fewer tillers ($P < 0.05$), and produced 19% less ($P < 0.01$) root biomass than unshaded plants. Plants in under-canopy soil produced more biomass than plants in outside-canopy soil even when they were shaded or water-stressed. Shaded, water-stressed plants in under-canopy soil ('under-canopy' plants) were taller and produced 46% more above ground biomass and 20% more total dry matter than unshaded, non-stressed plants in outside-canopy soil ('outside-canopy' plants) ($P < 0.05$). Biomass, height and tiller production of unshaded, water-stressed plants in outside-canopy soil were similar to those of non-stressed 'outside-canopy' plants. 'Under-canopy' plants had higher leaf N and P uptake than 'outside-canopy' plants ($P < 0.05$). Water stressed and non-stressed outside-canopy plants had similar leaf quality characteristics. It is suggested that the enhanced soil fertility under eucalypt canopies, and the influence of this on forage productivity and quality, should be considered when taking mangement decisions to remove or kill trees in eucalypt woodlands
Descriptors:biomass. canopy. chemical-composition. digestibility. forest-influences. forests. nitrogen. nutrient-availability. phosphorus. plant-interaction. shade. soil-fertility. water-stress. woodland-grasslands. woodland-soils. woodlands
Geographic Locator:Australia. Queensland
Identifiers:Eucalyptus xanthoclada
Organism Descriptors:Chrysopogon-fallax. Eucalyptus-drepanophylla. Heteropogon-contortus

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Chrysopogon. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Eucalyptus. Myrtaceae. Myrtales. dicotyledons. Heteropogon. Australia
Subject Codes:PP350. JJ600. KK100. KK600. FF040
Supplementary Info:43 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

61. Title:Soil and rainforest composition in Tasmania: correlations of soil characteristics with canopy composition and growth rates in Nothofagus cunninghamii associations
View Article: Australian Journal of Botany. 2001. 49 (2). 121-135
CD Volume:338
Print Article: Pages: 121-135
Author(s):Read J
Author Affiliation:Department of Biological Sciences, Monash University, Clayton, Vic. 3800, Australia
Language:English
Abstract:The relationships between soil chemistry and canopy composition and growth rate were examined in several Nothofagus cunninghamii rainforest associations in Tasmania, Australia. There was considerable variation in the concentrations of some of the soil nutrients, with ca. 40-fold differences in total phosphorus among surface samples (5-15 cm depth) and 170-fold differences among deep samples (50-60 cm depth). Principal components analysis with rotated axes indicated that surface extractable K, total N and loss of ignition (LOI) contributed most to Component 1. The factors contributing most to Component 2 were total exchangeable bases, extractable Mg and LOI of the deep samples and surface extractable Ca. Total phosphorus (surface and deep), pH and surface C:N contributed most to Component 3. The soils of N. cunninghamii-dominated forests had significantly higher pH and total phosphorus than mixed rainforests (rainforest without a clear dominant species) and a lower C:N ratio than soils of both mixed rainforests and P. aspleniifolius-dominated rainforests ($P < 0.05$). However, no significant differences were recorded in any soil parameter between the latter two forest types. Factor 3 of the PCA was positively correlated with the abundance of N. cunninghamii and negatively correlated with abundance of P. aspleniifolius and E. lucida ($P < 0.05$). In addition, the growth rate of N. cunninghamii was positively correlated with total phosphorus after removal of high-altitude sites (more than or equal to 700 m a.s.l.). These results, together with previous data on comparative growth rates, suggest that phosphorus has a significant influence on the canopy composition of these rainforests via its effect on the growth rate of N. cunninghamii. Concentrations of both total and available phosphorus were very low on some sites, overlapping the range of values recorded in button grass plains, heaths and eucalypt forests from other studies in Tasmania. More comprehensive data are required to allow detailed comparisons among these vegetation formations. However, the results are consistent with Jackson's (1968, 1983) hypothesis that the absence of rainforest from some low-nutrient soils may be influenced more by fire frequency (via the interactions among soil nutrients, vegetation and fire) than directly by soil nutrients

Descriptors:altitude. canopy. forests. growth. growth-rate. magnesium. nitrogen. pH. phosphorus. population-density. potassium. rain-forests. soil-chemistry. soil-fertility
Geographic Locator:Australia. Tasmania
Identifiers:Phyllocladus aspleniifolius
Organism Descriptors:Eucryphia-lucida. Nothofagus-cunninghamii. Phyllocladus
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Eucryphia. Eucryphiaceae. Rosales. dicotyledons. angiosperms. Spermatophyta. plants. Nothofagus. Fagaceae. Fagales. Phyllocladaceae. Pinopsida. gymnosperms. Phyllocladus. Podocarpaceae. Australia
Subject Codes:JJ200. JJ600. KK100. ZZ331
Supplementary Info:31 ref
ISSN:0067-1924
Year:2001
Journal Title:Australian Journal of Botany

62. Title:Residual effect of nitrogen fixed by mungbean (Vigna radiata) and blackgram (Vigna mungo) on subsequent rice and wheat crops
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (2). 245-248
CD Volume:339
Print Article: Pages: 245-248
Author(s):Ahmad T Hafeez F Y Mahmood T Malik K A
Author Affiliation:National Institute for Biotechnology and Genetic Engineering, PO Box 577, Faisalabad, Pakistan
Language:English
Abstract:Annual crop legumes, grown in rotation with cereal crops, contribute to the total pool of nitrogen in the soil and improve the yield of cereals. The present study aimed at the quantification of nitrogen fixation by mung bean and black gram using 15N isotopic dilution methodology; and the quantification of grain and nitrogen yield differences of succeeding rice and wheat crops compared with a cereal-cereal rotation in a field experiment conducted in Pakistan during 1997-98. There were 2 experiments in separate fields but with the same layout; in experiment 1, rice followed the mung bean and black gram varieties and in experiment 2, wheat followed the mung bean and black gram varieties. Nitrogen fixed ranged from 26 to 36 kg/ha in experiment 1 and from 30 to 36 kg/ha in experiment 2. Soil nitrogen spared by legume crops ranged from 2 to 26 kg/ha in experiment 1 and from 4 to 23 kg/ha in experiment 2. Rice paddy yields were 0.6-1.1 t/ha higher in the legume-cereal rotation than in the cereal-cereal sequence. Similarly, wheat grain yields were 0.5-1.1 t/ha higher in the legume-cereal rotation
Descriptors:black-gram. crop-yield. mung-beans. nitrogen-content. nitrogen-fixation. residual-effects. rice. rotations. sequential-cropping. soil-fertility. wheat
Geographic Locator:Pakistan
Organism Descriptors:Oryza. Oryza-sativa. Triticum. Triticum-aestivum. Vigna-mungo. Vigna-radiata
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. Triticum. Vigna. Papilionoideae. Fabaceae. Fabales. dicotyledons
Subject Codes:FF005. FF100. JJ100. JJ600
Supplementary Info:23 ref
ISSN:0816-1089
Year:2001

Journal Title:Australian Journal of Experimental Agriculture

63. Title:Nitrogen dynamics of pastures: nitrogen fixation inputs, the impact of legumes on soil nitrogen fertility, and the contributions of fixed nitrogen to Australian farming systems
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (3). 327-346
CD Volume:339
Print Article: Pages: 327-346
Author(s):Peoples M B Baldock J A
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia
Language:English
Abstract:Experimental estimates of amounts of foliage nitrogen (N) fixed in Australian pastures range from 2 to 284 kg N/ha.year for annual and perennial legumes growing in temperate and tropical environments. Differences in the amounts of N2 fixed relate primarily to the legume content and net productivity of pastures. On average, close to 20-25 kg of shoot N are fixed for every tonne of legume herbage dry matter produced across a wide range of environments. Strategies likely to improve the potential for N2 fixation include: (i) rhizobial inoculation at time of first sowing a new legume species; (ii) amelioration of nutritional problems (applications of superphosphate or lime); (iii) manipulation of pasture composition (herbicide applications to remove grasses in annual pastures in the year prior to cropping); and (iv) including lucerne to offset the year-to-year variability in N2 fixation inputs from annual legumes. However, pasture response to such management treatments and the subsequent availability of soil mineral N may be modified by livestock effects on nutrient cycling, pasture productivity and botanical composition. Conclusions about the relative size of the contributions of fixed N to the N economies of Australian farming systems depend on whether or not estimates of fixed N are included for nodulated roots. Thus, residual net inputs of fixed N after each year of a legume-based pasture are generally rated sufficient to balance the N removed by at least 1 subsequent wheat crop provided estimates of below ground N are included in calculations. Pasture type influences the duration of subsequent rotational benefits and while residual effects on mineral N are commonly exhausted within 2 years after an annual legume-based pasture phase, N carry-over following lucerne generally lasts considerably longer
Descriptors:botanical-composition. cycling. dry-matter. farming-systems. legumes. lime. lucerne. nitrogen-fixation. pasture-legumes. pastures. residual-effects. reviews. seed-inoculation. soil-fertility. superphosphate. wheat
Geographic Locator:Australia
Identifiers:soil amelioration
Organism Descriptors:Fabaceae. Medicago. Medicago-sativa. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF007. JJ100. JJ600. JJ700. FF005. FF150
Supplementary Info:94 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

64. Title:Net nitrogen balances for cool-season grain legume crops and contributions to wheat nitrogen uptake: a review
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (3). 347-359
CD Volume:339
Print Article: Pages: 347-359
Author(s):Evans J McNeill A M Unkovich M J Fettell N A Heenan D P
Author Affiliation:NSW Agriculture, Agricultural Institute, Private Mail Bag, Wagga Wagga, NSW 2650, Australia
Language:English
Abstract:The removal of nitrogen (N) in grain cereal and rape crops in Australia exceeds 0.3 million t N/year and is increasing with improvements in average crop yields. Although N fertilizer applications to cereals are also rising, N2-fixing legumes still play a pivotal role through inputs of biologically fixed N in crop and pasture systems. This review collates Australian data on the effects of grain legume N2 fixation, the net N balance of legume cropping, summarizes trends in the soil N balance in grain legume-cereal rotations, and evaluates the direct contribution of grain legume stubble and root N to wheat production in southern Australia. The net effect of grain legume N2 fixation on the soil N balance, i.e., the difference between fixed N and N harvested in legume grain (Nadd) ranges widely, viz. lupin (Lupinus angustifolius) -29-247 kg N/ha (mean 80), pea -46-181 kg N/ha (mean 40), chickpea -67-102 kg N/ha (mean 6), and faba bean 8-271 kg N/ha (mean 113). Nadd is found to be related to the amount (Nfix) and proportion (Pfix) of crop N derived from N2 fixation, but not to legume grain yield (GY). When Nfix exceeded 30 (lupin), 39 (pea) and 49 (chickpea) kg N/ha the N balance was frequently positive, averaging 0.60 kg N/kg of N fixed. Since Nfix increased with shoot dry matter (SDM) (21 kg N fixed/t SDM; pea and lupin) and Pfix (pea, lupin and chickpea), increases in SDM and Pfix usually increased the legume's effect on soil N balance. Additive effects of SDM, Pfix and GY explained most (R2=0.87) of the variation in Nadd. Using crop-specific models based on these parameters the average effects of grain legumes on soil N balance across Australia were estimated to be 88 (lupin), 44 (pea) and 18 (chickpea) kg N/ha. Values of Nadd for the combined legumes were 47 kg N/ha in southeastern Australia and 90 kg N/ha in southwestern Australia. The average net N input from lupin crops was estimated to increase from 61 to 79 kg N/ha as annual rainfall rose from 445 to 627 mm across 3 shires in the southeast. The comparative average input from pea was 37 to 47 kg N/ha with least input in the higher rainfall shires. When the effects of legumes on soil N balance in southeastern Australia were compared with average amounts of N removed in wheat grain, pea-wheat (1:1) sequences were considered less sustainable for N than lupin-wheat (1:1) sequences, while in southwestern Australia the latter were considered sustainable. Nitrogen mineralized from lupin residues was estimated to contribute 40% of the N in the average grain yield of a following wheat crop, and that from pea residues, 15-30%, respectively, about 25 and 15 kg N/ha. Therefore, it was concluded that the majority of wheat N must be obtained from pre-existing soil sources. As the amounts above represented only 25-35% of the total N added to soil by grain legumes, the residual amount of N in legume residues is likely to be important in sustaining those pre-existing soil sources of N
Descriptors:chickpeas. faba-beans. grain-legumes. mineral-uptake. mineralization. nitrogen-balance. nitrogen-fertilizers. nitrogen-

fixation. nutrient-uptake. peas. plant-nutrition. plant-residues. residual-effects. reviews. rotations. shoots. soil-fertility. wheat
Geographic Locator:Australia
Organism Descriptors:Cicer-arietinum. Lupinus-angustifolius. Pisum-sativum. Triticum. Triticum-aestivum. Vicia-faba
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Cicer. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lupinus. Pisum. Triticum. Poaceae. Cyperales. monocotyledons. Vicia
Subject Codes:FF005. FF150. FF061. JJ100. JJ600. XX200
Supplementary Info:38 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

65. Title:A decision support system for mapping the site-specific potassium requirement of wheat in the field
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (5). 655-661
CD Volume:339
Print Article: Pages: 655-661
Author(s):Wong M T F Corner R J Cook S E
Author Affiliation:CSIRO Land and Water, Private Bag, PO Wembley, WA 6014, Australia
Language:English
Abstract:The intensely weathered nature of Western Australian cropping soils and the long history of potassium depletion by the farming system has resulted in increased incidence of potassium deficiency in wheat. There is currently no scientifically based method for potassium recommendation in Western Australia. This paper describes the use of site-specific plot-scale field trials carried out in 1995-98 and a crop response model to develop a generally applicable potassium recommendation system. Geographic information system technology was used to extend the uniform potassium recommendation system into a system for mapping spatially variable potassium requirement that takes account of crop demand and soil available potassium. The field trials were carried out on a range of soil types and showed that wheat response to potassium can be described by the Mitscherlich equation. The size of the response was dependent on the soil test value for plant available potassium and the yield of the crop. The latter is mainly dependent on rainfall in the water-limited Mediterranean environment of Western Australia. The relationships between the maximum achievable yield, crop response and soil available potassium values were quantified in order to allow the decision support system to be developed for uniform whole-paddock fertilizer recommendation. Both soil available potassium and yield are very spatially variable in Western Australia and for wheat, the coefficient of variation of yield within the paddock is often of the order of 30%. Soil property variation can be of a similar order. Maps of soil available potassium values and of spatially variable target yield determined either from (i) farmer's estimate, (ii) yield monitors and (iii) remotely sensed normalised difference vegetation index measurements allow this decision system to map spatially variable potassium requirement. Comparison of the map of potassium requirement with measured spatially variable response to potassium showed that the decision support system performed satisfactorily

Descriptors:crop-yield. geographical-information-systems. potassium. potassium-fertilizers. soil-fertility. wheat
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:CC300. FF005. FF100. JJ700
Supplementary Info:18 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

66. Title:Tactical versus continuous stocking in perennial ryegrass-subterranean clover pastures grazed by sheep in south-western Victoria. 1. Stocking rates and herbage production
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (8). 1099-1108
CD Volume:339
Print Article: Pages: 1099-1108
Author(s):Waller R A Sale P W G Saul G R Kearney G A
Author Affiliation:Agriculture Victoria - Hamilton, Pastoral and Veterinary Institute, Private Bag 105, Hamilton, Vic. 3300, Australia
Language:English
Abstract:A 4-year field experiment was carried out in southwestern Victoria, Australia, to determine whether tactical stocking might improve perennial ryegrass (Lolium perenne) persistence and prime lamb production, compared with the more common practice of year-around continuous stocking. Tactical stocking consisted of variable lengths summer, autumn and winter rotations and continuous stocking in spring. The 2 grazing strategies were compared on 2 contrasting pastures: an upgraded pasture, sown with newer cultivars of perennial ryegrass and subterranean clover (Trifolium subterraneum) with 26 kg phosphorus/ha per year, and a more typical naturalized perennial ryegrass pasture receiving 6 kg phosphorus/ha per year. Paddocks were grazed by Border Leicester x Merino ewes, which were mated to a terminal sire to lamb in September. The effects of the grazing systems and pasture treatments on herbage production and stocking rate are presented in this paper. Herbage production was similar between the treatments, but tactical stocking significantly increased herbage mass during the growing season ($P<0.05$) compared with continuous stocking. In spring each year, the herbage mass generally exceeded 3000 kg dry matter/ha in tactically stocked paddocks and averaged 500-900 kg dry matter/ha higher than the mass on continuously stocked paddocks. This enabled the year-round stocking rate to be increased by an average of 9% over the 4 years of the experiment. We considered that the stocking rates could not be further increased, despite the higher herbage mass in spring, as stock reduced the dry herbage to a low residual mass by the opening rains in autumn. In contrast, stocking rates averaged 51% higher on the upgraded pasture compared with the typical pasture over the 4 years of the experiment. This indicates that pasture improvement and soil fertility status have a much greater impact on productivity than changes to grazing method. However, tactical stocking was able to increase the sustainability of prime lamb production on upgraded pastures in a dry summer climate, by maintaining herbage cover on the paddocks over the summer-autumn period

Descriptors:herbage. lamb-production. lambs. pastures. phosphorus-fertilizers. rotational-grazing. soil-fertility. stocking-rate
Geographic Locator:Australia. Victoria
Organism Descriptors:Lolium-perenne. sheep. Trifolium-subterraneum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Lolium. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons. Australia. Ovis. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates
Subject Codes:JJ600. JJ700. PP350
Supplementary Info:many ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

67. Title:Tactical versus continuous stocking in perennial ryegrass-subterranean clover pastures grazed by sheep in south-western Victoria. 3. Herbage nutritive characteristics and animal production
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (8). 1121-1131
CD Volume:339
Print Article: Pages: 1121-1131
Author(s):Waller R A Sale P W G Saul G R Kearney G A
Author Affiliation:Agriculture Victoria - Hamilton, Pastoral and Veterinary Institute, Private Bag 105, Hamilton, Vic. 3300, Australia
Language:English
Abstract:A 4-year grazing experiment was carried out in southwestern Victoria, Australia, to compare the effect of tactical stocking with continuous stocking on the persistence of perennial ryegrass (Lolium perenne) and the productivity of sheep used for prime lamb production. Tactical stocking consisted of variable lengths of summer, autumn and winter rotations, and continuous stocking in spring. The 2 grazing strategies were compared on 2 contrasting pastures: an upgraded pasture, sown with newer cultivars of perennial ryegrass and subterranean clover (Trifolium subterraneum) with 26 kg phosphorus/ha per year, and a naturalized perennial ryegrass pasture receiving 6 kg phosphorus/ha per year. Paddocks were grazed by Border Leicester x Merino ewes, which were mated to a terminal sire to lamb in September. In this final paper of the series, the effects of the grazing systems and pasture treatments on animal production and herbage quality are presented. The liveweights of the ewes were similar across all treatments during autumn and winter, but the tactically stocked ewes were 3-6 kg lighter than continuously stocked ewes during spring and summer. The lower liveweight was attributed to the lower ($P<0.001$) herbage quality on the tactically stocked pastures in spring ($P<0.001$). Both digestibility and crude protein concentration were about 4 percentage units lower with tactical stocking in spring. This lower quality was associated with the higher herbage mass (by 500-900 kg dry matter/ha) on the tactically stocked pastures, which presumably had a higher stem : leaf ratio and showed reproductive growth earlier than the continuously stocked pastures. Although there were differences in ewe liveweight, this did not affect individual lamb weaning weight or ewe fleece weight. There were significant increases in production per hectare from tactically stocked or upgraded pasture treatments due to the higher stocking rates that could be carried, 9 and 51%, respectively. In 1998, 544 kilograms of lamb per hectare was weaned from continuously stocked

paddocks and 607 kg/ha from tactically stocked paddocks (P<0.05), and 449 and 702 kg/ha from the typical and upgraded pastures, respectively. This study reinforces the view that soil fertility and pasture improvement have a much greater impact on animal productivity than changes to grazing method with little effect on per head productivity. The negative impact of rotational stocking on herbage quality reinforces the need to use these systems strategically when benefits from increased herbage mass are expected to increase animal production or overcome sustainability or pasture persistence problems

Descriptors:animal-production. chemical-composition. crude-protein. digestibility. ewes. grazing-systems. herbage. lamb-production. lambs. liveweight-gain. phosphorus-fertilizers. plant-composition. rotational-grazing. soil-fertility. stocking-rate

Geographic Locator:Australia. Victoria

Organism Descriptors:Lolium-perenne. sheep. Trifolium-subterraneum

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Lolium. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons. Australia. Ovis. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates

Subject Codes:JJ700. LL180. PP350. RR300

Supplementary Info:34 ref

ISSN:0816-1089

Year:2001

Journal Title:Australian Journal of Experimental Agriculture

68. Title:Effect of long-term stubble management on yield and nitrogen-uptake efficiency of wheat topdressed with urea in north-eastern Victoria

View Article: Australian Journal of Experimental Agriculture. 2001. 41 (8). 1167-1178

CD Volume:339

Print Article: Pages: 1167-1178

Author(s):Newton P J

Author Affiliation:Department of Natural Resources and Environment, Agriculture Victoria, Rutherglen, RMB 1145, Chiltern Valley Road, Rutherglen, Vic. 3685, Australia

Language:English

Abstract:Use of urea fertilizer for cereal cropping in southeastern Australia has increased rapidly in recent years to arrest a general decline in grain protein and to increase yields. In conservation cropping systems, crop stubbles provide a source of carbon, which has the potential to retain a portion of the fertilizer nitrogen in the soil. The impact of fertilizer nitrogen was compared under 4 stubble management regimes for efficiency of nitrogen uptake by a wheat crop in a long-term cereal-grain legume rotation. The experiment was established on a duplex red-brown earth during 1985 in Australia to compare stubble retention (standing, shredded, incorporated) with stubble burning. In 1995, wheat following a failed lupin crop was topdressed with urea fertilizer at 50 kg nitrogen/ha to split plots of each stubble treatment at the third-leaf stage of growth. The urea significantly increased nitrogen uptake by wheat grown on burnt stubbles and increased grain yield by 1 t/ha. Nitrogen applied to wheat grown on stubbles retained aboveground increased yield by 0.5 t/ha, whereas there was no significant yield increase from nitrogen when stubble was incorporated due to less transfer of dry matter to grain. Efficiency of urea-nitrogen uptake in grain was reduced under stubble retention. The total grain nitrogen uptake in response to

stubble burning increased by 17.6 kg/ha, which was equivalent to a conversion efficiency of 35%, compared with only 26, 24 and 16% of the applied 50 kg nitrogen per hectare for stubble standing, shredding and incorporation treatments, respectively. Soil organic carbon and total nitrogen levels were 1 and 0.1%, respectively, irrespective of stubble treatment. Added urea increased microbial decomposition of cellulose in calico cloth buried beneath stubbles retained aboveground by 30% compared with stubble incorporated or burnt treatments. These results suggest that where low levels of available nitrogen exist in cropping systems that use stubble retention, higher nitrogen inputs may be needed, due to less efficient uptake of nitrogen from urea fertilizer

Descriptors:crop-yield. nitrogen. nutrient-uptake. soil-fertility. stubble-mulching. urea-fertilizers. wheat

Geographic Locator:Australia

Organism Descriptors:Triticum. Triticum-aestivum

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. FF061. FF100. JJ600. JJ700. JJ900

Supplementary Info:44 ref

ISSN:0816-1089

Year:2001

Journal Title:Australian Journal of Experimental Agriculture

69. Title:Nutrient transfer in arbuscular mycorrhizas: how are fungal and plant processes integrated?

View Article: Australian Journal of Plant Physiology. 2001. 28 (7). 683-694

CD Volume:339

Print Article: Pages: 683-694

Author(s):Smith S E Dickson S Smith F A

Author Affiliation:Department of Soil and Water, Centre for Plant Root Symbioses, Adelaide University, Waite Campus, Glen Osmond, SA 5064, Australia

Conference Title:Membrane transport in modern plant physiology. Selected papers from an international conference, Port Lincoln, South Australia, Australia, 3-5 December 2000

Language:English

Abstract:This review brings together recent work on the coordination of transport processes between fungus and plant symbionts in arbuscular mycorrhizal (AM) symbioses, and focuses on new information on the diversity in structure and function of interfaces and their potential roles in transport processes. We consider the way that fungal activity is polarized to absorb mineral nutrients (especially phosphorus, P) in soil, transport them to the root and release them to the plant. Conversely, the fungal structures within the root appear to be specialized to absorb sugars, which the external mycelium cannot do. The external mycelium depends on a supply of lipids, transported from within the root. High affinity P transporters expressed in the root apices and root hairs of non-mycorrhizal roots, and most probably mycorrhizal roots, absorb P actively. This can result in the development of P depletion zones, so that a low concentration of P at the absorbing surfaces limits further uptake. The external hyphae of AM fungi extend well beyond the depletion zone, accessing supplies of P at a distance and in narrow soil pores, that is absorbed actively by a high affinity P transporter expressed in these small diameter hyphae. Translocation of P within the hyphae and transfer to the plant results in much

higher rates of uptake (inflows) by mycorrhizal than non-mycorrhizal roots. The possible role of polyphosphate (polyP) in this process is discussed in light of new data. Within the root, P is lost from the fungal structures to the interfacial apoplast by an unknown mechanism, and is absorbed by the root cortical cells. The expression of a high affinity P transporter and H+-ATPase in arbuscule-containing cells indicates that these are probably the sites of fungus/plant P transfer. The site of sugar transfer from plant to fungus has not yet been established. At the whole plant level, plant uptake systems located in the youngest regions of the root are positioned to absorb P from undepleted soil, into which the root apex has just grown. In older regions of the roots, colonized by mycorrhizal fungi, the external mycelium will take over the absorptive role and overcome the difficulties posed by the slow diffusion of P in soil

Descriptors:adenosinetriphosphatase. apical-meristems. cells. cortex. endomycorrhizas. fungal-structures. lipids. mineral-nutrition. mycelium. mycorrhizal-fungi. mycorrhizas. nutrient-transport. phosphorus. pores. reviews. root-hairs. roots. soil-fertility. sugars. vesicular-arbuscular-mycorrhizas

Subject Codes:FF061. JJ100. JJ600

Supplementary Info:89 ref

ISSN:0310-7841

Year:2001

Journal Title:Australian Journal of Plant Physiology

70. Title:Problems and prospects of cyanobacterial biofertilizer for rice cultivation

View Article: Australian Journal of Plant Physiology. 2001. 28 (9). 881-888

CD Volume:339

Print Article: Pages: 881-888

Author(s):Hashem M A

Author Affiliation:Department of Soil Science, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh

Conference Title:Contributed papers from the 8th International Symposium on Nitrogen Fixation with Non-Legumes, Sydney, NSW, Australia, 3-7 December 2000

Language:English

Abstract:Nitrogen (N2)-fixing cyanobacteria are a dominant microflora in rice fields and are currently being used sporadically as a supplement to chemical nitrogen fertilizers for rice cultivation in rice-growing countries, including India and Bangladesh. This technology suffers from serious drawbacks and its use at the farm level is not gaining universal acceptance due to some major problems, which include development of a suitable production technology of biofertilizer for field use, establishment of the applied biofertilizer in the rice field and the sustainability of the technology. In order to significantly improve the efficient use of cyanobacteria as a N-based biofertilizer for rice cultivation, experiments were carried out in different dimensions both in the laboratory and field. Cyanobacterial strains were isolated identified and quantified from a wide range of distinctively different types of soils, viz., acid, calcareous, saline, red and neutral soils under different agroecological zones (AEZ) of Bangladesh. The isolated strains were tested for their N2-fixing capacity and growth rate under various stress conditions prevailing in the rice field e.g. pH, combined N, pesticides, salinity and nutrient availability in order to select suitable strains for use as biofertilizer. Large-scale cyanobacterial

biofertilizer was produced with the strains showing high rates of growth and N2 fixation both in liquid cultures under laboratory conditions and in soils of their habitats and non-habitats under open air. To assess the effectiveness of the produced biofertilizer, field trials at the selected locations were carried out on rice. To assess the effectiveness of the produced biofertilizer, field trials at the selected locations were carried out on rice. Results of the field trials showed that cyanobacterial biofertilizer may reclaim the problem soils such as acid soils and saline soils, improve the fertility status and may supplement 215-35% N for rice cultivation in these soils. This biofertilizer may be used in improving the soil environment

Descriptors:acid-soils. agroecological-zones. calcareous-soils. cultivation. growth. nitrogen-fertilizers. nitrogen-fixation. nitrogen-fixing-bacteria. nutrient-availability. red-soils. rice. saline-soils. soil-fertility. soil-pH. soil-salinity. soil-types. sustainability

Geographic Locator:Bangladesh. India

Identifiers:biofertilizers. microbial communities

Organism Descriptors:cyanobacteria. Oryza. Oryza-sativa

Supplemental Descriptors:South-Asia. Asia. Least-Developed-Countries. Developing-Countries. Commonwealth-of-Nations. prokaryotes. Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. JJ100. JJ200. JJ600. JJ700

Supplementary Info:22 ref

ISSN:0310-7841

Year:2001

Journal Title:Australian Journal of Plant Physiology

71. Title:Soil degradation under cropping and its influence on wheat yield on a weakly structured New Zealand silt loam

View Article: Australian Journal of Soil Research. 2001. 39 (2). 291-305

CD Volume:338

Print Article: Pages: 291-305

Author(s):Francis G S Tabley F J White K M

Author Affiliation:New Zealand Institute for Crop and Food Research Limited, Private Bag 4704, Christchurch, New Zealand

Language:English

Abstract:Results from the first phase of a long-term experiment (started in March 1989) in Canterbury, New Zealand showed that, after 6 years (1989-95) under pasture, several soil quality attributes had improved compared with soil cropped annually. The objectives of this study were to quantify the effects of pasture-induced increases in structural stability and organic matter (N fertility) on wheat grown in 3 successive seasons following pasture cultivation. Growing winter wheat after the ploughing of land that had previously grown perennial grass resulted in gradual reductions in soil organic C and total N. Reductions in soil microbial biomass C and earthworm populations were much more rapid. Soil aggregate stability declined rapidly in the first year after ploughing, but more slowly after that. Soil macroporosity increased after ploughing, mainly due to the relief of compaction caused by sheep treading during grazing. The contrasting soil conditions that existed at the end of the first experimental phase significantly affected the harvest yield of the first and second wheat crops, with yields 2-3 tonnes/ha greater after perennial grasses than after annual crops. Variations in harvest yield and N uptake were explained by differences in soil N fertility and soil structural conditions. Treatment effects on yield were not detected

in the third wheat crop. For the structural condition and N fertility of this soil, the extent of improvement during 3 years under perennial pasture was similar to the extent of decline under 3 years of cropping. This suggests that similar lengths of pastoral and arable cropping are needed in crop rotations for the long-term maintenance of these properties in weakly structured silt loam soils in New Zealand
Descriptors:arable-farming. continuous-cropping. crop-yield. organic-matter. silt-loam-soils. soil-degradation. soil-fertility. soil-structure. wheat
Geographic Locator:New-Zealand
Organism Descriptors:grasses. Poaceae. Triticum. Triticum-aestivum
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum
Subject Codes:FF005. FF007. FF100. FF150. JJ600. JJ300
Supplementary Info:28 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research

72. Title:Rotation crops for irrigated cotton in a medium-fine, self-mulching, grey Vertosol
View Article: Australian Journal of Soil Research. 2001. 39 (2). 317-328
CD Volume:338
Print Article: Pages: 317-328
Author(s):Hulugalle N R Entwistle P C Scott F Kahl J
Author Affiliation:Australian Cotton Co-operative Research Centre, NSW Agriculture, Australian Cotton Research Institute, Narrabri, NSW 2390, Australia
Language:English
Abstract:Many cotton growers sow rotation crops after irrigated cotton (Gossypium hirsutum), assuming that they will improve soil quality and maintain profitability of cotton. Wheat (Triticum aestivum) is the most common rotation crop, although more recently, legumes such as faba bean (Vicia faba) and chickpea (Cicer arietinum) have come into favour. This paper reports data on soil quality (organic C, nitrate-N, soil structure), yield (cotton lint and rotation crop grain yield, fibre quality), economic returns (gross margins/ha, gross margins/ML irrigation water), and management constraints from an experiment conducted from 1993 to 1998 near Wee Waa, north-western New South Wales, Australia. The soil is a medium-fine, self-mulching, grey Vertisol. The cropping sequences used were cotton followed by N-fertilized wheat (urea at 140 kg N/ha in 1993; 120 kg N/ha thereafter), unfertilized wheat, and unfertilized grain legumes (chickpea in 1993; faba bean thereafter), which were either harvested or the grain incorporated during land preparation. Soil organic C in the 0-0.6 m depth was not affected by the rotation crop, although variations occurred between times of sampling. Regression analysis indicated that there had been no net gain or loss of organic C between June 1993 and October 1998. Sowing leguminous rotation crops increased nitrate-N values. A net increase in root-zone nitrate-N reserves occurred with time (from June 1993 to October 1998) with all rotation crops. Soil compaction (measured as specific volume of oven-dried soil) was lower with wheat by October 1998. A net decrease in soil compaction occurred in the surface 0.15 m with all rotation crops between 1993 and 1998, whereas it increased in the 0.15-0.60 m depth. Cotton lint yield and quality, and gross margins/ha and gross

margins/ML, were always higher where wheat was sown, with highest gross margins occurring when N fertilizer was applied. Applying N fertilizer to wheat did not significantly increase cotton lint yield and fibre quality, but increased gross margins of the cotton-wheat sequence due to higher wheat yield and protein percentage. Lint yield and fibre quality were decreased by sowing leguminous rotation crops. Management constraints such as lack of effective herbicides, insect damage, harvesting damage, and availability of suitable marketing options were greater with legumes than with wheat. Overall, wheat was a better rotation crop than grain legumes for irrigated cotton

Descriptors:chickpeas. crop-quality. crop-yield. faba-beans. growth. nitrate. organic-carbon. profitability. rotations. sequential-cropping. soil-compaction. soil-fertility. soil-structure. soil-types. Vertisols. wheat

Geographic Locator:Australia. New-South-Wales

Identifiers:soil quality

Organism Descriptors:Cicer-arietinum. Gossypium-hirsutum. Triticum. Triticum-aestivum. Vicia-faba

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Cicer. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Gossypium. Malvaceae. Malvales. Australia. Triticum. Poaceae. Cyperales. monocotyledons. Vicia

Subject Codes:FF005. FF100. JJ300. JJ600. EE110. FF150. JJ700. JJ800

Supplementary Info:33 ref

ISSN:0004-9573

Year:2001

Journal Title:Australian Journal of Soil Research

73. Title:Soil factors affecting the availability of potassium to plants for Western Australian soils: a glasshouse study

View Article: Australian Journal of Soil Research. 2001. 39 (3). 611-625

CD Volume:338

Print Article: Pages: 611-625

Author(s):Pal Y Gilkes R J Wong M T F

Author Affiliation:Department of Soil Science and Plant Nutrition, The University of Western Australia, Nedlands, WA 6009, Australia

Language:English

Abstract:A glasshouse experiment was conducted with 41 surface and 8 subsurface soils to measure their potassium (K) supply capacities and K depletion of soils by ryegrass (Lolium perenne) grown for 260 days and harvested at approx equal to 40-day intervals. Dry matter yield ranged from 0.22 g to 25.4 g/kg soil, cumulative K uptake ranged from 0.006 to 1.49 cmol/kg soil, and values of K concentration (%) in the first cut herbage ranged from 0.40 to 5.97%. Some of the light-textured soils have low K content, that symptoms of K deficiency appeared during the first growth period. Water-soluble K + exchangeable K accounted for 43-100% of cumulative K uptake by the ryegrass. Multiple regression analysis indicated that 68% of the variation in dry matter yield and 90% of the variation in K uptake may be predicted by the exchangeable K content of these soils. The 6 harvests of ryegrass extracted only 0.21-12.07% of total K from these soils, which was not sufficient to cause discernible mineralogical changes in most soils. For some soils, vermiculite was formed at the expense of illite/mica by K release to plants. For soils containing vermiculite but no other K-bearing clay minerals, vermiculite peaks broadened on K depletion by plants. Major proportions of total K in

these soils are present in silicate minerals, yet only minor amounts are released to plants by very slow weathering processes. For soils that do not contain any K bearing clay minerals, very minor amounts of felspar may have dissolved to release K
Descriptors:clay-minerals. exchangeable-potassium. felspar. illite. mica. nutrient-availability. nutrient-uptake. plant-nutrition. potassium. silicates. soil-chemical-properties. soil-fertility. soil-properties. vermiculite
Geographic Locator:Western-Australia
Organism Descriptors:Lolium-perenne
Supplemental Descriptors:Lolium. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australia. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:FF007. FF060. FF061. JJ200. JJ600
Supplementary Info:31 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research
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74. Title:New horizons in soil fertility management
View Article: Australian Journal of Soil Research. 2001. 39 (4). 683-710
CD Volume:338
Print Article: Pages: 683-710
Author(s):Price G H
Author Affiliation:Incitec Fertilizers, PO Box 140 Morningside, Qld 4170, Australia
Language:English
Abstract:As the 21st century dawns, we can reflect on the progress made during the 20th century in the fields broadly covered by soil fertility and its management and see that progress has been truly amazing. When we consider the many aspects of soil fertility measurement, the management practices, the changes in productivity, the awareness of the off-site effects of management practices, and the speed with which changes can be implemented, we can but wonder what advances the next 100 years will bring. We can cast our minds back to where the science of soil fertility and its management was at the turn of the 20th century, track the progress since then, and finally discuss where the major advances in the next 10 years are likely to occur
Descriptors:application-rates. fertilizers. soil-analysis. soil-fertility. soil-management. soil-testing
Subject Codes:JJ600. JJ700
Supplementary Info:70 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research
Copyright:Copyright CAB International

75. Title:Changes in organic and inorganic sulfur fractions and S mineralisation in a Typic Haplustert after long-term cropping with different fertiliser and organic manure inputs
View Article: Australian Journal of Soil Research. 2001. 39 (4). 737-748
CD Volume:338
Print Article: Pages: 737-748
Author(s):Reddy K S Muneshwar Singh Tripathi A K Swarup A Dwivedi A K
Author Variant:Singh-M
Author Affiliation:Indian Institute of Soil Science, Nabi Bagh, Berasia Road, Bhopal - 462 038, India

Language:English
Abstract:Changes in the status of organic and inorganic pools of soil sulfur (S), total nitrogen (N), and organic carbon, and their interrelationships and S mineralization were examined on a Typic Haplustert soil after a 27-year long-term cropping. Since the start of the experiment in 1972, an annual 3-crop rotation of soyabean (Glycine max), wheat (Triticum aestivum), and fodder maize (Zea mays) has been followed up to 1994. The results indicated that NPK(+S) applied for 27 years at 50, 100, and 150% of optimum recommended rates and 100% NPK(+S) with farmyard manure (FYM) increased the organic C and total N status of soil compared with the control and the initial status of the soil. Intensive cropping with continuous use of 100% NPK without S resulted in depletion of total, organic, and inorganic S concentrations by 18.13, 17.80, and 21.72%, respectively, over the control, while the status of total, organic and inorganic S improved in plots that received graded rates of S with NPK and NPK plus FYM. Intensive cropping with continuous use of S-free NPK fertilizer (100% NPK-S) resulted in the widest C:N:S ratio in the soil. NaHCO3-extractable total, inorganic, and organic S fractions and NaOH-extractable total and inorganic S fractions were found to be better indices of soil S mineralization than CaCl2-extractable inorganic S. Cumulative amounts of S mineralized during a 14-week incubation period varied between 2.3 and 21.3 mg S/kg soil and increased with an increase in the rates of S applied, along with NPK fertilizers. Incorporation of FYM with 100% NPK(+S) resulted in greater cumulative mineralized S over 10% NPK(+S) alone. The cumulative mineralized S showed a quadratic relationship with the duration of incubation in all the treatments
Descriptors:application-rates. calcium-chloride. farmyard-manure. intensive-cropping. maize. nitrogen. NPK-fertilizers. organic-carbon. sodium-bicarbonate. sodium-hydroxide. soil-fertility. soyabeans. sulfur. Vertisols. wheat
Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Triticum. Triticum-aestivum. Zea-mays
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Triticum. Poaceae. Cyperales. monocotyledons. Zea
Subject Codes:FF150. JJ200. JJ600. JJ700. XX100. FF005. FF007
Supplementary Info:34 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research

76. Title:Changes in the surface charge characteristics of degraded soils in the wet tropics through the addition of beneficiated bentonite
View Article: Australian Journal of Soil Research. 2001. 39 (5). 991-1001
CD Volume:338
Print Article: Pages: 991-1001
Author(s):Noble A D Gillman G P Nath S Srivastava R J
Author Affiliation:CSIRO Land and Water, Davies Laboratory, Private Mail Bag, PO Aitkenvale, Townsville, Qld 4814, Australia
Language:English
Abstract:In their pristine state, soils of the wet tropics maintain highly productive climax rainforests that have an intrinsically tight nutrient cycling capacity. When these ecosystems are disturbed and placed under agronomic production, soil organic matter is rapidly lost due to continuous stirring of surface soils, and consequently, there is a rapid decline in fertility. In this study, a methodology

is presented that quantifies the degree of degradation that an agronomic system has undergone since land conversion. In an effort to reverse this degradation, a glasshouse study was undertaken to evaluate the effect of applying beneficiated bentonite clays on the surface charge characteristics of 2 degraded soils and their influence on the growth of sorghum. The properties of an Oxisol cleared of climax rain forest 53 years previously and currently under tea production were compared with an adjacent undisturbed forest in Queensland, Australia. Soil pH declined by approximately 0.6 unit. Organic carbon levels decreased dramatically under the disturbed site, along with exchangeable basic cations. The degree of degradation associated with changed land use was estimated to be 85% for the surface soil horizon. In an effort to remediate the aforementioned degraded Oxisol and a similarly degraded light-textured Ultisol currently under sugarcane, varying rates (0-40 tonnes/ha) of beneficiated (Ca2+, Mg2+, and K+ saturated in a ratio of 8:4:1) bentonite were applied. Charge fingerprints were produced for each treatment prior to and after the growing of a sorghum crop. The basic cation exchange capacity at soil pH was increased from 1.15 to 3.00 cmolc/kg on a light-textured Ultisol and from 0.8 to 2.00 cmolc/kg on the Oxisol through the addition of beneficiated bentonites. This increase in surface charge was found to be permanent. Concomitant with the improved charge characteristics was a significant and sustained increase in forage sorghum biomass production with increasing additions of bentonites on both soil types. The cumulative increase in yield between the control and 40 tonnes/ha bentonite application was a 7.7- and 3.1-fold increase for the Ultisol and Oxisol soil types, respectively

Descriptors:bentonite. cations. charges. clay-minerals. Oxisols. soil-chemical-properties. soil-degradation. soil-organic-matter. soil-types. Ultisols

Geographic Locator:Australia. Queensland

Identifiers:remediation

Organism Descriptors:Sorghum

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:JJ200. JJ600. PP600

Supplementary Info:15 ref

ISSN:0004-9573

Year:2001

Journal Title:Australian Journal of Soil Research

77. Title:Effects of rundown in soil hydraulic condition on crop productivity in south-eastern Queensland - a simulation study

View Article: Australian Journal of Soil Research. 2001. 39 (5). 1111-1129

CD Volume:338

Print Article: Pages: 1111-1129

Author(s):Connolly R D Freebairn D M Bell M J Thomas G

Author Affiliation:Agricultural Productions Systems Research Unit, Queensland Department of Natural Resources, PO Box 318, Toowoomba, Qld 4350, Australia

Language:English

Abstract:Declining soil organic matter levels because of cropping have been shown to reduce crop growth and yield, but the effects of changing infiltration and soil hydraulic properties on crop productivity have not been widely evaluated. Cropping systems in south-eastern Queensland have, in the past, involved intense tillage, trafficking

with heavy machinery, and changed organic matter cycling, affecting soil aggregation, permeability, water holding characteristics, and organic matter. The aim of this paper is to determine how important infiltration and soil hydraulic condition has been to the water balance, crop growth, and yield in the past, and may be in the future if management is not changed. Change in physical and chemical condition of the 5 most commonly cropped soils in southeast Queensland, Australia (Sodosols, Vertosols with less than or equal to 55% clay, Vertosols with >55% clay, Red Ferrosols and Red Chromosols/Kandosols) was measured over 0-70 years of cropping and estimated up to 200 years. The APSIM model was used to predict effects of changing soil condition in a rain-fed, fertilized, wheat-summer fallow cropping system with intense tillage. Decline in infiltration, restricted internal redistribution of water, and increased evaporation reduced water supply to the crop, causing simulated yield to decline by 29, 38, 25, 17, and 13% for the 5 soils, respectively, after 50 years of cropping. Gross margin declined at a faster rate, falling by 36, 50, 40, 20, and 21%, respectively after 50 years because of increasing fertilizer requirement to compensate for declining soil fertility. Crop productivity on most soils continued to steadily decline as period of cropping increased to 200 years. To arrest or reverse this downward trend, it is likely that substantial changes to current cropping systems will be needed, including reducing tillage and trafficking, and improving organic matter levels

Descriptors:crop-yield. cropping-systems. growth. hydraulic-conductivity. infiltration. simulation-models. soil-types. water-balance. wheat

Geographic Locator:Australia. Queensland

Organism Descriptors:Triticum. Triticum-aestivum

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF150. JJ300. JJ900. ZZ100. FF005

Supplementary Info:48 ref

ISSN:0004-9573

Year:2001

Journal Title:Australian Journal of Soil Research

78. Title:Long-term effects of intercropping and bio-litter recycling on soil biological activity and fertility status of sub-tropical soils

View Article: Bioresource Technology. 2001. 76 (2). 143-150

CD Volume:367

Print Article: Pages: 143-150

Author(s):Manna M C Singh M V

Author Affiliation:Indian Institute of Soil Science, Nabibagh, Berasia Road, Bhopal 462038, India

Language:English

Abstract:On-farm field experiments were carried out at two sites in Gujarat, India, having 38- and 10-year-old orchard cropping systems to evaluate changes in organic carbon accumulation and chemical and microbiological properties of the soils. Under a system of different intercropped fruit trees, the cultivation of coconut (Cocos nucifera) intercropped with guava (Psidium guajava) enhanced the soil microbial activity approximately 2-fold after 38 years over 10 years of the same intercropped system. Soil organic carbon increased from 3.4 to 7.8 and 2.4 to 6.2 g kg-1 after 38 and 10 years, respectively, following the establishment of orchards. The increase was attributed

to greater recycling of bio-litters. Levels of dehydrogenase, phosphatase and soil microbial biomass under field conditions generally depended more on the nature of the cropping system than on soil types. Similarly, average carbon inputs of bio-litter to the soil in monocrop (0.98 t ha-1 yr-1) was less than intercropped fruit trees (2.07 t ha-1 yr-1). The average level of soil microbial biomass carbon was 1158 kg ha-1 (0-0.15 m depth) and the organic carbon turnover rate was 8.5 yr-1 after 38 years of intercropped fruit trees, which resulted in a lower ratio (1.81) of carbon inputs to soil microbial biomass carbon

Descriptors:intercropping. long-term-experiments. orchards. organic-carbon. soil-properties. coconuts. guavas. biological-activity-in-soil. soil. recycling. litter-(plant). cropping-systems. monoculture. biomass. microorganisms. cycling. soil-fertility

Geographic Locator:India. Gujarat

Identifiers:microbial biomass

Organism Descriptors:Cocos-nucifera. Psidium-guajava. Psidium

Supplemental Descriptors:Cocos. Arecaceae. Arecales. monocotyledons. angiosperms. Spermatophyta. plants. Psidium. Myrtaceae. Myrtales. dicotyledons. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India

Subject Codes:JJ100. JJ200. FF003. JJ600. FF150

Supplementary Info:23 ref

ISSN:0960-8524

Year:2001

Journal Title:Bioresource Technology

79. Title:Reclamation of a burned forest soil with municipal waste compost: macronutrient dynamic and improved vegetation cover recovery

View Article: Bioresource Technology. 2001. 76 (3). 221-227

CD Volume:367

Print Article: Pages: 221-227

Author(s):Guerrero C Gomez I Moral R Mataix Solera J Mataix Beneyto J Hernandez T

Author Affiliation:Department of Agrochemistry and Environment, University of Miguel Hernandez, 03202 Elche, Spain

Language:English

Abstract:The reclamation of burned soils in Mediterranean environments is of paramount importance in order to increase the levels of soil protection and minimise erosion and soil loss. The changes produced in the content of total organic carbon (TOC), N (Kjeldahl) and available P, K, Ca and Mg by the addition of different doses of a municipal solid waste compost to a burned soil were evaluated during one year. The effect of organic amendment on the improvement in the vegetation cover after one year was also evaluated. The organic amendment, particularly at a high dose, increased the TOC and N-Kjeldahl content of the soil in a closely related way. The levels of available K in soil were also enhanced by the organic amendment. Although the effects on all three parameters tended to decrease with time, their values in the amended soils were higher than in the control soil, which clearly indicates the improvement in the chemical quality of the soil brought about by the organic amendment. The available P content did not seem to be influenced by organic treatment, while available Mg levels were higher than in the control during the first 4 months following organic amendment. The application of compost to the burned soil improved its fertility and favoured rapid vegetal recovery, thus minimising the risk of soil erosion

Descriptors:burnt-soils. composts. erosion. forest-soils. reclamation. refuse-compost. soil-amendments. soil-conservation. soil-fertility
Geographic Locator:Mediterranean-Region
Subject Codes:PP400. PP300. JJ700. JJ600. XX300
Supplementary Info:32 ref
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology
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80. Title:Physico-chemical properties and productivity of a Nigerian Typic-Haplustult amended with fresh and burnt rice-mill wastes
View Article: Bioresource Technology. 2001. 76 (3). 265-272
CD Volume:367
Print Article: Pages: 265-272
Author(s):Nnabude P C Mbagwu J S C
Author Affiliation:Department of Biological Sciences, Nnamdi Azikiwe University, P.M.B. 5025, Awka, Anambra State, Nigeria
Language:English
Abstract:In order to arrest the declining productivity of the soils in the Abakaliki agro-ecological zone of S.E. Nigeria, four levels (12.5, 25.0, 37.5 and 50.0 Mg ha-1) of fresh (FW) and burnt (BW) rice-mill wastes abundant in the area, and a mixture of the waste+NPK and NPK alone were added to the soil (Typic-Haplustult) to evaluate their immediate and residual effects on the productivity of the soil using maize (Zea mays L.) as a test crop. Results showed a significant reduction in bulk density as well as improvements in total porosity and water stable aggregates (WSA>0.5 mm) at levels >12.5 Mg ha-1 of the FW amendments. Although both amendments failed to improve the soil pH, significant improvements in soil C, N and BS were obtained at 37.5 Mg ha-1 and above in both amendments. The highest relative increase (TF) of 135.1% and 102.8% in C and N in the first season and 94.4% and 99.3% in the second season were obtained in the FW at 50.0 Mg ha-1. The highest maize grain yields of 2.74 and 2.66 Mg ha-1 were obtained in the waste+NPK mixtures (FW/BW+NPK) in the first season. The residual yield was highest (1.45 Mg ha-1) in the FW amendment at 50.0 Mg ha-1. The results showed that regular and properly planned applications of these wastes can sustain the productivity of soils in this region
Descriptors:bulk-density. fertilizers. maize. NPK-fertilizers. organic-amendments. plant-residues. porosity. rice-byproducts. soil-amendments. soil-density. soil-fertility. soil-physical-properties. ultisols. yields
Geographic Locator:Nigeria
Organism Descriptors:Zea-mays
Supplemental Descriptors:West-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:JJ100. JJ200. JJ700. JJ600. XX200. FF005. FF100
Supplementary Info:31 ref
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology
Copyright:Copyright CAB International

81. Title:Nitrogen, carbon and phosphorus mineralization in soils from semi-arid highlands of central Mexico amended with tannery sludge
View Article: Bioresource Technology. 2001. 77 (2). 121-130

CD Volume:367
Print Article: Pages: 121-130
Author(s):Barajas Aceves M Dendooven L
Author Affiliation:Laboratory of Soil Ecology, Department of Biotechnology and Bioengineering, CINVESTAV-IPN, Avenida Instituto Politecnico Nacional 2508, Apartado Postal 14740, San Pedro Zacatenco, C.P. 07000, Mexico, DF, Mexico
Language:English
Abstract:Tannery sludge contains valuable nutrients and could be used as a fertilizer to pioneering vegetation in heavily eroded soils of the semiarid highlands of central Mexico. Soil collected under and outside the canopy of mesquite (Prosopis laevigata), huizache (Acacia tortuosa) and catclaw (Mimosa biuncifera), and cultivated with maize (Zea mays) and beans (Phaesolus vulgaris) was amended with 1.5 g tannery sludge/kg soil (or 210 kg dry sludge/ha), or left unamended. Amended and unamended soils were incubated aerobically for 70 days at 22 plus or minus 2 deg C and CO2 production, available P, and inorganic N concentrations were monitored. The CO2 production rate, total C and P, available P, biomass C and P were larger under the vegetation canopy than outside it. The soils were depleted of N as more than 50 mg N/kg soil could not be accounted for in the first days of the incubation. Nitrification showed a lag, which lasted 28 days, and the concentration of available P remained constant or increased slightly. Application of tannery sludge to soil increased CO2 production and inorganic N after 70 days, but available P did not increase. Application of tannery sludge increased C and N mineralization and could thus provide valuable nutrients to pioneer vegetation. Although no inhibitory effects on the biological functioning of the soil were found, further investigation into possible long-term environmental effects of the tannery sludge are necessary
Descriptors:beans. canopy. carbon-cycle. carbon-dioxide. eroded-soils. highlands. maize. mineralization. mineralization. nitrification. nitrogen-content. nitrogen-cycle. nutrient-availability. organic-amendments. organic-fertilizers. phosphorus. pioneer-species. rehabilitation. semiarid-zones. soil-amendments. soil-biology. soil-chemical-properties. soil-fertility. tannery-sludge. waste-utilization
Geographic Locator:Mexico
Identifiers:Phaesolus vulgaris. Prosopis laevigata
Organism Descriptors:Acacia-tortuosa. Mimosa-biuncifera. Prosopis. Zea-mays
Supplemental Descriptors:North-America. America. Developing-Countries. Threshold-Countries. Latin-America. OECD-Countries. Mimosa. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Acacia. Zea. Poaceae. Cyperales. monocotyledons. Prosopis
Subject Codes:JJ700. JJ600. JJ100. JJ200. KK600. KK100. XX400
Supplementary Info:47 ref
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology

82. Title:The potential for short rotation energy forestry on restored landfill caps
View Article: Bioresource Technology. 2001. 77 (3). 237-245
CD Volume:367
Print Article: Pages: 237-245
Author(s):Nixon D J Stephens W Tyrrel S F Brierley E D R

Author Affiliation:Institute of Water and Environment, Cranfield University at Silsoe, Bedfordshire MK45 4DT, UK
Language:English
Abstract:This review examines the potential for producing biomass on restored landfills using willow (Salix spp.) and poplar (Populus spp.) species in short rotation energy forestry. In southern England, the potential production may be about 20 t/ha of dry stem wood annually. However, actual yields are likely to be constrained by detrimental soil conditions, including shallow depth, compaction, low water holding capacity and poor nutritional status. These factors will affect plant growth by causing drought, waterlogging, poor soil aeration and nutritional deficiencies. Practical solutions to these problems include the correct placement and handling of the 'agricultural' cap material (a 0.5-1 m deep layer placed over the engineering cap - a layer of compacted clay material about 1 m deep - used to seal the completed landfill), soil amelioration using tillage and the addition of organic matter (such as sewage sludge), irrigation (possibly using landfill leachate), the installation of drainage, and the application of inorganic fertilizers. The correct choice of species and clone, along with good site management, are also essential if economically viable yields are to be obtained. Further investigations are required to determine the actual yields that can be obtained on landfill sites using a range of management inputs
Descriptors:biomass-production. choice-of-species. constraints. coppice. drainage. drought. fertilizers. irrigation. landfills. nutrient-deficiencies. organic-fertilizers. reclamation. reviews. short-rotation-forestry. silviculture. site-preparation. soil-air. soil-fertility. soil-toxicity. tillage. waterlogging
Geographic Locator:England. UK
Organism Descriptors:Populus. Salix
Supplemental Descriptors:Salicaceae. Salicales. dicotyledons. angiosperms. Spermatophyta. plants. Great-Britain. UK. British-Isles. Western-Europe. Europe. Developed-Countries. Commonwealth-of-Nations. European-Union-Countries. OECD-Countries
Subject Codes:KK110. PP400. JJ600. JJ700. JJ800. JJ900. FF700. FF061
Supplementary Info:Many ref
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology

83. Title:Characteristics of wood ash and influence on soil properties and nutrient uptake: an overview
View Article: Bioresource Technology. 2001. 77 (3). 287-295
CD Volume:367
Print Article: Pages: 287-295
Author(s):Demeyer A Nkana J C V Verloo M G
Author Affiliation:Department of Applied Analytical and Physical Chemistry, University of Gent, Coupure Links 653, Belgium
Language:English
Abstract:Wood industries and power plants generate enormous quantities of wood ash. Disposal in landfills has been for long a common method for removal. New regulations for conserving the environment have raised the costs of landfill disposal and added to the difficulties for acquiring new sites for disposal. Over several decades a number of studies have been carried out on the utilization of wood ash in agriculture and forestry as an alternative method for disposal. Because of their properties and their influence on soil chemistry,

the utilization of wood ash is particularly suited for the fertility management of acid tropical soils and forest soils. This review principally focuses on ash from the wood industry and power plants, and considers its physical, chemical and mineralogical characteristics, its effect on soil properties, on the availability of nutrient elements and on the growth and chemical composition of crops and trees, as well as its impact on the environment
Descriptors:acid-soils. effects. fertilizers. forest-soils. nutrient-availability. physicochemical-properties. reviews. soil-amendments. soil-properties. tropical-soils. waste-disposal. waste-utilization. wood-ash
Subject Codes:JJ700. PP400. KK540
Supplementary Info:42 ref
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology

84. Title:Crop residue addition effects on myriad forms and sorption of phosphorus in a Vertisol
View Article: Bioresource Technology. 80 (2). November, 2001. 93-99
CD Volume:368
Print Article: Pages: 93-99
Author(s):Reddy D Damodar Rao A Subba Singh M
Author Affiliation:Division of Soil Chemistry and Fertility, Indian Institute of Soil Science, Nabibagh, Berasia Road, Bhopal, Madhya Pradesh, 462 038: ddr@iiss.mp.nic.in
Language:English
Language of Summary:English (EN)
Abstract:Crop residues are a vital organic resource and their extensive use in soil management for sustainable agriculture is widely advocated. The effects of soybean residue (SR) and wheat residue (WR) applied alone or in combination with fertilizer P (FP) on dynamics of labile P, distribution of P fractions and P sorption in a Vertisol (Typic Haplustert) were assessed in a 16 week long incubation study. The amount of P added through crop residues, FP or their combination was kept constant at 10 mg P kg-1 soil. Addition of SR or WR resulted in net increase of labile inorganic (Pi) and organic (Po) P, and microbial P throughout the incubation period, except that the WR decreased labile Pi during the first two weeks due to Pi immobilization. Integration of FP with SR had no added benefit compared to SR alone, while use of FP + WR proved better in ensuring short-term P availability by offsetting initial P immobilization associated with WR alone. Sequential fractionation of soil P at the end of 16 weeks showed that addition of SR and WR alone or in combination with FP favoured a build-up in labile Pi and Po (NaHCO3-Pi and -Po), and moderately labile Po (NaOH-Po) fractions at the expense of recalcitrant P (HCl-P). The P sorption capacity of soil and P required to maintain optimum solution P concentration of 0.2 mg P l-1 also decreased with addition of these crop residues. The implication of the results of this study is that soybean and wheat residues can potentially improve soil P fertility by increasing labile Pi and Po, and moderately labile Po fractions, decreasing P sorption and concomitantly causing dissolution of recalcitrant P in soil
Descriptors:Vertisol: phosphorus sorption properties; bioresource technology; crop residues: addition effects, uses; soil fertility studies; soil management; soils. Agriculture; Waste Management (Sanitation); Soil

Science. phosphorus: sorption studies; phosphorus fractions: analysis
Organism Descriptors:soybean (Leguminosae); wheat (Gramineae)
Supplemental Descriptors:Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae; Leguminosae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Agriculture; Waste Management (Sanitation); Soil Science
ISSN:0960-8524
Year:2001
Journal Title:Bioresource Technology

85. Title:Characterization of litter falls and their contributions to soil nutrients in a mangrove in French Guyana
View Article: Canadian Journal of Botany. 79 (2). February, 2001. 238-249
CD Volume:360
Print Article: Pages: 238-249
Author(s):Betoulle Jean Luc Fromard Francois Fabre Andre Puig Henri
Author Affiliation:Laboratoire d'Ecologie Terrestre, Unite Mixte de Recherche, Centre National de la Recherche Scientifique - UPS, 13, Avenue du Colonel Roche, 31 029, Toulouse Cedex 4: Francois.Fromard@cict.fr
Other Title:Caracterisation des chutes de litiere et des apports au sol en nutriments dans une mangrove de Guyane francaise
Language:French
Language of Summary:English (EN); French (FR)
Abstract:Litter falls and their contributions to soil nutriments were measured in five distinct facies of a mangrove in French Guyana. These facies were characterized by their distance from the sea, their floral composition (Laguncularia racemosa (L.), Avicennia germinans (L.) Stearn, Rhizophora spp.), and their structural features. Data were analyzed according to facies and to species for litters, as well as to seasons for the nutriments. This mangrove produced respectively 8.8 and 8.7 tcntdotha-1cntdotyear-1 of litter at the pioneer and senescent stages submitted to strong environmental constraint and 12.5 and 12.6 tcntdotha-1cntdotyear-1 for young and mature stages where developmental conditions are optimum. Nitrogen and carbon inputs were estimated to 1.3 X 10-2 and 6.4 tcntdotha-1cntdotyear-1, respectively. Litter appeared rich in phosphorous, corresponding with the high concentrations characterizing the sediments. For a given species, magnesium and calcium concentrations were constant between facies, whereas potassium and sodium concentrations varied according to the distance from the sea. Differences were perceived between species for all nutriments except sodium. Results are discussed in relation with the ecophysiological characteristics of the mangrove trees and the specific sedimentology of Guyana coast and are replaced in the perspective of an improved knowledge of the carbon and mineral balances in tropical coastal ecosystems
Descriptors:carbon balance; litter fall characterization; mangrove; mineral balance; soil fertility; spatial variation; tropical coastal ecosystem. Estuarine Ecology (Ecology, Environmental Sciences); Nutrition; Soil Science. soil nutrients
Geographic Locator:French Guyana [French Guiana] (South America, Neotropical region)
Organism Descriptors:Avicennia germinans (Verbenaceae); Laguncularia racemosa (Combretaceae); Rhizophora spp. (Rhizophoraceae)
Supplemental Descriptors:Combretaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Rhizophoraceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Verbenaceae: Dicotyledones, Angiospermae,

Spermatophyta, Plantae. Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Estuarine Ecology (Ecology, Environmental Sciences); Nutrition; Soil Science
ISSN:0008-4026
Year:2001
Journal Title:Canadian Journal of Botany

86. Title:The influence of edaphic and competitive factors on productivity of marsh reed grass (Calamagrostis canadensis) in a cooperative pathosystem
View Article: Canadian Journal of Botany. 79 (7). July, 2001. 805-814
CD Volume:360
Print Article: Pages: 805-814
Author(s):Winder Richard S Macey Donna E
Author Affiliation:Pacific Forestry Centre, Natural Resources Canada, Canadian Forest Service, 506 West Burnside Road, Victoria, BC, V8Z 1M5: rwinder@pfc.forestry.ca
Language:English
Language of Summary:English (EN); French (FR)
Abstract:Calamagrostis canadensis (Michx.) Beauv., marsh reed grass, hinders the regeneration of conifer seedlings. The influence of nutrients, autoallelopathy, and intraspecific competition on the productivity of greenhouse-grown marsh reed grass inoculated with a combined Fusarium avenaceum (Fr.:Fr.) Sacc. - Pseudomonas sp. pathosystem was studied. The productivity of uninoculated plants increased following fertilization, but these increases were not observed in inoculated plants. Leaf damage in inoculated plants was enhanced by P and K fertilization, but shoot height was not affected. Autoallelopathic straw extract interacted with intraspecific competition to nearly double pathogenic inhibition of shoot growth at high levels of competition. The straw extract also interacted with N fertilizer to reduce shoot productivity. Shoot growth was inhibited at higher levels of intraspecific competition. Responses to nutrients, autoallelopathy, and competition may be useful in developing improved biological control strategies
Descriptors:competitive factors; cooperative pathosystem; edaphic factors; fertility; fertilization; intraspecific competition; soil ecology. Pest Assessment Control and Management. Calamagrostis canadensis straw extract: autoallelopathic; nitrogen: fertilizer; phosphorus: fertilizer; potassium: fertilizer
Organism Descriptors:Calamagrostis canadensis [marsh reed grass] (Gramineae): productivity; Fusarium avenaceum (Fungi Imperfecti or Deuteromycetes): bioherbicide; Pseudomonas sp. (Pseudomonadaceae): bioherbicide. leaf: damage; shoot: growth inhibition, height, productivity
Supplemental Descriptors:Fungi Imperfecti or Deuteromycetes: Fungi, Plantae; Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae; Pseudomonadaceae: Gram-Negative Aerobic Rods and Cocci, Eubacteria, Bacteria, Microorganisms. Angiosperms; Bacteria; Eubacteria; Fungi; Microorganisms; Monocots; Nonvascular Plants; Plants; Spermatophytes; Vascular Plants
Subject Codes:Pest Assessment Control and Management
ISSN:0008-4026
Year:2001
Journal Title:Canadian Journal of Botany

87. Title:Characterization of Pinus ectomycorrhizas from mixed conifer and pygmy forests using morphotyping and molecular methods
View Article: Canadian Journal of Botany. 79 (10). October, 2001. 1211-1216
CD Volume:360
Print Article: Pages: 1211-1216
Author(s):Wurzburger Nina Bidartondo Martin I Bledsoe Caroline S
Author Affiliation:Warnell School of Forest Resources, University of Georgia, Athens, GA, 30602-2152: wurzburg@arches.uga.edu
Language:English
Language of Summary:English (EN); French (FR)
Abstract:We used morphotyping and molecular methods to characterize ectomycorrhizas of bishop pine (Pinus muricata D. Don) and Bolander pine (Pinus contorta ssp. bolanderi (Parl.) Critchf.) from mixed conifer and hydric pygmy forests on the northern California coast. Sixteen ectomycorrhizal morphotypes were described, producing 15 internal transcribed spacer restriction fragment length polymorphism (ITS-RFLP) types, and 12 were identified via ITS sequencing. From a given site, all root tips of a specific morphotype produced identical ITS-RFLP patterns. However, sometimes two morphotypes produced the same ITS-RFLP type, and sometimes samples of the same morphotype from two different sites produced two different ITS-RFLP types. These results indicate that surveys of ectomycorrhizal fungi based on morphology alone are not sufficient, and that grouping morphotypes prior to molecular analysis can expedite the process. Ectomycorrhizas from mixed conifer included Russuloid sp., Tomentella sublilacina (Ellis & Holw.) Wakef., Tuber sp., and two Thelephoroid species. Ectomycorrhizas from hydric pygmy included two Dermocybe spp., a Cortinarius sp., two Thelephoroid spp., and Suillus tomentosus (Kauffman) Singer. Both plant communities contained Cenococcum geophilum Fr.:Fr. The hydric pygmy sites were more similar to each other than to the mixed conifer site (Jaccard similarity). The presence of ectomycorrhizal taxa in one plant community type may reflect biotic (host specificity) or abiotic (soil fertility or hydrology) adaptation
Descriptors:ectomycorrhizal colonization; ectomycorrhizal morphotypes; ericoid colonization; microtopography; mixed conifer forest: habitat; pygmy forest: habitat. Infection; Molecular Genetics (Biochemistry and Molecular Biophysics); Morphology; Terrestrial Ecology (Ecology, Environmental Sciences)
Geographic Locator:California (USA, North America, Nearctic region)
Organism Descriptors:Cenococcum geophilum (Fungi Imperfecti or Deuteromycetes): symbiont; Cortinarius sp. (Basidiomycetes): symbiont; Dermocybe spp. (Basidiomycetes): symbiont; Pinus contorta ssp. bolanderi (Coniferopsida): host; Pinus muricata (Coniferopsida): host; Suillus tomentosus (Basidiomycetes): symbiont; Tomentella sublilacina (Basidiomycetes): symbiont; ectomycorrhizal fungi (Fungi): symbiont
Supplemental Descriptors:Basidiomycetes: Fungi, Plantae; Coniferopsida: Gymnospermae, Spermatophyta, Plantae; Fungi Imperfecti or Deuteromycetes: Fungi, Plantae; Fungi: Plantae. Fungi; Gymnosperms; Microorganisms; Nonvascular Plants; Plants; Spermatophytes; Vascular Plants
Subject Codes:Infection; Molecular Genetics (Biochemistry and Molecular Biophysics); Morphology; Terrestrial Ecology (Ecology, Environmental Sciences)
ISSN:0008-4026
Year:2001
Journal Title:Canadian Journal of Botany

88. Title:Productivity, resource use, and competitive interactions of Fraxinus uhdei in Hawaii uplands
View Article: Canadian Journal of Forest Research. 2001. 31 (1). 132-142
CD Volume:365
Print Article: Pages: 132-142
Author(s):Ares A Fownes J H
Author Affiliation:Department of Agronomy and Soil Science, University of Hawaii at Manoa, 1910 East-West Road, Honolulu, HI 96822, USA
Language:English
Language of Summary:french
Abstract:We examined stand growth, canopy development, and resource use of Fraxinus uhdei, a non-indigenous tree grown in Hawaii, USA, and its interaction with the native N-fixing tree Acacia koa. Along a gradient of decreasing rainfall with elevation (670 to 1450 m), on Histosols, F. uhdei had decreased stand basal area, productivity, and canopy development. At high-elevation sites, productivity of F. uhdei was limited by N, and F. uhdei benefited from association with A. koa, as (i) foliar N content of F. uhdei was positively related to aboveground net primary productivity (ANPP), (ii) leaf area index, biomass increment, and ANPP of F. uhdei increased in a single-species stand after N additions, but there was no response by either F. uhdei or A. koa in a mixed stand, and (iii) productivity of F. uhdei in mixed stands with A. koa at high-elevation sites was greater than in single-species stands, and F. uhdei foliage was enriched with N in proportion to the fraction of stand basal area in A. koa. Seemingly, growth of F. uhdei on Histosols was also limited by water availability, as an index of carbon isotope composition of leaves (delta 13C), and, therefore, intrinsic water-use efficiency (WUE) increased with elevation. Biomass production of F. uhdei stands per unit leaf area and per unit intercepted radiation (epsilon) decreased with increasing elevation on Histosols. Decreased nitrogen-use efficiency and epsilon of F. uhdei on Histosols were both traded off against increased WUE
Descriptors:altitude. basal-area. biomass-production. canopy. chemical-composition. forests. growth. Histosols. increment. leaf-area-index. leaves. light-relations. mixed-forests. nitrogen-content. nitrogen-fixing-trees. plant-composition. plant-nutrition. soil-fertility. soil-types. soil-water-content. trees. use-efficiency. water-use-efficiency
Geographic Locator:Hawaii. USA
Organism Descriptors:Acacia-koa. Fraxinus-uhdei
Supplemental Descriptors:Acacia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Fraxinus. Oleaceae. Scrophulariales. Polynesia. Oceania. Pacific-Islands. Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:FF040. FF060. JJ600. KK100. KK110. KK600. FF061. FF062. JJ300
Supplementary Info:48 ref
ISSN:0045-5067
Year:2001
Journal Title:Canadian Journal of Forest Research

89. Title:Estimating forest productivity in the eastern Siskiyou mountains of southwestern Oregon using a satellite driven process model, 3-PGS
View Article: Canadian Journal of Forest Research. 2001. 31 (1). 143-154
CD Volume:365
Print Article: Pages: 143-154
Author(s):Coops N C Waring R H

Author Affiliation:CSIRO Forestry and Forest Products, Private Bag 10, Clayton South 3169, Melbourne, Australia
Language:English
Language of Summary:french
Abstract:The 3-PGS (physiological principles for predicting growth using satellite data) model generates monthly estimates of transpiration, photosynthesis, and net primary production, the last derived as a fixed proportion (0.47) of gross photosynthesis. To assess the reliability of 3-PGS in predicting the productive capacity of coniferous forest across diverse landscapes in southwestern Oregon, USA, we first used a geographic information system to display and manipulate basic data. This involved the following steps: (i) extrapolate monthly mean weather data to reflect topographic variation; (ii) transform monthly temperature extremes to spatial resolution of 4 ha and estimate incoming solar radiation, subfreezing days per month, daytime vapour pressure deficits, and mean temperatures; (iii) convert statewide soil survey maps into topographically adjusted estimates of soil fertility and water storage capacity (theta); and (iv) acquire satellite-derived estimates of the fraction of light intercepted by vegetation during midsummer. Model predictions of soil water availability during summer months compared well with those reported from published measurements of predawn water potentials at three contrasting sites and with measurements acquired at the end of seasonal drought at 18 sites (r2=0.78 with mean monthly modelled drought index; r2=0.57 with seasonal modelled drought index). Similarly, seasonal shifts in the relative importance of various climatic and edaphic variables closely matched those defined in previously published studies. Finally, model predictions of maximum annual aboveground growth were compared with those derived from forestry yield tables based on height-age relationships with a resulting r2 of 0.76, and a standard error of 1.2 m3 ha-1 year-1 (P<0.01)
Descriptors:biological-production. coniferous-forests. estimation. forest-soils. forests. geographical-information-systems. growth-models. plant-water-relations. productivity. satellite-imagery. seasonal-variation. site-class-assessment. soil-fertility. soil-water. soil-water-balance. water-availability. water-potential. water-stress. weather-data
Geographic Locator:Oregon. USA
Supplemental Descriptors:Pacific-Northwest-States-of-USA. Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:KK100. ZZ100. JJ300. JJ500. KK110
Supplementary Info:74 ref
ISSN:0045-5067
Year:2001
Journal Title:Canadian Journal of Forest Research

90. Title:Seasonal nutrient transfers by foliar resorption, leaching, and litter fall in a northern hardwood forest at Lake Clair Watershed, Quebec, Canada
View Article: Canadian Journal of Forest Research. 2001. 31 (2). 333-344
CD Volume:365
Print Article: Pages: 333-344
Author(s):Duchesne L Ouimet R Camire C Houle D
Author Affiliation:Direction de la recherche forestiere, Foret Quebec, Ministere des Ressources naturelles du Quebec, 2700, rue Einstein, Sainte-Foy, QC G1P 3W8, Canada

Language:English
Language of Summary:french
Abstract:A descriptive temporal model was used to evaluate the flow of macronutrients (N, P, K, Ca and Mg) between the forest canopy and incident precipitation for the Lake Clair Watershed (LCW) located in the northern hardwood forest region of Quebec, Canada. The stand is uneven aged and dominated by sugar maple (Acer saccharum) in association with yellow birch (Betula alleghaniensis) and American beech (Fagus grandifolia). The model also quantified the resorption mechanism. Wet precipitation, throughfall, foliage and litter fall data for 1997 were used to quantify the following: (1) dry deposition intercepted by forest cover (0.38, 0.07, 0.07 and 0.03 kg.ha-1 for Ca, K, Mg and P, respectively); (2) leaching from foliage (1.81, 6.46, 0.48 and 0.13 kg.ha-1 for Ca, K, Mg and P, respectively); and (3) foliar resorption (N=65%, P=65%, K=42%, Mg=30% and Ca=10%). Foliar N, P and K pools increased after bud break and remained constant until mid-September when they decreased rapidly. The foliar Ca pool increased until leaf fall, while the foliar Mg pool reached a maximum in early July and decreased slowly until leaf senescence. Phosphorus, K, Ca and Mg were leached from the canopy whereas N from wet precipitation was retained by the canopy. The relatively high Mg and Ca resorption rates are consistent with the low soil Ca and Mg availability reported at the LCW. Consideration of leaching and dry deposition, as well as the temporal dimension, demonstrated the importance of each of these parameters for increasing the accuracy of the foliar nutrient resorption estimates
Descriptors:calcium. canopy. cycling. deciduous-forests. deposition. foliage. foliar-diagnosis. forest-litter. forest-soils. forests. leaching. magnesium. nitrogen. nutrients. phosphorus. plant-nutrition. potassium. resorption. seasonal-variation. soil-fertility. throughfall
Geographic Locator:Canada. Quebec
Identifiers:precipition
Organism Descriptors:Acer-saccharum. Betula-alleghaniensis. Fagus-grandifolia
Supplemental Descriptors:Acer. Aceraceae. Sapindales. dicotyledons. angiosperms. Spermatophyta. plants. Betula. Betulaceae. Fagales. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Fagus. Fagaceae. Canada
Subject Codes:KK100. PP500. FF061. JJ600. JJ200
Supplementary Info:46 ref
ISSN:0045-5067
Year:2001
Journal Title:Canadian Journal of Forest Research

91. Title:Growth responses following nitrogen and N-P-K-Mg additions to previously N-fertilized Scots pine and Norway spruce stands on mineral soils in Sweden
View Article: Canadian Journal of Forest Research. 2001. 31 (5). 899-909
CD Volume:365
Print Article: Pages: 899-909
Author(s):Jacobson S Pettersson F
Author Affiliation:The Forestry Research Institute of Sweden, Uppsala Science Park, SE-751 83 Uppsala, Sweden
Language:English
Language of Summary:french
Abstract:To study growth responses to reapplication of fertilizer, 12 Scots pine (Pinus sylvestris) and 6 Norway spruce (Picea abies) stands on mineral soils (Podzols) in Sweden, used in long-term nitrogen (N)

fertilizer application experiments (1989-92) were refertilized with N (urea, and/or ammonium nitrate alone or with lime), either alone or with various combinations and doses of phosphorus (P; 20-60 kg ha-1), potassium (K; 40-150 kg ha-1), and magnesium (Mg; 10-60 kg ha-1). Many of the experimental plots had previously been subjected to heavy N fertilizer application regimes over a period of 20-30 years. On average, for all the experiments, the latest N addition resulted in a significant growth increase, corresponding to 57% of the mean annual volume increment and comparable with the response to the initial fertilizer application. Differences in growth response between fertilizer application with N alone or in combination with P-K-Mg were in most cases insignificant for both tree species. Overall, the joint addition of P-K-Mg resulted in a non-significant additional growth increase of 0.2 m3 ha-1 year-1, corresponding to 6% of the N fertilizer application effect. Repeated additions of N alone had no effect on the P, K, and Mg concentrations in current-year needles. It was concluded that the repeated N fertilizer applications did not cause any serious nutrient deficiencies

Descriptors:ammonium-nitrate. application-rates. growth. increment. lime. long-term-experiments. magnesium-fertilizers. mineral-soils. nitrogen. nitrogen-fertilizers. nutrient-deficiencies. phosphorus-fertilizers. plant-nutrition. Podzols. potassium-fertilizers. residual-effects. soil-fertility. soil-types. urea

Geographic Locator:Sweden

Organism Descriptors:Picea-abies. Pinus-sylvestris

Supplemental Descriptors:Picea. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Pinus. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:FF060. FF061. JJ600. JJ700. KK110

Supplementary Info:41 ref

ISSN:0045-5067

Year:2001

Journal Title:Canadian Journal of Forest Research

92. Title:Intact soil-core microcosms compared with multi-site field releases for pre-release testing of microbes in diverse soils and climates

View Article: Canadian Journal of Microbiology. 47 (3). March, 2001. 237-252

CD Volume:365

Print Article: Pages: 237-252

Author(s):Gagliardi Joel V Angle J Scott Germida James J Wyndham R Campbell Chanway Christopher P Watson Robert J Greer Charles W McIntyre Terry Yu Hans H Levin Morris A Russek Cohen Estelle Rosolen Sarah Nairn James Seib Arlette Martin Heller Teresa Wisse Gesine

Author Affiliation:USDA-ARS, 151 Dixon Drive, Suite 4, Chestertown, MD, 21620: gagliarj@ba.ars.usda.gov

Language:English

Language of Summary:English (EN); French (FR)

Abstract:Intact soil-core microcosms were used to compare persistence of Pseudomonas chlororaphis 3732RN-L11 in fallow soil and on wheat roots with field releases at diverse sites. Parallel field and microcosm releases at four sites in 1996 were repeated with addition of one site in 1997. Microcosms were obtained fresh and maintained at 60% soil water holding capacity in a growth chamber at 70% relative humidity, a 12-hour photoperiod, and constant temperature. Persistence of 3732RN-L11 was measured at each site in field plots and microcosms at 7-21 day intervals, and in duplicate microcosms sampled at an independent laboratory. Linear regression slopes of field plot and microcosm persistence were compared for each site, and

between identical microcosms sampled at different sites, using log10 transformed plate counts. Microcosm persistence closely matched field plots for wheat roots, but persistence in fallow soil differed significantly in several instances where persistence in field plots was lower than in microcosms. Analysis of weather variations at each site indicated that rainfall events of 30-40 mm caused decreased persistence in fallow soil. Cooler temperatures enhanced persistence in field plots at later time points. Inter-laboratory comparison of regression slopes showed good agreement for data generated at different sites, though in two instances, longer sampling periods at one site caused significant differences between the sites. Soil characteristics were compared and it was found that fertility, namely the carbon to nitrogen ratio, and the presence of expanding clays, were related to persistence. These microcosm protocols produced reliable data at low cost, and were useable for pre-release risk analyses for microorganisms

Descriptors:carbon-nitrogen ratio; diverse climates; diverse soils; fallow soil; field plots; intact soil-core microcosm; microcosm persistence; microcosm release; multi-site field releases; parallel field release. Ecology (Environmental Sciences); Soil Science. carbon; nitrogen

Organism Descriptors:Pseudomonas chlororahis (Pseudomonadaceae): persistence, strain- 3732RN-L11; Triticum aestivum [hard red spring wheat] (Gramineae); microbe (Microorganisms): multi-site field releases, pre-release testing. root

Supplemental Descriptors:Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae; Microorganisms; Pseudomonadaceae: Gram-Negative Aerobic Rods and Cocci, Eubacteria, Bacteria, Microorganisms. Angiosperms; Bacteria; Eubacteria; Microorganisms; Monocots; Plants; Spermatophytes; Vascular Plants

Subject Codes:Ecology (Environmental Sciences); Soil Science

ISSN:0008-4166
Year:2001
Journal Title:Canadian Journal of Microbiology

93. Title:CMS-D8 restoration in cotton is conditioned by one dominant gene

View Article: Crop Science. 2001. 41 (2). 283-288
CD Volume:359
Print Article: Pages: 283-288

Author(s):Zhang J F Stewart J M
Author Affiliation:Dep. of Crop, Soil and Environmental Sciences, Univ. of Arkansas, Fayetteville, AR 72701, USA

Language:English

Abstract:Cytoplasmic male sterile (CMS-D8) and fertile restorer lines (D8R) of cotton (Gossypium hirsutum, AD1) were developed by transferring the cytoplasm and nuclear gene(s) from G. trilobum (D8) into the cotton nuclear background. Understanding the genetics of fertility restoration in this CMS system is essential for its use in a hybrid breeding system. The objective of this investigation was to determine the mode of inheritance of D8R restoration to CMS-D8. The experimental approach involved a series of crossing schemes involving nuclear permutations among the AD1 and D8 alloplasms. Eighteen normal genotypes did not restore fertility to the CMS-D8 (A line) and could be used as maintainer (B) lines. D8R crossed as female with B lines yielded F1 and F2 populations with all fertile plants. F1 pollen also produced all fertile progeny in crosses on A lines. Thus, the D8 restorer functions at the gametophytic level. When heterozygous restored plants were pollinated with B lines, or when reciprocal F1's with normal cytoplasm were crossed as male with the A

line, the progeny ratio was one fertile to one sterile. A 3 : 1 ratio was obtained when restored F1 plants with D8 cytoplasm were pollinated by their reciprocal F1's with normal cytoplasm. Accordingly, restoration of CMS-D8 by the D8R restorer is conditioned by a single dominant gene (Rf2). The genotypes for A, B and D8R lines in the CMS-D8 system are designated S (rf2rf2), N (rf2rf2), and S (Rf2Rf2), respectively. This gametophytic restoration system is potentially useful for utilizing F2 heterosis in cotton

Descriptors:cotton. crossing. cytoplasmic-male-sterility. dominance. fertility. genotypes. lines. pollination. restorer-genes. wild-relatives

Identifiers:Gossypium trilobum

Organism Descriptors:Gossypium. Gossypium-hirsutum

Supplemental Descriptors:Gossypium. Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. FF020. PP720

Supplementary Info:29 ref

ISSN:0011-183X

Year:2001

Journal Title:Crop Science

94. Title:Inheritance and genetic relationships of the D8 and D2-2 restorer genes for cotton cytoplasmic male sterility

View Article: Crop Science. 2001. 41 (2). 289-294

CD Volume:359

Print Article: Pages: 289-294

Author(s):Zhang J F Stewart J M

Author Affiliation:Dep. of Crop, Soil & Environmental Sciences, Univ. of Arkansas, Fayetteville, AR 72701, USA

Language:English

Abstract:In cotton (Gossypium hirsutum), cytoplasmic male sterility conditioned by the D8 alloplasm (CMS-D8) is independently restored to fertility by its specific D8 restorer (D8R) and by the D2 restorer (D2R) that was developed for the D2 cytoplasmic male sterile alloplasm (CMS-D2). However, knowledge of the relationship between the two restorer genes is lacking. The objectives of these studies were to determine the inheritance and genetic relationship between D2R and D8R. A series of intercrosses and test crosses were used to determine the inheritance and relationships. CMS-D2 lines crossed with D8R resulted in all sterile F1 plants, confirming that the D8 restorer gene does not suppress D2 cytoplasmic dysfunction. A segregation ratio of one fertile to one sterile in three testcross combinations revealed that D2R contained one restorer gene, Rf, for both CMS-D8 and CMS-D2. The Rf gene functioned sporophytically, whereas the D8R gene is known to function gametophytically. However, Rf pollen with the D8 or D2 cytoplasm was preferentially effective in fertilization based on the low number of sterile plants obtained when alloplasmic F1 plants were self-pollinated or used as the pollen-parent in crosses with CMS-D8. In tests for allelism, only 8 sterile plants out of 1921 were obtained in two testcrosses of (D8R x D2R)F1 x normal cotton. Thus, the two restorer loci are not allelic but are tightly linked with an average genetic distance of 0.93 cM. The D2 gene Rf is redesignated Rf1, and Rf2 is assigned to the D8 restorer gene

Descriptors:allelism. cotton. crosses. cytoplasmic-male-sterility. fertility. fertilization. genetic-distance. inheritance. loci. pollen. restorer-genes. segregation. self-pollination

Organism Descriptors:Gossypium. Gossypium-hirsutum

Supplemental Descriptors:Gossypium. Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. FF020
Supplementary Info:49 ref
ISSN:0011-183X
Year:2001
Journal Title:Crop Science
Copyright:Copyright CAB International

95. Title:Influence of organic amendments on copper distribution among particle-size and density fractions in Champagne vineyard soils
View Article: Environmental Pollution. 112 (3). 2001. 329-337
CD Volume:376
Print Article: Pages: 329-337
Author(s):Besnard E Chenu C Robert M
Author Affiliation:Unite de Science du Sol, INRA, Route de St Cyr, 78026, Versailles Cedex: chenu@versailles.inra.fr
Language:English
Language of Summary:English (EN)
Abstract:The intensive use for over 100 years of copper sulfate (Bordeaux mixture) to fight against mildew in vineyard soils has led to an important, widespread accumulation of Cu (100 to 1500 mg Cu kg-1 soil). In Champagne vineyards, organic amendments are used currently to increase soil fertility and to limit soil erosion. Organic amendments may have a direct effect on the retention of Cu in the soil. To assess the influence of the organic management on the fate of Cu in calcareous Champagne vineyard soils, we studied Cu distribution (1) in the soil profile and (2) among primary soil particles, in vineyard parcels with different amendments. Amendments were oak-bark, vine-shoots and urban compost. The results were compared with the amount and the distribution of Cu in an unamended calcareous soil. Physical soil fractionations were carried out to separate soil primary particles according to their size and density. Cu has a heterogeneous distribution among soil particle fractions. Two fractions were mainly responsible for Cu retention in soils: the organic debris larger than 50 mum or coarse particulate organic matter (POM) issued from the organic amendments, and the clay-sized fraction < 2 mum. The POM contained up to 2000 mg Cu kg-1 fraction and the clay fraction contained up to 500 mg Cu kg-1 fraction. The clay-sized fraction was responsible for almost 40% of the total amount of Cu in the four parcels. POM was predominantly responsible for the differences in Cu contents between the unamended and the three amended parcels. Our results attested that methods of soil particle-size fractionation can be successfully used to assess the distribution of metal elements in soils
Descriptors:Champagne vineyard soils: density fractions, particle-size fractions; coarse particulate organic matter; organic amendments; organic debris; physical soil fractionation; soil fertility; urban compost. Biochemistry and Molecular Biophysics; Pollution Assessment Control and Management; Soil Science. copper sulfate: environmental contaminant, heterogenous distribution, pollutant, soil retention
Geographic Locator:Champagne (France, Europe, Palearctic region)
Subject Codes:Biochemistry and Molecular Biophysics; Pollution Assessment Control and Management; Soil Science
ISSN:0269-7491
Year:2001
Journal Title:Environmental Pollution
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96. Title:Growth and yield responses of spring wheat (Triticum aestivum L. cv. Minaret) to elevated CO2 and water limitation

View Article: Environmental Pollution. 114 (2). 2001. 187-194
CD Volume:376
Print Article: Pages: 187-194
Author(s):Schuetz M Fangmeier A
Author Affiliation:Institut fuer Pflanzenoekologie, Heinrich-Buff-Ring 26-32, D-35392, Giessen: michael.schuetz@bot2.bio.uni-giessen.de, andreas.fangmeier@bot2.bio.uni-giessen.de
Language:English
Language of Summary:English (EN)
Abstract:Spring wheat (Triticum aestivum L. cv. Minaret) was grown at two different CO2 concentrations (367 and 650 mumol mol-1) in open-top-chambers from sowing until final harvest. Furthermore two different watering treatments (well watered and water stressed) and two soil types of different fertility were used. At final harvest, which took place at growth stage 92, plants were separated into different fractions. Elevated atmospheric CO2 caused an accelerated chlorophyll-a breakdown and increased growth and yield. Total shoot biomass was enhanced by 43%, grain yield by 46% and main stem yield by 19%. Water stress also accelerated chlorophyll-a breakdown but reduced total shoot biomass by 40%, grain yield by 45%, main stem yield by 30% and thousand grain weight by 6%. On average, soil fertility altered shoot biomass by 30%, grain yield by 39% and main stem yield by 25%
Descriptors:crop yield; growth; soil fertility; water stress. Agronomy (Agriculture); Climatology (Environmental Sciences); Pollution Assessment Control and Management. carbon dioxide: atmospheric, pollutant; chlorophyll-a
Organism Descriptors:Triticum aestivum [spring wheat] (Gramineae): cultivar-Minaret, grain crop
Supplemental Descriptors:Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Agronomy (Agriculture); Climatology (Environmental Sciences); Pollution Assessment Control and Management
ISSN:0269-7491
Year:2001
Journal Title:Environmental Pollution

97. Title:Burial of bovine dung by coprophagous beetles (Coleoptera: Scarabaeidae) from horse and cow grazing sites in El Salvador
View Article: European Journal of Soil Biology. 2001. 37 (2). 103-111
CD Volume:378
Print Article: Pages: 103-111
Author(s):Horgan F G
Author Affiliation:Escuela de Biologia, Universidad de El Salvador, Final 25 Avenida Norte, San Salvador, El Salvador
Language:English
Abstract:Dung beetles that colonize horse and cow dung were collected using baited pitfall traps at three contrasting El Salvadoran sites subject to varying degrees of livestock grazing. The sites included a lowland coastal farm, a mid-altitude farm and a high altitude pine (Pinus oocarpa)-grass (Cupressus lusitanica) site. The quantities of cow dung buried by each of ten tunnelling species from the sites (five Coprini (Copris lugubris, Dichotomius carolinus, D. centralis, Phanaeus demon, and P. eximius) and five Onthophagini (Onthophagus batesi, O. incensus, O. hopfneri, O. marginicollis and O. championi)) were evaluated through laboratory experiments. The quantities of dung buried in the absence of competition and the amount of dung provided

for each egg were related to female beetle body size across species. The quantities of dung buried by pairs of each species and the low number of beetles colonizing dung at the mid-altitude site suggest that much of the dung is not buried at the site. However, sufficient colonization occurred at the coastal farm and at the pine-grass site for dung pads at these sites to be completely buried, indicating that competition is normally intense. In the face of such competition, the opportunistic Onthophagini quickly provision and lay eggs as long as favourable conditions persist while the Coprini, which are rapid dung pre-emptors, can rarely bury sufficient dung to attain full brood production. The importance and conservation of the small number of native dung beetles adapted to Central American pastures is discussed

Descriptors:animal-competition. cattle-dung. colonization. dung-beetles. dung-patches. grasslands. grazing. horse-dung. pastures. soil-fauna. soil-fertility. tropical-grasslands

Geographic Locator:El-Salvador

Identifiers:Copris lugubris. Dichotomius. Dichotomius carolinus. Dichotomius centralis. Onthophagus batesi. Onthophagus championi. Onthophagus hopfneri. Onthophagus incensus. Onthophagus marginicollis. Phanaeus demon. Phanaeus eximius

Organism Descriptors:cattle. Coleoptera. Copris. Onthophagus. Scarabaeidae

Supplemental Descriptors:Scarabaeidae. Coleoptera. insects. arthropods. invertebrates. animals. Copris. Central-America. America. Developing-Countries. CACM. Latin-America. Onthophagus. Bos. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. ungulates

Subject Codes:PP350. XX100. YY500. ZZ332. JJ100. YY200

Supplementary Info:28 ref

ISSN:1164-5563

Year:2001

Journal Title:European Journal of Soil Biology

98. Title:Applying ProMod spatially across Tasmania with sensitivity analysis to screen for prospective Eucalyptus globulus plantation sites

View Article: Forest Ecology and Management. 2001. 140 (1). 51-63

CD Volume:378

Print Article: Pages: 51-63

Author(s):Mummery D Battaglia M

Author Affiliation:Cooperative Research Centre for Sustainable Production Forestry and CSIRO Forestry and Forest Products, G.P.O. Box 252-12, Hobart, Tasmania 7001, Australia

Language:English

Abstract:When screening areas as prospective forest plantation sites, two criteria are of interest: the expected yield at that site and the uncertainty associated with this yield expectation. This paper describes a methodology to enable spatial estimates of uncertainty to be attached to predictions of tree growth in relation to variations in soil depth, nutrient status, and drainage. An environmental sensitivity analysis was applied using the growth model ProMod to produce site productivity and suitability maps for Eucalyptus globulus on a 1000 m regular grid of Tasmania, Australia. Nine productivity surfaces were computed, one for each of three assumed soil-water holding capacities (for soil depths of 0.5, 1.0, and 1.5 m - the common classes in Tasmania), combined with three permutations of soil-nutrient rating (the expected rating and one class above and one below this value), and incorporating potential waterlogging estimates. The mean and coefficient of variation was calculated for each 1000 m grid cell in the nine subsequent productivity surfaces. A

final plantation suitability grid was then mapped to show areas of the State with predicted high (>25 m3 ha-1 year-1), moderate (15-25 m3 ha-1 year-1), and low productivity (<15 m3 ha-1 year-1), each with corresponding high variability (coefficient of variation (CV>30%)) and low variability classes (CV<30%). As no areas had both high productivity and high variability, only five plantation suitability classes were mapped. Those areas indicated as high productivity/low variation sites have a high probability of being successful E. globulus plantations. Low productivity sites with either high or low variation are very unlikely to be favourable for this species. Moderate productivity sites with low variation are likely to be viable potential plantation sites with relatively low risk, particularly with nutrient amelioration. Moderate productivity sites with high variation might warrant further field investigation to determine if there are major environmental factors or combinations of these, such as soil depth (water-holding capacity), nutrient status, or drainage, that are actually going to be limiting reasonable growth at these sites

Descriptors:forest-plantations. growth. growth-models. land-productivity. methodology. nutrient-content. site-factors. soil-depth. soil-fertility. soil-texture. soil-water

Geographic Locator:Australia. Tasmania

Organism Descriptors:Eucalyptus-globulus

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Eucalyptus. Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants. Australia

Subject Codes:JJ300. KK100. KK110. ZZ900. FF900. JJ600

Supplementary Info:55 ref

ISSN:0378-1127

Year:2001

Journal Title:Forest Ecology and Management

99. Title:Effects of forest management on soil C and N storage: meta analysis

View Article: Forest Ecology and Management. 2001. 140 (2/3). 227-238

CD Volume:378

Print Article: Pages: 227-238

Author(s):Johnson D W Curtis P S

Author Affiliation:Desert Research Institute, 2215 Raggio Parkway, Reno, NV 89512, USA

Language:English

Abstract:The effects of forest management on soil carbon (C) and nitrogen (N) are important to understand not only because these are often master variables determining soil fertility but also because of the role of soils as a source or sink for C on a global scale. This paper reviews the literature on forest management effects on soil C and N and reports the results of a meta analysis of these data. The meta analysis showed that forest harvesting, on average, had little or no effect on soil C and N. Significant effects of harvest type and species were noted, with sawlog harvesting causing increases (+18%) in soil C and N and whole-tree harvesting causing decreases (-6%). The positive effect of sawlog harvesting appeared to be restricted to coniferous species. Fire resulted in no significant overall effects of fire on either C or N (when categories were combined); but there was a significant effect of time since fire, with an increase in both soil C and N after 10 years (compared to controls). Significant differences among fire treatments were found, with the counterintuitive result of lower soil C following prescribed fire and

higher soil C following wildfire. The latter is attributed to the sequestration of charcoal and recalcitrant, hydrophobic organic matter and to the effects of naturally invading, post-fire, N-fixing vegetation. Both fertilizer application and N-fixing vegetation caused marked overall increases in soil C and N
Descriptors:carbon. controlled-burning. effects. fertilizers. fire. fire. forest-fires. forest-management. forest-soils. forests. harvesting. logging. nitrogen. nitrogen-fixation. nutrients. silviculture. site-preparation. soil-chemical-properties. soil-fertility. soil-organic-matter. tree-length-logging. whole-tree-logging
Subject Codes:KK130. JJ600. KK100. KK110. JJ200. JJ700. FF061. KK515
Supplementary Info:79 ref
ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management

100. Title:The effects of forest structure and site characteristics on probability of pine twisting rust damage in young Scots pine stands
View Article: Forest Ecology and Management. 2001. 142 (1/3). 89-97
CD Volume:378
Print Article: Pages: 89-97
Author(s):Mattila U Jalkanen R Nikula A
Author Affiliation:Faculty of Forestry, University of Joensuu, P.O. Box 111, Fin-80101, Joensuu, Finland
Language:English
Abstract:The effects of forest structure and site characteristics on the susceptibility of Scots pine (Pinus sylvestris) stands to pine twisting rust (Melampsora pinitorqua) [M. populnea] and on the relative amount of the disease in a pine stand were analysed in 109 young Scots pine stands on mineral soils in northern Finland. The data included the occurrence of pine twisting rust in pine leader shoots, the numbers of trees by species, the mean height and mean age of the pines and site characteristics. The susceptibility of a pine stand, defined as the probability of rust occurrence, was modelled with logistic regression and the relative amount of pine twisting rust in a susceptible stand with multiple linear regression. The models were linked together to assess the relative amount of pine twisting rust in pine stands. The results show that the susceptibility of the stands to the disease is best explained by the presence or number of aspen (Populus tremula, the alternate host for the fungus), site fertility, soil stoniness and the number of pines per hectare. A combination of forest soil stoniness and site fertility has a strong effect on the probability of pine twisting rust occurring in a pine stand. The relative amount of rust in infected pine stands is best explained by the number of aspens and the number of willows in stands where aspens are present. When the relative amount of disease in the stands was calculated with the combined model, failure to correctly classify infected stands led to more serious mistakes than failure to classify healthy stands correctly
Descriptors:disease-prevalence. fungal-diseases. mathematical-models. plant-diseases. plant-pathogenic-fungi. plant-pathogens. probability. regression-analysis. rock-fragments. rust-diseases. shoots. soil-fertility. stand-characteristics. stand-structure. susceptibility
Geographic Locator:Finland
Organism Descriptors:Melampsora-populnea. Pinus-sylvestris. Populus-tremula. Salix

Supplemental Descriptors:Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries. Melampsora. Uredinales. Basidiomycotina. Eumycota. fungi. Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Populus. Salicaceae. Salicales. dicotyledons. angiosperms
Subject Codes:FF610. KK100. ZZ100. JJ300. JJ600
Supplementary Info:18 ref
ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management

101. Title:Land-use and erosion of a Costa Rican Ultisol affect soil chemistry, mycorrhizal fungi and early regeneration
View Article: Forest Ecology and Management. 2001. 144 (1/3). 1-17
CD Volume:378
Print Article: Pages: 1-17
Author(s):Carpenter F L Mayorga S P Quintero E G Schroeder M
Author Affiliation:Department of Ecology and Evolutionary Biology, University of California, Irvine, CA 92697, USA
Language:English
Abstract:Deforestation causes soil erosion, especially in the humid tropics where rainfall is heavy and terrain is often steep. Land-uses, such as overgrazing and planting annual crops on slopes exacerbate the resultant land degradation. Apparent erosion intensity, land-use history, and soil colour were used to find eight sites representing an a priori spatial gradient of soil degradation on an overgrazed Costa Rican farm. The gradient was tested by measuring several chemical factors that indicate fertility of these tropical Ultisols (from Typic Hapludults to Humic or Andic Hapludults). These factors decreased with increasing degrees of soil degradation. Spore density and diversity of arbuscular mycorrhizal fungi (AMF) was assessed along the gradient. Inga edulis was the target tree for the AMF colonization measurements. It was found that the diversity and composition of AMF changed across the gradient although not in the same pattern as the chemical factors. Three years of vegetative regeneration after cattle exclusion did not improve the soils chemically but some improvement in AMF status was suggested for the less damaged sites. These results show that local farmers can use common sense cues to determine the chemical and biological status of their soils, that they can use these cues in future land-use decisions, such as planting hardy trees in the most degraded sites, and that they must expect severely degraded sites to require many years for recuperation. It is possible that intervention to improve the AMF status of soils could hasten recovery, since this process seems to be the first to occur
Descriptors:deforestation. endomycorrhizas. erosion. forests. fungal-spores. land-degradation. land-use. mycorrhizal-fungi. mycorrhizas. natural-regeneration. overgrazing. soil-chemical-properties. soil-colour. soil-degradation. soil-fertility. soil-physical-properties. tropical-rain-forests. tropical-soils. Ultisols. vesicular-arbuscular-mycorrhizas
Geographic Locator:Costa-Rica
Identifiers:arbuscular mycorrhizas
Organism Descriptors:Inga-edulis
Supplemental Descriptors:Central-America. America. Developing-Countries. Threshold-Countries. CACM. Latin-America. Inga. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:JJ100. JJ200. JJ300. KK100. PP300. PP400. PP600

Supplementary Info:70 ref
ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management

102. Title:Litterfall, litter accumulation and litter decomposition rates in four forest ecosystems in northern Greece
View Article: Forest Ecology and Management. 2001. 144 (1/3). 113-127
CD Volume:378
Print Article: Pages: 113-127
Author(s):Kavvadias V A Alifragis D Tsiontsis A Brofas G Stamatelos G
Author Affiliation:Laboratory of Forest Soils, Department of Forestry and Natural Environment, Aristotle University of Thessaloniki, 546 06 Thessaloniki, Greece
Language:English
Abstract:Dry weight, and N, P, K, Ca, Mg and Na quantities in the litter fall (collected from January 1994 to December 1995) and forest floor (sampled in December 1994 and 1995) were measured in two site qualities of four undisturbed natural forest sites of three coniferous (Pinus pinaster), (P. nigra), and (Abies borisii-regis), and one deciduous (Fagus silvatica) species located in northern Greece. Mass and nutrient content of litter fall and forest floor differed greatly among species and generally decreased in the order: F. silvatica > A. borisii regis > P. nigra > P. pinaster. Mean annual litter fall ranged from 4000 kg/ha at the beech site to 1420 kg/ha at the maritime pine site and forest floor dry weight varied from a high of 82 t/ha under the fir site to a low of 32 t/ha under the maritime pine site. The accretion of nutrients (kg/ha per year) on the forest floor through litter fall ranged from 6.9 to 32.8 for N, 0.7 to 2.8 for P, 3.2 to 12.3 for K, 3.7 to 47.9 for Ca, 1.8 to 8.6 for Mg and from 0.25 to 0.80 for Na. Average element quantities (kg/ha per year) of the forest floor were between 235.4 and 913.9 for N, 15.4 and 55.8 for P, 40.4 and 113.1 for K, 99.3 and 506.9 for Ca, 39.9 and 285.5 for Mg, and between 3.1 and 18.2 for Na. Site quality did not considerably affect either the litter fall and nutrient returns to the forest floor or the litter mass and nutrient accumulation in the L horizon. A positive relationship, however, was noticed between site quality and litter and nutrient accumulation in the F and H horizons beneath the black pine and beech and a negative one beneath the fir. Residence times of forest floor were approx equal to 17 years at the beech site, 21 years at the black pine site, 23 years at the maritime pine site and 32 years at the fir site suggesting considerable differences in the decomposition rate among forest sites which were mainly associated to the litter fall, the microclimate conditions and the nutrient status of the sites. Residence time of litter mass and nutrients were substantially greater in the current study than in other studies carried out in Mediterranean type conditions indicating slower decomposition rates in Greek forests
Descriptors:chemical-composition. coniferous-forests. cycling. deciduous-forests. decomposition. forest-litter. forest-soils. forest-trees. forests. horizons. nitrogen. nutrient-content. soil-fertility. trees
Geographic Locator:Greece
Organism Descriptors:Abies-borisii-regis. Fagus-sylvatica. Pinus-nigra. Pinus-pinaster
Supplemental Descriptors:Abies. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Fagus. Fagaceae. Fagales. dicotyledons. angiosperms.

Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries. Pinus
Subject Codes:JJ100. JJ600. KK100. JJ400
Supplementary Info:89 ref
ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management

103. Title:Forest floor plant response to lime and fertilizer before and after partial cutting of a northern red oak stand on an extremely acidic soil in Pennsylvania, USA
View Article: Forest Ecology and Management. 2001. 144 (1/3). 239-244
CD Volume:378
Print Article: Pages: 239-244
Author(s):Demchik M C Sharpe W E
Author Affiliation:Environmental Resources Research Institute and School of Forest Resources, Land and Water Building, Pennsylvania State University, University Park, PA 16802, USA
Language:English
Abstract:Liming and fertilizer application have been suggested as means to remedy calcium (Ca) and magnesium (Mg) deficiencies on acidic, base poor forested soils. However, little is known about the effect such treatments could have on forest floor plants in North America. The objective of this study was to determine if additions of dolomitic lime (6600 kg/ha) and fertilizer (220 kg/ha K2O, 110 kg/ha P2O5) would alter forest floor plant communities. Forest floor plants were monitored for 2 years prior and 2 years after partial cutting on plots that received lime and fertilizer and on control plots. Forest floor plant diversity was unaffected by lime and fertilizer application. Deer-tongue grass (Panicum clandestinum), white violet (Viola blanda), blue violet (V. sororia) and Carex spp. increased in number on limed and fertilized plots. While not affected by lime and fertilizer, numbers of dwarf ginseng (Panax trifolius) and mayflower (Maianthemum canadense) decreased after cutting, while numbers of fire cherry (Prunus pensylvanica) and hay-scented fern (Dennstaedtia punctilobula) increased after cutting. A general trend toward decreased numbers of red oak (Quercus rubra) seedlings was also noted. While there was no effect of liming and fertilizer application on overall forest floor plant diversity, numbers of some species increased significantly
Descriptors:acid-soils. calcium. chemical-composition. forest-ecology. forest-soils. forests. ground-vegetation. lime. liming. magnesium. natural-regeneration. nutrient-deficiencies. phosphorus. plant-communities. soil-fertility. species-diversity. species-richness. thinning
Geographic Locator:USA
Identifiers:Maianthemum. Maianthemum canadense. Panax trifolius. Panicum clandestinum. Viola blanda
Organism Descriptors:Carex. Dennstaedtia-punctilobula. Panax. Prunus-pensylvanica. Quercus-rubra. Viola-sororia
Supplemental Descriptors:Cyperaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Dennstaedtia. Dennstaedtiaceae. ferns. Pteridophyta. Maianthemum. Liliaceae. Liliales. Araliaceae. Apiales. dicotyledons. Panicum. Poaceae. Prunus. Rosaceae. Rosales. Quercus. Fagaceae. Fagales. North-America. America. Developed-Countries. OECD-Countries. Viola. Violaceae. Violales
Subject Codes:JJ600. JJ700. KK100. KK110. PP720
Supplementary Info:23 ref

ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management
Copyright:Copyright CAB International

104. Title:Soil-site productivity of Gmelina arborea, Eucalyptus urophylla and Eucalyptus grandis forest plantations in western Venezuela
View Article: Forest Ecology and Management. 2001. 144 (1/3). 255-264
CD Volume:378
Print Article: Pages: 255-264
Author(s):Henri C J
Author Affiliation:Department of Forestry, North Carolina State University, Hardwood Research Cooperative, Jordan Hall, Box 8008, Raleigh, NC 27695, USA
Language:English
Abstract:The purpose of this research was to explore the soil factors that are indicators of site productivity. A study was conducted in a dry tropical region of western Venezuela on Gmelina arborea, Eucalyptus urophylla, and E. grandis plantations to identify the soil properties that provide optimum growing conditions for these species. Soils in the area include Alfisols, Ultisols, Inceptisols, Entisols, Mollisols and Vertisols. Results of a multiple regression analysis indicated that soil texture was a significant predictor of tree growth for all three species. All species grew best in soils with clay loam textures. Excessive soil moisture was inversely correlated with tree growth in E. grandis. As commercial forestry companies in western Venezuela expand their land holdings through new acquisitions, this knowledge could improve their ability to select land parcels that are economically optimal for plantation purposes
Descriptors:Alfisols. Cambisols. edaphic-factors. Entisols. forest-plantations. forest-soils. forest-trees. Inceptisols. land-evaluation. land-productivity. Mollisols. site-selection. soil-fertility. soil-properties. soil-texture. soil-water-content. trees. tropical-soils. Ultisols. Vertisols
Geographic Locator:Venezuela
Organism Descriptors:Eucalyptus-grandis. Eucalyptus-urophylla. Gmelina-arborea
Supplemental Descriptors:Eucalyptus. Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants. Gmelina. Verbenaceae. Lamiales. South-America. America. Developing-Countries. Threshold-Countries. Andean-Group. Latin-America
Subject Codes:JJ200. JJ600. KK110
Supplementary Info:12 ref
ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management
Copyright:Copyright CAB International

105. Title:Effects of Pinus caribaea forests on the C, N, P, and S status of Brazilian savanna Oxisols
View Article: Forest Ecology and Management. 2001. 147 (2/3). 171-182
CD Volume:378
Print Article: Pages: 171-182
Author(s):Lilienfein J Wilcke W Thomas R Vilela L Lima S do C Zech W
Author Affiliation:Institute of Soil Science and Soil Geography, University of Bayreuth, D-95440 Bayreuth, Germany
Language:English
Abstract:The accumulation of humus in soils under Pinus caribaea forests may increase the availability of organically bound N, P, and S to plants and thus improve soil fertility. We compared C, N, P, and S

concentrations and forms in soil solid phase and soil solution under Pinus (PI) and natural savanna vegetation (Cerrado, CE) in Minas Gerais, Brazil. We sampled the 0-0.15, 0.15-0.3, 0.3-0.8, 0.8-1.2, and 1.2-2 m soil depth layers of Oxisols from three spatially separated plots under CE and PI; at each plot, soil solution at 0.15, 0.3, 0.8, 1.2, and 2.0 m soil depth and under PI additionally below the organic layer was collected during two rainy seasons (14 October-28 April 1997/1998 and 14 October-28 April 1998/1999). Under PI, the organic layer stored more C (24.5 t ha-1), N (2.6 t ha-1), P (140 kg ha-1), and S (261 kg ha-1) than under CE (1.2 t C ha-1, 23 kg N ha-1, 1.2 kg P ha-1, 2.3 kg S ha-1). No significant difference in C, N, P, and S concentrations between CE and PI in the surface horizons of the mineral soil (C: 20.7-23.4 g kg-1, N: 1.2-1.5 g kg-1, P: 0.16-0.26 g kg-1, S: 0.18-0.21 g kg-1) was observed. However, at 1.2-2 m soil depth C and organic N (Norg) concentrations were significantly higher under PI (C: 6.9 g kg-1, Norg: 0.54 g kg-1) than under CE (C: 6.4 g kg-1, Norg: 0.41 g kg-1). C:P and C:S ratios in soil solid phase decreased with increasing soil depth under CE and PI, those of C:Norg only under PI, leading to narrower C:Norg ratios under PI (12.9) than under CE (15.6) at 1.2-2 m soil depth. The result indicated enhanced N transport to the subsoil under PI. Total organic C concentrations (TOC) in the soil solution were similar under CE and PI and throughout the mineral soil. Under PI, TOC concentrations decreased sharply between the litter leachate (30 mg C l-1) and 0.15 m soil depth (5 mg C litre-1) indicating strong TOC sorption onto the surface mineral soil. Total N concentrations in the soil solution were 11-23 times higher under PI than under CE. Organic N concentrations also decreased between the litter leachate and 0.15 m soil depth under PI but NO3- concentrations increased from the litter leachate to 1.2 m soil depth and decreased between 1.2 and 2 soil depth, probably due to enhanced anion sorption at 2 m soil depth. No S and P was detectable in any solution sample. Higher C, N, and S storages and higher N availability under PI indicated that PI forests improve C, N, P, and S supply for plants in subsequent cultures and may therefore be considered sustainable with respect to organically bound nutrients

Descriptors:carbon. carbon-nitrogen-ratio. cerrado. coniferous-forests. dry-matter-accumulation. forests. grasslands. humus. leachates. nitrogen. nutrient-availability. nutrient-content. nutritional-state. oxisols. phosphorus. savannas. soil-depth. soil-fertility. soil-organic-matter. soil-solution. sorption. sulfur

Geographic Locator:Brazil. Minas-Gerais

Organism Descriptors:Pinus-caribaea

Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Brazil. Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants

Subject Codes:JJ200. JJ600. KK100. PP350

Supplementary Info:Many ref

ISSN:0378-1127

Year:2001

Journal Title:Forest Ecology and Management

106. Title:The impact of vine maple on site fertility of coastal temperate forests

View Article: Forest Ecology and Management. 2001. 147 (2/3). 263-279

CD Volume:378

Print Article: Pages: 263-279

Author(s):Tashe N C Schmidt M G

Author Affiliation:Department of Geography, Simon Fraser University, Burnaby, BC V5A 1S6, Canada
Language:English
Abstract:Vine maple (Acer circinatum) has often been viewed as a competitor with conifers in coastal forests of the Pacific Northwest. Few researchers have examined vine maple's ecological role in forest ecosystems with much of the literature focusing on its role as a weed species. We studied vine maple to determine if it enhanced site fertility in mature coastal forests and whether the nutrient status of adjacent Douglas-fir (Pseudotsuga menziesii) was improved by the presence of vine maple. Site fertility was assessed by analysing litterfall, forest litter and Douglas-fir foliage using plots where vine maple was present or absent. Paired plots were established in a 75-year-old and a 130-year-old stand in southwestern British Columbia, Canada. At both stands, total autumn litterfall collected from vine maple plots had significantly higher N content than litterfall from conifer plots. Both stands had autumn, needle litterfall from vine maple plots with significantly higher N concentrations relative to needle litterfall from conifer plots. At the 130-year-old stand, N concentration in Douglas-fir foliage had a weak tendency to be higher for vine maple plots compared to conifer plots, with Douglas-fir adjacent to vine maple having larger boles. At both stands, total B concentrations and contents in the forest floor were higher in vine maple compared to conifer plots. At the 75-year-old stand, Douglas-fir adjacent to vine maple had foliage with greater B concentrations and contents which appeared to alleviate a B deficiency. Vine maple may be desirable in managed stands of temperate coastal forests due to the positive impact on site fertility and the potential to influence Douglas-fir growth
Descriptors:boron. calcium. chemical-composition. foliage. forest-litter. forests. magnesium. manganese. nitrogen. nutrient-content. phosphorus. plant-composition. plant-nutrition. potassium. soil-fertility. zinc
Geographic Locator:British-Columbia. Canada
Identifiers:temperate forests
Organism Descriptors:Acer-circinatum. Pseudotsuga-menziesii. Tsuga-heterophylla
Supplemental Descriptors:Acer. Aceraceae. Sapindales. dicotyledons. angiosperms. Spermatophyta. plants. Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Pseudotsuga. Pinaceae. Pinopsida. gymnosperms. Tsuga
Subject Codes:FF040. FF061. FF500. JJ600. KK100
Supplementary Info:41 ref
ISSN:0378-1127
Year:2001
Journal Title:Forest Ecology and Management

107. Title:Effect of pine needle removal and fertilization on tree growth and soil P availability in a Pinus elliottii Engelm. var. elliottii stand
View Article: Forest Ecology and Management. 2001. 148 (1/3). 125-134
CD Volume:378
Print Article: Pages: 125-134
Author(s):Lopez Zamora I Duryea M L Wild C M Comerford N B Neary D G
Author Affiliation:School of Forest Resources and Conservation, University of Florida, 118 Newins-Ziegler Hall, P.O. Box 110410, Gainesville, FL 32611-0410, USA
Language:English
Abstract:Pine-needle raking (to simulate harvest of pine straw) and fertilizer application effects on tree growth nutrition and soil inorganic

phosphorus availability were examined during 1991-95 in a 13-year-old slash pine (Pinus elliottii var. elliottii) stand in Clay County, Florida, USA. Fertilized and non-fertilized treatments were applied to main plots. Sixteen of the 32 plots were unfertilized, while the remaining 16 plots received fertilizer application with 280 kg ha diammonium phosphate in August 1991 and again in September 1992. Four raking frequency treatments: no raking; rake-every-year; rake-every-2-years; and rake-every-4-years were applied to split-plots within these main plots. Diameter at breast height and tree heights were measured annually from 1991 to 1995. Raking every year significantly reduced diameter growth by 5.2 mm. Fertilizer had a significant negative effect on tree heights; non-fertilized trees in the stand grew more than fertilized trees in all diameter classes. Annual needlefall production rate was 8735 kg ha-1 with a maximum of 50 kg N ha-1 and 5 kg P ha-1 removed through litter raking. During 1 year, a maximum yield of 737, 934, and 1093 bales/ha were produced in the rake-every-year, every-2, and every-4-year plots. N and P concentrations in the raked needles were 0.59 and 0.052%, respectively. Needlefall P concentration was significantly lower among trees raked more frequently. Fertilizer significantly increased needlefall N concentration. Availability of soil inorganic phosphorus detected by anion-exchange membranes was significantly higher in the plots raked every 4 years followed by the control compared to the plots that were raked every year. These results indicate that removal of pine needles does not have an immediate effect on old-field sites with high residual fertility, but removing 50 kg ha-1 of N and 5 kg ha-1 of P annually may eventually deplete the site

Descriptors:diameter. diammonium-phosphate. forest-litter. forest-plantations. forest-soils. growth. harvesting-frequency. height. increment. leaf-fall. leaves. nitrogen. nitrogen-phosphorus-fertilizers. nutrient-availability. nutrient-content. phosphorus. pine-needles. plant-nutrition. soil-fertility

Geographic Locator:Florida. USA

Organism Descriptors:Pinus-elliottii

Supplemental Descriptors:South-Atlantic-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Gulf-States-of-USA. Southeastern-States-of-USA. Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants

Subject Codes:FF060. FF061. JJ600. JJ400. JJ700. KK100. SS200

Supplementary Info:31 ref

ISSN:0378-1127

Year:2001

Journal Title:Forest Ecology and Management

108. Title:Predicting site index of Douglas-Fir plantations from ecological variables in the Massif Central area of France

View Article: Forest Ecology and Management. 2001. 149 (1/3). 61-74

CD Volume:378

Print Article: Pages: 61-74

Author(s):Curt T Bouchaud M Agrech G

Author Affiliation:Cemagref-Forest and Agroforestry Research Team, 24 av. des Landais-BP 50085-F 63172 Aubiere, France

Language:English

Abstract:Douglas-Fir (Pseudotsuga menziesii) is the main species used in France for reforesting mid-elevation regions, mostly on former heathlands and coppices. In order to clarify its auto-ecological limits, and to provide forest managers with relevant information for planting, we

studied its productivity in a wide range of site conditions. Based on data from 202 Douglas-Fir pure stands at mid-elevation regions of the northwestern French Massif Central (Limousin), site productivity was assessed using variance analysis with site types, site groups, and multiple regression analysis with ecological variables. Site index, determined from stem analysis, data was used as a species specific measure of site quality. Results show that Douglas-Fir site index is correlated to soil nutrient status, and secondarily to soil moisture regime. Mean stand productivity was generally high, but considerable variation in site index was determined within a study area that was classified by forest managers as uniform. Correlation between site classification and site index was confirmed, because it was based on synoptic factors that are simple and robust indicators of site productivity. Other methods to assess site quality, such as multiple regression on ecological variables and multivariate site groups, appear to be less explicative and robust for predicting site index. The results allow forest managers to predict the site index at parcel scale

Descriptors:forest-management. forest-plantations. forests. land-productivity. multiple-regression. nutrient-content. site-class-assessment. site-factors. soil-fertility. soil-water-content

Geographic Locator:Central-France. France. Limousin

Supplemental Descriptors:France. Western-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:JJ600. KK110. JJ300. JJ500

Supplementary Info:28 ref

ISSN:0378-1127

Year:2001

Journal Title:Forest Ecology and Management

109. Title:Species effects of Ceanothus velutinus versus Pseudotsuga menziesii, Douglas-fir, on soil phosphorus and nitrogen properties in the Oregon Cascades

View Article: Forest Ecology and Management. 2001. 149 (1/3). 205-216

CD Volume:378

Print Article: Pages: 205-216

Author(s):Spears J D H Lajtha K Caldwell B A Pennington S B Vanderbilt K

Author Affiliation:Botany and Plant Pathology Department, Oregon State University, Cordley Hall 2082, Corvallis, OR 97331-2902, USA

Language:English

Abstract:Many authors have hypothesized that nitrogen-fixing species, as a functional group, would express different controls on soil properties and ecosystem development than non-nitrogen-fixing species. Although nitrogen (N) accretion under nitrogen-fixing tree species has been well studied, the effect of nitrogen-fixing species on other soil nutrients, such as phosphorus (P), has received less attention. We studied differences in soil phosphorus and nitrogen properties beneath Ceanothus velutinus (Ceanothus), a nitrogen-fixing species, and Psuedotsuga menziesii (Douglas-fir), a non-fixing species, in a high elevation successional watershed in the H.J. Andrews Experimental Forest in Oregon, USA. Total P was 20% greater in Douglas-fir soils than Ceanothus soils in surface horizons, but there was no significant difference in deeper soil horizons. Surface soils (5 and 15 cm) under Douglas-fir generally had higher concentrations of specific P fractions than surface soils under Ceanothus, but this difference either disappeared or was not as apparent at greater soil depths (30 and 60 cm). Total nitrogen, and extractable ammonium and nitrate were greater in surface soils under Ceanothus than under

Douglas-fir. delta 15N values of leaves and litter differed between Ceanothus and Douglas-fir (p-value=0.0001 and 0.03, respectively), but the delta 15N of bulk soil and KCl extracted nitrate and ammonium did not differ. Soil enzyme activities suggested greater mineralization of organic P (phosphatase activity) under Ceanothus in summer, but not in autumn, while no significant differences in general decomposition (beta -glucosidase activity) were found in soils between the two species

Descriptors:ammonium. beta-glucosidase. chemical-composition. coniferous-forests. enzyme-activity. forest-influences. forest-litter. forests. leaves. nitrate. nitrogen. nitrogen-fixation. nitrogen-fixing-trees. nutrient-availability. organophosphorus-compounds. phosphoric-monoester-hydrolases. phosphorus. plant-composition. potassium-chloride. soil-chemical-properties. soil-composition. soil-depth. soil-enzymes. soil-fertility. trees

Geographic Locator:Oregon. USA

Organism Descriptors:Ceanothus-velutinus. Pseudotsuga-menziesii

Supplemental Descriptors:Ceanothus. Rhamnaceae. Rhamnales. dicotyledons. angiosperms. Spermatophyta. plants. Pacific-Northwest-States-of-USA. Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Pseudotsuga. Pinaceae. Pinopsida. gymnosperms

Subject Codes:JJ100. JJ200. KK100

Supplementary Info:68 ref

ISSN:0378-1127

Year:2001

Journal Title:Forest Ecology and Management

110. Title:Microbial communities in boreal coniferous forest humus exposed to heavy metals and changes in soil pH - a summary of the use of phospholipid fatty acids, Biolog(R) and 3H-thymidine incorporation methods in field studies

View Article: Geoderma. 2001. 100 (1/2). 91-126

CD Volume:371

Print Article: Pages: 91-126

Author(s):Pennanen T

Author Affiliation:Finnish Forest Research Institute, P.O. Box 18, 01301 Vantaa, Finland

Language:English

Abstract:This paper summarizes our recent field studies on the microbial communities of boreal coniferous forest humus exposed to environmental stress, heavy metals and changes in humus pH. The microbial community was measured using the phospholipid fatty acid (PLFA) and Biolog(R) analyses, and the actual factor in the environment exerting the selective pressure on the bacterial community was estimated with the help of tolerance determinations using the 3H-thymidine incorporation technique. Field experiments in Finland showed that the structure of the microbial community inhabiting the boreal coniferous forest humus was influenced by changes in humus pH and heavy metal concentrations at levels where no, or only small, effects on the microbial biomass or carbon mineralization rate were seen. The alterations in the humus PLFA patterns were related to the abundance of the major groups of microorganisms, bacteria and fungi. Changes in the relative proportions of Gram-negative and Gram-positive bacteria, including actinomycetes, were also shown. With the help of the 3H-thymidine incorporation technique, it was demonstrated that forest humus bacterial communities exposed to heavy metals or alterations in humus

pH were able to adapt to the environmental disturbance in question. When combining the results from the PLFA and 3H-thymidine analyses, it was shown that the increased tolerance of the humus bacterial community to heavy metals or to altered pH resulted at least partly from a change in microbial species composition. Coniferous forest humus seemed to contain a bacterial group, consisting mainly of Gram-positive bacteria, which were adapted more easily to the acidifying environment and a group of bacteria, mainly Gram-negative ones, which were more easily adapted to the humus with a higher pH. The Biolog(R) technique, which determines the community level physiological profile of the bacterial community was less sensitive and less suitable than the PLFA analysis to detect the characteristics of the forest humus microbial community. The 3H-thymidine incorporation technique was the most sensitive of the techniques used in this study to detect the influence of environmental disturbances on the microbial community. In addition, a gradient of coniferous forest stands having naturally different humus pH because of the different site properties was studied to compare these natural microbial communities with the communities subjected to anthropogenic change in humus pH. In order to reveal the similarity of the humus samples with respect to their community structure, the PLFA patterns from all the field studies were subjected to multivariate cluster analysis. The structure of the forest humus microbial community was shown to be strongly influenced by the indigenous fertility of the coniferous forest site type, which was in turn related to humus nutritional status, pH, moisture, tree species and ground vegetation. Thus, a prerequisite for successful determination of the impacts of environmental stress on forest humus microbial community is the homogeneity of the forest site types between the experimental plots

Descriptors:biomass. boreal-forests. environmental-impact. forest-soils. forests. heavy-metals. humus. methodology. microorganisms. soil-pH

Geographic Locator:Finland

Identifiers:microbial biomass

Supplemental Descriptors:Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:JJ100. PP600. KK100. JJ200. ZZ900

Supplementary Info:Many ref

ISSN:0016-7061

Year:2001

Journal Title:Geoderma

111. Title:Properties and effects of management on selected granitic soils in Zimbabwe

View Article: Geoderma. 2001. 101 (3/4). 119-141

CD Volume:371

Print Article: Pages: 119-141

Author(s):Burt R Wilson M A Kanyanda C W Spurway J K R Metzler J D

Author Affiliation:Soil Survey Laboratory, United States Department of Agriculture, National Soil Survey Center, Lincoln, NE 68508-3866, USA

Language:English

Abstract:Regional-based surveys of Zimbabwe have evaluated the general extent of erosion of sandy granitic soils, but site-specific data to determine soil properties related to erosional susceptibility and influence of management are lacking in this area. This study measured physical and chemical properties of five sites (10 pedons) in an area of granitic soils east of the city of Harare. Sites were from university research, commercial, and communal farms. Pedons were paired to determine soil property differences in row crop vs. pasture

management. The objectives of this study were to (a) verify important soil properties that influence erosional susceptibility and productivity of these granitic soils, and (b) determine differences in those properties as related to agriculture management. Results indicate important properties that favour high erosional susceptibility in these soils are coarse textures and high degree of weathering (resulting in extractable bases and cation exchange capacity <10 cmol kg-1), and low organic C (ranging from 2.5 to 23.5 g kg-1 C in surface horizons). Pedons in pasture have 2 to 19 cm thicker A horizons, water dispersible to total clay ratios 3 to 17% lower, and greater aggregate stability relative to the paired, cropped pedons. Saturated hydraulic conductivity (Ksat) at 15 to 30 cm depth ranges from 0.2 to 23.4 cm h-1 for all pedons. Greater Ksat in cropped pedons relative to the pasture pair is likely to be temporal and influenced by tillage. Bulk density and extractable-P exhibit no trends with management and such results are likely to be confounded by management history such as crop-pasture rotations and fertilization. This study has shown the importance of increasing and maintaining soil C levels to minimize agricultural-induced erosion of these granitic soils. Results suggest that soil textures and the weathered nature of these soils in this subtropical climate produce conditions where organic matter is generally low even in soils maintained in pasture. Therefore, use of conservation management practices will be required to maintain and build adequate soil tilth and fertility for sustainable crop production

Descriptors:carbon. erosion. granite-soils. horizons. sandy-soils. soil. soil-chemical-properties. soil-degradation. soil-management. soil-morphology. soil-organic-matter. soil-physical-properties. soil-types. weathering

Geographic Locator:Zimbabwe

Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. SADC-Countries. Anglophone-Africa

Subject Codes:JJ200. JJ400. JJ900. PP400. JJ300. JJ600

Supplementary Info:52 ref

ISSN:0016-7061

Year:2001

Journal Title:Geoderma

112. Title:Quantitative characterization of nutrient regimes of high-elevation forest soils in the southern coastal region of British Columbia, Canada

View Article: Geoderma. 2001. 102 (1/2). 153-174

CD Volume:371

Print Article: Pages: 153-174

Author(s):Splechtna B E Klinka K

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Language:English

Abstract:To quantify the gradient of plant-available nutrients on high-elevation coastal sites that support growth of Pacific silver fir (Abies amabilis) in southern British Columbia, Canada, we collected samples of forest floor and mineral soil (0-30 cm) from montane and subalpine sites within maritime-windward, maritime-leeward, submaritime and subcontinental climatic strata. The samples were analysed for acidity, total C, total N, mineralizable-N, and extractable Ca, Mg, K, P, and SO4-S. Relationships between field-identified soil nutrient

regimes (SNRs) and measured soil nutrient properties were examined using principal component analysis, discriminant function analysis and covariance analysis. The nutrient gradient appeared to be heterogeneous as indicated by a relatively low percentage (29%) of variation explained by the first principal component. Within the space of soil chemical properties resulting from principal component analysis, the grouping of samples was weak and the relationship to SNRs also appeared weak. However, using discriminant analysis, 70% agreement was found between field-identified SNRs and the classification based on measured soil properties. Nitrogen-related variables (total N, mineralizable-N, and C:N ratio) and the sum of extractable Ca, Mg, and K were the properties most strongly related to the field-identified SNRs. Mineral soil mineralizable-N concentrations appeared to be unrelated to changes in continentality within the study area. These findings agree with the results of previous studies suggesting that mineralizable-N of the mineral soil is the best property for a quantitative characterization of a soil nutrient gradient, and, hence for quantification of field-estimated SNRs. Field-estimated SNRs were also good predictors of site index as they explained the variation in site index of Pacific silver fir similarly well as total N and C:N ratio. However, the absence of a relationship between mineralizable-N and the Pacific silver fir site index requires a further study of plant-soil relationships in the area

Descriptors:calcium. carbon. forest-litter. forest-soils. magnesium. mineral-soils. nitrogen. nutrient-availability. phosphorus. potassium. soil-acidity. soil-fertility. soil-types. sulfate. sulfur

Geographic Locator:British-Columbia. Canada

Organism Descriptors:Abies-amabilis

Supplemental Descriptors:Abies. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries

Subject Codes:JJ200. JJ600. KK100

Supplementary Info:42 ref

ISSN:0016-7061

Year:2001

Journal Title:Geoderma

113. Title:Dynamics of resistant soil carbon of Midwestern agricultural soils measured by naturally occurring 14C abundance

View Article: Geoderma. 2001. 104 (3/4). 239-256

CD Volume:371

Print Article: Pages: 239-256

Author(s):Paul E A Collins H P Leavitt S W

Author Affiliation:Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824, USA

Language:English

Abstract:Information on the mean residence time (MRT) of soil organic carbon (SOC) on different soil types and management regimes is required for pedo-geological, agronomic, ecological and global change interpretations. This is best determined by carbon dating the total soil together with acid hydrolysis and carbon dating of the non-hydrolysable residue (NHC). Midwestern USA soils in a transect from Lamberton, Minnesota to Kutztown, Pennsylvania, were found to contain from 33 to 65% of their SOC in the non-hydrolysable fraction. Soils on lacustrine deposits had the most NHC; glacial till and shale soils, the least. The MRTs of the SOC of surface horizons of soil ranged from modern to 1100 years with an average of 560 years. The

MRT increased to an average of 1700 years in the 25-50-cm depth increment and 2757 years at 50-100 cm. The NHC was 1340 years greater at the surface and 5584 years at depth. The MRTs of the total SOC were inversely correlated to sand and directly related to clay content. Silt did not have a significant effect on the MRT of total SOC, but was significantly correlated with the MRT of the NHC. A four-parameter model described the relationship between the SOC content and MRT. The complexity of this equation reflected the strong effect of depth, which greatly decreased SOC while increasing the MRT. The MRT of these soils, as determined with carbon dating of the naturally occurring 14C, was compared to that measured with the 13C signal produced by approximately 30 years of continuous maize (Zea mays) (C4) on soils with a known plant history of C3-C4 cropping. The equation of 14C MRT=176(13CMRT)0.54 with an R2 of 0.70 showed that although short-term 13C studies correlate well with the total MRT, they reflect the dynamics of the active and slow pools, not the total SOC

Descriptors:agricultural-soils. carbon. carbon-sequestration. clay-fraction. climatic-change. glacial-till. lacustrine-deposits. maize. organic-carbon. radiocarbon-dating. sand-fraction. shale-soils. silt. soil-fertility. soil-organic-matter. soil-types

Geographic Locator:Minnesota. Pennsylvania. USA

Organism Descriptors:Zea-mays

Supplemental Descriptors:West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Lake-States-of-USA. Middle-Atlantic-States-of-USA. Northeastern-States-of-USA. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. JJ200. JJ600. PP500

Supplementary Info:35 ref

ISSN:0016-7061

Year:2001

Journal Title:Geoderma

114. Title:Stand structure and commercial volume of secondary forests in Paraguay and Costa Rica: implications for management options

View Article: International Forestry Review. 2001. 3 (1). 42-50

CD Volume:362

Print Article: Pages: 42-50

Author(s):Kammesheidt L Fedlmeier C

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Language:English

Abstract:Stand development of secondary forests (established after clearing for agriculture) was studied and compared with primary forest in Paraguay and Costa Rica, focusing on commercial species. The stands in subtropical Paraguay were 2-15 years old, while those in the humid Atlantic lowlands of Costa Rica were 2.5-18 years old. Accumulation of bole volume was markedly more rapid in the wetter (Costa Rica) than the drier site (Paraguay). However, the more fertile soils in Costa Rica compared to Paraguay may contribute to a faster development of this stand parameter. The proportion of commercial species contributed by bole volume increased with successional age. In young secondary forests, commercial species at sapling stage were mainly represented by sprout-established individuals, while the proportion of vegetative regeneration declined in more advanced

successional stages. Management (silvicultural) options and major legal shortcomings are discussed
Descriptors:botanical-composition. climate. forest-management. forest-soils. forestry-law. forests. increment. natural-regeneration. plant-succession. secondary-forests. silviculture. soil-fertility. stand-development. stand-structure
Geographic Locator:Costa-Rica. Paraguay
Supplemental Descriptors:Central-America. America. Developing-Countries. Threshold-Countries. CACM. Latin-America. South-America
Subject Codes:KK110. KK100. PP720. DD500. PP500. JJ600
Supplementary Info:27 ref
ISSN:1465-5489
Year:2001
Journal Title:International Forestry Review

115. Title:Relationships between seed mass, seed nutrients, and seedling growth in Banksia cunninghamii (Proteaceae)
View Article: International Journal of Plant Sciences. 162 (3). May, 2001. 599-606
CD Volume:353
Print Article: Pages: 599-606
Author(s):Vaughton Glenda Ramsey Mike
Author Affiliation:Department of Botany, University of New England, Armidale, NSW, 2351: gvaughto@metz.une.edu.au
Language:English
Language of Summary:English (EN)
Abstract:We examined relationships between seed mass, seed nutrients, and seedling growth in two populations of Banksia cunninghamii to determine whether large seed mass provided an advantage for seedling establishment on nutrient-poor soils. N and P content of seeds increased more than proportionally with increasing seed mass, indicating that large seeds had greater concentrations of these nutrients than small seeds. K content of seeds increased either proportionally or more than proportionally with seed mass, depending on population. In a common garden, larger seeds produced larger seedlings, although seed mass had little effect on seed germination, seedling survival, root : shoot ratios, or relative growth rate. In a nutrient-deprivation experiment, seedlings were smaller under low nutrients than under high nutrients. Under low nutrients in one population, the increase in seedling size with seed mass was greater than proportional, indicating that large seed mass minimized the effect of nutrient deprivation. Under high nutrients in this population and under both nutrient regimes in the other population, the increase in seedling size with seed mass was only proportional. Overall, our findings highlight the advantage of large seed mass on nutrient-poor soils, probably by rendering seedlings less reliant on soil nutrients
Descriptors:allocation pattern; growth rate; seed mass; seedling growth; soil fertility; survival. Development; Nutrition. seed nutrients; soil nutrients: availability
Organism Descriptors:Banksia cunninghamii (Proteaceae): seed, seedling
Supplemental Descriptors:Proteaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Development; Nutrition
ISSN:1058-5893
Year:2001
Journal Title:International Journal of Plant Sciences

116. Title:Effects of endophyte infection in tall fescue (Festuca arundinacea: Poaceae) on community diversity
View Article: International Journal of Plant Sciences. 162 (6). November, 2001. 1237-1245
CD Volume:353
Print Article: Pages: 1237-1245
Author(s):Spyreas Greg Gibson David J Middleton Beth A
Author Affiliation:Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, IL, 61820-6917: spyreas@inhs.uiuc.edu
Language:English
Language of Summary:English (EN)
Abstract:Recent studies have suggested that the presence of endophytes in tall fescue can lead to decreased species richness in the associated plant community. To assess the generality of this hypothesis, a field study tested the effects of endophyte infection on a 3-yr-old successional field dominated by Festuca arundinacea. The potential importance of endophyte infection relative to other environmental factors was tested by including two additional treatments: the effects of soil fertility and mowing. Contrary to previous studies, a positive relationship was found between endophyte infection frequency and diversity (N=23, F=5.23, R2=0.19, P<0.03). A strong interaction was found between the mowing treatment and endophyte infection frequency in predicting diversity (N=22, F=36.1, R2=0.84, P<0.0001), where the maximum species richness was present in plots that were both mowed and highly endophyte infected. The relationship between endophytes and diversity varied through the successional continuum (the mowing treatments) but was generally positive. The soil in mowed plots was drier than in unmowed plots (t=2.1, df=28, P<0.05). We suggest that heavy mowing decreases soil moisture levels enough to reduce the interspecific competitive ability of infected F. arundinacea, thereby promoting local diversity. Endophyte presence is important, but the previously reported negative relationship between endophyte infection and community diversity is probably overly simplistic in complex ecological settings
Descriptors:interspecific competition; species richness; successional old field: community diversity. Infection; Terrestrial Ecology (Ecology, Environmental Sciences)
Geographic Locator:Illinois (USA, North America, Nearctic region)
Organism Descriptors:Festuca arundinacea (Gramineae); fungus (Fungi): endophyte
Supplemental Descriptors:Fungi: Plantae; Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Fungi; Microorganisms; Monocots; Nonvascular Plants; Plants; Spermatophytes; Vascular Plants
Subject Codes:Infection; Terrestrial Ecology (Ecology, Environmental Sciences)
ISSN:1058-5893
Year:2001
Journal Title:International Journal of Plant Sciences

117. Title:Spatial and temporal rainfall variability in the Sahel and its effects on farmers' management strategies
View Article: Journal of Arid Environments. 48 (2). June, 2001. 221-231
CD Volume:357
Print Article: Pages: 221-231
Author(s):Graef F Haigis J
Author Affiliation:Department of Soil Science and Land Evaluation (310), University of Hohenheim, 70593, Stuttgart

Language:English
Language of Summary:English (EN)
Abstract:The variability in rainfall in semi-arid Niger is great both spatially and temporally and is considered to be one of the most limiting factors in agriculture. To investigate these constraints more quantitatively, climate data at both survey and detailed scale were analysed. The results show that rainfall can vary considerably even within a few kilometres distance and on different time scales which means that crop yields are very unpredictable. Socio-economic surveys at two villages showed that smallholders have adapted a range of management strategies to ensure at least a minimum yield. Despite this, soil fertility is declining and further technologies need to be integrated into farming systems to make them sustainable
Descriptors:climate: detailed scale, survey scale; farmers' management strategies; minimum yield; rainfall: agriculture limiting factor, spatial variability, temporal variability; risk aversion strategies; smallholders: multiple management strategy adoption; soil fertility: decline. Agriculture; Climatology (Environmental Sciences)
Geographic Locator:Niger (Ethiopian region); Sahel (Ethiopian region)
Subject Codes:Agriculture; Climatology (Environmental Sciences)
ISSN:0140-1963
Year:2001
Journal Title:Journal of Arid Environments

118. Title:Characteristics of major soils of Banni mudflat in arid western India and their relationship with topography
View Article: Journal of Arid Environments. 48 (4). August, 2001. 509-520
CD Volume:357
Print Article: Pages: 509-520
Author(s):Singh Nepal Kar Amal
Author Affiliation:Laboratory of Landscape Ecology, Graduate School of Agricultural and Life Sciences, University of Tokyo, Yayoi, Bunkyo-ku, Tokyo, 113-8657
Language:English
Language of Summary:English (EN)
Abstract:Studies on the soil properties of the apparently flat-lying, but salt-affected Banni mudflat region of arid Kachchh in western India revealed the influence of subtle topographic variations on soil texture and nature and distribution of salts. Six master pedons were investigated to an average depth of 150 cm. The pedons on the upper surfaces showed an abundance of fine sand and a gradual impoverishment of silt and clay, as also lesser amounts of salts in the profiles. Pedons on the successively lower surfaces showed more silt and clay contents, as well as higher amounts of salts. The findings helped to identify the areas suitable for pasture development in this vast degraded rangeland, and to suggest some management practices for improvement
Descriptors:arid rangelands; clay content; management requirements; mudflats; pasture development; physico-chemical characteristics; salt composition; silt content; soil fertility; soil texture; topography. Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science
Geographic Locator:Banni (India, Asia, Oriental region)
Subject Codes:Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science
ISSN:0140-1963
Year:2001
Journal Title:Journal of Arid Environments

119. Title:Soil, water and nutrient conservation in mountain farming systems: Case-study from the Sikkim Himalaya
View Article: Journal of Environmental Management. 61 (2). February, 2001. 123-135
CD Volume:380
Print Article: Pages: 123-135
Author(s):Sharma E Rai S C Sharma R
Author Affiliation:G.B. Pant Institute of Himalayan Environment and Development Sikkim Unit, Sikkim, 737 102: gbp.sk@sikkim.org
Language:English
Language of Summary:English (EN)
Abstract:The Khanikhola watershed in Sikkim is agrarian with about 50% area under rain-fed agriculture representing the conditions of the middle mountains all over the Himalaya. The study was conducted to assess overland flow, soil loss and subsequent nutrient losses from different land uses in the watershed, and identify biotechnological inputs for management of mountain farming systems. Overland flow, soil and nutrient losses were very high from open agricultural (cropped) fields compared to other land uses, and more than 72% of nutrient losses were attributable to agriculture land use. Forests and large cardamon agroforestry conserved more soil compared to other land uses. Interventions, like cultivation of broom grass upon terrace risers, N2-fixing Albizia trees for maintenance of soil fertility and plantation of horticulture trees, have reduced the soil loss (by 22%). Soil and water conservation values (>80%) of both large cardamom and broom grass were higher compared to other crops. Use of N2-fixing Albizia tree in large cardamom agroforestry and croplands contributed to soil fertility, and increased productivity and yield. Bio-composting of farm resources ensured increase in nutrient availability specially phosphorus in cropped areas. Agricultural practices in mountain areas should be strengthened with more agroforestry components, and cash crops like large cardamom and broom grass in agroforestry provide high economic return and are hydroecologically sustainable
Descriptors:agricultural land use; agroforestry; biotechnology; cash croplands; ecological sustainability; economic return; horticultural plantations; mounting farming systems; nutrient availability; nutrient loss; overland flow; soil conservation; soil erosion; soil fertility; water conservation; watershed management. Conservation; Forestry. nitrogen: fixation; phosphorus: nutrient
Geographic Locator:Sikkim (India, Asia, Oriental region)
Organism Descriptors:broom grass (Gramineae): crop; cardamom (Zingiberaceae): crop
Supplemental Descriptors:Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae; Zingiberaceae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Conservation; Forestry
ISSN:0301-4797
Year:2001
Journal Title:Journal of Environmental Management

120. Title:Cultural ecology of Whitethroat (Sylvia communis) habitat management by farmers: Winter in farmland trees and shrubs in Senegambia
View Article: Journal of Environmental Management. 62 (4). August, 2001. 343-356
CD Volume:380
Print Article: Pages: 343-356

Author(s):Stoate C Morris R M Wilson J D
Author Affiliation:Allerton Research and Educational Trust, Loddington House, Loddington, Leics, LE7 9XE
Language:English
Language of Summary:English (EN)
Abstract:The presence of Whitethroats and their potential invertebrate prey in farmland trees and shrubs was investigated. The management of this vegetation by farmers, and their motivation for that management, was explored using participatory techniques. Whitethroats were associated with Guiera senegalensis, the shrub species which supports most caterpillars and spiders. Farmers reported declines in trees and shrubs since the 1950s, loss of fallow areas, declines in soil fertility and crop yields, and increases in the use of fire for clearing fields. Trees are valued by people for their cultural and medicinal uses and some species used by Whitethroats and other birds have potential for restoring soil fertility, although this was not recognised by farmers. More sustainable use of savanna farmland could have both agronomic and wider conservation benefits, and the provision of information that accommodates farmers' cultural and economic incentives could benefit both farmers and wildlife
Descriptors:cultural incentives; economic incentives; farmland trees; shrubs; soil fertility; winter. Agriculture; Conservation
Organism Descriptors:Guiera senegalensis (Combretaceae): shrub species; Sylvia communis [whitethroat] (Passeriformes): cultural ecology, habitat management; caterpillar (Lepidoptera); spider (Arachnida)
Supplemental Descriptors:Arachnida: Chelicerata, Arthropoda, Invertebrata, Animalia; Combretaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Lepidoptera: Insecta, Arthropoda, Invertebrata, Animalia; Passeriformes: Aves, Vertebrata, Chordata, Animalia. Angiosperms; Animals; Arthropods; Birds; Chelicerates; Chordates; Dicots; Insects; Invertebrates; Nonhuman Vertebrates; Plants; Spermatophytes; Vascular Plants; Vertebrates
Subject Codes:Agriculture; Conservation
ISSN:0301-4797
Year:2001
Journal Title:Journal of Environmental Management

121. Title:Grazing impacts on soil nitrogen and phosphorus under parkland pastures
View Article: Journal of Range Management. 2001. 54 (6). 704-710
CD Volume:365
Print Article: Pages: 704-710
Author(s):Baron V S Dick A C Mapfumo E Malhi S S Naeth M A Chanasyk D S
Author Affiliation:Lacombe Research Centre, Agriculture and Agri-Food Canada, 6000 C&E Trail, Lacombe, Alberta T4L 1W1, Canada
Language:English
Language of Summary:spanish
Abstract:Because intensive grazing is new to the humid western Canadian parkland (prairies), there is little information available about its effects on soil N and P status. This study addressed the question of grazing intensity and pasture species effects on soil macronutrient status in a Typic Haplustoll at Lacombe, Alberta, Canada. Paddocks of smooth bromegrass (Bromus inermis), meadow bromegrass (Bromus riparius), and winter triticale (Triticum x Secale), replicated 4 times, were subjected to 3 grazing intensities (heavy, medium, and light as defined by frequency and severity of defoliation) using yearling beef heifers. Nitrogen (N), P and K fertilizers were broadcast annually at 100, 22 and 42 kg ha-1 during production years. The experiment was

maintained on the same paddocks for 4 years. In the establishment year and in the third and fourth production years, soil samples were taken randomly from each paddock to a depth of 60 cm. Concentrations of nitrate-N (NO3-N), ammonium-N (NH4-N), mineral-N (the sum of NO3-N and NH4-N), total Kjeldahl-N, and extractable-P were determined in the 0-15, 15-30, 30-60, and 0-60-cm depths. Nitrate-N concentration was (1.7 to 2.4 times) greater for heavy than light grazed treatments for each soil depth increment and the amount of NO3-N in the 0-60 cm depth was 2.2 times greater than light paddocks. More NO3-N was measured under perennials than triticale (22.2 vs 13.6 mg kg-1, respectively) at the 30-60-cm depth. Ammonium-N amount (0-60 cm) was greater in meadow bromegrass (30 kg ha-1) than in triticale (25 kg ha-1), but not smooth bromegrass paddocks for the 0-15-cm depth. Extractable-P concentration was greater in the 0-15-cm depth of heavy (154 mg kg-1) than in medium (138 mg kg-1) or light-grazed (127 mg kg-1) paddocks and was higher under meadow bromegrass than under triticale. Given the large amounts of NO3-N in the heavy paddocks, there is potential for loss through both leaching and denitrification. Differences among treatments for NH4-N, and P concentrations are not of particular concern environmentally, but are important from a fertility management point of view

Descriptors:ammonium-nitrogen. application-rates. beef-cattle. broadcasting. chemical-composition. denitrification. grassland-soils. grazing. grazing-intensity. heifers. leaching. losses-from-soil. Mollisols. nitrate-nitrogen. nitrogen. nitrogen-fertilizers. nutrient-content. pastures. phosphorus. phosphorus-fertilizers. potassium-fertilizers. soil-composition. soil-depth. soil-fertility. soil-types. triticale

Geographic Locator:Alberta. Canada

Organism Descriptors:Bromus-inermis. Bromus-riparius. cattle. Triticum-x-Secale

Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Bromus. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Bos. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates

Subject Codes:JJ200. JJ600. JJ700. PP350

Supplementary Info:28 ref

ISSN:0022-409X

Year:2001

Journal Title:Journal of Range Management

122. Title:Dependency on arbuscular mycorrhizal fungi and responsiveness of some Brazilian native woody species

View Article: Mycorrhiza. 2001. 11 (5). 245-255

CD Volume:378

Print Article: Pages: 245-255

Author(s):Siqueira J O Saggin Junior O J

Author Affiliation:Departamento de Ciencia do Solo, Universidade Federal de Lavras, CP. 37, Lavras, MG, 37200-000, Brazil

Language:English

Abstract:Arbuscular mycorrhiza (AM) associations are of great importance in forest ecology and land rehabilitation in the tropics, but information on AM susceptibility, host dependence and host responsiveness to the fungi is scarce. The present study was carried out under greenhouse conditions in a low-fertility soil with 29 woody species. There were very large differences between plant species in AM colonization, responsiveness to inoculation, mycorrhizal dependency and efficiency of phosphorus (P) uptake. All of these

parameters were influenced by available soil P in solution. AM colonization ranged from zero in several non-mycotrophic species to >60% in the highly mycotrophic ones. Ten species (34% of the total) were found to be mycorrhiza-independent or non-mycotrophic, whereas the rest were highly to very highly dependent. The level of P above which there was no AM effect, defined here as the T' value, allowed distinction between AM dependence and responsiveness of the host and was very efficient for separating species according to these traits. Mycorrhizal responsiveness and dependency were not related and some species were responsive to increased P in the soil solution only when mycorrhizal. Efficiency of P uptake was affected by AM and by P levels. Some species exhibited a high efficiency independent of AM, while others were very inefficient even at high P. Despite differences between species, in most cases AM growth enhancement was nutritionally mediated. Differences in AM responsiveness and dependency as well as the importance of these concepts for reforestation technology in the tropics are discussed
Descriptors:mycorrhizal-fungi. mycorrhizas. nutrient-uptake. phosphorus. vesicular-arbuscular-mycorrhizas. woody-plants
Organism Descriptors:plants
Subject Codes:FF060. FF061. JJ100
Supplementary Info:37 ref
ISSN:0940-6360
Year:2001
Journal Title:Mycorrhiza
Copyright:Copyright CAB International

123. Title:Potential ecosystem-level effects of genetic variation among populations of Metrosideros polymorpha from a soil fertility gradient in Hawaii
View Article: Oecologia (Berlin). 126 (2). January, 2001. 266-275
CD Volume:354
Print Article: Pages: 266-275
Author(s):Treseder Kathleen K Vitousek Peter M
Author Affiliation:Center for Conservation Biology, University of California, Riverside, CA, 92521: treseder@mail.ucr.edu
Language:English
Language of Summary:English (EN)
Abstract:This study assessed intrinsic differences in tissue quality and growth rate among populations of Metrosideros polymorpha native to sites with a range of soil fertilities. We collected seedlings from three Hawaiian mesic forests that were either phosphorus-limited, nitrogen-limited, or relatively fertile. These individuals were grown in a common garden under a factorial high/low, N/P fertilization regime for 1.5 years and then harvested to determine genetic divergence; aboveground growth rate; and lignin, N, and P concentrations in leaves and roots. Allozyme analyses indicated that the three groups had genetically diverged to some degree (genetic distance=0.036-0.053 among populations). Relative growth rate did not differ significantly among the populations. Senescent leaves from the fertile-site population had the highest N concentrations (due to low N resorption) and had lower lignin concentrations than plants from the N-limited site. Across treatments, P concentrations in senescent leaves were highest in plants from the fertile and P-limited site. Root tissue quality did not generally differ significantly among populations. Since decomposition rate of senescent leaves in this system is related positively to N concentration and negatively to lignin concentration, senescent leaves from the fertile-site population may have a genetic tendency toward faster decay than the others. The

intrinsic qualities of the three populations may provide positive feedbacks on nutrient cycling at each site-nutrient availability may be raised to some degree at the fertile site, and reduced at the N- or P-limited sites. Our results suggest that even a small degree of genetic differentiation among groups can influence traits related to nutrient cycling

Descriptors:aboveground growth; ecosystem-level effects; genetic divergence; genetic variation; growth rate; intrinsic differences; root tissue quality; site-nutrient availability; soil fertility gradient; tissue quality. Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science. lignin; nitrogen: limitation; phosphorus: limitation

Geographic Locator:Hawaii (USA, North America, Nearctic region)

Organism Descriptors:Metrosideros polymorpha (Myrtaceae). leaves; roots

Supplemental Descriptors:Myrtaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants

Subject Codes:Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science

ISSN:0029-8549
Year:2001
Journal Title:Oecologia

124. Title:Regulation of leaf life-span and nutrient-use efficiency of Metrosideros polymorpha trees at two extremes of a long chronosequence in Hawaii

View Article: Oecologia (Berlin). 127 (2). April, 2001. 198-206
CD Volume:354
Print Article: Pages: 198-206

Author(s):Cordell S Goldstein G Meinzer F C Vitousek P M
Author Affiliation:USDA Forest Service, 23 E. Kawili St, Hilo, HI, 96720: cordell@hawaii.edu

Language:English
Language of Summary:English (EN)

Abstract:Leaf traits related to life-span and nutrient-use efficiency were studied in the dominant Hawaiian tree species, Metrosideros polymorpha, at both ends of a natural fertility gradient, from young, nitrogen-poor soils to older, phosphorus-poor soils. The main objective of this study was to understand how nutrient limitations affect leaf-level attributes that ultimately play a mechanistic role in regulating whole-ecosystem function. Different types of adjustments to removal of nutrient limitation by long-term fertilization (9-15 years) with nitrogen (N), phosphorus (P), and a combined treatment of N plus P were observed at each site. Nitrogen fertilization at the young, mostly N-limited site did not significantly affect net CO2 assimilation (A), foliar N content, or N resorption. The primary response to N fertilization was a decrease in average leaf life span to approximately 553 days compared with 898 days in the control plot. Significantly shorter average leaf life-span coupled with constant A and foliar N content resulted in reduced integrated photosynthetic nitrogen-use efficiency (PNUE: A summed over the life-span of a leaf divided by foliar N) in the fertilized plots. In contrast, removal of nutrient limitations at the old, mostly P-limited site resulted in increased A, and increased foliar P concentration which also resulted in reduced integrated photosynthetic phosphorus-use efficiency (PPUE). P resorption was also reduced at this site, yet leaf life-span remained constant. When results from both sites and all treatments were combined, statistically significant relationships between leaf life-span, and

A, leaf mass per area (LMA), and the cost of leaf construction per unit carbon gain (cost of construction determined by combustion of leaf samples divided by A) were found. As leaf life-span increased, A decreased asymptotically, and LMA and the carbon cost per carbon gain increased linearly. It appears that the balance between leaf carbon cost and carbon uptake is a major determinant of leaf longevity in M. polymorpha despite contrasting responses to removal of N and P limitations by long-term fertilization. Removal of the main nutrient limitations at both sites also resulted in reduced integrated nutrient use efficiency. However, the regulatory mechanisms were different depending on the site limitations: a shorter leaf life-span in the young, N-limited site and substantially higher foliar P concentration in the P- fertilized plots at the old, P-limited site

Descriptors:chronosequences; leaf mass per area [LMA]; natural fertility gradients; nutrient limitation; nutritional ecology; photosynthetic nutrient-use efficiency [PNUE]; soil conditions; whole-ecosystem function. Bioenergetics (Biochemistry and Molecular Biophysics); Terrestrial Ecology (Ecology, Environmental Sciences). carbon: nutrient, uptake; carbon dioxide: assimilation; nitrogen: foliar content, nutrient, resorption; phosphorus: nutrient, resorption

Geographic Locator:Hawaii (USA, North America, Nearctic region)

Organism Descriptors:Metrosideros polymorpha (Myrtaceae). leaves: life span, longevity

Supplemental Descriptors:Myrtaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants

Subject Codes:Bioenergetics (Biochemistry and Molecular Biophysics); Terrestrial Ecology (Ecology, Environmental Sciences)

ISSN:0029-8549
Year:2001
Journal Title:Oecologia

125. Title:Nitrogen management in 'adequate' input maize-based agriculture in the derived savanna benchmark zone of Benin Republic

View Article: Plant and Soil. 2001. 228 (1). 61-71
CD Volume:372
Print Article: Pages: 61-71

Author(s):Vanlauwe B Aihou K Houngnandan P Diels J Sanginga N Merckx R
Author Affiliation:International Institute of Tropical Agriculture, Ibadan, Nigeria

Document Editor:Jensen-E-S. Recous-S
Conference Title:The 10th International Nitrogen Workshop, Copenhagen, Denmark, 23-26 August 1999
Language:English

Abstract:We explore options to produce organic matter in-situ and evaluate the impact of combining inorganic and organic sources of N on maize yields, focusing on the densely populated derived savanna benchmark of Benin, Africa. Although most of the farmers (93%) in this benchmark use inorganic fertilizer, applications rates are low (on average, 27 kg N ha-1). A significant response to N was observed for 96% of the studied farmers' fields. Grain and herbaceous legumes were observed to produce between 383 and 8700 kg dry matter ha-1 in the benchmark area. Inoculation with Rhizobia and inorganic P additions were shown to significantly improve biomass production on sites with low contents of Rhizobia and P. Although maize grain yield was observed to increase significantly following a legume compared with following a maize crop or natural fallow, these increases were insufficient in the case of a cowpea crop or were obtained at the

cost of leaving the field idle for a whole year in the case of a herbaceous Mucuna fallow. Topping up a cowpea haulms equivalent of 45 kg N ha-1 with 45 kg urea-N ha-1 was shown to give maize yields similar to the yields obtained after applying 90 kg urea-N ha-1 on the poorest fields. Moreover, on these fields, a positive interaction between cowpea-N and urea-N sources of 200 kg grain ha-1 was observed. On the richest fields, the effects of applied organic matter and fertilizer were additive. Agroforestry systems are alternative cropping systems that produce organic matter in-situ. As tree roots go down below the rooting depth of food crops, sub-soil fertility was observed to influence tree biomass production. Yield increases in tree-crop intercrop systems - such as alley cropping - in the absence of inorganic inputs are often reduced by the occurrence of tree-crop competition. In cut-and-carry systems, where tree prunings are harvested from a field adjacent to the crop land, increases in maize grain yield caused by addition of those prunings were observed to be on the low side. Mixing these residues with urea, however, was shown to lead to added benefits of about 500 kg grains ha-1, relative to the treatments with sole inputs of organic matter or urea. Although residue quality was shown to affect maize N uptake in a pot trial, its impact under field conditions was minimal for the range of considered residue qualities. In an alley cropping trial, maize yield was shown to be sustained on a non-degraded site and enhanced on a degraded site, when a minimal amount of mineral fertilizer was added with the prunings, whereas fertilizer application alone failed to do so in both cases

Descriptors:agroforestry. agroforestry-systems. alley-cropping. benchmark-soils. crop-production. crop-residues. cropping-systems. grain. grasslands. legumes. maize. nitrogen. organic-fertilizers. organic-matter. prunings-disposal. savannas. soil-fertility. urea-fertilizers

Geographic Locator:Africa. Benin

Organism Descriptors:Fabaceae. Mucuna-pruriens. Rhizobium. Zea-mays

Supplemental Descriptors:Mucuna. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Rhizobiaceae. Gracilicutes. bacteria. prokaryotes. Zea. Poaceae. Cyperales. monocotyledons. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa

Subject Codes:FF005. FF150. JJ100. JJ600. JJ700. KK600. PP350

Supplementary Info:32 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

126. Title:Disproportionately high N-mineralisation rates from green manures at low temperatures - implications for modeling and management in cool temperate agro-ecosystems

View Article: Plant and Soil. 2001. 228 (1). 73-82

CD Volume:372

Print Article: Pages: 73-82

Author(s):Magid J Henriksen O Thorup Kristensen K Mueller T

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Document Editor:Jensen-E-S. Recous-S

Conference Title:The 10th International Nitrogen Workshop, Copenhagen, Denmark, 23-26 August 1999

Language:English
Abstract:We examined the decomposition of Medicago lupulina, Melilotus alba and Poa pratensis at 3, 9 and 25 deg C for 4 weeks in Denmark. There was a strong temperature effect on the rate of CO2 evolution, and thus the extent of energy exhaustion from the added substrates. However, there was no concomitant retardation of N mineralization at low temperatures. In the analysis of variance of mineralized N the residue type gave a 10 times larger contribution to the regression than the temperature, whereas for CO2 evolution residue type and temperature were equally important contributors. This indicates that although the temperature has a statistically significant effect on N-mineralization it is substantially less than compared with the effect on carbon mineralization in the materials examined. The retardation of carbon mineralization was least strong in Melilotus alba that had a relatively low cellulose content and a higher content of low molecular compounds. Though more research will be necessary to consolidate and explain this phenomena, it is likely that an important factor is a decrease in the bioavailability of C-rich polymers at low temperatures, and thus, a preferential utilization of N-rich low molecular substances. Nitrification was not effectively deterred at 3 deg C. Thus, in terms of management, it is pertinent to reconsider the timing of green manure and catch crop incorporation in cool temperate climate regions, since the rapid release of nitrogen, coupled with the relatively undeterred nitrification may result in a high N leaching risk by early incorporation, but a low risk for N immobilization at late incorporation, if N rich residues are used
Descriptors:agroecological-zones. application-rates. bioavailability. biodegradation. carbon-dioxide. catch-crops. crop-residues. decomposition. ecosystems. green-manures. mineralization. nitrification. nitrogen. soil-management. soil-types. temperate-soils. temperate-zones. temperature
Geographic Locator:Denmark
Organism Descriptors:Medicago-lupulina. Melilotus-alba. Poa-pratensis
Supplemental Descriptors:Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Melilotus. Poa. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. JJ100. JJ900. JJ200. XX200. JJ700. PP500
Supplementary Info:16 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

127. Title:Effects of soil pH and nitrogen fertility on the population dynamics of Thielaviopsis basicola
View Article: Plant and Soil. 2001. 228 (2). 147-155
CD Volume:372
Print Article: Pages: 147-155
Author(s):Harrison U J Shew H D
Author Affiliation:Department of Plant Pathology, North Carolina State University, Raleigh, NC 27695, USA
Language:English
Abstract:Black root rot of tobacco, caused by Thielaviopsis basicola, is generally severe at soil pH values >5.6 and suppressed under more acidic conditions (pH<5.2). Soil acidifying fertilizers containing NH4-N are generally recommended for burley tobacco production in North Carolina, USA, but the effects of N form and application rate

on development of black root rot and on the population dynamics of T. basicola have not been determined. Greenhouse and laboratory studies were conducted to evaluate the effects of N form (NH4+ or NO3-) and rate on pathogen and disease parameters at several initial soil pH levels. A moderately-conducive field soil, initial pH 4.7, was adjusted to a pH of 5.5 or 6.5 by the addition of CaOH2, then amended with the desired nitrogen form and rate. Pathogen populations were determined over time. In addition, spore production in extracts of roots from plants grown in the various nitrogen and pH treatments was determined. Finally, because tobacco responds to acidic soil conditions and exposure to NH4-N by accumulating high concentrations of the polyamine putrescine, the toxicity of putrescine on vegetative growth and reproduction of T. basicola was investigated. Low soil pH and high levels of NH4-N suppressed reproduction of T. basicola in soil and in root extract, while use of NO3-N and depletion of NH4-N resulted in rapid increases in populations of T. basicola. At 20 mM, putrescine inhibited hyphal growth by 60% and aleuriospore production by 98%. Fertilizers that reduced soil pH also reduced reproduction by T. basicola, and thus have potential for management of black root rot by suppressing populations of T. basicola over multiple years of crop production. The suppression of T. basicola and black root rot observed with NH4-N amendments may be partially due to development of an inhibitory environment in the root and not solely to changes in rhizosphere pH

Descriptors:ammonium. application-rates. fungal-diseases. fungal-spores. growth. nitrate. nitrogen-fertilizers. plant-diseases. plant-pathogenic-fungi. plant-pathogens. polyamines. population-dynamics. putrescine. roots. soil. soil-amendments. soil-pH. tobacco. toxicity

Geographic Locator:North-Carolina. USA

Organism Descriptors:Nicotiana. Thielaviopsis-basicola

Supplemental Descriptors:Solanaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants. Thielaviopsis. Deuteromycotina. Eumycota. fungi. North-America. America. Developed-Countries. OECD-Countries. Appalachian-States-of-USA. Southern-States-of-USA. USA. South-Atlantic-States-of-USA

Subject Codes:FF610. JJ200. JJ700. JJ100

Supplementary Info:47 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

128. Title:Changes in soil mineral nitrogen during and after 3-year and 5-year set-aside and nitrate leaching losses after ploughing out the 5-year plant covers in the UK

View Article: Plant and Soil. 2001. 228 (2). 157-177

CD Volume:372

Print Article: Pages: 157-177

Author(s):Chalmers A G Bacon E T G Clarke J H

Author Affiliation:ADAS Bridgets, Martyr Worthy, Winchester, Hants SO21 1AP, UK

Language:English

Abstract:The management and effects of 3- and 5-year set-aside covers on soil mineral nitrogen (SMN, 0.0-0.9 m) were studied at six sites (Boxworth, Bridgets, Gleadthorpe, High Mowthorpe and Woburn) in England, UK. Soil mineral N was measured annually in autumn and spring during the period of set-aside cover, with more frequent SMN sampling over the first winter after ploughing out the covers. Spring SMN was measured in the second year after set-aside. Nitrate

leaching losses were also measured at three sites in the first winter after destruction of the 5-year set-aside covers. Winter cereals were grown in both test years after each set-aside period. Amounts of both autumn and spring SMN in the perennial ryegrass (Lolium perenne, PRG), perennial ryegrass/Trifolium repens (PRG/WC) and natural regeneration (NR) covers were generally less than, or similar to those in the continuous arable treatment during each year of set-aside, indicating a slightly smaller nitrate leaching risk under set-aside management. Slight increases in autumn SMN, and hence leaching potential were, however, observed under PRG/WC in the fourth and fifth years, compared with continuous arable cropping. Ploughing out of both 3- and 5-year covers increased soil N supply and potential nitrate leaching losses over winter, compared with continuous arable cropping. By the following spring, mean increases across all sites in amounts of SMN after 3-year covers of PRG, NR and PRG/WC were 14, 18 and 33 kg ha-1 N, respectively, compared with the arable rotation. Equivalent increases in spring SMN following destruction of the 5-year set-aside covers were almost identical, at 17, 19 and 33 kg ha-1, respectively, although only the ploughed-out PRG/WC covers increased SMN at the clay sites. Measured nitrate leaching losses in the first winter after 5-year set-aside were greatest after PRG/WC at two sites on shallow chalk but greatest after NR, which had a naturally large clover content, at the third site which was on a sandy soil. However, the leaching losses after set-aside were relatively small, relative to typical losses after ploughing out intensively managed grass or grass/clover swards, and would have been compensated for by potentially less leaching during set-aside. Spring SMN measurements in the second year after ploughing out the set-aside covers, showed negligible or, for PRG/WC, only slight increases (12-18 kg ha-1) in residual soil N supply after both 3- and 5-year covers, compared to continuous arable cropping. The extra N mineralization after cover destruction justified small reductions in fertilizer N inputs for the first, but not second crop following either 3- or 5-year set-aside, unless the cover had contained a large clover content. Both 3- and 5-year set-aside covers had minimal or no effect on either organic matter content, apart from a slight increase in the PRG/WC treatments, or extractable phosphorus, potassium and magnesium status in the topsoil

Descriptors:cereals. chalk-soils. clay-soils. land-diversion. leaching. mineralization. natural-regeneration. nitrate. nitrogen. nutrients. ploughing. residual-effects. rye. sandy-soils. soil. soil-fertility. soil-types. topsoil

Geographic Locator:England. UK

Organism Descriptors:Lolium-perenne. Secale-cereale. Trifolium-repens

Supplemental Descriptors:Great-Britain. UK. British-Isles. Western-Europe. Europe. Developed-Countries. Commonwealth-of-Nations. European-Union-Countries. OECD-Countries. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lolium. Poaceae. Cyperales. monocotyledons. Secale

Subject Codes:FF005. FF007. JJ200. JJ700. JJ900. PP720

Supplementary Info:34 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

129. Title:Plant species and nutritional-mediated control over rhizodeposition and root decomposition

View Article: Plant and Soil. 2001. 228 (2). 191-200

CD Volume:372
Print Article: Pages: 191-200
Author(s):Krift T A J van der Kuikman P J Moller F Berendse F
Author Variant:van-der-Krift-T-A-J
Author Affiliation:Nature Conservation and Plant Ecology group, Department of Environmental Sciences, Wageningen University and Research Centre, Bornsesteeg 69, 6708 PD, Wageningen, Netherlands
Language:English
Abstract:The influence of nitrogen (N) availability and species on rhizodeposition and on decomposition of rhizodeposits, roots and soil organic matter was studied. Four perennial grass species (Holcus lanatus, Festuca rubra, Anthoxanthum odoratum and F. ovina) that are characteristic of grassland habitats that differ in nutrient availability, were homogeneously labelled with 14CO2. Plants were grown on soil without N addition and with N addition (14 g N m-2). After 8 weeks, plants were harvested and root production and the remaining amount of rhizodeposits in the soil were measured. 14C-labelled roots were incubated in fresh soil. Decomposition was measured through (1) the labelled rhizodeposits in the soil in which the plants had been growing and (2) the labelled dead roots incubated in fresh soil, by trapping the evolved 14CO2, over 69 days. In general, decomposability of both roots and rhizodeposits increased when nitrogen availability increased. Moreover, the species differed in their response to N. Higher N supply increased total rhizodeposition of H. lanatus and the decomposability of rhizodeposited carbon compounds of this high fertility species was greater than of the low fertility species F. ovina, but lower than of A. odoratum. The presented study gives no evidence for a relation between root decomposition rate and the nutrient availability of the habitat of the four species. It is suggested that species can affect nutrient cycling by differences in rates of rhizodeposition and litter production. This offers a mechanism whereby species can influence species replacement during succession
Descriptors:cycling. decomposition. deposition. nitrogen. nutrient-availability. plant-nutrition. responses. rhizosphere. roots. soil-fertility. soil-organic-matter
Organism Descriptors:Anthoxanthum-odoratum. Festuca-ovina. Festuca-rubra. Holcus-lanatus
Supplemental Descriptors:Anthoxanthum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Festuca. Holcus
Subject Codes:FF007. JJ100. JJ600. FF061. JJ200
Supplementary Info:43 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

130. Title:Effect of tillage and farming system upon VAM fungus populations and mycorrhizas and nutrient uptake of maize
View Article: Plant and Soil. 2001. 228 (2). 299-308
CD Volume:372
Print Article: Pages: 299-308
Author(s):Galvez L Douds D D Jr Drinkwater L E Wagoner P
Author Affiliation:Agricultural Research Service, U.S. Department of Agriculture, Eastern Regional Research Center, 600 East Mermaid Lane, Wyndmoor, PA 19038, USA
Language:English
Abstract:Low-input agricultural systems that do not rely on fertilizers may be more dependent on vesicular-arbuscular mycorrhizal [VAM] fungi than

conventionally managed systems. We studied populations of spores of VAM fungi, mycorrhiza formation and nutrient utilization of maize (Zea mays) grown in mouldboard ploughed, chisel- disced or no-tilled soil under conventional and low-input agricultural systems at the Rodale Institute Experimental farm in Pennsylvania, USA (initiated in 1988). Maize shoots and roots were collected at four growth stages. Soils under low-input management had higher VAM fungus spore populations than soils under conventional management. Spore populations and colonization of maize roots by VAM fungi were higher in no-tilled than in mouldboard ploughed or chisel- disced soil. The inoculum potential of soil collected in the autumn was greater for no-till and chisel- disced soils than for mouldboard ploughed soils and greater for low-input than conventionally farmed soil. The effects of tillage and farming system on N uptake and utilization varied with growth stage of the maize plants. The effect of farming system on P use efficiency was significant at the vegetative stages only, with higher efficiencies in plants under low-input management. The effect of tillage was consistent through all growth stages, with higher P use efficiencies in plants under mouldboard plough and chisel- disc than under no-till. Plants grown in no-tilled soils had the highest shoot P concentrations throughout the experiment. This benefit of enhanced VAM fungus colonization, particularly in the low-input system in the absence of effective weed control and with likely lower soil temperatures, did not translate into enhanced growth and yield

Descriptors:chisel-ploughs. colonization. discing. farming-systems. low-input-agriculture. maize. microbial-ecology. mouldboards. mycorrhizal-fungi. no-tillage. nutrient-uptake. nutrition-physiology. phosphorus. ploughing. roots. shoots. soil. soil-fertility. spores. tillage. use-efficiency. vesicular-arbuscular-mycorrhizas

Geographic Locator:Pennsylvania. USA

Identifiers:microbial communities

Organism Descriptors:Zea-mays

Supplemental Descriptors:Middle-Atlantic-States-of-USA. Northeastern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. FF150. JJ100. JJ600. JJ900

Supplementary Info:49 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

131. Title:Patterns of natural 15N abundance in the leaf-to-soil continuum of tropical rain forests differing in N availability on Mount Kinabalu, Borneo

View Article: Plant and Soil. 2001. 229 (2). 203-212

CD Volume:372

Print Article: Pages: 203-212

Author(s):Kitayama K Iwamoto K

Author Affiliation:Japanese Forestry and Forest Products Research Institute, P.O. Box 16, Tsukuba Norin Kenkyu Danchi, Ibaraki 305-8687, Japan

Language:English

Abstract:We investigated the natural abundance of 15N in sun leaves and other components of tropical rain forests on altitudinal sequences of eight sites that form a gradient of soil N availability with varying ectomycorrhizal abundances in Mt. Kinabalu, Borneo [date not given]. Sun leaves of canopy trees from selected evergreen broadleaved

families such as Dipterocarpaceae (Shorea and Hopea), Myrtaceae (Leptospermum, Syzygium and Tristaniopsis), Fagaceae (Lithocarpus) and Theaceae (Adinandra, Schima and Ternstroemia), and coniferous families such as Araucariaceae (Agathis), Podocarpaceae (Dacrycarpus and Dacrydium) and Phyllocladaceae (Phyllocladus) were collected. We also investigated how soil N availability and ectomycorrhizal abundance are related to 15N abundance of ecosystem components. delta 15N values (15N abundance relative to 14N) increased consistently in the following order at each site: sun leaves, leaf litter, fine roots and from shallower organic to deeper mineral soil horizons. Enrichment (3-6 per mil delta 15N) of 15N occurred at the litter-topsoil interface at all sites, and the magnitude of the enrichment correlated negatively with 15N depletion in the foliage, irrespective of ectomycorrhizal abundance. Foliar delta 15N values significantly and positively correlated with their N concentrations. Foliar, litter and root delta 15N values correlated positively with NO3 availability, and negatively with NH4 availability. The two positive correlations of foliar delta 15N with foliar N and NO3 availability were inconsistent with the assumption that stronger nitrification (hence a greater nitrate availability) produced a more 15N-depleted active inorganic N pool. The isotopic fractionation during the passage of N through ectomycorrhizas to plants might explain the positive correlation of foliar delta 15N and N concentration; however, this mechanism could not fully explain the correlation in our case because strong foliar 15N depletions occurred at the sites that lacked ectomycorrhizas. Alternatively, the positive correlation across sites reflected the tightness of N cycling. Strong nitrification and associated isotopic fractionation might have occurred at N-richer sites and the subsequent removal of NO3 from the system could decrease isotopically lighter N at these sites

Descriptors:altitude. availability. chemical-composition. ectomycorrhizas. enrichment. forest-litter. forests. horizons. isotope-fractionation. leaves. mineralization. mycorrhizal-fungi. mycorrhizas. nitrate. nitrification. nitrogen. nutrient-availability. organic-horizons. plant-composition. roots. soil. soil-fertility. trees. tropical-rain-forests

Geographic Locator:Borneo

Identifiers:Adinandra. broadleaved trees. Tristaniopsis

Organism Descriptors:Agathis-(Araucariaceae). Dacrycarpus. Dacrydium. Dipterocarpaceae. Fagaceae. Hopea. Leptospermum. Lithocarpus. Myrtaceae. Phyllocladaceae. Phyllocladus. Podocarpus. Schima. Shorea. Syzygium. Ternstroemia. Theaceae

Supplemental Descriptors:Podocarpaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Theales. dicotyledons. angiosperms. Fagales. Dipterocarpaceae. Myrtaceae. Myrtales. Fagaceae. Phyllocladaceae. Theaceae

Subject Codes:JJ100. JJ600. KK100. PP500. JJ200

Supplementary Info:22 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

132. Title:Continuous measurements of electrical conductivity in growing media using a modified suction probe: initial calibration and potential usefulness

View Article: Plant and Soil. 2001. 230 (1). 67-75

CD Volume:372

Print Article: Pages: 67-75

Author(s):Eymar E Oki L R Lieth J H
Author Affiliation:Departamento de Quimica Agricola, C-VII. Facultad de Ciencias. Universidad Autonoma de Madrid. 28049 Madrid, Spain
Language:English
Abstract:An electrical conductivity (EC) cell introduced into a porous ceramic cup was developed to continuously sample the solution and measure EC from different growing media. Application of pressure head creates a continuous flow of solution from the growing media tested, into the ceramic cup, and through the EC cell. Continuous recording of the EC was achieved by connecting the EC meter to a data logger. Using two different pressure heads (-5 and -15 kPa) allowed us to observe differences in the EC of the solution extracted that resulted from the different moisture retention of each growing media. After a maximum period of 24 h extracting the solution from different growing media, EC values obtained with the probe were compared with those obtained using paste extracts, saturated with either deionized water or nutrient solution. EC values obtained using the probe with a -15 kPa pressure head were closer to values of EC measured in saturated extracts made with nutrient solution. Using a -5 kPa pressure head, EC values with probe were lower than those obtained by extracts done with nutrient solution but higher than EC values from saturated extracts made with deionized water. Simultaneous measurements of matric tension and EC showed the effect of pressure heads applied in the probe on the water content of growing media. This technique is not destructive (the sampling of growing media is not necessary) and it is possible to obtain EC measurements of solutions continuously. This method of measuring water and salt content of the root environment has potential applications in the greenhouse production of pot plants. Measurements obtained with this method may lead to new information on nutrient uptake by plants and the development of new strategies of managing fertility and irrigation of horticultural crops
Descriptors:calibration. electrical-conductivity. growing-media. matric-potential. nutrient-solutions. probes. soil-solution. tensiometers
Identifiers:measurementsoil salinity
Subject Codes:JJ200. JJ300. ZZ900. FF100
Supplementary Info:24 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

133. Title:Leaf litter decomposition of Piper aduncum, Gliricidia sepium and Imperata cylindrica in the humid lowlands of Papua New Guinea
View Article: Plant and Soil. 2001. 230 (1). 115-124
CD Volume:372
Print Article: Pages: 115-124
Author(s):Hartemink A E O'Sullivan J N
Author Affiliation:International Soil Reference and Information Centre, PO Box 353 6700 AJ, Wageningen, Netherlands
Language:English
Abstract:No information is available on the decomposition and nutrient release pattern of Piper aduncum and Imperata cylindrica despite their importance in shifting cultivation systems of Papua New Guinea and other tropical regions. We conducted a 24-week litter bag study (started October 1996) on a Typic Eutropepts in the humid lowlands to assess the rate of decomposition of P. aduncum, I. cylindrica and Gliricidia sepium leaves under sweet potato (Ipomoea batatas). Decomposition rates of P. aduncum leaf litter were the fastest

followed closely by G. sepium, and both lost 50% of the leaf biomass within 10 weeks. I. cylindrica leaf litter decomposed much more slowly and half-life values exceeded the period of observation. The decomposition patterns were best explained by the lignin plus polyphenol over N ratio which was lowest for P. aduncum (4.3) and highest for I. cylindrica (24.7). G. sepium leaf litter released 79 kg N ha-1, whereas 18 kg N ha-1 was immobilized in the I. cylindrica litter. The mineralization of P was similar for the three species, but P. aduncum litter released large amounts of K. The decomposition and nutrient release patterns had significant effects on the soil. The soil contained significantly more water in the previous I. cylindrica plots at 13 weeks due to the relative slow decomposition of the leaves. Soil N levels were significantly reduced in the previous I. cylindrica plots due to immobilization of N. Levels of exchangeable K were significantly increased in the previous P. aduncum plots due to large addition of K. It can be concluded that P. aduncum leaf litter is a significant and easily decomposable source of K which is an important nutrient for sweet potato. G. sepium leaf litter contained much N, whereas I. cylindrica leaf litter releases relatively little nutrients and keeps the soil more moist. G. sepium fallow is more attractive than an I. cylindrica fallow for it improves the soil fertility and produces fuelwood as additional saleable products

Descriptors:decomposition. exchangeable-potassium. fallow. fuelwood. humid-zones. immobilization. Inceptisols. leaves. lignin. litter-(plant). lowland-areas. mineralization. multipurpose-trees. nitrogen. nutrient-content. phosphorus. plant-composition. polyphenols. potassium. potassium. soil-fertility. soil-water-content. sweet-potatoes. trees

Geographic Locator:Papua-New-Guinea

Organism Descriptors:Gliricidia-sepium. Imperata-cylindrica. Ipomoea-batatas. Piper-aduncum

Supplemental Descriptors:Gliricidia. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Imperata. Poaceae. Cyperales. monocotyledons. Ipomoea. Convolvulaceae. Solanales. New-Guinea. Melanesia. Australasia. Oceania. Pacific-Islands. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Piper. Piperaceae. Piperales

Subject Codes:FF003. FF007. FF150. JJ100. JJ600. KK100. KK600

Supplementary Info:31 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

134. Title:Cereal/legume rotations affect chemical properties and biological activities in two West African soils

View Article: Plant and Soil. 2001. 231 (1). 45-54

CD Volume:372

Print Article: Pages: 45-54

Author(s):Alvey S Bagayoko M Neumann G Buerkert A

Author Affiliation:Department of Environmental Sciences, University of California Riverside, Riverside, CA 92521, USA

Language:English

Abstract:A more widespread use of cereal/legume rotations has been suggested as a means to sustainably meet increasing food demands in sub-Saharan West Africa. Enhanced cereal yields following legumes have been attributed to chemical and biological factors such as higher levels of mineral nitrogen (Nmin) and arbuscular mycorrhizas (AM) but also

to lower amounts of plant parasitic nematodes. This study was conducted under controlled conditions to examine the relative contribution of AM, plant parasitic nematodes and increased nitrogen (N) and phosphorus (P) availability to cereal (pearl millet and sorghum (Sorghum bicolor))/legume (cowpeas and groundnuts) rotation effects on two West African soils. Sample soils were taken from field experiments at Gaya (Niger) and Fada (Burkina Faso), classified as Arenic Kandiustalf and Haplustalf, respectively, supporting continuous cereal and cereal/legume rotation systems and analysed for chemical and biological parameters. Average increases in cereal shoot dry matter of rotation cereals compared with continuous cereals were 490% at Gaya and 550% at Fada. Shoot P concentration of rotation pearl millet was significantly higher than in continuous pearl millet and P uptake in rotation cereals was on average 62.5-fold higher than in continuous cereals. Rotation rhizosphere soils also had higher pH at both sites. For the Fada soil, large increases in Bray-1-P and organic P were observed in bulk and rhizosphere soils. Plant parasitic nematodes in roots of continuous cereals were 60-80-fold higher than in those of rotation cereals. In both cropping systems mycorrhizal infection rates were similar at 37 days after sowing (DAS) but at 57 DAS AM infection was 10-15% higher in rotation sorghum than in continuous sorghum. This study provides strong evidence that cereal/legume rotations can enhance P nutrition of cereals through improved soil chemical P availability and microbiologically increased P uptake

Descriptors:Alfisols. biological-activity-in-soil. chemical-composition. continuous-cropping. cowpeas. crop-yield. dry-matter-accumulation. endomycorrhizas. enzyme-activity. enzymes. groundnuts. mineral-uptake. mycorrhizal-fungi. mycorrhizas. nitrogen. nutrient-availability. nutrient-uptake. pearl-millet. phosphoric-monoester-hydrolases. phosphorus. plant-composition. plant-nutrition. plant-parasitic-nematodes. plant-pests. rhizosphere. roots. rotations. shoots. soil-chemical-properties. soil-fertility. soil-pH. soil-types. vesicular-arbuscular-mycorrhizas

Geographic Locator:Burkina-Faso. Niger. West-Africa

Identifiers:arbuscular mycorrhizas

Organism Descriptors:Arachis-hypogaea. Nematoda. Pennisetum-glaucum. Sorghum-bicolor. Vigna-unguiculata

Supplemental Descriptors:Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa. Pennisetum. Poaceae. Cyperales. monocotyledons. Sorghum. Vigna. invertebrates. animals

Subject Codes:FF005. FF060. FF061. FF100. FF620. JJ100. JJ200. JJ600

Supplementary Info:40 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

135. Title:Changes in soil organic matter and phosphorus fractions under planted fallows and a crop rotation system on a Colombian volcanic-ash soil

View Article: Plant and Soil. 2001. 231 (2). 211-223

CD Volume:372

Print Article: Pages: 211-223

Author(s):Phiri S Barrios E Rao I M Singh B R

Author Affiliation:Agricultural University of Norway, P.O. Box 5028, NLH, N-1432 Aas, Norway

Language:English
Abstract:Planted tree or shrub fallows can help increase the fertility of degraded tropical soils. We investigated the effects of planted fallows of Indigofera constricta (IND), Calliandra calothyrsus (CAL), and Tithonia diversifolia (TTH); a natural, unmanaged fallow (NAT); and a maize/bean rotation (ROT) on the dynamics and partitioning of soil organic matter (SOM) and phosphorus (P). One year after treatment, samples were collected from a fine-textured volcanic-ash soil (Oxic Dystropept) of a mid-altitude hillside in southwestern Colombia. The SOM in the sand-size fraction (150-2000 micro m) was subdivided into light (LL), intermediate (LM), and heavy (LH) fractions. Total soil P was also fractionated into inorganic (Pi) and organic (Po). Of the planted fallows, TTH increased most and NAT least increased plant-available Pi and Po. The amounts of C, N, and P in the LL and LM fractions of SOM followed the order, TTH > CAL > NAT > ROT > IND and CAL > TTH > IND > NAT > ROT, respectively. Total amounts of N, P, K, Ca, and Mg in the soil were significantly ($P < 0.05$) high under TTH and low under NAT. The fallow and ROT systems did not affect the C:N, C:P, and N:P ratios in the soil but significantly did so in the LL and LM fractions of SOM. Significant correlations indicated that the P content in the LL and LM fractions of SOM may help determine the amounts of $NaHCO_3$-extractable Pi and Po, which may therefore serve as sensitive indicators of 'readily available' and 'readily mineralizable' soil P pools, respectively, in the volcanic-ash soils of the Andes
Descriptors:beans. calcium. fallow. Inceptisols. magnesium. maize. phosphorus. potassium. rotations. soil-organic-matter. soil-types. volcanic-ash-soils
Geographic Locator:Colombia
Identifiers:Indigofera constricta
Organism Descriptors:Calliandra-calothyrsus. Indigofera. Tithonia-diversifolia. Zea-mays
Supplemental Descriptors:Calliandra. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. South-America. America. Developing-Countries. Andean-Group. Latin-America. Papilionoideae. Tithonia. Asteraceae. Asterales. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF150. JJ200. KK100. KK110
Supplementary Info:62 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

136. Title:Effects of fertility management strategies on phosphorus bioavailability in four West African soils
View Article: Plant and Soil. 2001. 233 (1). 71-83
CD Volume:372
Print Article: Pages: 71-83
Author(s):Sinaj S Buerkert A El Hajj G Bationo A Traore H Frossard E
Author Affiliation:Institute of Plant Science, Swiss Federal Institute of Technology Zurich, Eschikon 33, CH-8315 Lindau, Switzerland
Language:English
Abstract:Low phosphorus (P) in acid sandy soils of the West African Sudano-Sahelian zone is a major limitation to crop growth. To compare treatment effects on total dry matter (TDM) of crops and plant available P (P-Bray and isotopically exchangeable P), field experiments were carried out during 1995-99 at four sites where annual rainfall ranged from 560 to 850 mm and topsoil pH varied

between 4.2 and 5.6. Main treatments were: (i) crop residue (CR) mulch at 500 and 2000 kg ha-1, respectively; (ii) eight different rates and sources of P; and (iii) cereal/legume rotations including millet (Pennisetum glaucum), sorghum (Sorghum bicolor), cowpea (Vigna unguiculata) and groundnut (Arachis hypogaea). The soils in the study area were Psammentic Paleustalfs at Kara Bedji and Goberi in the southern Sahelian zone, Arenic Kandiustalfs at Gaya-Bengou in the Sudanian zone of Niger and a Haplustalf at Fada-Kouare in the Sudanian zone of Burkina Faso. For the two Sahelian sites with large CR-induced differences in TDM, mulching did not modify significantly the soils' buffering capacity for phosphate ions but led to large increases in the intensity factor (Cp) and quantity of directly available soil P (E1 minute). In the wetter Sudanian zone, lacking effects of CR mulching on TDM mirrored a decline of E1 minute with CR. Broadcast application of soluble single superphosphate (SSP) at 13 kg P ha-1 led to large increases in Cp and quantity of E1 minute at all sites which translated in respective TDM increases. The high agronomic efficiency of SSP placement (4 kg P ha-1) across sites could be explained by consistent increases in the quantity factor which confirms the power of the isotopic exchange method in explaining management effects on crop growth across the region

Descriptors:acid-soils. Alfisols. application-rates. bioavailability. broadcasting. cowpeas. crop-residues. crop-yield. groundnuts. mulches. mulching. nutrient-availability. pearl-millet. phosphorus. phosphorus-fertilizers. placement. rock-phosphate. rotations. sandy-soils. soil. soil-management. soil-types. superphosphate

Geographic Locator:Burkina-Faso. Niger. Sahel. West-Africa

Organism Descriptors:Arachis-hypogaea. Pennisetum-glaucum. Sorghum-bicolor. Vigna-unguiculata

Supplemental Descriptors:Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa. Pennisetum. Poaceae. Cyperales. monocotyledons. Sorghum. Vigna

Subject Codes:FF005. FF100. JJ200. JJ700. JJ900

Supplementary Info:41 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

137. Title:Douglas-fir root biomass and rooting profile in relation to soils in a mid-elevation area (Beaujolais Mounts, France)

View Article: Plant and Soil. 2001. 233 (1). 109-125

CD Volume:372

Print Article: Pages: 109-125

Author(s):Curt T Lucot E Bouchaud M

Author Affiliation:Cemagref, Forest and Agroforestry Research Unit, 24 Av. des Landais, BP 50085, F-63172 Aubiere, France

Language:English

Abstract:Douglas-fir (Pseudotsuga menziesii) is the main reforestation species in the French Massif Central area (14 000 ha), but little is known about its rooting strategy in different soil conditions. This information has important implications for the choice of better soils for settling Douglas-fir, and consequently limiting risks of failure, pests or diseases. As a result, the influence of edaphic conditions on rooting patterns of dominant Douglas-fir was studied over a large range of ecological conditions in a mid-elevation area of the French Massif Central (Beaujolais Mounts). Root systems were studied

extensively using the trench profile wall technique and the sector method in 74 pure and evenly aged Douglas-fir stands. The stands were chosen as being representative of soil conditions among 165 stands in an auto-ecological study. The rooting patterns were related to seven typical soil profiles, and to root profile groups. Most soils belong to Cambisols. The main soil type is a Cambic Arenosol; Regosols are located on most ridges, and colluvial Cambisols in vales and on lower parts of slopes. Results stressed that edaphic constraints due to substratum and soil structures have a strong influence on root system morphology. Important variations in root biomass and vertical distribution were highlighted among soils. Small fine root biomass was maximal for soils with no major edaphic constraints. The vertical distribution of fine root biomass was positively correlated for some soil types with organic C, total N, and most cations. For some types it was negatively correlated with the amount of exchangeable aluminium and coarse fragments, and with constraining rock facies. Harsher soils however, showed no correlation between soil chemical variables and fine-root biomass. A practical implication is that Douglas-fir seems to be a pliable and adaptive species: variation in habit and root system biomass are considerable within a study area which was presumed uniform

Descriptors:Arenosols. Cambisols. cations. edaphic-factors. forest-plantations. nitrogen. organic-carbon. Regosols. root-systems. rooting-depth. roots. soil-chemical-properties. soil-fertility. soil-organic-matter. soil-structure. soil-types

Geographic Locator:France

Identifiers:vertical distribution

Organism Descriptors:Pseudotsuga-menziesii

Supplemental Descriptors:Western-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries. Pseudotsuga. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants

Subject Codes:FF030. JJ200. JJ600. KK100. JJ400

Supplementary Info:55 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

138. Title:Analysis of water- and nitrogen-use efficiency of wheat in a Mediterranean climate

View Article: Plant and Soil. 2001. 233 (1). 127-143

CD Volume:372

Print Article: Pages: 127-143

Author(s):Asseng S Turner N C Keating B A

Author Affiliation:CSIRO Plant Industry, Private Bag No 5, Wembley, WA 6913, Australia

Language:English

Abstract:Water-use efficiency (WUE, g grain yield m-2 mm-1 evapotranspiration) and nitrogen-use efficiency (NUE, DELTA g grain yield g-1 Napplied) are important measures that can affect the productivity of crops in different environmental systems. However, measurement and interpretation of WUE and NUE in the field are often hampered by the high degree of complexity of these systems due to season-to-season variability in rainfall, the variation in crop responses to soil types and to agronomic management. To be able to guide agronomic practice, experimentally-derived measurements of WUE and NUE need to be extrapolated across time and space through appropriate modelling. To illustrate this approach, the Agricultural Production Systems

Simulator (APSIM), which has been rigorously tested for wheat (Triticum aestivum) in a Mediterranean environment, was used to estimate and analyse the WUE and NUE of wheat crops in the Mediterranean-climatic region of the central Western Australian agricultural zone. The APSIM model was tested for three locations (average annual rainfall of 461 mm (high rainfall zone), 386 mm (medium) and 310 mm (low)) and two soil types that had contrasting plant-available water-holding capacities in the rooting zone (sand: 55 mm, clay soil: 109 mm). Simulations were carried out with historical weather records (82-87 years) assuming current crop management and cultivars. The modelling analyses highlighted the inherently high degree of seasonal variability in yield, WUE and NUE of wheat, depending on soil type, N fertilizer input, rainfall amount and, in particular, rainfall distribution. The clay soil tended to be more productive in terms of grain yield, WUE and NUE in the high and medium rainfall zones, but less productive in most years in the low rainfall zone. The sandy soil was less productive in the high rainfall zone due to the high nitrate leaching potential of this soil type, but more productive than the clay in the low rainfall zone due to poorer pre-anthesis growth and less water use, less water loss by soil evaporation and relatively more water use in the post-anthesis phase. When a wheat crop was sown early on clay soil in the low rainfall zone, it yielded as high as in the other rainfall zones in seasons when rainfall was above average or there was a good store of water in the soil prior to sowing. The simulations confirmed findings from a limited number of field experiments and extended these findings both qualitatively and quantitatively across soil types, rainfall regions and crop management options. Furthermore, by using long-term historical weather records, the simulations extended the findings across the wide range of climatic scenarios experienced in mediterranean-climatic regions

Descriptors:clay-soils. crop-yield. leaching. Mediterranean-climate. nitrate. nitrogen. nitrogen-fertilizers. plant-water-relations. rain. sandy-soils. seasonal-variation. simulation-models. soil-fertility. soil-types. soil-water-content. use-efficiency. water-use. water-use-efficiency. wheat

Geographic Locator:Australia. Western-Australia

Organism Descriptors:Triticum. Triticum-aestivum

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australia

Subject Codes:FF061. FF062. FF100. JJ300. JJ700. PP500. FF005. JJ400

Supplementary Info:62 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

139. Title:Soil conditions and regeneration after clear felling of a Pinus sylvestris L. stand in a nitrogen experiment, Central Sweden

View Article: Plant and Soil. 2001. 233 (2). 241-250

CD Volume:372

Print Article: Pages: 241-250

Author(s):Hogbom L Nohrstedt H O Lundstrom H Nordlund S

Author Affiliation:SkogForsk, The Forest Research Institute of Sweden, Uppsala Science Park, SE-751 83 Uppsala, Sweden

Language:English

Abstract:Forest N fertilization is a common practice in areas of Sweden that are not affected by high levels of N deposition. The environmental consequences of high N input to closed forests are fairly well known, but the long-term effects following clear felling are a lot less well known. Thus, residual effects on soil and planted seedlings of previous N additions at an experimental N gradient 11 years after clear felling were studied at a naturally nutrient-poor forest site in central Sweden. The experimental N gradient had been established by three repeated applications (in 1967, 1974 and 1981) of six dosages of NH4NO3 with increments of 120 kg N ha-1. Thus, in total, the applied N dose ranged between 0-1800 kg N ha-1. The study examined extractable base cations and P, soil pH, total-N, total-C, net N-mineralization and potential nitrification in four soil horizons (the humus layer, and 0-5, 5-10 and 10-20 cm in the mineral soil). We also measured the survival and growth of planted Pinus sylvestris seedlings. The applied N had no effect on the amounts of extractable-P or base cations in the soil. The soil pH decreased with increasing N dose in the deeper soil horizons, while in the humus the pH showed a weak but statistically significant increase due to the N application. Both total C and total N increased as a result of the N application, while the C:N ratio decreased. In the humus layer and the uppermost mineral soil layer, NH4+ was the major inorganic N source, in contrast to the lowest mineral soil horizon where NO3- dominated. For most of the studied horizons, there was a positive linear relationship between applied N dose and amount of inorganic N. Both net N mineralization and potential nitrification showed increases with increasing N dose. As for the plants, no difference in survival or growth was found between the different N treatments. For doses generally applied in forest fertilization no significant differences in any of the studied properties were found
Descriptors:application-date. application-rates. carbon. cations. clear-felling. coniferous-forests. deposition. forest-plantations. forests. growth. horizons. mineral-soils. mineralization. natural-regeneration. nitrogen. nitrogen-fertilizers. phosphorus. residual-effects. seedlings. soil-fertility. soil-pH. survival
Geographic Locator:Sweden
Organism Descriptors:Pinus-sylvestris
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:JJ200. JJ600. JJ700. KK110
Supplementary Info:24 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

140. Title:A comparison of soil quality in adjacent cultivated, forest and native grassland soils
View Article: Plant and Soil. 2001. 233 (2). 251-259
CD Volume:372
Print Article: Pages: 251-259
Author(s):Saviozzi A Levi Minzi R Cardelli R Riffaldi R
Author Affiliation:Department of Chimica e Biotecnologie Agrarie, University of Pisa, Via del Borghetto 80, 56124 Pisa, Italy
Language:English
Abstract:Changes in soil quality after 45 years of continuous production of maize (Zea mays) by the conventional tillage method (C) compared with adjacent poplar [Populus] forest (F) and native grassland (G) sites

were examined. The investigated parameters were: total and humified organic C, total N, light fraction content and composition, water-soluble organic C (WSOC), water-soluble carbohydrates (WSC), phenolic substances, biomass C, cumulative CO2-C (soil respiration) (Cm), enzyme activities (alkaline phosphatase, protease, beta -glucosidase, urease, catalase and dehydrogenase). Empirical indexes of soil quality were also calculated: biomass C/organic C, specific respiration of biomass C (qCO2), death rate quotient (qD), metabolic potential (MP), biological index of fertility (BIF), enzyme activity number (EAN) and hydrolysing coefficient (HC). Results indicate that long-term maize production at an intensive level caused a marked decline in all examined parameters. Between the undisturbed systems, native grassland showed higher values of soil quality parameters than forest site. The indexes most responsive to management practices that may provide indications of the effects of soil cultivation, as well as of the differently undisturbed ecosystems were: organic C, WSC, Cm, protease, beta -glucosidase, urease and HC. Soil enzyme activities were well related with, and not more sensitive than organic carbon

Descriptors:alkaline-phosphatase. beta-glucosidase. biomass. carbohydrates. catalase. crop-production. enzyme-activity. forest-soils. grassland-soils. grasslands. maize. nitrogen. organic-carbon. oxidoreductases. phenolic-compounds. proteinases. respiration. soil-enzymes. soil-types. tillage. urease

Identifiers:soil quality

Organism Descriptors:Populus. Zea-mays

Supplemental Descriptors:Salicaceae. Salicales. dicotyledons. angiosperms. Spermatophyta. plants. Zea. Poaceae. Cyperales. monocotyledons

Subject Codes:FF005. JJ100. JJ200. JJ900. KK100. PP350

Supplementary Info:62 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

141. Title:Influence of a pulsed nitrogen supply on growth and nitrogen uptake in alpine graminoids

View Article: Plant and Soil. 2001. 233 (2). 283-290

CD Volume:372

Print Article: Pages: 283-290

Author(s):Bowman W D Bilbrough C J

Author Affiliation:Mountain Research Station, Institute of Arctic and Alpine Research, Department of Environmental, Population, and Organismic Biology, University of Colorado, Boulder, CO 80309-0334, USA

Language:English

Abstract:The supply of N in alpine soils is influenced by environmental factors (freeze-thaw, drying-rewetting, release of N from winter snowpack) which lead to a pulsed nature in plant N availability. To address the ability of alpine species to acquire N and grow when N is supplied in a pulsed manner, six alpine graminoid species, 3 sedges (Cyperaceae: Carex rupestris, Kobresia myosuroides and C. scopulorum) and 3 grasses (Poaceae: Calamagrostis purpurascens, Deschampsia cespitosa and Trisetum spicatum), were grown under 3 treatments: low and high N supply applied 3 times weekly, and a pulsed N supply applied once weekly at the same concentration as the high N treatment, but with the same total N supply as the low N treatment. Growth, biomass allocation, and N uptake were the same in all species for plants grown under a pulsed N treatment relative to a constant N supply with the same amount of total N. Root:shoot ratios and uptake

of experimentally applied 15N indicated there were no adjustments in growth allocation or root uptake capacity in the plants to enhance the uptake of N when supplied in a pulsed relative to a more constant supply. The fertility of the site from which the graminoids were collected did not influence the plants' ability to respond to a high versus a low N supply, but instead growth form was more important. Grasses exhibited variation in growth, biomass allocation, and N uptake in response to changes in N supply, while sedges did not
Descriptors:biomass. growth. mountain-soils. nitrogen. nutrient-uptake. pasture-plants. pastures. root-shoot-ratio. soil-types
Identifiers:Carex rupestris. Carex scopulorum. Kobresia myosuroides
Organism Descriptors:Calamagrostis-purpurascens. Carex. Deschampsia-cespitosa. Kobresia. plants. Trisetum-spicatum
Supplemental Descriptors:Calamagrostis. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Cyperaceae. Carex. Deschampsia. Kobresia. Trisetum
Subject Codes:FF007. FF060. FF061. JJ200
Supplementary Info:32 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil
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142. Title:Bauxite residue sand has the capacity to rapidly decrease availability of added manganese
View Article: Plant and Soil. 2001. 234 (2). 143-151
CD Volume:372
Print Article: Pages: 143-151
Author(s):Gherardi M J Rengel Z
Author Affiliation:Soil Science and Plant Nutrition, The University of Western Australia, 35 Stirling Highway, Crawley WA 6009, Australia
Language:English
Abstract:Bauxite residue sand, even though a poor substrate for plant growth because of very high pH, salinity and sodicity, is required to be revegetated. Manganese deficiency is observed in residue-grown plants because broadcast applications of manganese fertilizer to the surface of residue deposits have a low residual value. In a laboratory experiment, manganese (as MnSO4) was added to fresh and 4-year-old residue sand and a sequential fractionation procedure performed at 0, 1, 4, 8 and 24 h and 6, 14, 21, 43, 73, 103 and 130 days. Extraction with DTPA estimated plant-available Mn, while sequential fractionation with various extractants yielded the following fractions: readily soluble [Ca(NO3)2]; weakly adsorbed [CaDTPA-B4O7]; carbonate-bound [HNO3]; and oxide-bound [NH2OH.HCl]. Residual Mn was calculated as the difference between the sum of all these forms and total Mn in residue sand. Transformation of manganese from the initially dominant readily soluble form to the less-available forms was very rapid (<24 h). A change to fertilizer application strategies is required if better efficiency of manganese application and uptake is to be achieved for plants growing on bauxite residue
Descriptors:bauxite. clay-minerals. fractionation. growth. manganese. manganous-sulfate. mineral-deficiencies. nutrient-availability. nutrient-deficiencies. nutrient-uptake. plant-nutrition. soil-fertility. soil-pH
Subject Codes:FF060. FF061. JJ200. JJ600
Supplementary Info:37 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

143. Title:Nutrient limitation along a productivity gradient in wet meadows
View Article: Plant and Soil. 2001. 234 (2). 171-179
CD Volume:372
Print Article: Pages: 171-179
Author(s):Venterink H O Vliet R E van der Wassen M J
Author Variant:der-Vliet-R-E-van. van-der-Vliet-R-E
Author Affiliation:Environmental Sciences, Utrecht University, PO Box 80115, 3508 TC Utrecht, Netherlands
Language:English
Abstract:Conservation management in meadows often focuses on reducing soil fertility and consequently community productivity as to promote and sustain species-rich vegetations. The productivity level to which nutrients are limiting growth is, however, unclear, as well as the relationship between productivity and the type of nutrient limitation. In 1996, we carried out a fertilizer application experiment with N, P and K in six annually mown meadows (Molinia-orchid, Molinia-Plantago, Cyperaceaes fen meadow, Holcus, Caltha and Glyceria meadow) in the Netherlands (n=5) and Belgium (n=1) along an aerial phytomass gradient (200-650 g m-2). All meadows were found to be growth-limited by nutrients. Low-productive meadows were N-limited, or N+P co-limited, whereas our higher productive meadows were co-limited by a combination of N, P and/or K. The results from our experiments were compared with the results from 45 other fertilizer application experiments with N, P and K in grasslands and wetlands (aerial phytomass range 50-1500 g m-2). Our results were consistent in nitrogen being the most frequent (co)-limiting nutrient, and regarding the equal frequence of occurrence of P (co)-limitation and K (co)-limitation (both in ca. 25-30% of all sites). Co-limitation occurred more often in our sites than in the other experiments. There was no clear relationship between aerial phytomass and type of nutrient limitation, except that K (co)-limitation only occurred at sites with phytomass above 200 g m-2, and P (co)-limitation below 600 g m-2. A comparison of productivity and nutrient concentrations in aerial phytomass among two years indicated that the type of nutrient limitation is not a static site characteristic but may vary with dynamic environmental conditions such as soil wetness; drought seems to enhance N availability which may induce P and K limitation
Descriptors:flood-meadows. grasslands. mineral-deficiencies. nitrogen. NPK-fertilizers. nutrient-availability. nutrient-deficiencies. phosphorus. plant-nutrition. potassium. soil-fertility. wetlands
Organism Descriptors:Caltha. Glyceria. Holcus. Molinia. Orchidaceae. Plantago
Supplemental Descriptors:Ranunculaceae. Ranunculales. dicotyledons. angiosperms. Spermatophyta. plants. Poaceae. Cyperales. monocotyledons. Orchidales. Plantaginaceae. Plantaginales
Subject Codes:FF061. JJ600. PP320. PP350
Supplementary Info:45 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

144. Title:Interaction of lime, organic matter and fertilizer on growth and uptake of arsenic and mercury by Zorro fescue (Vulpia myuros L.)
View Article: Plant and Soil. 2001. 234 (2). 215-231
CD Volume:372
Print Article: Pages: 215-231

Author(s):Heeraman D A Claassen V P Zasoski R J
Author Affiliation:Beak International Incorporated, Brampton, Ontario L6T 5B7, Canada
Language:English
Abstract:The Sulfur Bank Mercury Mine (SBMM) is an abandoned open pit mine located on the eastern shores of Clear Lake, California, USA. Revegetation efforts have been difficult because the mine-soils at SBMM have low pH, low fertility and elevated As and Hg concentrations. In a greenhouse study, we examined the interactions of lime, N, P and OM additions with respect to plant growth, and As and Hg uptake. Three selected acidic mine-soils from the site containing high (164 mg/kg) (S-H), medium (123 mg/kg) (S-M) and low (31 mg/kg) (S-L) total As content were planted to the Eurasian annual grass, Zorro fescue (Vulpia myuros). The Hg concentrations for these soils varied between 1700 and 3000 mg/kg with S-L>S-H approx. S-M. A factorial design used 3 soils, 2 lime, 2 N, 2 P and 2 OM treatments with treatments replicated three times. Multiple regression analyses indicated a strong relationship between As plant uptake, root length density (RLD) and soluble As. A highly significant linear relationship between Hg uptake and RLD for plants growing on the three soils illustrated the importance of plant root characteristics in influencing Hg uptake. Soluble As decreased in the order S-H > S-M > S-L in positive correlation with P and DOC but in inverse relationship to oxalate extractable Fe. Lime and OM additions correlated negatively with soluble Hg and Hg tissue concentration due to either Hg adsorption to OM or to inorganic surfaces. Addition of lime increased dry matter yield and Hg uptake in all three soils
Descriptors:arsenic. fertilizers. growth. iron. lime. liming. mercury. nutrient-content. nutrient-uptake. oxalates. phosphorus. plant-nutrition. revegetation. roots. soil-organic-matter. soil-types
Identifiers:dissolved organic carbon. mine soils
Organism Descriptors:Vulpia-myuros
Supplemental Descriptors:Vulpia. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF060. FF061. JJ200. JJ700. PP350. PP720
Supplementary Info:many ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

145. Title:Genotypic effects in phytoavailability of radiocaesium are pronounced at low K intensities in soil
View Article: Plant and Soil. 2001. 235 (1). 11-20
CD Volume:372
Print Article: Pages: 11-20
Author(s):Waegeneers N Camps M Smolders E Merckx R
Author Affiliation:SCK.CEN, Radioecology Laboratory, Boeretang 200, B-2400 Mol, Belgium
Language:English
Abstract:The differences in radiocaesium uptake between species were analysed in a series of solution culture and pot trials. Since radiocaesium uptake is very sensitive to the solution potassium (K) concentration, it was hypothesized that species depleting K in the rhizosphere to a larger extent will have a higher radiocaesium uptake. Five species (bean (Phaseolus vulgaris cv. Novirex), lettuce cv. Batavia, winter barley cv. Orblonde, ryegrass (Lolium perenne cv. Vigor) and bentgrass (Agrostis capillaris)) were grown for 18-21 days in nutrient solution spiked with 137Cs and at 4 K concentrations between

0.025 and 1.0 mM. Shoot 137Cs activities all decreased between 17- and 81-fold with increasing K supply. Shoot 137Cs activities were 4-fold different between species at the lowest K supply and 3.4-fold different at high K supply. The same five species were grown in two 134Cs spiked soils (Luvisols) with contrasting exchangeable K but similar clay content. Shoot 134Cs activities were up to 19-fold higher in the soil with lowest exchangeable K. Differences in shoot activity concentrations between the species were only 4.5-fold in the high K soil, but were 15-fold in the low K soil. Bulk soil solution 134Cs and K concentration data were combined with radiocaesium uptake characteristics measured in solution culture to predict radiocaesium uptake from soil. Predictions were within 1.6-fold of observations in the high K soil but largely underestimated 134Cs uptake in lettuce, ryegrass and barley in the low K soil. A solute transport model was used to estimate K and radiocaesium concentrations in the rhizosphere. These calculations confirmed the assumption that higher radiocaesium uptake is found for species that deplete K in the rhizosphere to a larger extent

Descriptors:barley. bioavailability. caesium. chemical-composition. clay-fraction. exchangeable-potassium. genotypes. lettuces. Luvisols. mineral-content. mineral-uptake. nutrient-availability. nutrient-content. nutrient-solutions. nutrient-uptake. plant-composition. plant-nutrition. potassium. radionuclides. rhizosphere. shoots. soil-fertility. soil-solution. soil-types

Organism Descriptors:Agrostis-capillaris. Hordeum-vulgare. Lactuca-sativa. Lolium-perenne. Phaseolus-vulgaris

Supplemental Descriptors:Agrostis. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Hordeum. Lactuca. Asteraceae. Asterales. dicotyledons. Lolium. Phaseolus. Papilionoideae. Fabaceae. Fabales

Subject Codes:FF005. FF007. FF061. JJ200. JJ600. PP600

Supplementary Info:27 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

146. Title:Macronutrient concentrations of soybean infected with soybean cyst nematode

View Article: Plant and Soil. 2001. 235 (1). 21-26

CD Volume:372

Print Article: Pages: 21-26

Author(s):Smith G J Wiebold W J Niblack T L Scharf P C Blevins D G

Author Affiliation:Dept. of Agronomy, University of Missouri, Columbia, MO 65211, USA

Language:English

Abstract:Soyabean cultivars (Glycine max) infected with soyabean cyst nematode (SCN; Heterodera glycines) often show symptoms similar to K deficiency. The objectives of this experiment were to determine if SCN infection affected macronutrient concentrations in soyabean seedling vegetative tissues, determine whether increased K fertility can overcome these possible effects, and to determine if these possible effects are localized at the site of infection or expressed systemically throughout the root system. During 1994 and 1995 in Missouri, USA, soyabean plants were grown with root systems split into two halves. This allowed differential K (0.2, 2.4 and 6.0 mM K nutrient solutions) and SCN (0 and 15 000 eggs/plant) treatments to be applied to opposite root-halves of the same plant. Thirty days after plants were inoculated with SCN, macronutrient concentrations

of shoot and root tissues were determined. The K concentration in leaf blades was not affected; but K concentrations in leaf-petiole and stem tissues were increased with SCN infection. Roots infected with SCN contained lower K concentrations than uninfected roots, but only for the 2.4 mM K treatment. Thus, at the medium level of K fertility, SCN reduced K concentration in soyabean roots, and increasing K fertility to the high level of overcame the effect. Because K concentrations in the shoot tissues were not reduced by SCN infection, above ground portions of the plant may be able to overcome limitations that occur in roots during the first 30 days of infection. Increasing K fertility level in soyabean fields may not benefit vegetative growth of soyabean infected with SCN

Descriptors:application-rates. chemical-composition. leaves. mineral-content. nutrient-content. petioles. plant-composition. plant-nutrition. plant-parasitic-nematodes. plant-pests. potassium. roots. seedlings. shoots. soyabeans. stems

Geographic Locator:Missouri. USA

Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Heterodera-glycines. Nematoda

Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Heterodera. Heteroderidae. Nematoda. invertebrates. animals. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Corn-Belt-States-of-USA

Subject Codes:FF005. FF040. FF061. FF620

Supplementary Info:25 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

147. Title:Estimating seasonal and annual carbon inputs, and root decomposition rates in a temperate pasture following field 14C pulse-labelling

View Article: Plant and Soil. 2001. 236 (1). 91-103

CD Volume:372

Print Article: Pages: 91-103

Author(s):Saggar S Hedley C B

Author Affiliation:Landcare Research, Private Bag 11052, Palmerston North, New Zealand

Language:English

Abstract:Using a 14C pulse-labelling technique, we studied, in Palmerston, New Zealand, between September 1998 and July 2000, the seasonal changes in assimilation and partitioning of photoassimilated C in the plant-root-soil components of a temperate pasture. Pasture and soil samples were taken after 4-h, and 35-day chase periods, to examine these seasonal 14C fluxes. Total C and 14C were determined in the shoot, root and soil system. The amounts of C translocated annually to roots and soil were also estimated from the seasonal 14C distribution and pasture growth. The in situ field decomposition of newly formed roots during different seasons, also using 14C-labelling, was studied for one year in undisturbed rhizosphere soil. The 14C-labelled roots were sampled five times and decomposition rates were calculated assuming first-order decomposition. Annual pasture production at the site was 16 020 kg DM ha-1, and pasture growth varied with season being highest (75-79 kg ha-1 d-1) in spring and lowest (18-20 kg ha-1 d-1) in winter. The above- and below-ground partitioning of 14C also varied with the season. The respiratory 14C-CO2 losses, calculated as the difference between the total amounts of 14C recovered in the

soil-plant system at 4 h and 35 days, were high (66-70%) during the summer, autumn and winter season, and low (37-39%) during the spring and late-spring season. Pasture plants partitioned more C below-ground during spring compared with summer, autumn and winter seasons. Overall, at this high fertility dairy pasture site, 18 220 kg C/ha was respired, 6490 kg remained above-ground in the shoot, and 6820 kg was translocated to roots and 1320 kg to soil. Root decomposition rate constant (k) differed widely with the season and were the highest for the autumn roots. The half-life was highest (111 days) for autumn roots and lowest (64 days) for spring roots. About one-third of the root label measured in the spring season disappeared in the first 5 weeks after the initial 35 Day of allocation period. The late spring, summer, late summer and winter roots had intermediate half-lives (88-94 days). These results indicate that seasonal changes in root growth and decomposition should be accounted for to give a better quantification of root turnover

Descriptors:assimilation. carbon. decomposition. growth. half-life. pastures. rhizosphere. roots. seasonal-variation. shoots

Geographic Locator:New-Zealand

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries

Subject Codes:JJ100. PP350. PP500

Supplementary Info:41 ref

ISSN:0032-079X

Year:2001

Journal Title:Plant and Soil

148. Title:Root hairs confer a competitive advantage under low phosphorus availability

View Article: Plant and Soil. 2001. 236 (2). 243-250

CD Volume:372

Print Article: Pages: 243-250

Author(s):Bates T R Lynch J P

Author Affiliation:Department of Horticulture, The Pennsylvania State University, University Park, PA 16802, USA

Language:English

Abstract:Root hairs are presumably important in the acquisition of immobile soil resources such as phosphorus. The density and length of root hairs vary substantially within and between species, and are highly regulated by soil phosphorus availability, which suggests that at high nutrient availability, root hairs may have a neutral or negative impact on fitness. We used a root-hairless mutant (rhd2) of the small herbaceous dicot Arabidopsis thaliana to assess the effect of root hairs on plant competition under contrasting phosphorus regimes. Wild-type plants (WS) were grown with hairless plants in a replacement series design at high (60 micro m phosphate in soil solution) and low (1 micro m phosphate in soil solution) phosphorus availability. At high phosphorus availability, wild-type and mutant plants were equal in growth, phosphorus acquisition, fertility and relative crowding coefficient (RCC). At low phosphorus availability, hairless plants accumulated less biomass and phosphorus, and produced less seeds when planted with wild-type plants. Wild-type plants were unaffected by the presence of hairless plants in mixed genotype plantings. Wild-type plants had RCC values greater than one while hairless plants had RCC values less than one. We conclude that root hairs increase the competitiveness of plants under low phosphorus availability but do not reduce growth or competitiveness under high phosphorus availability

Descriptors:biomass. dry-matter-accumulation. fertility. growth. mixed-cropping. mutants. nutrient-availability. phosphorus. phosphorus-fertilizers. plant-competition. root-hairs
Organism Descriptors:Arabidopsis-thaliana
Supplemental Descriptors:Arabidopsis. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF060. FF061. FF500. JJ700. FF020
Supplementary Info:37 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

149. Title:Topsoil foraging - an architectural adaptation of plants to low phosphorus availability
View Article: Plant and Soil. 2001. 237 (2). 225-237
CD Volume:372
Print Article: Pages: 225-237
Author(s):Lynch J P Brown K M
Author Affiliation:Department of Horticulture, Penn State University, University Park, PA 16802, USA
Document Editor:Rengel-Z
Conference Title:International Symposium on phosphorus cycling in the soil plant continuum, Beijing, China, 17-23 September 2000.
Language:English
Abstract:Low phosphorus availability is a primary constraint to plant productivity in many natural and agricultural ecosystems. Plants display a wide array of adaptive responses to low phosphorus availability that generally serve to enhance phosphorus mobility in the soil and increase its uptake. One set of adaptive responses is the alteration of root architecture to increase phosphorus acquisition from the soil at minimum metabolic cost. In a series of studies with the common bean, work in our laboratory has shown that architectural traits that enhance topsoil foraging appear to be particularly important for genotypic adaptation to low phosphorus soils ('phosphorus efficiency'). In particular, the gravitropic trajectory of basal roots, adventitious rooting, the dispersion of lateral roots, and the plasticity of these processes in response to phosphorus availability contribute to phosphorus efficiency in this species. These traits enhance the exploration and exploitation of shallow soil horizons, where phosphorus availability is greatest in many soils. Studies with computer models of root architecture show that root systems with enhanced topsoil foraging acquire phosphorus more efficiently than others of equivalent size. Comparisons of contrasting genotypes in controlled environments and in the field show that plants with better topsoil foraging have superior phosphorus acquisition and growth in low phosphorus soils. It appears that many architectural responses to phosphorus stress may be mediated by the plant hormone ethylene. Genetic mapping of these traits shows that they are quantitatively inherited but can be tagged with QTLs that can be used in plant breeding programmes. New crop genotypes incorporating these traits have substantially improved yield in low phosphorus soils, and are being deployed in Africa and Latin America
Descriptors:adventitious-roots. ethylene. genetic-mapping. genetic-variation. gravitropism. growth. horizons. nutrient-availability. phosphorus. plant-breeding. rhizosphere. root-systems. rooting. soil-fertility. topsoil
Organism Descriptors:Phaseolus-vulgaris

Supplemental Descriptors:Phaseolus. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF020. FF030. FF060. FF061. JJ100. JJ600
Supplementary Info:many ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

150. Title:Root production and root mortality of winter barley and its implication with regard to phosphate acquisition
View Article: Plant and Soil. 2001. 237 (2). 239-248
CD Volume:372
Print Article: Pages: 239-248
Author(s):Steingrobe B Schmid H Claassen N
Author Affiliation:Institute of Agricultural Chemistry, Georg-August University, Von-Siebold-Str. 6, 37079 Gottingen, Germany
Document Editor:Rengel-Z
Conference Title:International Symposium on phosphorus cycling in the soil plant continuum, Beijing, China, 17-23 September 2000.
Language:English
Abstract:Winter barley was grown in a long-term fertilizer experiment (14 years) in Bavaria, south Germany, established in 1997 using two P treatments: (i) no P fertilizer application over the whole time (-P) and (ii) an annual fertilizer application of 44 kg P/ha (+P). The objective of the study was to investigate the influence of P supply on total root production and root mortality (i.e., root turnover) and to assess the benefit of a more rapid root turnover on P acquisition. Shoot development and grain yield was reduced in the '-P' treatment, whereas the standing root system had nearly the same size as in the '+P' treatment. Gross root growth was measured using the 'ingrowth core method'. Mesh bags filled with root-free soil were buried into the rooting zone (0-30 cm) and root growth into the bags over periods of 2-3 weeks was determined. Assuming that no root mortality occurred inside the bags during this short period, root length in the bags will be a measure of total root production. Total root production between April and June exceeded the size of the standing root system by a factor of 2 to 3 and was significantly higher at P deficiency. Root mortality as the difference between total root production and the size of the standing root system was also increased at P shortage. P uptake was calculated by using a mechanistic transport and uptake model. Calculations based on gross root growth and root mortality resulted in a higher uptake than calculations based on the development of the standing root system, although the length of the active roots were the same in both calculations. This was due to a better exploitation of undepleted soil areas by the growing root system. The root renewal by a continuous root growth and root mortality is discussed as a mechanism of P uptake efficiency
Descriptors:application-rates. barley. crop-yield. growth. nutrient-deficiencies. nutrient-uptake. phosphorus-fertilizers. root-systems. roots. soil-fertility
Geographic Locator:Bavaria. Germany
Organism Descriptors:Hordeum-vulgare
Supplemental Descriptors:Germany. Western-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries. Hordeum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF061. FF100. JJ700. FF030. JJ600
Supplementary Info:43 ref
ISSN:0032-079X

Year:2001
Journal Title:Plant and Soil

151. Title:Further characterization of two QTLs that increase phosphorus uptake of rice (Oryza sativa L.) under phosphorus deficiency
View Article: Plant and Soil. 2001. 237 (2). 275-286
CD Volume:372
Print Article: Pages: 275-286
Author(s):Wissuwa M Ae N
Author Affiliation:National Institute of Agro-Environmental Sciences, 3-1-1 Kannondai, Tsukuba, Ibaraki 305, Japan
Document Editor:Rengel-Z
Conference Title:International Symposium on phosphorus cycling in the soil plant continuum, Beijing, China, 17-23 September 2000.
Language:English
Abstract:Four quantitative trait loci (QTLs) for P uptake were previously identified in a rice population that had been developed from a cross between the indica landrace Kasalath (high P uptake) with the japonica cultivar Nipponbare (low P uptake). For further studies, near isogenic lines (NILs) were developed for a major QTL linked to marker C443 on chromosome 12 and for a minor QTL linked to C498 on chromosome 6. On a highly P-deficient upland soil (aerobic conditions), NIL-C443 had three to four times the P uptake of Nipponbare, whereas the advantage of NIL-C498 was in the range of 60-90%. The superiority of NILs over Nipponbare vanished when grown in the same soil under anaerobic paddy conditions. All genotypes had high P uptake when P was supplied at a rate of 60 kg P/ha, regardless of soil conditions. These results confirmed the presence of both QTLs and furthermore implied that QTLs affected absorption mechanisms that specifically increased P uptake in a P deficient upland soil. Additional experiments were conducted to investigate if the effect of QTLs is linked to an increase in root growth or due to more efficient P uptake per unit root size (higher root efficiency). Root size did not differ significantly between genotypes in the plus-P treatment. P deficiency, however, reduced the root surface area of Nipponbare by more than 80% whereas NIL-C443 maintained almost half of its non-stress root surface area. The low root growth of Nipponbare observed under P deficiency was probably the result of insufficient P uptake to sustain plant growth, including root growth. Genotypic differences in the ability to maintain root growth, therefore are likely caused by some mechanism that increases the efficiency of roots to access P forms not readily available. This however, only had an effect in aerobic soil. Potential mechanisms leading to higher P uptake of NILs are discussed
Descriptors:application-rates. chromosomes. cultivars. genotypes. growth. lines. mineral-uptake. nutrient-deficiencies. nutrient-uptake. phosphorus. quantitative-trait-loci. rice. soil-fertility. upland-soils
Organism Descriptors:Oryza. Oryza-sativa
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF020. FF061. JJ600
Supplementary Info:20 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

152. Title:Phosphorus management for perennial crops in central Amazonian upland soils
View Article: Plant and Soil. 2001. 237 (2). 309-319
CD Volume:372
Print Article: Pages: 309-319
Author(s):Lehmann J Cravo M da S Macedo J L V de Moreira A Schroth G
Author Variant:da-S-Cravo-M. de-Macedo-J-L-V
Author Affiliation:Department of Crop and Soil Sciences, College of Agriculture and Life Sciences, Cornell University, Ithaca, NY 14853, USA
Document Editor:Rengel-Z
Conference Title:International Symposium on phosphorus cycling in the soil plant continuum, Beijing, China, 17-23 September 2000.
Language:English
Abstract:The present contribution discusses the soil P status of central Amazonian (Brazil) upland soils, the effects of tree crops on soil P availability and the factors controlling soil P cycling in land use systems with tree crops. Soil fertility management has to target the prevalent P deficiency by adequate P fertilizer application, especially in southern and northern municipalities of central Amazonia, where the largest areas with severe P deficiency are found. P fixation to clay minerals is not a major obstacle for P management in the highly weathered upland soils of the central Amazon due to their low Al- and Fe-oxide contents. Low total soil P amounts are mainly responsible for low P availability. Tree crops are found to be especially suitable for land use under low-P-input conditions. Their large P return to soil by litterfall and pruning improves soil P availability. Additionally, litter quality affects P release and soil P availability. Both aspects, quantity and quality effects, are strongly dependent on tree species. Phosphorus sorption does not seem to be reduced by different litter types confirming earlier results that P fixation is not a major problem in central Amazonian upland soils. In conclusion, biological approaches are more important than physical approaches to improve soil P availability in central Amazonian Oxisols. With large P cycling through soil microbial biomass and between plant and soil, a higher availability of added P can be maintained and P applications only need to replenish P exports by harvest. Low P additions will improve productivity also for long-term uptake by trees. This is of high importance in regions with poor infrastructure and the lack of financial resources
Descriptors:crop-production. cycling. forest-trees. litter-(plant). nutrient-availability. nutrient-uptake. nutritional-state. Oxisols. perennials. phosphorus. phosphorus-fertilizers. pruning. soil-fertility. trees. upland-soils
Geographic Locator:Amazonia. Brazil
Identifiers:microbial biomass
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America
Subject Codes:FF061. FF100. JJ100. JJ200. JJ600. JJ700. KK100
Supplementary Info:many ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

153. Title:Long-term changes in extractable soil phosphorus (P) in organic dairy farming systems
View Article: Plant and Soil. 2001. 237 (2). 321-332
CD Volume:372
Print Article: Pages: 321-332

Author(s):Loes A K Ogaard A F
Author Affiliation:Norwegian Centre for Ecological Agriculture, N-6630 Tingvoll, Norway
Document Editor:Rengel-Z
Conference Title:International Symposium on phosphorus cycling in the soil plant continuum, Beijing, China, 17-23 September 2000.
Language:English
Abstract:On five dairy farms located in Norway, that have been managed organically for several years, all cultivated soils were sampled on two occasions. The time span between the first and second soil sampling varied from 6 to 12 years. At the first sampling, the farms had been managed organically for 3, 4, 6, 11 or 53 years. The average phosphorus (P) concentrations in topsoil (0-20 cm) extracted by ammonium-acetate lactate solution (P-AL) decreased from the first to the second sampling on all farms. At the second soil sampling, the average topsoil P-AL concentrations on the five farms were 50, 64, 65, 75 and 119 mg P kg-1, which is characterized as medium (26-65 mg P kg-1) or high (66-150 mg P kg-1). The decrease occurred mostly in soils with high and very high (>150 mg P kg-1) P-AL concentrations at the first sampling. In these samples, the average value decreased from 100 to 87 and from 188 to 151 mg P kg-1, respectively. In subsoil (20-40 cm), an increase from 15 to 27 mg P kg-1 ($P<0.01$) in P-AL concentration was found in subsoil samples with low P-AL concentrations (0-25 mg P kg-1) at the first sampling. This indicates P transfer from topsoil to subsoil. The pattern of decrease in topsoil was fairly well explained by farm level P balances. The average topsoil concentrations of P-AL were well below values for comparable conventional farms, but still at a level acceptable for crop production. Crop yields were acceptable, but the general pattern of decrease shows that in the future, some P should be supplied from external sources to avoid a further decrease, especially on the fields with lowest P-AL concentrations
Descriptors:animal-production. crop-production. crop-yield. dairy-farming. farming-systems. movement-in-soil. organic-farming. phosphorus. sampling. soil-analysis. soil-fertility. subsoil. sustainability. temporal-variation. topsoil
Geographic Locator:Norway
Supplemental Descriptors:Scandinavia. Northern-Europe. Europe. Developed-Countries. EFTA. OECD-Countries
Subject Codes:FF100. FF150. JJ400. LL110. JJ200. JJ600
Supplementary Info:48 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

154. Title:Production, nutrient availability, and elemental balances of two meadows affected by different fertilization and water table regimes in The Netherlands
View Article: Plant Ecology. 2001. 155 (1). 61-73
CD Volume:380
Print Article: Pages: 61-73
Author(s):Best E P H Jacobs F H H
Author Affiliation:DLO Centre for Agrobiology and Soil Fertility, P.O.Box 14, 6700 AA Wageningen, Netherlands
Language:English
Abstract:The restoration of degraded peat-grasslands is an important nature conservation goal in The Netherlands. We investigated the effects of ceased fertilizer application (15 years) combined with a groundwater-

raised water table (6 years) on the production of the peat-grassland vegetation and soil nutrient availability in a meadow. Furthermore, we evaluated whether and how this difference between meadows affected the balances between nutrient inputs and outputs in the ecosystem. We used an adjacent fertilized meadow in which the water table followed agricultural practice as a control. Yield of the grassland vegetation was significantly lower in the wet than in the control meadow. The tissue concentrations of N, P, and K in the harvested vegetation were significantly lower, but those of Ca higher in the wet than in the control meadow. The difference between both meadows significantly affected the annual nitrification rate, but not the annual C and N mineralization rates and the annual net P and K release rates. The difference between both meadows also significantly affected the seasonal nitrification and K release rates. Season exerted a significant effect on the seasonal C and N mineralization and nitrification rates. The elemental balances and relative contributions of the balance terms to elemental inputs and outputs varied considerably with element. Annually, the wet meadow lost N, P and K, while the control meadow gained these elements. The elemental demand of the grassland vegetation in the wet meadow was met for N for a large part by mineralization and for the remainder by atmospheric deposition, for P it was in the same order of magnitude as the net soil-P release, as it was for K. It is to be expected that the soil resources of N, P and K will continue to decrease under a continued regime of ceased fertilizer application and a raised water table, with those of N decreasing with the same rate, of P more rapidly and of K more slowly than estimated from regressions

Descriptors:biological-production. carbon. denitrification. dry-matter-accumulation. grasslands. groundwater. meadows. mineralization. nature-conservation. nitrification. nitrogen. nitrogen-fertilizers. nutrient-availability. phosphorus. potassium. water-table

Geographic Locator:Netherlands

Supplemental Descriptors:Western-Europe. Europe. Developed-Countries. Benelux. European-Union-Countries. OECD-Countries

Subject Codes:JJ100. JJ600. JJ700. PP200. PP350. ZZ331. JJ300

Supplementary Info:34 ref

ISSN:1385-0237

Year:2001

Journal Title:Plant Ecology

155. Title:Arbuscular mycorrhiza in relation to management history, soil nutrients and plant species diversity

View Article: Plant Ecology. 2001. 155 (2). 129-137

CD Volume:380

Print Article: Pages: 129-137

Author(s):Eriksson A

Author Affiliation:Department of Botany, Stockholm University, SE-106 91, Stockholm, Sweden

Language:English

Abstract:The low nutrient status of semi-natural grasslands, pastures and meadows, reflects a continuity of nutrient reduction by grazing and hay-making. It has been hypothesized that the nutrient depletion itself may reduce competition between individuals, and that mycorrhiza smooths out differences in nutrient uptake and competitive ability, so that competition for nutrients is even further reduced. This interaction between site history, nutrient status and mycorrhiza could thus be one explanation for a high species diversity usually found in semi-natural grasslands. To determine variation in

colonization of arbuscular mycorrhizal fungi (AM), three species (Achillea millefolium, Ranunculus acris and Anthriscus sylvestris) were sampled at sites in Sweden with different management history. All three species had mycorrhizal colonization. Correlations between species diversity patterns at different spatial scales (0.04m2, 1m2 and total species number in the site) and mycorrhizal colonization were examined. In addition, soil samples were analysed concerning P, K, N and pH. When combining measures for the three species together, there were significantly higher AM colonization at sites with a long continuous management regime, compared with sites with short or interrupted management regime. A significantly positive correlation was also found between plant species diversity and colonization of mycorrhiza. Soil nutrient status and root weight density did not differ among the sites with different management regime. This indicates that increasing nutrient status, or root competition, are not likely causal mechanisms behind a reduced AM colonization rate at sites with short or interrupted management regime. The correlation with species diversity is more likely a result of management continuity itself. A long continuous management is associated with an increasing likelihood of successful dispersal of plant species as well as of fungal species

Descriptors:colonization. endomycorrhizas. grassland-management. grasslands. mycorrhizal-fungi. mycorrhizas. nitrogen. nutrient-content. phosphorus. potassium. soil-fertility. soil-pH. species-diversity. vesicular-arbuscular-mycorrhizas

Geographic Locator:Sweden

Identifiers:arbuscular mycorrhizas

Organism Descriptors:Achillea-millefolium. Anthriscus-sylvestris. Ranunculus-acris

Supplemental Descriptors:Achillea. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Anthriscus. Apiaceae. Apiales. Ranunculus. Ranunculaceae. Ranunculales. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:JJ100. JJ200. JJ600. PP350. PP720. ZZ331

Supplementary Info:42 ref

ISSN:1385-0237

Year:2001

Journal Title:Plant Ecology

156. Title:Short-term effects of fire frequency on vegetation composition and biomass in mixed prairie in south-western Manitoba

View Article: Plant Ecology. 2001. 155 (2). 157-167

CD Volume:380

Print Article: Pages: 157-167

Author(s):Shay J Kunec D Dyck B

Author Affiliation:Department of Botany, University of Manitoba, Winnipeg, R3T 2N2, MB, Canada

Language:English

Abstract:The net effects of one, two, and three spring burns in consecutive years on the aboveground biomass, species composition, and soil variables were assessed in two different mixed-grass prairie sites in south-western Manitoba, Canada. Precipitation in the first year was greater than the 30-year average but lower during the next three years. The first site (Area 6) was characterized by Bouteloua gracilis, Stipa spartea [Hesperostipa spartea], Selaginella densa and lichens, while the second, somewhat drier site (Area 10) was dominated by B. gracilis and Carex spp. Each burn treatment was

applied to 15 plots in a random block design. Vegetation and soil data collected following the third burn are presented. In general, the effects of repeated burning were more pronounced in the drier Area 10, where litter was significantly reduced with each additional burn. In Area 6, litter was significantly reduced only after three years of burning. In both sites, the cumulative effect of fire had no significant effect on total standing crop, even after three consecutive years of burning. In the drier Area 10, however, the biomass of several components shifted such that B. gracilis biomass increased significantly and forb biomass decreased significantly after three burns. Plant cover was also affected more in the drier Area 10. The cover of B. gracilis, the dominant C4 grass, significantly increased and Carex spp. cover decreased after two burns in the drier site. In Area 6, the most significant effect of fire was a reduction in Selaginella and lichen cover. Bare ground increased in both sites as the number of burns increased. There was little change in soil nutrients with burning, but soil moisture somewhat decreased and surface temperature significantly increased after three burns

Descriptors:biomass. botanical-composition. burning. carbon-pathways. fire. forbs. grasslands. litter-(plant). nutrient-content. prairies. precipitation. soil-fertility. soil-water-content. temperature

Geographic Locator:Canada. Manitoba

Identifiers:Hesperostipa spartea. Selaginella densa

Organism Descriptors:Bouteloua-gracilis. Carex. lichens. Lycopsida. Poaceae

Supplemental Descriptors:Bouteloua. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Cyperaceae. Pteridophyta. Canada

Subject Codes:JJ200. JJ300. JJ600. KK130. PP350. PP720. ZZ331

Supplementary Info:46 ref

ISSN:1385-0237

Year:2001

Journal Title:Plant Ecology

157. Title:Field-level evaluation of heterogeneity in a large-sized paddy field and development of corrective measures

View Article: 2001. (41). 18-29

CD Volume:344

Print Article: Pages: 18-29

Author(s):Anbumozhi V EijiY Toshio T

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Language:English

Abstract:Increasing the land and labor productivity by enlarging the size of paddy fields is the main purpose of land consolidation works. In large- sized paddy fields the natural soil and water productivity varies, resulting in differences in yield from place to place. The heterogeneity of soil properties and fertility, non-uniformity in ponding water properties, and crop yield in a large-sized paddy field (2.14 ha) were evaluated. Measurements were made in a 25m, two-dimensional grid of 24 points. Field surface elevation was measured before planting. Topsoil properties measured on the grid were bulk density, moisture content, texture, soil strength, pH, hydraulic conductivity and soil nitrate nitrogen. Plant height was measured as a growth factor four times during the crop season and also after harvest. Shoot dry matter weight, grain weight and number of grains

were measured after harvest. Ponding water depth of the field and rainfall received at the site were recorded throughout the crop growing season. The coefficient of variation of shoot dry matter weight and grain yield were more than 35%, greater than that of canopy height. High productivity sites had 3.4 times more yield than low productivity sites. Among the soil properties measured on the grid, hydraulic conductivity had the highest coefficient of variation, 101.3%, followed by residual soil nitrate nitrogen, 52.7%. Although no apparent soil structure was found in crop yield, a regression relation was found between soil texture, fertility and ponding water depth and crop yield. Laboratory studies using 1/2000 a Wagner's pot were conducted with heterogeneous soils to develop corrective measures. From the experimental results, it is suggested that soil dressing and variable rate fertilization can be used to reduce the influence of field level heterogeneity in order to get maximum uniform yield in large-sized paddy fields

Descriptors:heterogeneity. paddy-soils. topsoil. water-yield. soil-fertility. texture. canopy. soil-science. soil-types. land-productivity. labor-productivity. land-consolidation. soil-properties. soil-chemical-properties. soil-physical-properties. hydraulic-conductivity

ISSN:0287-8607

Year:2001

Journal Title:Rural and Environmental Engineering

158. Title:Thematic evolution of ISTRO: transition in scientific issues and research focus from 1955 to 2000

View Article: Soil & Tillage Research. 2001. 61 (1/2). 3-12

CD Volume:374

Print Article: Pages: 3-12

Author(s):Lal R

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Document Editor:Voorhees-W-B. Borresen-T. Colvin-T. Tullberg-J. Wilkins-D

Conference Title:XVth conference on tillage at the threshold of the 21st century: looking ahead. Keynote papers of the XVth ISTRO Conference, Forth Worth, Texas, USA, 2-7 July, 2000

Language:English

Abstract:The International Soil and Tillage Research Organization (ISTRO) was initiated in 1955 as an activity of the World Ploughing Organization holding the world ploughing contests. The membership of ISTRO has grown from a dozen agricultural engineers and soil scientists in western Europe in the 1950s to 450 members from around the world in 2000. Thematic evolution of ISTRO has addressed four distinct but inter-related issues: (i) ploughing, mechanization and energy/power requirements during the 1950s and 1960s; (ii) reduced or conservation tillage and mulch farming during the 1970s, and soil compaction, soil strength and soil tilth during the 1980s; (iii) agricultural sustainability and soil quality in the 1990s; (iv) greenhouse effect, environment quality and modelling in the year 2000 and beyond. The ISTRO and its members will continue to play an important role in meeting the ever-increasing food demand of the growing human population of the world without jeopardizing soil and water resources that are already under great stress. A possible future strategy lies in understanding the processes and establishing the cause-effect relationship which create synergistic effects in enhancing productivity per unit input of land, labour, energy and time

Descriptors:conservation-tillage. energy-requirements. greenhouse-effect. international-organizations. mechanization. models. mulching. no-

tillage. ploughing. power-requirement. research. soil-compaction. soil-fertility. soil-strength. subsoiling. sustainability. tilth
Identifiers:soil quality
Subject Codes:JJ300. JJ900. PP400. AA500. JJ600. PP100. PP600
Supplementary Info:33 ref
ISSN:0167-1987
Year:2001
Journal Title:Soil & Tillage Research
Copyright:Copyright CAB International

159. Title:Soil management concepts and carbon sequestration in cropland soils
View Article: Soil & Tillage Research. 2001. 61 (1/2). 77-92
CD Volume:374
Print Article: Pages: 77-92
Author(s):Follett R F
Author Affiliation:USDA-ARS-NPA, Soil-Plant-Nutrient Research Unit, PO Box E, Ft. Collins, CO 80522, USA
Document Editor:Voorhees-W-B. Borresen-T. Colvin-T. Tullberg-J. Wilkins-D
Conference Title:XVth conference on tillage at the threshold of the 21st century: looking ahead. Keynote papers of the XVth ISTRO Conference, Forth Worth, Texas, USA, 2-7 July, 2000
Language:English
Abstract:One of the most important terrestrial pools for C storage and exchange with atmospheric CO2 is soil organic carbon (SOC). Following the advent of large-scale cultivation, this long-term balance was disrupted and increased amounts of SOC were exposed to oxidation and loss as atmospheric CO2. The result was a dramatic decrease in SOC. If amounts of C entering the soil exceed that lost to the atmosphere by oxidation, SOC increases. Such increase could result from practices to improve tillage management and cropping systems, management to increase amount of land cover, and efficient use of production inputs (e.g., nutrients and water). Among the most important contributors is conservation tillage (i.e., no-till, ridge-till, and mulch-tillage) whereby higher levels of residue cover are maintained than for conventional tillage. Other important contributors are crop residue, biomass management and fallow reduction. Two important examples of management strategies whereby land cover is increased include crop rotations with winter cover crops and the conservation reserve programme (CRP). Such practices enhance SOC sequestration by increasing the amount and time during which the land is covered by growing plants. Crop rotations, winter cover crops, and the CRP combined have the potential to sequester 14-29 MMTC/year. Biomass production is increased by efficient use of production inputs. Optimum fertility levels and water availability in soils can directly affect quantity of crop residues produced for return to the soil and for SOC sequestration. Nutrient inputs and supplement irrigation are estimated to have the potential to sequester 11-30 MMTC/year
Descriptors:arable-soils. carbon. carbon-sequestration. conservation-tillage. crop-residues. cropping-systems. fallow. fertilizers. irrigation. manures. plant-residues. research. soil-management. soil-types. tillage
Geographic Locator:USA
Identifiers:croplands
Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries
Subject Codes:EE110. FF100. JJ200. JJ900. FF150
Supplementary Info:58 ref
ISSN:0167-1987

Year:2001
Journal Title:Soil & Tillage Research

160. Title:Influence of land-use on properties of a ferralitic soil under low external input farming in southeastern Swaziland
View Article: Soil & Tillage Research. 2001. 62 (1/2). 15-25
CD Volume:374
Print Article: Pages: 15-25
Author(s):Materechera S A Mkhabela T S
Author Affiliation:Faculty of Agriculture, Science and Technology, University of North-West, P.O. Box 2046, Mmabatho 2735, South Africa
Language:English
Abstract:An assessment of changes in soil properties associated with land use and management practices is vital for the selection and establishment of appropriate sustainable practices under different agroecosystems. This study compared soil properties between lands in Swaziland located on an abandoned kraal site (KS), under fallow (FL) and one that was continuously cropped to maize (CC) for over 12 years. Aggregation and aggregate stability, as measured by both dry and wet sieving, showed large differences between land use systems. The soil under CC had a higher proportion (26.4%) of microaggregates (<0.25 mm) compared with that of FL (10.1%) and KS (6.9%). The dry mean weight diameter was larger in KS (3.03 mm) than in FL (2.17 mm) and CC (1.38 mm). Soil aggregates in CC were the least stable with a wet mean weight diameter of (1.61 mm) compared with those of FL (2.18 mm) and KS (2.89 mm). Reduced stability of aggregates in CC is likely due to the lower organic carbon content of soil in this land-use (1.7%) compared with that of FL (2.5%) and KS (3.2%). The soil under KS had lower bulk density (BD), penetration resistance (PR) and aggregate tensile strength (ATS) than that of FL and CC. Soil moisture content (MC) and available water capacity (AWC) showed an opposite trend. The soil in KS had a higher concentration of total N (TN), available P and exchangeable K, Ca, Mg and Zn. Soil on CC, on the other hand, had a higher concentration of Mn than that from FS and KS possibly because of its acidic nature. There were significant strong correlations between soil organic carbon and BD (-0.86***), PR (-0.61*), MC (0.82**), ATS (-0.62*), water stable aggregates (0.79***), AWC (0.91***), pH (-0.61**) and TN (0.76***). Grain yields of maize were highest in KS followed by FL and least in CC. The high yields were attributed to improved soil properties in plots of KS compared with both FL and CC. In conclusion, the findings suggested that organic matter had a major influence on soil properties and fertility
Descriptors:abandoned-land. aggregate-density. aggregates. available-water-capacity. bulk-density. calcium. chemical-composition. continuous-cropping. crop-yield. exchangeable-calcium. exchangeable-cations. exchangeable-magnesium. exchangeable-potassium. fallow. ferrallitic-soils. Ferralsols. land-use. magnesium. maize. manganese. mechanical-properties. mineral-content. nitrogen. organic-carbon. phosphorus. potassium. resistance-to-penetration. soil-composition. soil-density. soil-fertility. soil-mechanics. soil-organic-matter. soil-pH. soil-physical-properties. soil-strength. soil-types. soil-water-content. tensile-strength. zinc
Geographic Locator:Swaziland
Organism Descriptors:Zea-mays
Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. SADC-Countries. Anglophone-Africa. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF005. FF100. FF150. JJ200. JJ300. JJ600
Supplementary Info:43 ref
ISSN:0167-1987
Year:2001
Journal Title:Soil & Tillage Research
Copyright:Copyright CAB International

161. Title:Tillage and crop sequence effects on organic carbon and total nitrogen content in an irrigated Alberta soil
View Article: Soil & Tillage Research. 2001. 62 (3/4). 167-169
CD Volume:374
Print Article: Pages: 167-169
Author(s):Hao X Chang C Lindwall C W
Author Affiliation:Agriculture and Agri-Food Canada, Lethbridge Research Centre, P.O. Box 3000, Lethbridge AB T1J 4B1, Canada
Language:English
Abstract:A better understanding of tillage effects on soil organic matter is vital for development of effective soil conservation practices. The objective of this research is to determine the effect of tillage and crop sequence on soil organic carbon (OC) and total nitrogen content in an irrigated southern Alberta soil. A field experiment was conducted using a split-split plot design from 1994-98 in Alberta, Canada. There were two crop sequences (Sequence 1: spring wheat (Triticum aestivum)-sugarbeet (Beta vulgaris)-spring wheat-annual legume; and Sequence 2: spring wheat-spring wheat-annual legume-sugarbeet) and two tillage practices (CT: conventional tillage and MT: minimum tillage). Surface soil under MT had significantly higher OC (30.1 Mg ha-1) content than under CT (28.3 Mg ha-1) after 4 years of treatment. The MT treatment retains crop residue at the soil surface, reduces soil erosion and slows organic matter decomposition, which are key factors in enhancing the soil fertility status of southern Alberta irrigated soils
Descriptors:irrigated-soils. minimum-tillage. nitrogen. sequential-cropping. soil-organic-matter. soil-types. sugarbeet. tillage. wheat
Geographic Locator:Alberta. Canada
Organism Descriptors:Beta-vulgaris-var.-saccharifera. Triticum. Triticum-aestivum
Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Beta-vulgaris. Beta. Chenopodiaceae. Caryophyllales. dicotyledons. angiosperms. Spermatophyta. plants. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF150. JJ200. JJ900
Supplementary Info:8 ref
ISSN:0167-1987
Year:2001
Journal Title:Soil & Tillage Research
Copyright:Copyright CAB International

162. Title:Influence of conservation tillage and rotation length on potato productivity, tuber disease and soil quality parameters on a fine sandy loam in eastern Canada
View Article: Soil & Tillage Research. 2001. 63 (1/2). 1-13
CD Volume:374
Print Article: Pages: 1-13
Author(s):Carter M R Sanderson J B
Author Affiliation:Agriculture and Agri-Food Canada, Crops and Livestock Research Centre, P.O. Box 1210, Charlottetown, PEI C1A 7M8, Canada
Language:English

Abstract:Potato (Solanum tuberosum) farming systems generally use excess tillage and produce low levels of crop residue in the potato year, both of which are detrimental to soil quality. In eastern Canada, the major form of primary tillage is autumn (September-October) mouldboard ploughing (20 cm depth), which leaves the soil bare and unprotected over the winter period prior to planting potato in the following spring (May). A study (split-plot randomized block with six replicates) was initiated in 1994 on a fine sandy loam (Orthic Podzol) in Prince Edward Island to evaluate the use of conservation tillage in both 2-year (barley (Hordeum vulgare)-potato) and 3-year (barley-red clover (Trifolium pratense)-potato) potato rotations. The main conservation tillage strategy was to shift the primary tillage event from the autumn to spring, by replacing the autumn mouldboard ploughing with a herbicide treatment, and use of a relatively shallow (15 cm depth) one-pass reduced tillage (chisel plough) just prior to potato planting. Mulches were used on all plots after potato harvest to provide soil cover over the cool season. Potato yield and quality, incidence of tuber disease, surface residue levels after potato planting, soil organic carbon and carbon fractions, and soil structure were evaluated from 1994 to 1999, over three and two cycles of the 2- and 3-year rotation, respectively. Results for the 2-year rotation indicated that neither conventional nor conservation tillage were sustainable, due to Rhizoctonia disease pressure and a decline in tuber quality, in comparison to the 3-year rotation. Potato yields and tuber quality were similar between tillage systems in the 3-year rotation. Conservation tillage significantly increased the concentration of organic carbon and macro-organic carbon at the soil 0-8 cm depth, compared to conventional tillage, and significantly improved soil structural stability. Use of conservation tillage in 3-year potato systems has the potential to maintain crop productivity, protect the soil resource, and improve soil quality
Descriptors:barley. chisel-ploughs. conservation-tillage. crop-quality. crop-yield. farming-systems. fungal-diseases. herbicides. mouldboards. mulches. mulching. organic-carbon. plant-diseases. plant-pathogenic-fungi. plant-pathogens. ploughing. Podzols. potatoes. reduced-tillage. rotations. sandy-loam-soils. soil-fertility. soil-organic-matter. soil-structure. soil-types. tubers
Geographic Locator:Canada. Prince-Edward-Island
Identifiers:soil quality
Organism Descriptors:Hordeum-vulgare. Rhizoctonia. Solanum-tuberosum. Trifolium-pratense
Supplemental Descriptors:North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Hordeum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Canada. Deuteromycotina. Eumycota. fungi. Solanum. Solanaceae. Solanales. dicotyledons. Trifolium. Papilionoideae. Fabaceae. Fabales
Subject Codes:FF005. FF100. FF150. FF610. JJ200. JJ300. JJ600. JJ900
Supplementary Info:23 ref
ISSN:0167-1987
Year:2001
Journal Title:Soil & Tillage Research

163. Title:Long-term effects of wheat residue management on some fertility indicators of a semi-arid Plinthosol

View Article: Soil & Tillage Research. 2001. 63 (1/2). 25-33
CD Volume:374
Print Article: Pages: 25-33

Author(s):Preez C C du Steyn J T Kotze E
Author Variant:du-Preez-C-C
Author Affiliation:Department of Soil Science, University of the Free State, P.O. Box 339, Bloemfontein 9300, South Africa
Language:English
Abstract:This study was done to establish how soil fertility indicators such as pH, Ca, Mg, K, Na, P and Zn were influenced by the application of different residue management practices in a field trial near Bethlehem in South Africa. The trial consisted of 36 treatments, including all combinations of straw burning (burnt or unburnt), three primary tillage methods (ploughing, stubble mulch or no tillage), two weed control methods (mechanical or chemical) and three levels of nitrogen fertilizer application (20, 30 and 40 kg N ha-1). Representative soil (Plinthosols) samples were collected at 0-50, 50-150, 150-250, 250-450 and 450-650 mm depth intervals from the 30 kg N ha-1 plots for analysis, reducing the number of treatments to 12. After 11-12 years, only pH, K, P and Zn were significantly influenced by the residue management practices. Straw burning and conservational tillage increased the levels of those four indicators when compared with no burning and conventional tillage. The prominence of these effects declined with depth and phased out below 250 mm, viz. ploughing depth. A thorough investigation into the plant availability of the K, P and Zn that accumulated in the upper 50 mm soil as a result of either straw burning or conservational tillage is suggested
Descriptors:application-rates. burning. calcium. chemical-control. crop-residues. indicators. magnesium. nitrogen-fertilizers. no-tillage. nutrient-availability. phosphorus. physical-control. plant-nutrition. ploughing. potassium. sodium. soil-fertility. soil-pH. soil-types. straw. stubble. stubble-mulching. waste-management. weed-control. wheat. wheat-straw. zinc
Geographic Locator:South-Africa
Identifiers:Plinthosols
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. Threshold-Countries. Anglophone-Africa. Commonwealth-of-Nations. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF061. HH200. HH405. JJ200. JJ600. JJ700. JJ900. XX200
Supplementary Info:20 ref
ISSN:0167-1987
Year:2001
Journal Title:Soil & Tillage Research

164. Title:Decomposition of dissolved organic carbon after soil drying and rewetting as an indicator of metal toxicity in soils
View Article: Soil Biology & Biochemistry. 2001. 33 (2). 235-240
CD Volume:373
Print Article: Pages: 235-240
Author(s):Merckx R Brans K Smolders E
Author Affiliation:Laboratory of Soil Fertility and Soil Biology, Katholieke Universiteit Leuven, K. Mercierlaan, 92, 3001 Heverlee, Belgium
Language:English
Abstract:Carbon mineralization in metal-contaminated soils was measured using the native soil organic matter as the substrate. The method is based on monitoring the decrease in the dissolved organic carbon (DOC) in soil solution after the DOC flush, following two drying and rewetting cycles. Four agricultural topsoils were spiked with ZnCl2 at 50, 150

and 500 mg Zn kg-1. The DOC concentration in soil solutions did not change during the 23 days of moist incubation following spiking. Metals slightly reduced the DOC in all soils but this effect was significant (P<0.05) only in one soil. After the two air-drying and rewetting cycles, the DOC concentrations significantly (P<0.05) increased by factors between 2.5 and 5.3. The flush in carbon after rewetting consistently decreased in the following 24 days of moist incubation in all uncontaminated soils and this decrease was less pronounced in metal-contaminated soils. The first-order degradation constant varied between 34x10-3 and 90x10-3 day -1 for the uncontaminated soils. The degradation constants at the highest Zn rate were significantly lower by between 2.4 and 12-fold compared to the control for all soils (P<0.05). Inhibition of the DOC decomposition at 150 mg Zn kg-1 was only significant (P<0.05) in two soils. Since drying-rewetting events are natural processes that promote C-mineralization in the topsoil, we believe that the decomposition of the DOC flush may be a relevant indicator of the effects of contaminants on C- mineralization in the long term

Descriptors:contamination. decomposition. drying. heavy-metals. mineralization. organic-carbon. soil-organic-matter. soil-toxicity. topsoil. wetting. zinc. soil-pollution

Subject Codes:JJ100. JJ200. JJ600. PP600

Supplementary Info:24 ref

ISSN:0038-0717

Year:2001

Journal Title:Soil Biology & Biochemistry

165. Title:Low soil temperature effects on short-term gross N mineralisation-immobilisation turnover after incorporation of a green manure

View Article: Soil Biology & Biochemistry. 2001. 33 (4/5). 511-521

CD Volume:373

Print Article: Pages: 511-521

Author(s):Andersen M K Jensen L S

Author Affiliation:Plant Nutrition and Soil Fertility Laboratory, Department of Agricultural Sciences, The Royal Veterinary and Agricultural University, Thorvaldsensvej 40, 1871 Frederiksberg C, Denmark

Language:English

Abstract:The decomposition of Italian ryegrass (Lolium multiflorum) was studied over 37 days in an incubation experiment in a sandy loam soil, at constant temperatures of 3, 9 and 15 deg C. With the use of a 15N label in the form of (15NH4)2SO4 and employing the pool dilution principle, the short-term dynamics of the gross N transformation rates were estimated using both the classical analytical equations formulated by Kirkham and Bartholomew and the numerical model FLUAZ. The assumptions of the pool-dilution method concerning homogeneity of labelling, disturbance of processes upon labelling and reliability of measurements were evaluated. Gross transformation rates calculated with the numerical model FLUAZ were considered superior to those calculated analytically, because with the FLUAZ model data variability could be taken into account, statistical measures corresponding to calculated rates were given, and nitrate immobilization and nitrification kinetics were considered. The effect of temperature on the C mineralization and gross N transformation rates were clear, all rates increasing with increasing temperature. Initially, there was high microbial activity in the Italian ryegrass treatment, followed by a decline in the second half of the incubation, reflecting changes in the quality of substrate being decomposed. The Q10 [?coenzyme ubiquinone] relationship was used to

shed light on this effect and a comparison of Q10 values indicated that the breakdown of recalcitrant substances was more limited at low temperature than that of the more easily degradable substances. Decreases in the gross N mineralization-to-immobilization ratio with increasing temperature suggested that gross N immobilization may be more sensitive to low temperatures than gross N mineralization. That this may be the case was indicated by a positive net mineralization rate for Italian ryegrass at 3 deg C, versus a net immobilization in the short term at 9 and 15 deg C, as would also normally be expected for a green manure material with a C:N ratio above 20 such as the Italian ryegrass used in this study

Descriptors:decomposition. green-manures. immobilization. incorporation. mineralization. nitrification. sandy-loam-soils. soil-temperature. soil-types

Organism Descriptors:Lolium-multiflorum

Supplemental Descriptors:Lolium. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:JJ100. JJ300. XX200. JJ700

Supplementary Info:36 ref

ISSN:0038-0717

Year:2001

Journal Title:Soil Biology & Biochemistry

166. Title:Carbon distribution and variations in nitrogen-uptake between catch crop species in pot experiments

View Article: Soil Biology & Biochemistry. 2001. 33 (4/5). 523-532

CD Volume:373

Print Article: Pages: 523-532

Author(s):Zagal E Rydberg I Martensson A

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Language:English

Abstract:Chicory (Cichorium intybus) and perennial ryegrass (Lolium perenne) are suitable catch crops in Sweden (with a sandy loam soil). Pot experiments were conducted to study C distribution and variations in nitrogen uptake between several varieties of chicory and perennial ryegrass for comparison. A soil amended with Ca(15NO3) (109 and 145 mg N kg-1 soil) and glucose (2.5 g C kg-1 soil) was incubated for 10 days to promote the immobilization of added 15N; therefore, N was supplied to plants through the remineralization of the immobilized 15N. In experiment 1 four varieties of chicory and one variety of perennial ryegrass were grown for 60 days in greenhouse conditions. In experiment 2, only two varieties of chicory and one ryegrass were grown in soil with high-N fertilizer application. In the later experiment, pots were moved from greenhouse to a growth chamber with 14CO2 atmosphere for a pulse labelling of the plants 7-10 days before harvest. At both levels of N supply, dry weights of taproots were higher in the chicory cultivars Cassel and Fredonia than in cultivars Puna and Balsa. The opposite was found for dry weights of small roots. There were significant differences in N uptake between chicory varieties. Cultivars Cassel and Fredonia together with the ryegrass were significantly more effective in securing nitrate than the other two varieties. Significantly higher amounts of labelled-N were found in taproots of cv. Cassel than in cv. Puna. The opposite trend was found for small roots. Similar results were measured for amounts of radioactivity (kBq pot-1) of newly fixed C transferred to roots. Amounts of labelled-N measured in soil residues for both crop species

were significantly higher at the low level of N supply than at the high level of N. There was no significant increase in plant uptake of soil-N (native-N) either between chicory varieties or between chicory and ryegrass, when the high level of N was supplied. The importance of these results is discussed in relation to the suitability of chicory species as catch crop and as plant material for breeding

Descriptors:application-rates. calcium-nitrate. carbon. catch-crops. chicory. cultivars. distribution. glucose. immobilization. nitrogen. nitrogen-fertilizers. nutrient-uptake. plant-breeding. pot-experimentation. roots. sandy-loam-soils. soil. soil-amendments. soil-types. variation. varietal-reactions

Geographic Locator:Sweden

Identifiers:chickory

Organism Descriptors:Cichorium-intybus. Lolium-perenne

Supplemental Descriptors:Cichorium. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Lolium. Poaceae. Cyperales. monocotyledons. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:FF003. JJ700. FF007. FF100. FF061. FF020. FF030. JJ200

Supplementary Info:37 ref

ISSN:0038-0717

Year:2001

Journal Title:Soil Biology & Biochemistry

167. Title:Soil organic matter assessment in natural regrowth, Pueraria phaseoloides and Mucuna pruriens fallow

View Article: Soil Biology & Biochemistry. 2001. 33 (7/8). 1095-1101

CD Volume:373

Print Article: Pages: 1095-1101

Author(s):Koutika L S Hauser S Henrot J

Author Affiliation:International Institute of Tropical Agriculture (IITA), Humid Forest Ecoregional Centre (HFC) Cameroon c/o L.W. Lambourn and Co, 26 Dingwall Road, Croydon, CR9 3EE, UK

Language:English

Abstract:Biological and chemical components of soil fertility were quantified under three different fallow types and related to soil quality of an Ultisol in southern Cameroon at the end of a 9-month fallow. Soil organic matter (SOM), soil exchangeable Ca2+, Mg2+ and K+ and available P concentrations, effective cation exchange capacity (ECEC) and, soil acidity in the 0-10 and 10-20 cm layers were evaluated under: natural regrowth mainly composed of Chromolaena odorata and the legume cover crops velvet bean (Mucuna pruriens var. utilis) and kudzu (Pueraria phaseoloides). SOM quality was assessed by C mineralization during a 4-week incubation at 28 deg C in the laboratory. In addition, particulate organic matter (POM), the most active part of SOM, was fractionated by wet sieving into coarse (4000-2000 micro m), medium (2000-250 micro m) and fine (250-53 micro m) particle size classes and analysed for C and N contents. Under Mucuna, Ca2+, K+ and P concentrations, ECEC and soil pH were higher and C mineralization was lower than under natural regrowth and Pueraria in 0-10 cm depth. Soil under natural regrowth had a higher C mineralization in 0-10 cm indicating more labile SOM than in Pueraria and Mucuna fallow. There was no difference in weight of total POM, for any of the fractions between the three fallow types. However, both leguminous fallow species increased POM quality through a higher N content. Compared to natural regrowth, Pueraria increased N content in coarse POM by 36% in the 0-10 cm layer and by 19% (coarse POM) and 35% (medium POM) in the 10-20 cm layer. Mucuna increased N content

in the 0-10 cm layer by 12% (coarse POM), and by 19% (fine POM), compared to natural regrowth. According to the differences in nutrient concentrations, soil acidity and the biological stability of SOM, the three fallow types ranked: Mucuna more than or equal to Pueraria > natural regrowth. However, in terms of POM quality the ranking was: Pueraria > Mucuna > natural regrowth

Descriptors:agricultural-land. calcium. cation-exchange-capacity. exchangeable-calcium. exchangeable-magnesium. exchangeable-potassium. fallow. magnesium. mineralization. nitrogen. phosphorus. potassium. soil-acidity. soil-biology. soil-chemical-properties. soil-fertility. soil-organic-matter. Ultisols

Geographic Locator:Cameroon

Identifiers:soil quality

Organism Descriptors:Chromolaena-odorata. Mucuna-pruriens. Pueraria-phaseoloides

Supplemental Descriptors:Central-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Francophone-Africa. Chromolaena. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Mucuna. Papilionoideae. Fabaceae. Fabales. Pueraria

Subject Codes:FF005. JJ200. JJ100. JJ600

Supplementary Info:35 ref

ISSN:0038-0717

Year:2001

Journal Title:Soil Biology & Biochemistry

168. Title:Plant phenology and soil fertility effects on below-ground carbon allocation for an annual (Bromus madritensis) and a perennial (Bromus erectus) grass species

View Article: Soil Biology & Biochemistry. 2001. 33 (10). 1291-1303

CD Volume:373

Print Article: Pages: 1291-1303

Author(s):Warembourg F R Estelrich H D

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Language:English

Abstract:Plant strategies for using available resources were explored through a comparative analysis of C allocation and use in the rhizosphere. The seasonal dynamics of plant C partitioning was compared for annual and perennial species of bromegrass (Bromus madritensis and B. erectus) in soils of different fertility using successive 2-week labelling with 14CO2. Measurements of labelled soil CO2 indicated that current assimilates were readily used by roots and rhizosphere microflora. For vegetative stages of plant growth, there was a regular decrease during the year of carbon translocation from above to belowground and 10-20% more of net C assimilation was directed toward the roots in the poor soil than in the fertile soil. During reproductive stages, there were drastic decreases to as low as 10 and 25% of net C assimilation reaching belowground in the annual and perennial species, respectively. Over an entire year, belowground C allocation in B. madritensis was 37% of net assimilation in the fertile soil and 44% in the poor soil. In B. erectus the figures varied from 42-49 to 60% in the fertile and poor soil, respectively. The proportion of current belowground C respired and exuded in the rhizosphere was more than 15% higher in the fertile soil than in the poor soil. During reproductive stages, C losses exceeded gain by the roots and the variation from vegetative to reproductive stages reached 30% in B. madritensis (25-57% in poor soil, 45-73% in fertile soil), 20% in B. erectus (39-59% for plants developed from cuttings in the rich soil).

In B. erectus, the development of reproductive structures was strongly correlated with soil fertility and a determinant in rhizosphere C budgets. This feature characterized the difference between the annual and perennial species. When expressed in units of C translocated belowground per unit of root C, the highest C use efficiency was in the poor soil. In B. madritensis, 64% of annual belowground C allocation remained in the roots in the poor soil, 44% in the fertile soil. In B. erectus, this percentage varied from 62 to 50% between low and high fertility soils. The trade-off between rate of growth and resource use efficiency defined in the literature for aboveground plant traits was confirmed belowground: faster growth rate, higher losses and, therefore, lower resource use efficiency in the rich soil than in the poor soil

Descriptors:carbon-dioxide. growth. phenology. photosynthesis. resource-allocation. respiration. rhizosphere. roots. soil-fertility. use-efficiency

Organism Descriptors:Bromus-erectus. Bromus-madritensis

Supplemental Descriptors:Bromus. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:FF007. FF060. JJ600

Supplementary Info:41 ref

ISSN:0038-0717

Year:2001

Journal Title:Soil Biology & Biochemistry

169. Title:Interrelationships between microbial and soil properties in young volcanic ash soils of Nicaragua

View Article: Soil Biology & Biochemistry. 2001. 33 (12/13). 1581-1589

CD Volume:373

Print Article: Pages: 1581-1589

Author(s):Joergensen R G Castillo X

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Language:English

Abstract:The activity and biomass of soil microorganisms were measured in soils from 25 different arable sites in the Pacific region of Nicaragua with the objective of elucidating their interrelationship with soil textural and soil chemical properties. All soils developed from recent volcanic deposits but differ in their particle size distribution. Short-term phosphorus fixation capacity varied widely and was, on average, 11% of added P. In contrast, long-term P fixation capacity varied within a small range of around 55%. Mean basal respiration was 8.6 micro g CO2-C d-1 g-1 soil, average contents of biomass C, biomass P, and ergosterol as an indicator of fungal biomass were 116, 1.95, and 0.34 micro g g-1 soil, respectively. They were all, except biomass P, significantly lower in the sandy than in the loamy soils. The mean biomass C-to-soil C ratio was 0.69%, the mean metabolic quotient 95 mg CO2-C d-1 g-1 biomass C, the mean ergosterol-to-biomass C ratio 0.31% and the mean biomass C-to-P ratio 107. The very low ergosterol-to-biomass C ratio indicates that fungi contribute only a relatively small percentage to the microbial biomass. The biomass C-to-P ratio exceeded considerably the soil C-to-total P ratio. Metabolic quotient qCO2 and ergosterol-to-biomass C were both negatively correlated with biomass C-to-soil C ratio and clay content, indicating positive correlations between qCO2 and ergosterol-to-biomass C ratio and between biomass C-to-soil C ratio and clay content. Key problems of soil fertility and soil quality in Nicaragua are low availability of soil organic matter and

phosphorus to soil microorganisms, which are magnified by a low percentage of fungi, probably reducing the ability of soil to provide nutrients for plant growth
Descriptors:arable-land. carbon. microbial-activities. microorganisms. phosphorus. soil-chemical-properties. soil-fertility. soil-texture. soil-types. volcanic-ash-soils
Geographic Locator:Nicaragua
Identifiers:microbial biomass. soil quality
Supplemental Descriptors:Central-America. America. Developing-Countries. Threshold-Countries. CACM. Latin-America
Subject Codes:JJ100. JJ200. JJ300. ZZ394
Supplementary Info:many ref
ISSN:0038-0717
Year:2001
Journal Title:Soil Biology & Biochemistry

170. Title:Impact of ecological and conventional arable management systems on chemical and biological soil quality indices in Nicaragua
View Article: Soil Biology & Biochemistry. 2001. 33 (12/13). 1591-1597
CD Volume:373
Print Article: Pages: 1591-1597
Author(s):Castillo X Joergensen R G
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Language:English
Abstract:We measured the activity and soil microbial biomass in volcanic ash soils from 10 sites under ecological farming (no pesticides, shallow ploughing, mulching, organic fertilizers, crop rotation) and 15 sites under conventional farming (pesticides, mineral fertilizers, deep ploughing). Our aim was to determine the effects of management system on soil quality and soil fertility in tropical Nicaragua in relation to soil type. None of these sites were irrigated. Conventional management led to significantly increased amounts of total soil P and a significantly larger biomass C-to-P ratio compared to ecological management. Almost all of the other microbial properties, i.e. soil basal respiration, ergosterol and biomass C were significantly improved by ecological management. Also the biomass C-to-soil C ratio was significantly increased, but not the metabolic quotient qCO2 or the ergosterol-to-biomass C ratios, indicating that the positive effects of ecological management were mainly due to increased C input rates. Biomass C, ergosterol, and basal respiration rate were significantly larger at the loamy sites than at the sandy sites. The same was true for the biomass C-to-soil C ratio, but the ergosterol-to-biomass C ratio and the metabolic quotient qCO2 were larger at the sandy sites. Our results demonstrate that ecological management is an important tool for soil conservation and sustainable management of arable land in Nicaragua. However, the decline in total P and the low P availability to soil microorganisms need attention as a precaution against P deficiency. The improvement was greatest at the loamy sites, although the effects of management system were in most cases independent of the soil type. For this reason, ecological management should be preferably promoted on loamy soils
Descriptors:carbon. farming-systems. microbial-activities. organic-farming. phosphorus. soil-fertility. soil-management. soil-types. volcanic-ash-soils
Geographic Locator:Nicaragua
Identifiers:microbial biomass. soil quality

Supplemental Descriptors:Central-America. America. Developing-Countries. Threshold-Countries. CACM. Latin-America
Subject Codes:FF150. JJ100. JJ600. JJ900. ZZ394
Supplementary Info:36 ref
ISSN:0038-0717
Year:2001
Journal Title:Soil Biology & Biochemistry

171. Title:Response of soil microbial biomass and activity to agricultural de-intensification over a 10 year period
View Article: Soil Biology & Biochemistry. 2001. 33 (15). 2105-2114
CD Volume:373
Print Article: Pages: 2105-2114
Author(s):Emmerling C Udelhoven T Schroder D
Author Affiliation:Department of Soil Science, University of Trier, Universitatsring 15, 54286 Trier, Germany
Language:English
Abstract:Soil microbial properties, such as microbial biomass and microbial activity, are suitable indicators to predict soil biological status as a part of soil fertility after transition from high-input agricultural systems to low-input systems. These criteria were applied to evaluate how agricultural de-intensification as practiced by the integrated farming system of Germany differ from the conventional agricultural system over long-term investigation. The study was multi-factorial, covering agricultural management, spatial as well as temporal variability. Therefore, the research included nine different locations with a wide range of soil types, soil textures of the top horizons, parent materials, climatic conditions, along with the individual impact of farmers over a ten year period. In sum, the mean pH values, the mean amounts of microbial biomass (estimated from maximal initial responses) and soil organic matter, mean Cmic-to-Corg ratio, and mean dehydrogenase [oxidoreductases] activity of the nine locations were almost identical in both systems. The amounts of soil organic matter, microbial biomass and Cmic-to-Corg ratio increased 10-15% in the integrated management treatment compared with the conventional management system starting from the fifth year of investigation. Conversely, during the first 4 years of the investigation the examined parameters were slightly increased in the conventional management system. The differences in dehydrogenase activity between both systems changed from year to year. No differences between both systems were found for the pH values of the investigated soils. Beyond that, the factor soil texture of the top horizon (expressed as the clay content) was highly significant for the amounts of the investigated parameters. During the 10-year investigation period, differences between both management systems in particular years were related to the cultivation of intermediate crops and conservation tillage practices
Descriptors:enzyme-activity. enzymes. farming-systems. microbial-activities. oxidoreductases. soil-fertility. soil-organic-matter. soil-texture
Geographic Locator:Germany
Identifiers:microbial biomass
Supplemental Descriptors:Western-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:FF150. JJ100. JJ200. JJ300
Supplementary Info:many ref
ISSN:0038-0717
Year:2001
Journal Title:Soil Biology & Biochemistry

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172. Title:Effects of high and low fertility plant species on dead root decomposition and nitrogen mineralisation
View Article: Soil Biology & Biochemistry. 2001. 33 (15). 2115-2124
CD Volume:373
Print Article: Pages: 2115-2124
Author(s):Krift T A J van der Gioacchini P Kuikman P J Berendse F
Author Variant:der-Krift-T-A-J-van. van-der-Krift-T-A-J
Author Affiliation:Wageningen University and Research Centre, PO Box 47, 6700 AA Wageningen, Netherlands
Language:English
Abstract:The influence of growing grass species Holcus lanatus and Festuca ovina on the decomposition of dead roots of H. lanatus, F. rubra and F. ovina and on the nitrogen (N) mineralization from these residues was studied in a greenhouse experiment. H. lanatus, F. rubra and F. ovina are typical of soils with high, intermediate and low fertility, respectively. Dead roots of high fertility species were expected to decompose faster compared to those of low fertility species and living roots of high fertility species were expected to accelerate the rate of decomposition of dead roots more than low fertility species. To test this hypothesis, decomposition of 15N-labelled roots of these three species was measured after a 6-week incubation period in soil planted with either H. lanatus or F. ovina plants. After this period, the remaining dead root mass, living plant biomass, and the N and 15N distribution among plant, soil and dead roots was measured. The decomposition rate of dead roots from the three plant species was not significantly different. However, H. lanatus dead roots caused a lower N uptake by the growing plants (18.3 mg N) compared to F. ovina (21.5 mg N) and F. rubra (21.9 mg N) dead roots, as a result of a higher N immobilization by H. lanatus dead roots. The presence of growing plants stimulated dead root decomposition and N mineralization, the effect of Holcus plants being larger than that of Festuca. H. lanatus plants took up more N and 15N (26.3 mg N and 0.30 mg 15N) than F. ovina plants (14.1 mg N and 0.17 mg 15N). Our results provide evidence that living plant roots stimulate the nitrogen release from plant residues and thereby facilitate their own growth. This effect was stronger for high fertility species than for the low fertility species, because the high fertility species produced more root biomass. On the other hand, dead roots of high fertility species immobilized more N, due to their lower N concentration, resulting in a lower N availability to the growing plants
Descriptors:biomass. decomposition. immobilization. mineralization. nitrogen. nutrient-uptake. roots
Organism Descriptors:Festuca-ovina. Festuca-rubra. Holcus-lanatus
Supplemental Descriptors:Festuca. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Holcus
Subject Codes:FF007. JJ100
Supplementary Info:30 ref
ISSN:0038-0717
Year:2001
Journal Title:Soil Biology & Biochemistry
Copyright:Copyright CAB International

173. Title:Short-term dynamics of nitrogen, microbial activity, and phospholipid fatty acids after tillage
View Article: Soil Science Society of America Journal. 2001. 65 (1). 118-126
CD Volume:377
Print Article: Pages: 118-126

Author(s):Calderon F J Jackson L E Scow K M Rolston D E
Author Affiliation:Departamento de Biologia, Universidad de Puerto Rico, PO Box 23360, San Juan, PR 00931-3360, Puerto Rico
Language:English
Abstract:The effects of rototillage on microbial biomass C (MBC) and N (MBN), respiration (i.e. soil CO2 production in 1-h incubations), CO2 efflux from the soil surface, inorganic N, nitrification potential, denitrification rate, and phospholipid fatty acids (PLFA) were examined on an agricultural field in Salinas Valley, California, USA, in April 1998. A fallow silt loam soil was rototilled in the field and soil cores were immediately obtained from tilled and adjacent control soils. The soil cores were then incubated at constant temperature and sampled throughout a 2-week period. Tilled soil had higher CO2 efflux than the control soil. This increase occurred immediately after tillage and lasted for 4 days. Respiration was similar in both soils until the fourth day after tillage, and then declined in the tilled soil. Tilled soil showed increases in MBN, nitrate, and denitrification rates, suggesting that tillage makes available previously protected organic N. The overall reduction in respiration together with the lack of response in MBC, however, suggests that tillage did not make available significant amounts of readily decomposable C. These combined C and N dynamics suggest that low C:N ratio compounds may have been mineralized following tillage. Denitrification rates increased in the tilled soil even though the bulk of the soil had reduced respiration and bulk density. Tillage caused temporary changes in PLFA profiles, suggesting changes in soil microbial community structure. Phospholipid fatty acid 18:1 omega 7t, which marks the presence of eubacteria, decreased in the tilled soil. In contrast, 19:0 cy, a marker for anaerobic eubacteria, increased in the tilled soil. Results indicate that tillage causes short-term changes in nutrient dynamics that may potentially result in N losses through denitrification and nitrate leaching, as well as C losses through degassing of dissolved CO2. These changes are accompanied by concomitant shifts in microbial community structure, suggesting a possible relationship between microbial composition and ecosystem function
Descriptors:carbon. chemical-composition. denitrification. efflux. fatty-acids. microbial-activities. mineralization. nitrification. nitrogen. phospholipids. respiration. rotary-cultivation. soil-composition. soil-fertility. soil-physical-properties. tillage
Geographic Locator:California. USA
Identifiers:microbial biomass
Supplemental Descriptors:Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:JJ100. JJ200. JJ600. JJ900. ZZ333
Supplementary Info:36 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

174. Title:Lime-induced changes in indices of soil phosphate availability
View Article: Soil Science Society of America Journal. 2001. 65 (1). 147-152
CD Volume:377
Print Article: Pages: 147-152
Author(s):Curtin D Syers J K
Author Affiliation:New Zealand Institute for Crop and Food Research Limited, Private Bag 4704, Christchurch, New Zealand
Language:English

Abstract:In a laboratory study, we examined the effects of lime on labile P fractions in six New Zealand soils that varied in P-retention capacity. The soils (5.1-5.5 initial pH in water) were incubated with four rates of CaCO3 to raise pH incrementally to a maximum of approx equal to 6.5. Subsequently, P (as KH2PO4) was applied to give three P levels in each soil. Liming generally decreased Olsen bicarbonate values, with the effect being largest at the highest rate of P addition. Averaged across P treatments, the decrease in Olsen P for a unit increase in pH ranged from 3 to 7 mg kg-1. Liming also depressed water-extractable P. Decreases in extractable P suggest that liming increased phosphate adsorption. When data for the lime and P treatments were combined, water-extractable P and Olsen P were well correlated, although each soil showed a different relationship. Phosphate-retention capacity appeared to have a strong influence on the relationship between water-extractable P and Olsen P, with the high P retention soils having relatively low proportions of water-extractable P. When exchangeable cations were replaced with Na, soils that had been limed released significantly more P to distilled water than their unlimed counterparts. The results confirm that the nature of the exchangeable cation suite has a major influence on the pH-dependence of the phosphate adsorption-desorption equilibrium. In limed soil, exchangeable Ca and pH increase simultaneously so that shifts in this equilibrium may be small and unpredictable
Descriptors:calcium-carbonate. desorption. exchangeable-cations. lime. nutrient-availability. phosphorus. soil-acidity. soil-amendments. soil-chemical-properties. soil-fertility. soil-pH. calcium. soil. availability. phosphate. indexes-of-nutrient-availability. phosphorus-fertilizers. application-rates
Geographic Locator:New-Zealand
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:JJ600. JJ700. JJ200
Supplementary Info:24 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

175. Title:Manganese toxicity in a Hawaiian Oxisol affected by soil pH and organic amendments
View Article: Soil Science Society of America Journal. 2001. 65 (1). 153-160
CD Volume:377
Print Article: Pages: 153-160
Author(s):Hue N V Vega S Silva J A
Author Affiliation:Dep. of Tropical Plant and Soil Science, Univ. of Hawaii, 1910 East-West Road, Honolulu, HI 96822, USA
Language:English
Abstract:Manganese toxicity is a serious constraint to many crops grown on acid soils in Hawaii, USA. To develop management strategies to deal with the Mn problem, four experiments were conducted. First, to study soil pH effect, a pH gradient from 4.7 (unamended) to 6.0 was established in a high-Mn Oxisol (Wahiawa series), using combinations of Ca(OH)2 (lime) and CaSO4.2H2O (gypsum); soyabean (Glycine max cv. Kahala) was grown as a test crop. Second, effects of Ca, and particularly SO4, on ameliorating Mn toxicity to soyabean were subsequently evaluated. Third, soil Mn solubility by organic molecules was studied in the laboratory as a function of chemical structure, pH, and equilibration time. Fourth, soyabean responses to green manure (cowpea leaves) and biosolids applied at 5 and 10 g kg-1 to the Wahiawa soil were

compared with those of the unamended control and CaCO3 treatments. Manganese concentration in the saturated paste extract of the first experiment increased 100-fold for each pH unit decrease. A combination of gypsum and lime was more effective in correcting Mn toxicity than either amendment alone. Soyabean growth was better correlated with leaf Ca:Mn ratio than with leaf Mn concentration. Increased SO4 concentration alleviated Mn toxicity. Organic molecules or ions containing OH-OH in the ortho position of SH groups, such as catechol [pyrocatechol], tannic acid [tannins], and cysteine, were more effective in dissolving soil Mn than molecules or ions not containing these functional groups. Application of green manure and biosolids generally increased Mn toxicity

Descriptors:acid-soils. calcium. calcium-sulfate. chemical-composition. cowpeas. cysteine. Ferralsols. green-manures. gypsum. lime. liming. manganese. organic-amendments. oxisols. phytotoxicity. pyrocatechol. sewage-sludge. soil-acidity. soil-amendments. soil-composition. soil-fertility. soil-pH. soil-toxicity. soil-types. soyabeans. sulfate. tannins. toxic-substances. responses

Geographic Locator:Hawaii. USA

Identifiers:soil amelioration

Organism Descriptors:Glycine-max. Vigna-unguiculata. Glycine-(Fabaceae)

Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Polynesia. Oceania. Pacific-Islands. Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Vigna

Subject Codes:FF005. FF800. JJ200. JJ600. JJ700. XX400

Supplementary Info:38 ref

ISSN:0361-5995

Year:2001

Journal Title:Soil Science Society of America Journal

176. Title:Soil organic matter pools and carbon-13 natural abundances in particle-size fractions of a long-term agricultural field experiment receiving organic amendments

View Article: Soil Science Society of America Journal. 2001. 65 (2). 352-358

CD Volume:377

Print Article: Pages: 352-358

Author(s):Gerzabek M H Haberhauer G Kirchmann H

Author Affiliation:Department of Environmental Research, Austrian Research Centers Seibersdorf, A-2444 Seibersdorf, Austria

Language:English

Abstract:The present study combined a physical fractionation procedure with the natural abundance of 13C (delta 13C) to evaluate the effect of organic fertilizer applications, mineral fertilizer application, and fallow on changes in the organic C (Corg) associated with different particle-size fractions. The long-term agricultural field experiment was conducted since 1956 in Ultuna, Sweden, on a Eutric Cambisol. Organic C both in bulk soil samples and size fractions changed significantly since 1956. Fallow plots lost approximately one-third of their Corg from the topsoil layer (0-20 cm), whereas organic amendments based on an equivalent of 2000 kg C ha-1 year-1 increased Corg up to two-fold depending on the quality of the material applied (green manure < animal manure < sewage sludge < peat). Silt-sized particles increased in plots receiving sewage sludge or peat. Organic C in particle-size fractions responded significantly to treatments. Most Corg was found in the silt fraction. The relative contribution of the silt-sized particles to total Corg increased by 18% as Corg in

bulk soil increased from 10.8 (fallow) to 32.0 (peat) g Corg kg-1 soil; the contribution of clay-sized particles decreased by a similar proportion. Mass balance calculations showed that the proportion of Corg originating from organic amendments decreased with particle size and that sand fractions were the most sensitive to the treatments. The natural abundance of 13C in bulk soil and size fractions increased significantly in the continuous fallow and was affected by organic amendments. The delta 13C variations among size fractions were larger than among treatments and can be used as a fingerprint for differentiation. Our results suggest that silt-sized particles acted as medium-term sink for added Corg and that sand-sized fractions can be useful as sensitive indicators of changes in soil C status in response to land management

Descriptors:agricultural-land. animal-manures. Cambisols. carbon. clay-fraction. fallow. field-experimentation. fractionation. green-manures. land-management. long-term-experiments. microbial-degradation. organic-amendments. organic-carbon. organic-fertilizers. particle-size-distribution. peat. radioactive-tracers. radionuclides. sand-fraction. sewage-sludge. silt-fraction. soil-chemistry. soil-composition. soil-fertility. soil-organic-matter. soil-separates. soil-types. topsoil

Geographic Locator:Sweden

Supplemental Descriptors:Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:JJ200. JJ600. JJ700. XX100. XX300. JJ900. JJ100

Supplementary Info:41 ref

ISSN:0361-5995

Year:2001

Journal Title:Soil Science Society of America Journal

177. Title:Evaluating chemical and physical indices of nitrogen mineralization capacity with an unequivocal reference

View Article: Soil Science Society of America Journal. 2001. 65 (2). 368-376

CD Volume:377

Print Article: Pages: 368-376

Author(s):Wang WeiJin Smith C J Chalk P M Chen DeLi

Author Variant:Wang-W-J. Chen-D-L

Author Affiliation:DNR, 80 Meiers Rd., Indooroopilly, QLD, 4068, Australia

Language:English

Abstract:After decades of searching for a rapid method to estimate the N mineralization capacity of soil, there is still no consistent recommendation. It is legitimate to examine the causes for the often-conflicting results in literature. The efficacy of various references that have been used as benchmarks for assessing chemical and physical indices in the literature is critically reviewed in this paper. Gross N mineralization and consumption during waterlogged and aerobic incubations were estimated in a wide range of soils (19 soil types classified under Alfisols, Mollisols, Vertisols, and Entisols) from New South Wales, Victoria, Queensland and Australian Capital Territory, Australia. It was found that equivalent to 17-90% and 23-59% of the mineralized N was consumed during the waterlogged and aerobic incubations, respectively. As net N production rate represents the balance between N-producing and N-consuming processes, it appears difficult to find a simple method that could be used to predict the net effect of several concurrent processes. We used the gross N mineralization as a reference criterion for N mineralization ability. Total organic N, water-soluble organic N, alkali-hydrolysable N, acid-hydrolysable N, hot salt-hydrolysable N and N in

the light organic matter fraction were assessed against this reference criterion. All indices except light fraction N were significantly related to gross N mineralization. Water-soluble organic N had the highest correlation of all the indices tested. None of the chemically hydrolysed N fractions consistently showed closer relationships with N mineralization than total organic N, suggesting that these chemical methods are ineffective in extracting a biologically labile fraction of soil organic N

Descriptors:aerobic-conditions. Alfisols. Entisols. indexes. methodology. mineralization. Mollisols. nitrogen. organic-nitrogen. soil-chemical-properties. soil-fertility. soil-organic-matter. soil-physical-properties. soil-types. Vertisols. waterlogging

Geographic Locator:Australia. Australian-Capital-Territory. New-South-Wales. Queensland. Victoria

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia

Subject Codes:JJ100. JJ200. JJ400. JJ600. ZZ900

Supplementary Info:52 ref

ISSN:0361-5995

Year:2001

Journal Title:Soil Science Society of America Journal

178. Title:Assessing the impact of land conversion to urban use on soils with different productivity levels in the USA

View Article: Soil Science Society of America Journal. 2001. 65 (2). 391-402

CD Volume:377

Print Article: Pages: 391-402

Author(s):Nizeyimana E L Petersen G W Imhoff M L Sinclair H R Jr Waltman S W Reed Margetan D S Levine E R Russo J M

Author Affiliation:Dep. of Agronomy, College of Agricultural Sciences, Environmental Resources Research Institute, 101 Land and Water Research Building, The Pennsylvania State Univ., University Park, PA 16802, USA

Language:English

Abstract:There has been increased public concern in the USA over the long-term impact of urbanization on the available land used to produce food, feed, and fibre. Concern that urban use of highly productive soils may threaten our food security and sustainability has been debated for nearly three decades. This study was primarily initiated to compare different soil productivity classes in terms of areas and proportion of land converted to urban uses in the USA. The methodology consisted of analysing data resulting from a geographic information system overlay of urban land use maps derived from the Defense Meteorological Satellite Program's Operational Linescan System nighttime imagery and layers of potential soil productivity. Soil productivity distributions were obtained using the Soil Rating for Plant Growth model based primarily on soil and landscape parameters contained in the State Soil Geographic database. Currently, the urban land use covers approx equal to 3% of the conterminous USA and is primarily on areas that were originally of low and moderate soil productivity. Only 6% of the total land under urbanization had consisted of highly productive soils. However, land with highly productive soils, roughly 3% of the total U.S. area, has a higher level of urbanization (5%) than that of any other soil productivity category. States differ in the areas and proportion of land converted to urban uses in each soil productivity class. These results are a first step in determining the current status of soil resources in relation to urbanization and should be interpreted

according to the scale and resolution of data sources and assumptions made in the soil productivity modelling
Descriptors:aerial-surveys. databases. geographical-information-systems. growth-models. land-productivity. land-resources. land-use. maps. methodology. satellite-imagery. soil-fertility. soil-resources. sustainability. urbanization
Geographic Locator:USA
Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries
Subject Codes:CC300. JJ600. PP300. ZZ100. ZZ900. JJ500
Supplementary Info:42 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

179. Title:Carbon balance of the Breton Classical Plots over half a century
View Article: Soil Science Society of America Journal. 2001. 65 (2). 431-441
CD Volume:377
Print Article: Pages: 431-441
Author(s):Izaurralde R C McGill W B Robertson J A Juma N G Thurston J J
Author Affiliation:Pacific Northwest National Laboratories, 901 D Street S.W., Ste. 900, Washington, DC 20024-2115, USA
Language:English
Abstract:We related C input and management to soil organic C (SOC) dynamics over 51 years (1939-1990). We used two rotations from the Breton Classical Plots at Breton, Alberta, Canada, on a Typic Cryoboralf: (i) wheat (Triticum aestivum)-fallow (WF) and (ii) wheat-oat (Avena sativa)-barley (Hordeum vulgare)-hay (primarily lucerne, Medicago sativa)-hay (WOBHH), in factorial combination with three fertility levels: no added fertilizer [Nil], N-P-K-S fertilizers [F], and farmyard manure [M]. Net aboveground C productivity (NAGCP, kg ha-1 year-1) averaged 576 in WF-Nil and 1078 in WF-F and SOC decreased in both, but NAGCP averaged 1208 in WF-M, where SOC increased. A NAGCP of 853 in WOBHH-Nil maintained SOC, while both 1831 in WOBHH-F and 1714 in WOBHH-M increased SOC. After 51 years, WOBHH-M had 25 t ha-1 more SOC than did WF-Nil. Because of contrasting decay rates and root:shoot ratios, C input needed to maintain the original SOC was twofold greater in WF than in WOBHH, which required a fourfold increase in NAGCP to attain these inputs. A three-compartment model fitted to the data suggested loss of C from the active compartments and gain of C by the passive compartments. Inputs of C that maintained SOC over 51 years would lead to a steady state of 2.9 times more C than in 1939, and 26% higher than the native SOC content. Return of 30% of the crop C as manure would sustain SOC sequestration in all WOBHH rotations with NAGCP > 400 kg ha-1 year-1 and in those WF rotations with NAGCP > 1000 kg ha-1 year-1
Descriptors:Alfisols. application-rates. barley. biomass-production. carbon. carbon-cycle. carbon-sequestration. chemical-composition. fallow. farmyard-manure. hay. historical-records. lucerne. lucerne-hay. Luvisols. maps. mathematical-models. nitrogen-content. nitrogen-fertilizers. nutrient-balance. nutrient-content. oats. organic-carbon. phosphorus-fertilizers. potassium-fertilizers. root-shoot-ratio. rotations. soil-composition. soil-fertility. soil-management. soil-organic-matter. soil-surveys. soil-types. sulfur-fertilizers. temporal-variation. wheat
Geographic Locator:Alberta. Canada
Organism Descriptors:Avena-sativa. Hordeum-vulgare. Medicago. Medicago-sativa. Triticum. Triticum-aestivum

Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Avena. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Hordeum. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. Triticum
Subject Codes:FF005. FF007. FF100. FF150. JJ200. JJ600. JJ700. ZZ100
Supplementary Info:43 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

180. Title:Stabilization of fertilizer nitrogen-15 into humic substances in aerobic vs. waterlogged soil following straw incorporation
View Article: Soil Science Society of America Journal. 2001. 65 (2). 499-510
CD Volume:377
Print Article: Pages: 499-510
Author(s):Devevre O C Horwath W R
Author Affiliation:Department of Land, Air and Water Resources, University of California, One Shields Ave., Davis, CA 95616-8627, USA
Language:English
Abstract:This study was undertaken to investigate and quantify the interactive effects of flooding and straw incorporation on key microbial processes, principally stabilization of N fertilizer into various soil organic matter (SOM) pools. The fate of fertilizer 15N in a paddy soil was examined at 5, 15, and 25 deg C, with and without rice (Oryza sativa) straw added, and under flooded and non-flooded conditions. After a 160-day incubation, three fractions of the SOM were separated and defined as directly alkali-extractable humic substances (DAEHS), reducible metal-bound humic substances (RMBHS), and non-alkali-extractable organic matter (NAEOM). The DAEHS had the highest percentage, up to 50%, of fertilizer 15N recovered at 160 days, indicating that this SOM fraction was the most dynamic fraction of the SOM. On the other hand, the RMBHS was considered the least dynamic pool, containing up to 12% fertilizer 15N after 160 days. The NAEOM was surprisingly highly enriched, up to 28% fertilizer 15N, and showed a significant treatment effect, suggesting that some active components of N cycling were present in this SOM fraction. The addition of rice straw increased the recovery of fertilizer 15N in the above SOM fractions. Flooding significantly reduced the stabilization of fertilizer N compared with the non-flooded treatment. Indices of recalcitrance of the stabilized N confirm that the soil N supply capacity does not decrease with flooding. The total alkali-extractable organic matter (AEOM = DAEHS + RMBHS), as the NAEOM, appears to be a complex and dynamic mixture of potentially mineralizable and recalcitrant forms of N. Our data show that long-term N availability and stabilization into humic fractions is a function of rice residue input and temperature; however, the effects of residue and temperature are inversely related. With increase in temperature of incubation, less fertilizer N becomes stabilized into humic fractions, presumably from increased microbial activity, microbial consumption of potential humic precursors (N-containing precursors of humic substances turned over faster at higher temperatures), and/or formation of different end-products with less humification potential
Descriptors:aerobic-conditions. biological-activity-in-soil. crop-residues. effects. flooding. humification. microbial-activities. microorganisms. nitrogen. nitrogen-content. nitrogen-cycle. nitrogen-fertilizers. nutrient-availability. paddy-soils. rice.

rice-straw. soil. soil-fertility. soil-management. soil-organic-matter. soil-temperature. soil-types. straw. waterlogging
Organism Descriptors:Oryza. Oryza-sativa
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. JJ100. JJ200. JJ300. JJ600. JJ700. JJ900
Supplementary Info:73 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal
Copyright:Copyright CAB International

181. Title:Spatial variability in palustrine wetlands
View Article: Soil Science Society of America Journal. 2001. 65 (2). 527-535
CD Volume:377
Print Article: Pages: 527-535
Author(s):Stolt M H Genthner M H Daniels W L Groover V A
Author Affiliation:Dep. of Natural Resources Science, Univ. of Rhode Island, Kingston, RI 02881, USA
Language:English
Abstract:Wetlands are complex ecosystems having considerable spatial variability. Understanding soil spatial relationships in wetlands is difficult because of the number of factors that affect soil properties. We established a nested sampling design within five small, forested and scrub-shrub palustrine wetlands in Virginia, USA, to examine soil spatial variability within and among sites. Sampling was based on relative elevation intervals within each wetland and soil depth within each sampling unit. Soils were analysed to determine variability in nutrient status, pH, organic C content, and particle-size distribution (PSD). Elevation contributed the least amount to the total variability (variability among sites) for nearly every parameter. Depth from the soil surface explained the most total variability in regard to PSD, indicating that parent material stratification in these alluvial wetlands strongly influences soil physical properties. Most of the total variability in the soil chemical parameters was explained by site. Within sites, elevation trends were observed for particle-size and chemical parameters in most of the wetlands. Elevation trends were related to water table levels and the depositional environment. Within elevation sampling units, particle-size and chemical parameters were shown to be significantly related to depth from the soil surface (at the 0.05 level). These relationships could be attributed to the stratified nature of alluvial soils and the accumulation of organic matter at or near the soil surface. Pedon sampling locations were spaced approx equal to 1 m apart and therefore showed less random variability than elevation sampling locations spaced throughout the 0.25- to 0.35-ha study areas. Soils were classified as Endoaquepts, Humaquepts, Dystrudepts, Endoaquents, and Fluvaquents, depending on the wetland site
Descriptors:altitude. Cambisols. Entisols. Inceptisols. nutrient-content. organic-carbon. particle-size-analysis. soil. soil-depth. soil-fertility. soil-organic-matter. soil-pH. soil-physical-properties. soil-types. spatial-variation. wetlands
Geographic Locator:USA. Virginia
Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries. Appalachian-States-of-USA. Southern-States-of-USA. USA. South-Atlantic-States-of-USA
Subject Codes:JJ200. JJ400. PP320. PP500. JJ300
Supplementary Info:40 ref

ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

182. Title:Short-term dynamics of root- and shoot-derived carbon from a leguminous green manure
View Article: Soil Science Society of America Journal. 2001. 65 (3). 771-779
CD Volume:377
Print Article: Pages: 771-779
Author(s):Puget P Drinkwater L E
Author Affiliation:Ecole Superieure d'Ingenieurs et de Techniciens Pour l'Agriculture, 13, rue du Nord, 76000 Rouen, France
Language:English
Abstract:Although roots are an important source of soil organic matter (SOM) and are thought to be the major constituent of the particulate organic matter (POM) fraction, few studies have documented the fate of belowground C inputs in-situ. The main purpose of this experiment was to determine the fate of root-derived C vs. shoot-derived C and to identify factors contributing to any differences in the retention of aboveground vs. belowground C inputs. We labelled hairy vetch (Vicia villosa subsp. villosa) in-situ with 13CO2 and followed both root- and shoot-derived C in total soil organic C (SOC) and labile C pools for the first growing season following hairy vetch incorporation. At the end of the growing season, nearly one-half of the root-derived C was still present in the soil Typic Fragiudalf, whereas only 13% of shoot-derived C remained. A greater proportion of root-derived C was found as occluded POM and associated with the clay and silt fraction. Greater root-derived C also was retained as chloroform-extractable microbial biomass. It is suggested that three different mechanisms contributed to the increased retention of root-derived C: (i) the greater biochemical recalcitrance of root litter; (ii) increased physical protection of root-derived POM within aggregates; and (iii) the continuous nature of root C inputs from exudates and fine root turnover. It is concluded that shoot residues are broken down rapidly and serve as the source of N for the following cash crop (maize), whereas the root litter is probably largely responsible for the short-term soil structural improvements associated with the use of green manures. It is hypothesized that the greater retention of root-derived C in the first 6 months of decomposition will increase the persistence of this C in SOM in the long term
Descriptors:Alfisols. carbon. decomposition. green-manures. litter-(plant). maize. organic-carbon. organic-matter. roots. shoots. silt-fraction. soil-biology. soil-chemical-properties. soil-fertility. soil-organic-matter. vetch
Identifiers:microbial biomass
Organism Descriptors:Vicia. Vicia-villosa. Zea-mays
Supplemental Descriptors:Vicia. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. JJ100. JJ200. JJ600. JJ700
Supplementary Info:57 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal
Copyright:Copyright CAB International

183. Title:Organic phosphorus mineralization studies using isotopic dilution techniques

View Article: Soil Science Society of America Journal. 2001. 65 (3). 780-787
CD Volume:377
Print Article: Pages: 780-787
Author(s):Oehl F Oberson A Sinaj S Frossard E
Author Affiliation:Group of Plant Nutrition, Inst. of Plant Sciences, Swiss Federal Inst. of Technology (ETH), P.O. 185, CH-8315 Lindau, Switzerland
Language:English
Abstract:Soil organic P (Po) mineralization is an important process in P cycling. No accurate method for its quantification is available because any mineralized inorganic P(Pi) may be rapidly sorbed onto the soil solid phase where it cannot be separated from already present Pi. A method for measuring soil Po mineralization was explored using isotopic dilution techniques under conditions of constant soil respiration rates. First, the specific activity (SA) as affected by physicochemical processes was extrapolated from an isotopic exchange kinetics batch experiment. Second, the SA was assessed during incubation after labeling soil with 33PO4. Soil samples used were Typic Hapludalfs. Lower SA measured during incubation than extrapolated from the batch experiment was attributed to the release of non-labelled Pi due to mineralization of non-labelled Po. In order to separate biological from biochemical mineralization processes, one set of samples was gamma -irradiated to stop the microbial activity while maintaining phosphatase [phosphoric monoester hydrolases] activity. The gamma -irradiated soil revealed higher mineralization rates than the corresponding non-irradiated soil. This was explained by an increase of the amount of easily mineralizable Po derived from killed microbial cells by gamma -irradiation. Consequently, a gross, but overestimated, biochemical P mineralization can be assessed. In the non-irradiated soil, mineralization not only of non-labelled, but also of recently synthesized labelled Po resulting from microbial turnover, may occur. Thus, in the non-irradiated soil, after several days a gross, biologically and biochemically mediated mineralization is increasingly underestimated. During the first 7 days, the mineralization rate in the non-irradiated soil was 1.7 mg P kg-1 day-1, which is an amount approximately equivalent to soil solution P in this soil, indicating that soil P mineralization is a significant process in delivering available Pi
Descriptors:Alfisols. analytical-methods. microbial-activities. mineralization. physicochemical-properties. soil-biology. soil-chemical-properties. soil-fertility
Subject Codes:JJ100. JJ200. JJ600. ZZ900
Supplementary Info:46 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

184. Title:Dynamics of sulfur fractions in Brazilian soils submitted to consecutive harvests of sorghum
View Article: Soil Science Society of America Journal. 2001. 65 (3). 787-794
CD Volume:377
Print Article: Pages: 787-794
Author(s):Ribeiro Junior E S Dias L E Alvarez V V H Mello J W V Daniels W L
Author Affiliation:Dep. of Soils, Federal Univ. of Vicosa, Vicosa, MG 36571-000, Brazil
Language:English

Abstract:Different extractants have been used to determine sulfur availability in tropical soils. Due to variability in their composition, different soil S fractions are solubilized and taken up differentially by plants. We studied the dynamics of S fractions in tropical Oxisols, in the presence and absence of liming, over five consecutive harvests of sorghum (Sorghum bicolor). Fourteen soil samples (13 from Minas Gerais State and one from Maranhao State, Brazil) (0-20 cm) with differing levels of S adsorption capacity (SAC) were characterized for the following S fractions: S-s = ignition of a soil-sodium bicarbonate mixture; S-a = S available in NH4OAc (0.5 M) and HOAc (0.25 M); S-c = S available in CaCl2 (0.01 M); S-p = S available in Ca(H2PO4)2 (500 mg P litre-1 in 2.0 M HOAc); and S-r = S-s - S-a. Combined soil-root-shoot results indicate the existence of a short-term labile organic fraction and a second more recalcitrant organic fraction. In soils with low and medium SAC, the labile organic fraction drives short-term S availability. In high-SAC soils, the mineral fractions were the main drivers of S availability. Soil SAC strongly affected the extractant predictive potential for long-term S availability. In low-SAC soils, S availability was best correlated with the S-c fraction. In medium-SAC soils, the best predictive capacity was also associated with the S-c fraction, followed by the S-a fraction. Conversely, in high-SAC soils, S availability was best correlated with the S-a fraction, followed by the S-p fraction. No single S-extraction procedure appears well suited to predicting long-term S availability across the range of soils studied
Descriptors:adsorption. analytical-methods. chemical-composition. extraction. liming. nutrient-availability. Oxisols. soil-chemical-properties. soil-fertility. sulfur. tropical-soils
Geographic Locator:Brazil. Maranhao. Minas-Gerais
Organism Descriptors:Sorghum-bicolor
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Brazil. Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF007. JJ200. JJ600. JJ700
Supplementary Info:31 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

185. Title:Fertilization effects on soil solution chemistry in three eucalypt plantations
View Article: Soil Science Society of America Journal. 2001. 65 (3). 795-804
CD Volume:377
Print Article: Pages: 795-804
Author(s):Smethurst P J Herbert A M Ballard L M
Author Affiliation:Cooperative Research Centre for Sustainable Production Forestry, CSIRO Forestry and Forest Products, G.P.O. Box 252-12, Hobart TAS 7001, Australia
Language:English
Abstract:The effect of fertilizing Eucalyptus nitens plantations on the concentrations of NH4, NO3 and inorganic phosphate (Pi), and on electrical conductivity (EC) and pH in paste extracts was assessed at three sites in Tasmania, Australia. Soils at the area were mostly clay loam. Nitrogen and P fertilizers were broadcast at elemental rates in the range 0 to 600 kg ha-1 as (NH4)2SO4 and triple super-phosphate within 2 months of planting, and again at 26 months at two of the sites. Nutrient concentrations in undiluted soil solution were inferred by adjusting for the effects of dilution and buffering. Both

fertilizer application events decreased pH by up to one-half a unit, and increased conductivity and the concentrations of NH4 and Pi by up to 10-fold in the 0- to 60-cm depth at all sites. Even at the highest rate of application, values of all parameters generally returned to unfertilized values before the second application of fertilizer. Rates of decrease in concentrations of NH4 and Pi after fertilizer application were unaffected by the age of the crop. When broadcast, applications of fertilizers may be needed at 2- to 4-year intervals to maintain high nutrient availability. A single application of (NH4)2SO4 to these soils at a typical rate of 200 kg N ha-1 will have minimal effect on pH, but multiple applications could decrease pH and adversely affect Ca, K and Mg availability

Descriptors:ammonium. application-rates. chemical-composition. electrical-conductivity. forest-trees. nitrate. nitrogen. nitrogen-fertilizers. nutrient-availability. nutrient-content. phosphate. phosphorus. phosphorus-fertilizers. soil-amendments. soil-chemical-properties. soil-fertility. soil-pH. trees

Geographic Locator:Australia. Tasmania

Organism Descriptors:Eucalyptus-nitens

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Eucalyptus. Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants. Australia

Subject Codes:JJ200. JJ600. JJ700. KK100

Supplementary Info:37 ref

ISSN:0361-5995

Year:2001

Journal Title:Soil Science Society of America Journal

186. Title:Bermudagrass management in the Southern Piedmont USA: I. Soil and surface residue carbon and sulfur

View Article: Soil Science Society of America Journal. 2001. 65 (3). 834-841

CD Volume:377

Print Article: Pages: 834-841

Author(s):Franzluebbers A J Stuedemann J A Wilkinson S R

Author Affiliation:USDA-ARS, J. Phil Campbell Sr. Natural Resource Conservation Center, 1420 Experiment Station Road, Watkinsville, GA 30677-2373, USA

Language:English

Abstract:Improved forage management impacts on soil organic C and S depth distribution and surface residue accumulation could be large, but detailed temporal data are not available. We evaluated the factorial combination of three levels of N fertilizer application (inorganic, crimson clover (Trifolium incarnatum) cover crop plus inorganic, and broiler litter) and four levels of harvest strategy (unharvested, low grazing pressure, high grazing pressure, and hayed monthly) on soil bulk density, soil organic C, and total S, and surface residue C and S during the first 5 years of Coastal bermudagrass (Cynodon dactylon) management in Georgia, USA. Soil bulk density of the 0- to 6-cm depth responded very little to management, but across treatments it decreased 0.06 t m-3 year-1 due to increasing soil organic matter with time. Soil organic C did not respond significantly to fertilizer application strategy during the 5 years, but total S of the 0- to 6-cm depth was greater under broiler litter than under other fertilization strategies at the end of 3, 4, and 5 years. Low and high grazing pressures were similar in their effect on soil organic C accumulation, averaging 140 g m-2 year-1. Most of the net change in soil organic C occurred in the 0- to 2-cm depth. Soil under

unharvested and hayed management accumulated organic C at rates less than one-half of those observed under cattle grazing. Cattle grazing shunted C more directly from forage to the soil, which contributed to greater sequestration of soil organic C than with haying or unharvested management
Descriptors:bulk-density. carbon. carbon-sequestration. cycling. grazing. nitrogen-fertilizers. nutrient-availability. organic-carbon. poultry-manure. soil-fertility. soil-management. soil-organic-matter. soil-properties. sulfur
Geographic Locator:Georgia. USA
Organism Descriptors:Cynodon-dactylon. Trifolium-incarnatum
Supplemental Descriptors:Cynodon. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-Atlantic-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Southeastern-States-of-USA. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons
Subject Codes:JJ200. JJ600. JJ700. PP350. XX100
Supplementary Info:26 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

187. Title:Nutrient retranslocation response of Picea mariana seedlings to nitrogen supply
View Article: Soil Science Society of America Journal. 2001. 65 (3). 905-913
CD Volume:377
Print Article: Pages: 905-913
Author(s):Salifu K F Timmer V R
Author Affiliation:Faculty of Forestry, University of Toronto, 33 Willcocks Street, Toronto, ON M5S 3B3, Canada
Language:English
Abstract:The hypotheses that retranslocation is controlled by soil nutrient availability or plant nutrient reserves were tested under field conditions for one growing season using nutrient-loaded and non-loaded (conventional) black spruce (Picea mariana) seedlings planted on a poor, medium, and rich fertility soil (Podzols) in Ontario, Canada, created by equivalent applications of 0, 200, and 400 kg N ha-1, respectively. Growth and nutrient uptake increased with N supply, and was consistently higher in loaded than conventional seedlings, demonstrating the advantage of nutrient loading practices to accelerate seedling growth across the range of soil N tested. Compared to the poor soil, new shoot biomass of loaded seedlings increased by 34 and 134% on the medium and rich soils, suggesting loaded seedlings may be more efficiently transplanted on more fertile sites. Net retranslocation of N, P, and K increased by 569, 185, and 102%, respectively, by nutrient loading in the nursery, supporting the hypothesis of translocation driven by the magnitude of plant nutrient reserves. However, net N retranslocation diminished with time due to root system expansion that promoted uptake and reduced the needs for N redistribution. Net retranslocation of N (the most limiting nutrient) declined with soil N supply, but that of P and K were relatively independent of soil fertility. Increased N availability in the soil enhanced N accumulation in the plants but lowered N retranslocation. We conclude that higher net retranslocation of N on poor soils is a phenotypic adjustment by P. mariana seedling to maximize N use at low availability
Descriptors:application-rates. nitrogen. nitrogen-fertilizers. nutrient-availability. nutrient-reserves. nutrient-transport. nutrient-

uptake. phosphorus. plant-nutrition. Podzols. potassium. seedling-growth. shoots. soil-amendments. soil-chemical-properties. soil-fertility. Spodosols. translocation
Geographic Locator:Canada. Ontario
Organism Descriptors:Picea-mariana
Supplemental Descriptors:North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada. Picea. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants
Subject Codes:FF060. FF061. JJ200. JJ600. JJ700. KK100
Supplementary Info:68 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

188. Title:Estimation of nitrate leaching in an entisol under optimum citrus production
View Article: Soil Science Society of America Journal. 2001. 65 (3). 914-921
CD Volume:377
Print Article: Pages: 914-921
Author(s):Paramasivam S Alva A K Fares A Sajwan K S
Author Affiliation:Center for Marine, Environmental Sciences and Biotechnology Research, Drew Griffith Hall, Savannah State Univ., Savannah, GA 31404, USA
Language:English
Abstract:Leaching of fertilizer nutrients and widespread NO3-N contamination of drinking water wells in proximity to citrus growing regions of central Florida, USA, are a serious concern. We evaluated NO3-N distribution in soil solution at various depths in the vadose zone, and N leaching below the root zone for two cropping seasons under the canopy of 21-year-old Hamlim orange (Citrus sinensis) trees on Cleopatra mandarin (Citrus reticulata) rootstock, on an Entisol of central Florida. The treatments included 112, 168, 224, and 280 kg N ha-1 year-1 as either dry granular fertilizer (DGF; broadcast, in 4 equal doses) or fertigation (FRT; 15 applications year-1), and 56, 112, and 168 N kg ha-1 year-1 as controlled-release fertilizer (CRF; single application year-1). Irrigation was scheduled using recommended tensiometer set points as guidelines, with a target wetting depth of 90 cm. The NO3-N was measured in soil solutions bi-weekly at 60-, 120-, and 240-cm depths using suction lysimeters installed under the tree canopy. The 240-cm depth sample represented soil solution below the rooting depth of the trees, and the NO3-N at this depth could contaminate groundwater. At the 60- or 120-cm depths, the NO3-N concentrations occasionally peaked at 12 to 100 mg litre-1, but at 240 cm NO3-N concentration mostly remained below 10 mg litre-1. The careful irrigation management, split fertilizer application, and timing of application contributed to the low leaching of NO3-N below the root zone. Calculated NO3-N leaching losses below the rooting depth increased with increasing rate of N application and the amount of water drained, and accounted for 1 to 16% of applied fertilizer N
Descriptors:application-rates. Entisols. fertigation. irrigation. irrigation-scheduling. leaching. losses-from-soil. mandarins. nitrate. nitrate-nitrogen. nitrogen. nitrogen-fertilizers. oranges. pollution-control. rhizosphere. slow-release-fertilizers. soil-fertility. soil-properties. water-pollution
Geographic Locator:Florida. USA
Organism Descriptors:Citrus. Citrus-reticulata. Citrus-sinensis

Supplemental Descriptors:Citrus. Rutaceae. Sapindales. dicotyledons. angiosperms. Spermatophyta. plants. South-Atlantic-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Gulf-States-of-USA. Southeastern-States-of-USA
Subject Codes:FF003. FF060. JJ200. JJ600. JJ700. JJ800. PP600
Supplementary Info:27 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

189. Title:Seasonal nutrient dynamics of forested floodplain soil influenced by microtopography and depth
View Article: Soil Science Society of America Journal. 2001. 65 (3). 922-931
CD Volume:377
Print Article: Pages: 922-931
Author(s):Stoeckel D M Miller Goodman M S
Author Affiliation:Dep. Agronomy and Soils, Auburn Univ., Auburn, AL 36849, USA
Language:English
Abstract:Edaphic and hydrologic influences on floodplain soil nutrient dynamics must be characterized in order to more fully understand ecosystem functions of forested floodplains. The objective of this study was to characterize the impacts of microtopography and depth on soil microbial processes related to nutrient dynamics in a forested floodplain soil. Nutritional and biological parameters were measured seasonally for 2 years at paired plots representing two microtopographic classes (swales dominated by Nyssa aquatica and slopes dominated by Quercus laurifolia) and three soil profile locations - surface organic material, root zone (RZ, 0-0.1 m), and sub-root zone, (0.2-0.3 m) - on the Coosawhatchie River floodplain, South Carolina, USA. N and P concentrations increased relative to C following litterfall, and the relative increase was greater in swales than on slopes. Mineral soil on the Coosawhatchie floodplain was rich in total P compared with other sites. Soil N pools fluctuated together with C, while P was redistributed by floodwater independently of major C and N pools. As a result, P accumulated more in swale soil. C:N ratios in RZ soil were seasonally constant, averaging 14 in swales and 19 on slopes. Carbon:total P ratios were more variable, ranging from 77 to 118 in swales and 151 to 246 on slopes. Microtopographic differences (<1 m) influenced nutrient dynamics, particularly P, of surface organic material and soil in this floodplain
Descriptors:carbon. carbon-nitrogen-ratio. decomposition. floodplains. forest-litter. hydrological-factors. microbial-activities. microorganisms. mineral-soils. nitrogen. nutrient-content. phosphorus. seasonal-variation. soil-chemical-properties. soil-fertility. soil-organic-matter. soil-physical-properties. soil-water-content. topography. wetland-soils. wetlands
Geographic Locator:South-Carolina. USA
Supplemental Descriptors:South-Atlantic-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Southeastern-States-of-USA
Subject Codes:JJ100. JJ200. JJ300. JJ600. KK100. PP320
Supplementary Info:56 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

190. Title:Immobilization of fertilizer nitrogen in rice: effects of straw management practices
View Article: Soil Science Society of America Journal. 2001. 65 (4). 1143-1152
CD Volume:377
Print Article: Pages: 1143-1152
Author(s):Bird J A Horwath W R Eagle A J Kessel C van
Author Variant:van-Kessel-C
Author Affiliation:Dep. of Land, Air and Water Resources, Univ. of California, Davis, CA 95616, USA
Language:English
Abstract:A recent transition in rice straw management, from open-field burning to soil incorporation in combination with winter-fallow flooding, has led to uncertainty in evaluating long-term N fertility. A 2-year field study of 15N-labelled fertilizer and crop residue was initiated in the fourth year of a rice (Oryza sativa) straw management trial to examine the impacts of winter flooding and straw management on N fertilizer immobilization and crop uptake. The site was located at a commercial farm in the northern Sacramento Valley, near Maxwell, California (USA). After six seasons of residue incorporation and winter flooding, no effect on total soil C or N was observed. During the fifth and sixth year of the field study, microbial biomass C and N were greater for straw incorporation than for straw burned. Microbial biomass contained a sizable portion of soil-recovered 15N fertilizer after the first (23%) and second (10%) crop season of the 15N study. The half-life of the 15N in the biomass ranged from 0.55 to 0.87 year. One year after 15N-fertilizer application, greater recovery of 15N in the soil from straw incorporation versus burning (22.2 versus 18.7%) resulted in a slight increase in residual fertilizer N recovery in grain in the second growing season of the 15N study. Increased soil 15N recovery 1 year after fertilizer application in the straw incorporation treatment, however, was offset by higher grain recovery of 15N in the burned treatment during the first growing season. Hence, the net result of these competing soil and plant sinks for fertilizer N led to similar 15N losses after 2 years (50.3 plus or minus 2.2%) under burned and incorporated straw. The cumulative effects of straw incorporation resulted in greater net N mineralization, an increase in microbial biomass N, and greater recovery of 15N in soil 1 year after application. Clearly, an active, labile N pool was formed when straw was incorporated that led to a reduction in fertilizer N dependency for rice
Descriptors:crop-residues. flooding. immobilization. mineralization. nitrogen. nitrogen-fertilizers. nutrient-availability. rice. rice-straw. soil-fertility. soil-organic-matter. straw. straw-burning. straw-incorporation
Geographic Locator:California. USA
Identifiers:microbial biomass
Organism Descriptors:Oryza. Oryza-sativa
Supplemental Descriptors:Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. JJ100. JJ200. JJ600. JJ700. XX200
Supplementary Info:45 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

191. Title:Nitrogen response in cotton as affected by tillage system and irrigation level
View Article: Soil Science Society of America Journal. 2001. 65 (4). 1153-1163
CD Volume:377
Print Article: Pages: 1153-1163
Author(s):Bronson K F Onken A B Keeling J W Booker J D Torbert H A
Author Affiliation:Texas A&M Univ., Texas Agricultural Experiment Station, RR 3, Box 219, Lubbock, TX 79401, USA
Language:English
Abstract:More than 0.5 million ha of irrigated cotton (Gossypium hirsutum) are grown in the Southern High Plains of Texas, USA. Conservation tillage cotton in terminated wheat (Triticum aestivum) has been shown to improve water use efficiency and reduce wind erosion. However, limited N fertilizer response research has been done in this system. The objective of this 3-year field study at Lubbock, Texas was to characterize the response to N fertilizer (0, 28, 56, 84, or 112 kg N ha-1) at varying irrigation levels (0, 25, 50, or 75% Evapotranspiration (ET) replacement) for conventional and conservation tillage cotton in an Acuff loam (fine loamy, mixed, superactive, thermic, Aridic Paleustoll). Additionally, we tested the chlorophyll meter as an indicator of in-season N status of cotton and compared it to petiole NO3-N analysis. Cotton lint yields showed a quadratic response to irrigation level in 1996 and 1997, and a linear response in the drought year of 1998. Maximum lint yield varied from 71 to 97% ET replacement. In 1997 and 1998, cotton lint yields responded to N at the 50 and 75% estimated ET replacement irrigation levels, but not at the 0 or 25% ET levels. Quadratic-plateau models indicated that 19 to 38 kg N additional fertilizer ha-1 was needed to produce economically optimum lint yields near 1100 kg N ha-1 with conservation tillage than with conventional tillage. Chlorophyll meter and petiole NO3-N readings were positively related to N rate but were not affected by tillage system
Descriptors:application-rates. Aridisols. chemical-composition. chlorophyll. conservation-tillage. evapotranspiration. irrigation. lint. Mollisols. nitrate-nitrogen. nitrogen. nitrogen-fertilizers. plant-composition. plant-nutrition. plant-water-relations. soil-fertility. soil-types. tillage. water-use-efficiency. wheat. wind-erosion. yields
Geographic Locator:Texas. USA
Organism Descriptors:Gossypium-hirsutum. Triticum. Triticum-aestivum
Supplemental Descriptors:Gossypium. Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF062. JJ600. JJ700. JJ800. JJ900. FF061
Supplementary Info:28 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

192. Title:Nitrogen-15 recovery in soil incubated with potassium nitrate and clover residues
View Article: Soil Science Society of America Journal. 2001. 65 (5). 1430-1436
CD Volume:377
Print Article: Pages: 1430-1436
Author(s):Muriuki A W King L D Volk R J

Author Affiliation:Kenya Agricultural Research Inst., P.O. Box 57811, Nairobi, Kenya
Language:English
Abstract:In the southeastern USA, legumes are used as green manure to meet crop N requirements of a following crop, but recovery is usually lower than from conventional fertilizers. We conducted a laboratory study for 26 weeks under aerobic conditions to monitor recovery of 15N-labelled KNO3 (fertilizer) and crimson clover (Trifolium incarnatum) residues (clover) in organic, inorganic, and microbial biomass N pools. Volatilization of NH3 from decomposing clover residues was monitored for 12 weeks. Three hundred-gram samples of a Typic Kanhapludult soil (sandy clay loam) were amended with N (0.051 mg N kg-1 dry soil in fertilizer and 0.049 mg N kg-1 dry soil in clover). A control with no N was also included. Although inorganic N (NH4, NO2, and NO3) accumulated throughout (fertilizer > clover > control), the rate of accumulation did not differ among treatments. Organic and microbial biomass N concentration did not differ among treatments, but applied N recovery in microbial biomass was greater in clover than fertilizer (P<0.05) throughout. Ammonia volatilized was negligible. After 26 weeks, applied N recovered in soil inorganic N was 66% for fertilizer and 40% for clover; in soil organic N, 18% for fertilizer and 50% for clover; and in microbial biomass N, 0.75% for fertilizer and 1.5% for clover. Applied N presumed denitrified was 16% in fertilizer and 10% in clover. We concluded that clover green manure can meet the N requirements of a following crop from the time of emergence in the southeastern USA
Descriptors:ammonia. clay-soils. clovers. crop-residues. denitrification. green-manures. nitrogen. potassium-nitrate. sandy-soils. soil-fertility. soil-types. Ultisols
Geographic Locator:Southeastern-States-of-USA. USA
Identifiers:inorganic nitrogen. microbial biomass
Organism Descriptors:Trifolium-incarnatum
Supplemental Descriptors:Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. JJ100. JJ700. XX200
Supplementary Info:many ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

193. Title:Enhancing the mineralizable nitrogen pool through substrate diversity in long term cropping systems
View Article: Soil Science Society of America Journal. 2001. 65 (5). 1442-1447
CD Volume:377
Print Article: Pages: 1442-1447
Author(s):Sanchez J E Willson T C Kizilkaya K Parker E Harwood R R
Author Affiliation:Dep. of Crop and Soil Sciences, Michigan State University, East Lansing, MI 48824, USA
Language:English
Abstract:The development of sustainable N management systems requires a better understanding of the contribution of on-farm resources to the active N pool size and its mineralization. This study explores the effect of substrate diversity on improving N supply through mineralization. A 'diverse system', consisting of a maize (Zea mays)-maize-soyabean (Glycine max)-wheat (Triticum aestivum) rotation with cover crops and fertilized with composted manure and was compared with a maize monoculture with conventional fertilizers. Nitrogen mineralization

was measured in situ and in laboratory incubations as well as the ability of each soil to mineralize added compost and red clover (Trifolium pratense) residue in the 6th and 7th year of rotation. Net mineralized N in the diverse system was 90 and 40% higher than that in the monoculture at 70 and 150 days of laboratory incubation respectively. Comparable response was found in situ where a 70% higher net mineralization was observe in the diverse system at 70 days. The 70- and 150-days mineralizable N pools increased over time, but the ability of soil organisms to break down additional substrate did not change as a result of system diversity. At 150 days of laboratory incubation, a synergistic effect was observed when 5 t ha-1 of compost plus 5 t ha-1 of clover was added to either soil. The combination of the two organic material mineralized more N than the sum of their individual mineralization results. A more diverse cropping system may increase the soil's capacity to supply N to a growing crop while maintaining desirable levels of soil organic matter. This is essential for the overall long-term productivity and sustainability of agricultural systems

Descriptors:composts. cover-crops. cropping-systems. diversity. maize. mineralization. nitrogen. rotations. soil-fertility. soyabeans. wheat

Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Trifolium-pratense. Triticum. Triticum-aestivum. Zea-mays

Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Trifolium. Triticum. Poaceae. Cyperales. monocotyledons. Zea

Subject Codes:FF005. FF150. JJ100. JJ600. JJ700

Supplementary Info:37 ref

ISSN:0361-5995

Year:2001

Journal Title:Soil Science Society of America Journal

194. Title:Evaluating soil quality - soil redistribution relationship on terraces and steep hillslope

View Article: Soil Science Society of America Journal. 2001. 65 (5). 1500-1508

CD Volume:377

Print Article: Pages: 1500-1508

Author(s):Li Y Lindstrom M J

Author Affiliation:Institute of Mountain Hazards and Environment, CAS, Chengdu, Sichuan 610041, China

Language:English

Abstract:Soil redistribution from tillage and water erosion have the potential to modify the spatial patterns of soil quality on terraced and steep cultivated hillslopes. However, few studies have investigated this relationship. Our objectives were to quantify soil quality parameters along terraced and steep hillslopes and determine the relationship between soil redistribution from tillage erosion and water erosion on soil quality parameters in the Chinese Loess Plateau, Shaanxi, China. Soil quality indicators, i.e., soil organic matter (OM), available P, N, bulk density (Db), and clay and silt contents were measured at 5-m intervals on a terraced field and at 10-m intervals on a steep cultivated hillslope in a down slope transect. Soil redistribution rates from tillage and overland flow were obtained by 137Cs technique integrated with a tillage erosion prediction model. Water erosion was the primary cause for the overall decline in soil quality on the steep cultivated hillslope while tillage erosion had a comparable contribution to overall level in soil quality on the terraced hillslope. Soil movement by tillage controlled the spatial patterns

in OM, N, and P on both terraced and steep cultivated hillslopes. Selective removal of finer particles by water erosion caused a linear decrease in clay content of 0.02% m-1 and corresponding increase in silt content of 0.04% m-1 downslope on the steep cultivated hillslope. The impact of tillage erosion on OM, N, and P on the steep cultivated hillslope can be assessed using the change in adjacent slope gradients (X) through a soil quality-topography regression model, Y=aX+b
Descriptors:bulk-density. clay-fraction. distribution. hill-land. nitrogen. phosphorus. silt-fraction. soil. soil-organic-matter. terraces. tillage. water-erosion. soil-fertility
Geographic Locator:China. Shaanxi
Identifiers:soil quality
Supplemental Descriptors:East-Asia. Asia. Developing-Countries. North-Western-China. China
Subject Codes:PP400. JJ600. JJ200. JJ300. JJ900
Supplementary Info:35 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

195. Title:Map quality for site-specific fertility management
View Article: Soil Science Society of America Journal. 2001. 65 (5). 1547-1558
CD Volume:377
Print Article: Pages: 1547-1558
Author(s):Mueller T G Pierce F J Schabenberger O Warncke D D
Author Affiliation:Dep. of Agronomy, Univ. of Kentucky N-122 Ag. Science North, Lexington, KY 40546-0091, USA
Language:English
Abstract:The quality of soil fertility maps affects the efficacy of site-specific soil fertility management. The purpose of this study was to evaluate how different soil sampling approaches and grid interpolation schemes affect map quality. A field in south central Michigan, USA was soil sampled using several strategies including grid-point (30- and 100-m regular grids), grid cell (100-m cells), and a simulated soil map unit sampling. Soil fertility (pH, P, K, Ca, Mg, and cation-exchange capacity) data were predicted using ordinary kriging, inverse distance weighted (IDW), and nearest neighbour interpolations for the various data sets. Each resulting map was validated against an independent data (n=62) set to evaluate map quality. While soil properties were spatially structured, kriging predictions were marginal (prediction efficiencies less than or equal to 48%) at high sample densities and poor at lower densities (i.e., 61- and 100-m grids; prediction efficiencies <21%). The average optimal distance exponent at each scale of measurements was 1.5. The performance of kriging relative to IDW methods (with a distance exponent of 1.5) improved with increasing sampling intensity (i.e., IDW was superior to kriging for 100% of cases with the 100-m grid, 79% of the cases with the 61.5-m grid scale, and 67% of the cases with the 30-m grid). Practically, there was little difference between these interpolation methods. Grid sampling with a 100-m grid cell sampling, and simulated soil map unit sampling yielded similar prediction efficiencies to those of the field average approach, all of which were generally poor
Descriptors:kriging. mapping. soil-fertility. soil-management
Geographic Locator:Michigan. USA
Identifiers:soil maps

Supplemental Descriptors:East-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Lake-States-of-USA
Subject Codes:JJ500. JJ600. ZZ100
Supplementary Info:41 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

196. Title:Freezing effects on carbon and nitrogen cycling in northern hardwood forest soils
View Article: Soil Science Society of America Journal. 2001. 65 (6). 1723-1730
CD Volume:377
Print Article: Pages: 1723-1730
Author(s):Neilsen C B Groffman P M Hamburg S P Driscoll C T Fahey T J Hardy J P
Author Affiliation:Center for Environmental Studies, Brown Univ., Providence, RI 02912, USA
Language:English
Abstract:We evaluated the effects of freeze-thaw events on soil respiration, nitrogen mineralization, nitrification, and nitrous oxide production in soils from a northern hardwood (Fagus grandifolia)-dominated forest in New Hampshire, USA. Soil samples from three horizons (Oe, Oa, A) from nearly mono-specific stands of sugar maple (Acer saccharum) and yellow birch (Betula alleghaniensis) were placed in 200-mL incubation vessels (microlysimeters), subjected to severe (-13 deg C) and mild (-3 deg C) freeze treatments for 10 days, and then incubated at laboratory temperature (20-25 deg C) for 3 weeks. Evolution of CO2 and N2O and concentrations of leachable NH4+ and NO3- were measured at weekly intervals. Freezing increased rates of C and N cycling in these soils, but the effects varied with species, horizon, and freeze treatment. Whereas severe freezing stimulated respiration, N2O flux, and mineralization, mild freezing had very few effects. Nitrification did not appear to be affected by either freeze treatment, but increases in denitrification may have masked freeze effects on this process. Freeze effects were much more marked in maple than in birch soils and in the Oa and A horizons. Maple consistently had higher rates of nitrification and N2O production than did birch. The species and horizon differences were likely driven by higher levels of available C in the birch soils and Oe horizon at both sites. These results suggest that changes in climate and snow cover that influence soil freezing could increase N and C losses from northern hardwood forest ecosystems with potential effects on soil fertility and carbon storage, receiving water quality, and atmospheric chemistry
Descriptors:ammonium. atmosphere. biological-activity-in-soil. carbon. carbon-dioxide. carbon-sequestration. cycling. deciduous-forests. forest-soils. forests. freezing. horizons. mineralization. nitrate. nitrification. nitrogen. nitrogen-oxides. nitrous-oxide. soil-fertility. soil-types. thawing. water-quality
Geographic Locator:New-Hampshire. USA
Organism Descriptors:Acer-saccharum. Betula-alleghaniensis. Fagus-grandifolia
Supplemental Descriptors:Acer. Aceraceae. Sapindales. dicotyledons. angiosperms. Spermatophyta. plants. Betula. Betulaceae. Fagales. Fagus. Fagaceae. New-England-States-of-USA. Northeastern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:JJ100. JJ200. JJ600. KK100. PP200. PP500
Supplementary Info:44 ref
ISSN:0361-5995

Year:2001
Journal Title:Soil Science Society of America Journal
Copyright:Copyright CAB International

197. Title:Grain yield response and Chilo partellus infestation in diverse sorghum-cowpea intercrop arrangements
View Article: South African Journal of Plant and Soil. 2001. 18 (1). 39-42
CD Volume:340
Print Article: Pages: 39-42
Author(s):Ayisi K K Mposi M S Berg J van den
Author Variant:van-den-Berg-J
Author Affiliation:Department of Plant Production, University of the North, Private Bag X1106, Sovenga 0727, South Africa
Language:English
Abstract:Yield improvement and insect pest control in intercropping systems relative to sole cultures has been variable and inconsistent over habitats, component species, varieties, density, row arrangement, soil fertility and moisture. This study was initiated to quantify yield response of two sorghum cultivars Macia and SV-2 and a cowpea cultivar, PAN311, to different crop arrangements and to assess the level of Chilo partellus infestation in sorghum in the intercropping system. Superior intercropped sorghum yield was obtained when component crops were arranged in alternate rows at a 0.90 m spacing whereas cowpea yields were similar to or lower than sole crop yield in the different component crop arrangements. The overall land use efficiency, assessed by the land equivalent ratio, was improved by an average of 11% with intercropping at a row spacing of 0.90 m. However, no yield benefit was observed when crops were arranged in an alternate row pattern at a narrow row spacing of 0.45 m. Intercropping reduced C. partellus infestation in mixed and alternate intercropping systems, relative to the sole cultures
Descriptors:cowpeas. crop-yield. cultural-control. insect-control. insect-pests. intercropping. pest-control. plant-pests. row-spacing
Organism Descriptors:Chilo-partellus. insects. Sorghum. Vigna-unguiculata
Supplemental Descriptors:Chilo. Pyralidae. Lepidoptera. insects. arthropods. invertebrates. animals. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Vigna. Papilionoideae. Fabaceae. Fabales. dicotyledons
Subject Codes:FF005. FF100. FF150. FF620. HH200
Supplementary Info:9 ref
ISSN:0257-1862
Year:2001
Journal Title:South African Journal of Plant and Soil
Copyright:Copyright CAB International

198. Title:Clay-substrate application to sandy open-cast mine soils
View Article: South African Journal of Plant and Soil. 2001. 18 (2). 80-84
CD Volume:340
Print Article: Pages: 80-84
Author(s):Reuter G
Author Affiliation:Department of Soil Science and Plant Nutrition, University of Rostock, D-18051 Rostock, Germany
Language:English
Abstract:The review gives some insight into the objective of amelioration to improve fertility of sandy soils. The research concept is based on the high water and cation exchange capacity of clay minerals. Technological and economic problems as well as practicable possibilities of their solution are discussed. Numerous pot and plot vegetation experiments resulted in an average yield increase of 15%

and show the effectiveness of clay-substrate application. The amelioration procedure is particularly recommended on open-cast mine sites, where ecological aspects have to be observed
Descriptors:application-to-land. cation-exchange-capacity. clay. clay-minerals. mined-land. reviews. sandy-soils. soil-fertility. soil-types
Identifiers:soil amelioration
Subject Codes:JJ200. JJ700
Supplementary Info:21 ref
ISSN:0257-1862
Year:2001
Journal Title:South African Journal of Plant and Soil

199. Title:Comparisons of uniform and variable rate nitrogen and phosphorus fertilizer applications for grain sorghum
View Article: Transactions of the ASAE. 2001. 44 (2). 201-209
CD Volume:370
Print Article: Pages: 201-209
Author(s):Yang C Everitt J H Bradford J M
Author Affiliation:USDA-ARS, Kika de la Garza Subtropical Agricultural Research Center, 2413 E. Highway 83, Weslaco, TX 78596, USA
Language:English
Abstract:Variable rate fertilizer application has the potential to improve fertilizer use efficiency, increase economic returns, and reduce environmental impacts. This study was designed to examine differences in yield and economic returns between uniform and variable rate fertilizer applications. During the 1997 and 1998 growing seasons, a variable rate applicator, capable of varying two liquid fertilizers simultaneously, was used to evaluate three fertility strategies: conventional uniform N, uniform N and P, and variable rate N and P. The three treatments were assigned in six blocks within three 14-ha grain sorghum fields (two blocks in each field) in a randomized complete block design. Thirty-six soil samples were taken in a staggered systematic grid from each field, and levels of soil nutrients were determined. Application rate maps for the variable rate N and P treatment were generated based on a fixed yield goal and site-specific soil N and P levels across the experimental plots, while application rates for the uniform N and P treatment were calculated from the same yield goal and average soil N and P levels for all three fields. Yield monitor data indicated that the variable rate treatment resulted in significantly higher yields than the uniform N and P treatment for both years (400 kg/ha higher in 1997 and 338 kg/ha higher in 1998). Moreover, coefficients of variation of yield monitor data for the variable rate treatment had positive relative economic returns over the uniform N and P treatment ($27/ha in 1997 and $23/ha in 1998). However, if additional costs for soil sampling, equipment, and data analysis associated with variable rate application were considered, these returns would be much lower or even negative. These results showed that variable rate fertilizer application can increase yield, reduce yield variability, and improve economic returns. More experiments are needed to evaluate the long-term agronomic, economic, and environmental viability of variable rate technology in the Rio Grande Valley of south Texas, USA
Descriptors:application-rates. crop-yield. fertilizers. precision-agriculture. profitability. returns. use-efficiency
Organism Descriptors:Sorghum
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:EE110. FF005. FF100. JJ700

Supplementary Info:12 ref
ISSN:0001-2351
Year:2001
Journal Title:Transactions of the ASAE
Copyright:Copyright CAB International

200. Title:A neural network for setting target corn yields
View Article: Transactions of the ASAE. 2001. 44 (3). 705-713
CD Volume:370
Print Article: Pages: 705-713
Author(s):Liu J Goering C E Tian L
Author Affiliation:Agricultural Engineering Department, University of Illinois, 1304 W Pennsylvania Ave., Urbana, IL 61801, USA
Language:English
Abstract:Setting a realistic yield goal in each part of the field is one of the critical problems in precision agriculture. Factors affecting crop yields, such as soil, weather, and management, are so complex that traditional statistics cannot give accurate results. As an automatic learning tool, the artificial neural network (ANN) is an attractive alternative for processing the massive data set generated by precision farming production and research. A feed-forward, completely connected, back-propagation ANN was designed to approximate the nonlinear yield function relating maize yield to factors influencing yield. By stratified sampling based on rainfall, some of the data were excluded from the training set and used to verify the yield prediction accuracy of the ANN. The RMS error for 60 verification patterns was approximately 20%. After the ANN was developed and trained, three aspects of the input factors were investigated: (1) yield trends with 4 input factors, (2) interaction between nitrogen application rate and late July rainfall, and (3) optimization of the 15 input factors with a genetic algorithm to determine maximum yield. The model was then used on another field, and preliminary results of the latter study are given
Descriptors:automation. crop-yield. maize. neural-networks. nitrogen-fertilizers. precision-agriculture. soil-fertility
Identifiers:application rate
Organism Descriptors:Zea-mays
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF100. NN050. JJ700. JJ600
Supplementary Info:17 ref
ISSN:0001-2351
Year:2001
Journal Title:Transactions of the ASAE
Copyright:Copyright CAB International

201. Title:Effect of cutting on yield and quality of Paspalum atratum in Thailand
View Article: Tropical Grasslands. 2001. 35 (3). 144-150
CD Volume:342
Print Article: Pages: 144-150
Author(s):Hare M D Saengkham M Kaewkunya C Tudsri S Suriyajantratong W Thummasaeng K Wongpichet K
Author Affiliation:Faculty of Agriculture, Ubon Ratchathani University, Warin Chamrab, Ubon Ratchathani 34190, Thailand
Language:English
Abstract:Two trials were conducted to determine the effect of varying cutting height and interval on growth and forage quality of Ubon paspalum (Paspalum atratum) pastures grown in Thailand on low fertility soils

(sandy low humic gley soil mixed with a grey podzolic soil). In Trial 1 (from 9 May 1998 to 6 September 1998), an increase in cutting height (from 0 to 20 cm aboveground level) increased total dry matter (DM) yield at 20-day cutting intervals, had no effect at 30 days and decreased yields at 60-day cutting intervals. Cutting interval significantly increased DM yields in Trial 1 with the major response between 30- and 60-day intervals. Increasing the interval between harvests reduced concentrations of CP [crude protein], K and P but increased the concentrations of NDF [neutral detergent fibre] and ADF [acid detergent fivre]. In Trial 1, increases in cutting interval and cutting height increased stubble and root DM per plant. In Trial 2 (from 16 April 1999 to 13 December 1999), Ubon paspalum DM yields generally were significantly different only between 20- and 60-day cutting intervals. Cutting every 20 days over a 240-day period produced 74% (21.6 t/ha) of the total DM yield from cutting every 60 days (28.9 t/ha) but CP concentration was nearly twice as high (10.0 vs 5.3%). The cutting interval to be chosen by farmers is discussed in terms of the combination of yield and quality desired to produce different animal products

Descriptors:crop-quality. crop-yield. crude-protein. cutting. cutting-date. cutting-height. fibre-content. gley-soils. growth. nutrient-content. phosphorus. podzolic-soils. potassium. protein-content. roots. soil-types. stubble

Geographic Locator:Thailand

Identifiers:Paspalum atratum

Organism Descriptors:Paspalum

Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Paspalum. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries

Subject Codes:FF007. FF100. RR300

Supplementary Info:14 ref

ISSN:0049-4763

Year:2001

Journal Title:Tropical Grasslands

202. Title:30 years of N fertilisation in a forest ecosystem: The fate of added N and effects on N fluxes

View Article: Water Air and Soil Pollution. 130 (1-4 Part 2). August.-September, 2001. 637-642

CD Volume:374

Print Article: Pages: 637-642

Author(s):Andersson Pal Berggren Dan Johnsson Lars

Author Affiliation:Swedish University of Agricultural Sciences, 750 07, Uppsala: pal.andersson@mv.slu.se

Language:English

Language of Summary:English (EN)

Abstract:We investigated the fate of added N and its effect on N fluxes in a long-term nitrogen fertilisation experiment. Ammonium nitrate was added annually (30 years) at mean rates of 0 (N0), 35 (N1), 73 (N2) and 108 (N3) kg N ha-1 yr-1 to a spruce forest in Sweden, which initially showed signs of N deficiency. Net N mineralisation and N leaching were measured in situ together with soil N pools. We used the PnET-CN model to model the maximum sustainable net N mineralisation rate. The short-term fate of added N was studied by addition of 15NH4Cl. In N1 and N2 most of the added N (80-120%) was retained in the system, compared to 45% in N3. A major fraction was retained in the organic horizons (58-79%). The internal N fluxes had increased considerably as a result of the N additions. Net N

mineralisation in N1 had increased by a factor 10 and litterfall N flux by a factor 4. The PnET-CN model could not mimic the fast changes in tree growth and N mineralisation, but the maximum N mineralisation rate seems realistic. The ratio of actual to maximum mineralisation rate indicates that the N1 treatment now is close to N saturation, and nitrate was occasionally found in soil solution from the B-horizon in N1. The N retained was probably to a great extent immobilised directly by mycorrhizal fungi, as indicated by the high amounts of 15N found in the L and F layers and by the great fraction of 15N found in amino sugars compared to amino acids

Descriptors:30 year period; PnET-Cn model; forest ecosystem; soil fertility; spruce forest. Forestry; Nutrition; Pollution Assessment Control and Management. ammonium chloride: fertilizer; ammonium nitrate: fertilizer; nitrate; nitrogen: fate, fertilizer, flux, leaching, mineralization, pollution potential

Geographic Locator:Sweden (Europe, Palearctic region)

Organism Descriptors:mycorrhizal fungi (Fungi): symbiont

Supplemental Descriptors:Fungi: Plantae. Fungi; Microorganisms; Nonvascular Plants; Plants

Subject Codes:Forestry; Nutrition; Pollution Assessment Control and Management

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203. Title:The fertility of wheat x jointed goatgrass hybrid and its backcross progenies

View Article: Weed Science. 2001. 49 (3). 340-345
CD Volume:374
Print Article: Pages: 340-345

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Language:English

Abstract:The spontaneous flow of genes from wheat to jointed goatgrass (Aegilops cylindrica) is of great concern to breeders intending to release herbicide-resistant wheat. The objectives of this research were to study how genes could flow from wheat (cv. Madsen) to jointed goatgrass through crossing and backcrossing between these two species and, based on this knowledge, to propose possible ways to minimize the chance of gene flow between them. Results showed that the wheat x jointed goatgrass hybrid can only serve as a female parent to produce the BC1 generation. The BC1 generation was found to have 1.8% male fertility and 4.4% female fertility, indicating that it could serve as either the male or female parent to produce a BC2 generation. The fertility of the resultant BC2 generation further increased. The average male, female and self-fertility was 8.9, 18.0, and 6.9%, respectively. After the BC2 generation, the backcross progeny has three possible ways to reproduce: to pollinate jointed goatgrass, to be pollinated by jointed goatgrass or to pollinate itself. The restoration of the chromosome number of jointed goatgrass continues as the BC2 generation is selfed, but some plants can contain an alien chromosome over generations. Possible ways to reduce the chance of gene flow between these two species are to: (1) prevent the production of hybrids, (2) prevent the production of the BC1 generation, and (3) put a herbicide-resistant gene on the A- or B-genome of wheat

Descriptors:backcrosses. female-fertility. gene-flow. hybrids. introgression. male-fertility. weeds. wheat

Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF020. FF500
Supplementary Info:19 ref
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204. Title:Using soil parameters to predict weed infestations in soybean
View Article: Weed Science. 2001. 49 (3). 367-374
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Print Article: Pages: 367-374
Author(s):Medlin C R Shaw D R Cox M S Gerard P D Abshire M J Wardlaw M C III
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Language:English
Abstract:An understanding of environmental factors governing patchy weed distribution in fields could prove to be a valuable tool in weed management. The objectives of this research conducted during 1997-98 were to investigate the relationships between weed distribution patterns and environmental properties in two Mississippi, USA soyabean (Glycine max) fields and to construct models based on those relationships to predict weed distribution. Two months before planting, fields were soil sampled on a 60- by 60-m coordinate grid, and samples were analysed for calcium, magnesium, potassium, sodium, phosphorus, zinc, cation exchange capacity, percent organic matter and soil pH. The relative elevation of each sample location was also recorded. Approximately 8 weeks after planting, weed populations were estimated on a 30- by 30-m grid over the soil sample grid. Punctual kriging was used to estimate environmental values at each weed sample location. Discriminant analysis techniques were used to evaluate the associations between environmental characteristics on weed population densities of sample areas within each field. Generally, as sicklepod (Senna obtusifolia) and pitted morning glory (Ipomoea lacunosa) infestations increased, the prediction accuracy of the discriminant functions also increased; however, horsenettle (Solanum carolinense) infestations were not closely correlated to the environmental properties. Discriminant functions reasonably predicted the presence or absence of sicklepod and pitted morningglory within the field. However, the validation of functions across years within the same field and with data collected from the other fields resulted in poor classification of all species infestations. The prediction of weed infestations with environmental properties was specific for each field, year and species
Descriptors:calcium. cation-exchange-capacity. magnesium. phosphorus. population-distribution. potassium. sodium. soil-fertility. soil-organic-matter. soil-pH. soil-properties. soyabeans. weeds. zinc
Geographic Locator:Mississippi. USA
Identifiers:Senna obtusifolia
Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Ipomoea-lacunosa. Solanum-carolinense
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Ipomoea. Convolvulaceae. Solanales. East-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Delta-States-of-USA. Gulf-States-of-USA. Senna. Solanum. Solanaceae

Subject Codes:FF100. FF500. JJ200. ZZ331. FF005
Supplementary Info:19 ref
ISSN:0043-1745
Year:2001
Journal Title:Weed Science

205. Title:Evolving Tenure Rights and Agricultural Intensification in Southwestern Burkina Faso
View Article: World Development. 29 (4) 2001. 573-87
CD Volume:376
Print Article: Pages: 573-587
Author(s):Gray L C Kevane M
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Language:English
Abstract:Popular and official representations of the environment in Burkina Faso present soils as fragile and potentially subject to catastrophic collapses in fertility. In the cotton-growing zone of southwestern Burkina Faso, researchers and policy-makers attribute changes in land cover and land quality to population growth. This paper presents evidence questioning the dominant population-degradation narrative" as applied to Burkina. We find that farmers are intensifying their production systems. While population has led to land scarcity, farmers are responding to both the resulting uncertainty in land rights and reductions in soil quality by intensifying the production process. Investments are used both as a soil-building and a tenure-building strategy. Instead of producing an optimistic intensification counternarrative, we contend that intensification is a process with social costs. A more complex intensification narrative should encompass elements of changing asset distribution, expropriation, and conflict in the process whereby individuals and social groups vie for land rights and invest in intensified production processes
Descriptors:Economic Development: Agriculture; Natural Resources; Environment; Other Primary Products. Land Ownership and Tenure; Land Reform; Land Use; Irrigation. Renewable Resources and Conservation; Environmental Management: Land; Waste Disposal and Recycling
Geographic Locator:Burkina-Faso
Subject Codes:EE450. EE110. EE160. PP300
ISSN:0305-750X
Year:2001
Journal Title:World Development