1. Title:Tree legumes in medium-term fallows: Nitrogen fixation, nitrate recovery and effects on subsequent crops
View Article: African Crop Science Journal. 2000. 8 (3). 263-272
CD Volume:297
Print Article: Pages: 263-272
Author(s):Wortmann C Kaizzi C
Author Affiliation:Department of Agronomy and Horticulture, University of Nebraska-Lincoln, 279 Plant Science, NE 68583, USA
Language:English
Language of Summary:English. French
Abstract:Fallows improved with tree legumes have a potential role in soil fertility management in the sub-humid tropics. In addition to N2 fixation, deep rooting species can be used to redistribute leached nutrients to the topsoil while producing useful woody by-products. Such fallows are not very effective in improving phosphorus availability, however, and supplying P from other sources may be required to take full advantage of the improved fallows. Busumbu rock P is a potential source of P, but of low reactivity. Our objectives were to compare three tree or shrub legumes with Mucuna [Mucuna pruriens (L.) DC. var. utils], to determine their rotation effects on subsequent crops and on P availability from Busumbu P rock. Legume effects on the fixation of atmospheric N and nitrate recovery were determined in a sub-humid, bi-modal rainfall system. Fallows improved with sesbania (Sesbania sesban) and tephrosia (Tephrosia vogellii) produced more biomass and fixed more N than those fallows improved with pigeonpea (Cajanus cajan) or mucuna. Pigeonpea derived only about 11% of plant N from the atmosphere compared to 49% for sesbania and tephrosia. The maize-bean [Zea mays(L.)]- Phaseolus vulgaris(L.)] intercrop was most productive following sesbania and tephrosia fallow and least productive after the fallow improved with pigeonpea. All legumes and food crops failed to acquire significant amounts of P from the P rock. Sesbania and tephrosia were most efficient in recovery of nitrates from below 50 cm depth. The carbon:N ratios were low enough for the biomass of all fallows to allow early mineralisation of N, but the C:P ratios were within the critical level range for a net immobilisation of P following application. Generally, recovery by the subsequent maize-bean intercrops of N supplied in the biomass of tephrosia and sesbania was poor and the results indicate that much of the biomass N was lost. Recovery of N may be improved by transfer of a major part of the legume biomass to manure adjacent land which was continuously cropped
Organism Descriptors:Mucuna-pruriens. Sesbania-sesban. Tephrosia-vogellii. Cajanus-cajan. Zea-mays. Phaseolus-vulgaris
ISSN:1021-9730
Year:2000
Journal Title:African Crop Science Journal

2. Title:Effect of nitrogen fertiliser rates and plant density on grain yield of maize
View Article: African Crop Science Journal. 2000. 8 (3). 273-282
CD Volume:297
Print Article: Pages: 273-282
Author(s):Workayehu T
Author Affiliation:Awassa Research Centre, P.O. Box 366, Awassa, Ethiopia
Language:English
Language of Summary:English. French
Abstract:Low soil fertility has constrained maize production in Sidama district in the Southern region of Ethiopia. The effects of four levels of nitrogen fertiliser (0, 46, 92, 138 kg N ha-1) and four plant

populations (44000, 53000, 67000 and 89000 plants ha-1) on grain yield of maize were evaluated over four years (1995-98) at Awassa Research Centre. The experiment was laid out in a randomised complete block design arranged as a complete factorial with three replicates. Effect of N application was dependent on seasonal distribution of precipitation (P<0.01). The mean yields from N fertilised, under favourable and unfavourable rainfall, were 7802 and 5931 kg ha-1, respectively. N fertiliser had a very large effect under erratic rainfall and accounted for 81% of the variations in yield. Both the linear and quadratic responses to N were significant. Fertiliser use efficiency was more for the 46 kg N ha-1. Generally, increased application of N fertiliser resulted in higher yields and accounted for 83% of the variation. Response to higher plant density was significantly higher when moisture was favourable

Geographic Locator:Ethiopia
Organism Descriptors:Zea-mays
ISSN:1021-9730
Year:2000
Journal Title:African Crop Science Journal

3. Title:Integrated nutrient management strategies for soil fertility improvement and Striga control in northern Ethiopia
View Article: African Crop Science Journal. 2000. 8 (4). 403-410
CD Volume:297
Print Article: Pages: 403-410
Author(s):Esilaba A Reda F Ransom J Bayu W Woldewahid G Zemichael B
Author Affiliation:NARC-Mugaga,Kenya Agricultural Research Institute, P.O. Box 30148, Nairobi, Kenya
Language:English
Language of Summary:English. French
Abstract:Experiments were conducted near Siranka and Mekele in the highlands of northern Ethiopia during 1996 and 1997 to determine effects of integrated nutrient management practices on Striga density and yields of maize (Zea mays) and sorghum (Sorghum bicolor) in farmers fields and on-station. Field trials consisted of a factorial combination of four levels of inorganic fertiliser N (0,40,80 and 120 kg N ha-1 from Urea) and four rates of farmyard manure (0,10,20 and 30 t ha-1). Striga emergence was minimised with the application of 120 kg N ha-1. The combined application of 40 kg N ha-1 and 30 t ha-1 manure also significantly reduced Striga emergence. The combined application of manure and N (40 kg N ha-1 and 30 t ha-1 for sorghum and 80 kg N ha-1 and 30 t ha-1 manure for maize) increased crop yields at Sirinka during the second season. Thus, improving the N status of the soil help suppress Striga. However, long-term studies are required to quantify these beneficial effects of N on Striga density

Geographic Locator:Ethiopia
Organism Descriptors:Striga. Zea-mays
Supplemental Descriptors:East-Africa. Africa-South-of-Sahara. Africa
ISSN:1021-9730
Year:2000
Journal Title:African Crop Science Journal

4. Title:Four ways to feed your crops
View Article: African Farming and Food Processing. 2000. (July/August). 29-30
CD Volume:317
Print Article: Pages: 29-30
Author(s):Mabbett T
Language:English

Abstract:Soil is the source of plant nutrients but these can become severely depleted by intensive agriculture. Dr. Terry Mabbett explains what fertilisers might be needed and how these should be applied
Descriptors:crops. soil. plant-nutrition. soil-fertility. nutrients. fertilizers. soil-degredation
ISSN:0266-8017
Year:2000
Journal Title:African Farming and Food Processing

5. Title:The external costs of pasture weed spread: an economic assessment of serrated tussock control
View Article: Agricultural Economics. 2000. 22 (1). 91-103
CD Volume:332
Print Article: Pages: 91-103
Author(s):Jones R E Vere D T Campbell M H
Author Affiliation:Co-operative Research Centre for Weed Management Systems and NSW Agriculture, Orange Agricultural Institute, Forest Road, Orange, New South Wales 2800, Australia
Language:English
Abstract:The external cost associated with the spread of pasture weeds such as serrated tussock (Nassella trichotoma) is an important economic problem. This problem is complicated in many parts of south-eastern Australia where low rainfall and low soil fertility prevent the economic viability of control of this weed through pasture improvement. A consequence of serrated tussock spread in this region has been calls for increased public intervention in its control. However, because there have been no attempts to measure the external costs of serrated tussock spread, one of the major economic grounds on which this activity might be justified has not been quantified. The purpose of this paper is to provide this information. A stochastic simulation model is developed to determine the size of the external cost associated with the spread of serrated tussock and to evaluate the economic benefits of a range of control scenarios. It is concluded that on low rainfall-low soil fertility country the socially optimal control option for serrated tussock is to retire land from agriculture and re-vegetate it with trees
Descriptors:weeds. weed-control. models. stochastic-models. assessment. simulation-models. costs. soil-fertility. pastures. land-management. economics. fodder-plants
Geographic Locator:Australia
Organism Descriptors:Nassella-trichotoma
Supplemental Descriptors:Nassella. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:FF500. FF100. EE110. EE145. ZZ100
Supplementary Info:21 ref
ISSN:0169-5150
Year:2000
Journal Title:Agricultural Economics

6. Title:GIS-based fuzzy membership model for crop-land suitability analysis
View Article: Agricultural Systems. 2000. 63 (2). 75-95
CD Volume:325
Print Article: Pages: 75-95
Author(s):Ahamed T R N Rao K G Murthy J S R
Author Affiliation:Department of Civil Engineering, Indian Institute of Technology, Powai, Mumbai 400 076, India
Language:English

Abstract:Crop-land suitability analysis is a prerequisite to achieve optimum utilization of the available land resources for sustainable agricultural production. The FAO recommended an approach for land suitability evaluation for crops in terms of suitability ratings from highly suitable to not suitable based on climatic and terrain data and soil properties crop-wise. The assignment of a given area element (pixel) to any one suitability class is encountered with problems due to the variation of soil properties within the area as well as matching of the soil properties with more than one suitability class to different extents. The Boolean methods are designed to assign a pixel to a single class and no provision exists for assigning partial suitability to each of the appropriate suitability classes. In the present study the use of fuzzy (partial) membership classification is used to accommodate the above uncertainty in assigning the suitability classes to the pixel. The evaluation of the spatial variability of relevant terrain parameters is carried out in a geographic information system environment while assigning the land suitability for crops in the study area of Kalyanakere sub-watershed in Karnataka, India. Nine parameters (eight of soil and one of topography) are considered and suitability analysis is carried out by fuzzy membership classification with factors included to accommodate the relative importance of the soil parameters governing the crop productivity. According to the field information, the crop being grown in the maximum area is finger millet. However, the crop-land evaluation indicated that the maximum area is potentially suitable for growing groundnut
Descriptors:models. agricultural-production. finger-millet. land-evaluation. land-resources. crop-production. groundnuts. grain-legumes. soil-fertility. topography. soil-chemistry. soil-physical-properties. resource-management. analytical-methods. soil-suitability. soil-properties
Geographic Locator:India
Organism Descriptors:Eleusine-coracana. Arachis-hypogaea
Supplemental Descriptors:Eleusine. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:JJ200. JJ600. FF100. ZZ100. PP300
Supplementary Info:18 ref
ISSN:0308-521X
Year:2000
Journal Title:Agricultural Systems

7. Title:Modeling changes in farming systems with the adoption of improved fallows in southern Mali
View Article: Agricultural Systems. 2000. 66 (1). 51-68
CD Volume:325
Print Article: Pages: 51-68
Author(s):Kaya B Hildebrand P E Nair P K R
Author Affiliation:University of Florida, 118 Newins-Ziegler Hall, P.O. Box 110420, Gainesville, FL 32611-0420, USA
Language:English
Abstract:Research is being conducted in the Koutiala region of southern Mali to investigate the potential of improved fallows planted to leguminous agroforestry tree species to improve soil fertility and crop production. This paper examines the potential for the adoption of this technology on different household groups using linear programming-based modelling. The model revealed that an improved fallow would be an interesting venture only if fodder has a market value and if maize

yields equal to or higher than the regional average yield of 2500 kg ha-1 can be achieved. Improved fallows are not financially attractive to farmers if they do not produce benefits other than soil fertility improvement measured in terms of crop yield. Any subsidy programme which would prevent farmers from cutting the fodder, as secondary output before the end of the planned fallow length, would not have adoption potentials. A special fallow installation loan programme, similar to the one that cotton enjoys, would make the venture viable

Descriptors:farming-systems. fallow. agroforestry. innovation-adoption. linear-programming. soil-fertility. yields. fodder-legumes. maize. subsidies. economic-viability

Geographic Locator:Mali

Organism Descriptors:Zea-mays

Supplemental Descriptors:West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants

Subject Codes:KK600. FF100. EE800. EE120. EE110. FF150. FF007. JJ600

Supplementary Info:20 ref

ISSN:0308-521X

Year:2000

Journal Title:Agricultural Systems

8. Title:Legumes for improving maize yields and income in semi-arid Kenya

View Article: Agriculture, Ecosystems & Environment. 2000. 78 (2). 123-137

CD Volume:325

Print Article: Pages: 123-137

Author(s):Rao M R Mathuva M N

Author Affiliation:International Centre for Research in Agroforestry (ICRAF), P.O. Box 30677, Nairobi, Kenya

Language:English

Abstract:An experiment was conducted at the research station of the International Centre for Research in Agroforestry (ICRAF) at Machakos, Kenya from November 1989 to February 1996 to evaluate the effect of annual and perennial legumes on soil fertility, cereal yields and economic returns. The study evaluated six cropping systems: (1) continuous sole maize, (2) maize rotated with short-duration legume, cowpea (Vigna unguiculata), (3) maize rotated with long-duration legume, pigeonpea (Cajanus cajan), (4) maize intercropped with pigeonpea, (5) hedgerow intercropping of maize and a perennial legume, gliricidia (Gliricidia sepium), and (6) continuous sole maize, green-manured with gliricidia prunings produced from an equivalent area outside the cropped field ('biomass transfer technology'). Maize-cowpea sequential and pigeonpea/maize intercropping systems produced, respectively, 17 and 24% higher maize yields than continuous sole maize, but maize-pigeonpea rotation yielded only marginally better. Hedgerow intercropping did not increase maize yields because increased yields during the few high rainfall seasons did not compensate the yield losses in other seasons due to the competition of hedgerows for water with crop. Green manuring with gliricidia prunings increased maize production by 27%, but this technology was not economical because of high labour costs for production and application of prunings to the crop. The annual grain legume-based cropping systems were 32-49% more profitable than continuous sole maize, making them attractive to small farmers in semi-arid tropics. Both cowpea and pigeonpea were affected by pests and diseases, which indicated the need for integrated pest management for realising the potential benefits of these legume-based systems

Descriptors:maize. cropping-systems. intercropping. continuous-cropping. rotations. alley-cropping. green-manures. crop-yield. labour-costs. profitability. agroforestry-systems. cowpeas. pigeon-peas
Geographic Locator:Kenya
Organism Descriptors:Zea-mays. Vigna-unguiculata. Cajanus-cajan. Gliricidia-sepium
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Vigna. Papilionoideae. Fabaceae. Fabales. dicotyledons. Cajanus. Gliricidia. East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
Subject Codes:FF150. FF005. KK600. EE110. JJ700. EE112
Supplementary Info:22 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

9. Title:Land use effects on soil organic matter properties of chromic luvisols in semi-arid northern Tanzania: carbon, nitrogen, lignin and carbohydrates
View Article: Agriculture, Ecosystems & Environment. 2000. 78 (3). 203-213
CD Volume:325
Print Article: Pages: 203-213
Author(s):Solomon D Lehmann J Zech W
Author Affiliation:Institute of Soil Science and Soil Geography, University of Bayreuth, D-95440 Bayreuth, Germany
Language:English
Abstract:In the semi-arid part of northern Tanzania, the native tropical woodland is undergoing a rapid conversion into agricultural land. This has resulted in drastic ecological changes in the region. This study was undertaken to investigate the effects of these changes on land use systems on the amount and composition of SOM in bulk soil samples and size separates. Samples were collected from the upper 10 cm of a native tropical woodland, a degraded woodland, 3 and 15 years cultivated fields and homestead fields where animal manure was regularly applied. Carbon, N, lignin derived phenols and non-cellulosic carbohydrates were determined in the samples. Clearing and cultivation of the tropical woodland resulted in a decline of SOM contents in bulk soils and in all size separates. A 56% reduction of C and a 51% reduction of N contents were observed in bulk soils of the cultivated fields. A rapid decline in C and N in coarse and fine sand fractions occurred during the first 3 years of cultivation. The reduction of stable SOM, i.e. the SOM which was in intimate association with the silt and clay sized fractions was relatively small. These results show the importance of organo-mineral associations in stabilization of SOM in soils of the semi-arid tropics. However, a more pronounced decline of stable SOM, especially from the clay, was observed in the 15 years than in the 3 years cultivated fields. These indicate that SOM losses due to cultivation of the native soil may not level off in the near feature. A decline in labile fractions of SOM was found in soils of the degraded woodland. Application of manure increased SOM in bulk soil and in the stable fractions. An increasing degree of SOM humification with decreasing particle size separates was indicated by C:N ratios and by lignin and carbohydrate signatures. The carbohydrate signatures indicated a direct input of fresh plant residues into the mineral soils of the cultivated fields compared to the native woodland
Descriptors:soil-organic-matter. Luvisols. soil-types. woodlands. land-use. agricultural-land. carbon. nitrogen. lignin. tropical-forests. carbon-

nitrogen-ratio. land-clearance. environmental-degradation. animal-manures. soil-composition. soil-fertility. soil-properties. land-management
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:KK100. JJ400. JJ200. PP400. JJ700. JJ600
Supplementary Info:24 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

10. Title:Diagnostic indicators of soil quality in productive and non-productive smallholders' fields of Kenya's Central Highlands
View Article: Agriculture, Ecosystems & Environment. 2000. 79 (1). 1-8
CD Volume:325
Print Article: Pages: 1-8
Author(s):Murage E W Karanja N K Smithson P C Woomer P L
Author Affiliation:Kenya Agricultural Research Institute, P.O. Box 47811, Nairobi, Kenya
Language:English
Abstract:A study was conducted to identify indicators of soil fertility status that are consistent with farmers' perceptions of soil fertility. Physical, chemical and biological properties of soils (Kikuyu red clay, Humic Nitisols) were measured from paired fields identified as either productive or non-productive by 12 farmers and compared to findings of a household survey on soil fertility management. Special attention was given to the potential of different soil organic matter fractions to serve as diagnostic indicators of soil fertility. Farmers' criteria for distinguishing soil productivity included crop performance, soil tilth, moisture and colour and presence of weeds and soil invertebrates. All farmers attributed low fertility to inadequate use of organic and inorganic fertilizers (100%) and removal of crop residues (100%). Other causes included continuous cropping (83%), lack of crop rotation (66%) and soil erosion (42%). Productive soils had significantly higher soil pH, effective cation exchange capacity, exchangeable cations, extractable P and total N and P than non-productive soils. Total organic C and several estimates of soil labile C including particulate organic C (POC), three Ludox density separates of POC, KMnO4-oxidizable C and microbial biomass C were significantly greater in productive soils. Soil microbial biomass N, net N mineralization and soil respiration were also significantly higher in productive soils. Soil microbial biomass N, net N mineralization and soil respiration were also significantly higher in productive soils. Farmers' perceptions of soil quality were substantiated through soil chemical analyses and soil organic matter fractions provided precise information on these differences. The similarity of soil physical properties in productive and non-productive fields suggests that differences in chemical and biological indicators may have resulted, in part, from smallholders' management and are not inherent properties of the soils
Descriptors:highlands. indicators. biological-indicators. biomass. capacity. cation-exchange. cation-exchange-capacity. cations. continuous-cropping. crop-residues. rotations. density. erosion. exchangeable-cations. farmers. fertilizers. mineralization. moisture. organic-matter. physical-properties. productivity. properties. residues. respiration. soil-fertility. soil-invertebrates. soil-organic-matter.

soil-pH. soil-physical-properties. soil. tilth. weeds. Nitisols. farmers'-attitudes. soil-management
Geographic Locator:Kenya
Identifiers:soil quality
Supplemental Descriptors:East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
Subject Codes:JJ600. JJ200. JJ900. JJ100
Supplementary Info:33 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

11. Title:Land use effects on soil quality in a tropical forest ecosystem of Bangladesh
View Article: Agriculture, Ecosystems & Environment. 2000. 79 (1). 9-16
CD Volume:325
Print Article: Pages: 9-16
Author(s):Islam K R Weil R R
Author Affiliation:Department of Natural Resource Sciences and Landscape Architecture, 1103 H.J. Patterson Hall, University of Maryland, College Park, MD 20742, USA
Language:English
Abstract:The effects of land use changes on soil quality properties in a tropical forest ecosystem of Bangladesh were assessed by collecting soil samples from adjacent well-stocked Shorea robusta natural forest, land reforested with Acacia, grassland and cultivated land. Land use/land cover changes (degradation of natural forest and subsequent cultivation of soils) resulted in surface compaction and significant decreases in silt and clay contents, porosity and aggregate stability, N, fulvic and labile C, and microbial biomass C. Maintenance respiration rates increased in comparison to the soils under natural forest. Use of soil deterioration index showed that soil quality deteriorated significantly (-44%) under cultivation, while in sites revegetated with fast-growing Acacia or grasses, it improved by 6-16%. Degradation of soil quality may have resulted from increased disruption of macroaggregates, reductions in microbial biomass, and loss of labile organic matter due to fire, deforestation, tillage and accelerated erosion. Improvement in soil quality and enhanced biological activity at reforested and grassland sites demonstrated the inherent resilience of these soils once revegetated with highly adaptable and fast growing Acacia sp. and grass species
Descriptors:ecosystems. forests. tropics. tropical-forests. biomass. soil-compaction. cultivation. deforestation. soil-degradation. deterioration. erosion. fire. grasslands. improvement. land-resources. land-use. organic-matter. porosity. properties. respiration. silt-fraction. soil. tillage. soil-organic-matter. soil-fertility. forest-influences
Geographic Locator:Bangladesh
Identifiers:soil quality
Organism Descriptors:Acacia. grasses. Poaceae. Shorea. Shorea-robusta
Supplemental Descriptors:Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Poaceae. Cyperales. monocotyledons. Dipterocarpaceae. Theales. Shorea. South-Asia. Asia. Least-Developed-Countries. Developing-Countries. Commonwealth-of-Nations
Subject Codes:JJ600. PP300. KK100. JJ200. PP350. KK110. PP600
Supplementary Info:24 ref

ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

12. Title:The impact of land clearing and agricultural practices on soil organic C fractions and CO2 efflux in the Northern Guam aquifer
View Article: Agriculture, Ecosystems & Environment. 2000. 79 (1). 17-27
CD Volume:325
Print Article: Pages: 17-27
Author(s):Motavalli P P Discekici H Kuhn J
Author Affiliation:Department of Soil and Atmospheric Sciences, The School of Natural Resources, University of Missouri, Columbia, MO 65211, USA
Language:English
Abstract:The effects of land clearing, tillage, and fertilization of tropical secondary forest on soil organic and organic C fractions in the shallow, calcareous soil that overlies most of Northern Guam were determined. A field experiment was established on a secondary forest site to simulate land clearing, cultivation and fertilization with two separate applications of N, P and K fertilizer or Leucaena leucocephala leaves. Initial aboveground biomass of secondary forest was relatively low in comparison to that of other moist tropical forest sites, possibly because of poor soil fertility, shallow soil depth, and frequent natural disturbance from tropical storms. Rates of litterfall were also affected by the high winds associated with storm activity. Clearing, cultivation and fertilization over a 325-day period significantly reduced microbial biomass C. Soil surface CO2 efflux was characterized by short-term flushes shortly after tillage and was affected by soil moisture content and possibly by the proportion of active organic C contained in the soil. A comparison of commercial fields with continuous cultivation histories of 1-26 years and forest sites showed a approx equal to 44% decrease in soil organic C within 5 years after conversion of secondary forest to continuous cultivation
Descriptors:aquifers. efflux. land-clearance. amendments. biomass. calcareous-soils. characterization. continuous-cropping. conversion. cultivation. drinking-water. fertilizers. forests. minimum-tillage. moisture. moisture-content. organic-amendments. secondary-forests. soil-depth. soil-fertility. soil-water. tillage. tropics. tropical-forests. organic-carbon. soil. deforestation. soil-management. carbon-dioxide. emission
Geographic Locator:Guam
Organism Descriptors:Leucaena
Supplemental Descriptors:Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Mariana-Islands. Micronesia. Oceania. Pacific-Islands. Developing-Countries. American-Oceania
Subject Codes:JJ200. JJ900. KK100. JJ700. PP300. KK600. PP600. JJ600
Supplementary Info:41 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

13. Title:Grazing induced biodiversity in the highland ecozone of East Africa
View Article: Agriculture, Ecosystems & Environment. 2000. 79 (1). 43-52
CD Volume:325
Print Article: Pages: 43-52
Author(s):Woldu Z Saleem M A M
Author Affiliation:Department of Biology, National Herbarium, Addis Ababa University, P.O. Box 3434, Addis Ababa, Ethiopia

Language:English
Abstract:The species composition of grazing lands can be influenced by livestock and grazing pressure. A study on seed banks in manure was conducted in Ghinchi highland Research Site in Ethiopia between 1995 and 1997. The data on species composition and life-form of the plants germinating in pots receiving air dried manure were compared with species composition of experimental plots in natural grassland subjected to varying grazing intensity. There was significant difference among the species composition of grazed and non-grazed grasslands and the manure seed bank (p=0.01). The life-forms of the species also showed variation. There were more families and species in the natural grassland vegetation than indicated in the manure seed bank. The manure seed bank had more annuals than the natural grassland vegetation. The species composition and life-forms in the manure seed bank showed variation with time and this corresponded with the seasonal variation in the grassland, which had a direct relationship with the rainfall pattern. The study showed that livestock play a major role in maintaining the biodiversity of grassland vegetation by spatial and temporal dispersion of readily germinating seeds in their manure. The use of manure to improve soil fertility should be weighed cautiously against the introduction of weeds into crop fields, although weeds are an important feed resource for livestock in land-constrained areas. There is therefore the need for developing manure management practices so that the benefits can be optimized and the undesirable effects can be minimized
Descriptors:biodiversity. seed-banks. seed-dispersal. weeds. manures. grasslands. natural-grasslands. botanical-composition. grazing. fodder-plants
Geographic Locator:Ethiopia
Organism Descriptors:grasses. Poaceae
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries
Subject Codes:PP350. JJ100. FF500
Supplementary Info:13 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

14. Title:Farmer participatory research to minimize soil erosion on steepland vegetable systems in the Philippines
View Article: Agriculture, Ecosystems & Environment. 2000. 79 (2/3). 113-127
CD Volume:325
Print Article: Pages: 113-127
Author(s):Poudel D D Midmore D J West L T
Author Affiliation:Department of Agronomy and Range Science, University of California, Davis, CA 95616, USA
Language:English
Abstract:The effectiveness of high-value contour hedgerows species Asparagus, pineapple, pigeon peas (Cajanus cajan), lemon grass (Cymbopogon flexuosus), and tea on the control of steepland erosion was evaluated in a replicated researcher-managed field experiment, and 12 farmer-managed erosion-runoff plots from 1995 to 1998 across the Manupali watershed in Mindanao, the Philippines. Annual soil loss from 42% slopes with superimposed researcher-managed high-value contour hedgerows treatment (45.4 t ha-1) was lower by 30% compared to the conventional practice of up-and-down cultivation (65.3 t ha-1). Annual soil loss measured in farmers' plots ranged from 1.4 to 52.5 t ha-1 on

slopes ranging from 16 to 65%. Soil pH, organic C, total-N, and P downslope were greater by 7, 28, 13, and 10%, respectively, compared to upslope. Total-N, organic C, soil pH, Mg, and K measured at the end of the experiment in the researcher-managed contour hedgerows plots were lower by 45, 20, 30, 53, and 70%, respectively, compared to initial values. The Erosion-Productivity Impact Calculator (EPIC) model was used to assess the effects of annual cropping sequences under a contour hedgerow system on slopes ranging from 15 to 65%. The cabbage-tomato-cabbage sequence (CTC) resulted in an average simulated annual soil loss of 28.1 t ha-1 across slope ranging from 15 to 65%, whereas tomato-cabbage-tomato (TCT) resulted in an annual simulated soil loss of 98.3 t ha-1. The TCT cropping sequence lost 3.0 t ha-1 more soil at 15% slope than did the CTC sequence, while at 65% slope, the TCT sequence lost 181.2 t ha-1 more than the other sequence. On average, two-thirds of the total soil loss occurred during September-December. In order to reduce soil loss and increase productivity in steep sloping lands, high-value contour hedgerows with sequential cropping sequences that include either maize or cabbage rather than tomato during the most erosive period of the year and variable fertility management strategies along the slope positions are suggested. The coincidence of predicted to actual soil loss from farmer-managed plots, based largely upon model development from researcher-managed plots, and the acute awareness instilled amongst farmer cooperators of the magnitude of soil loss, strengthen the argument for farmer participatory research

Descriptors:erosion. research. cabbages. control. cultivation. hedges. lemons. pineapples. productivity. sequential-cropping. slope. soil-conservation. soil-pH. tea. watersheds. maize. cropping-systems. participation. farmers. steepland-soils. vegetables. pigeon-peas. tomatoes

Geographic Locator:Philippines

Organism Descriptors:Ananas. Ananas-comosus. Asparagus. Asparagus-officinalis. Brassica. Brassica-oleracea. Brassica-oleracea-var.-capitata. Cajanus. Cajanus-cajan. Camellia. Camellia-sinensis. Zea-mays. Cymbopogon. Cymbopogon-flexuosus. grasses. Citrus-limon. Lycopersicon. Lycopersicon-esculentum. Poaceae. Citrus

Supplemental Descriptors:Bromeliaceae. Bromeliales. monocotyledons. angiosperms. Spermatophyta. plants. Ananas. Liliaceae. Liliales. Asparagus. Brassicaceae. Capparidales. dicotyledons. Brassica. Brassica-oleracea. Papilionoideae. Fabaceae. Fabales. Cajanus. Theaceae. Theales. Camellia. Zea. Poaceae. Cyperales. Cymbopogon. Citrus. Rutaceae. Sapindales. Solanaceae. Solanales. Lycopersicon. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries

Subject Codes:PP400. FF150. KK600. FF100. AA500

Supplementary Info:53 ref

ISSN:0167-8809

Year:2000

Journal Title:Agriculture, Ecosystems & Environment

15. Title:Yield decline of sweet potato in the humid lowlands of Papua New Guinea

View Article: Agriculture, Ecosystems & Environment. 2000. 79 (2/3). 259-269

CD Volume:325

Print Article: Pages: 259-269

Author(s):Hartemink A E Poloma S Maino M Powell K S Egenae J O'Sullivan J N

Author Affiliation:ISRIC, P.O. Box 353, 6700 AJ Wageningen, Netherlands

Language:English

Abstract:Sweet potato (Ipomoea batatas) is the major staple crop in Papua New Guinea and experiments were conducted investigating factors affecting

yield decline. Yields of unfertilized plots were related to rainfall and measured changes in soil properties, nematode (Meloidogyne sp., Rotylenchulus reniformis) and sweet potato weevil (Cylas formicarius) populations. The research took place at two locations (Hobu and Unitech) on Eutropepts and Fluvents, respectively. Yields at Hobu decreased from 18 t ha-1 in the first season to around 7 t ha-1 in the third season, but no significant yield trend was observed at Unitech. Vine biomass was not affected by the number of cropping seasons at Hobu but it decreased at Unitech with time. Marketable tuber yield at both sites was significantly correlated to rainfall, i.e. the more rain the lower the yield. Significant changes in soil chemical properties included a decrease in pH and base saturation (Hobu) and a decrease in CEC and exchangeable K (Unitech). No significant changes in soil bulk density were found and no obvious pattern was found in the nutrient concentrations of leaf samples with time. Nematode populations were high and tripled between the first and third season at Hobu. Half of the vines at Hobu and all of the vines at Unitech were damaged by sweet potato weevils, but tuber damage was higher in Hobu although the damage was only superficial. Despite the considerable variation in yield and yield determining factors, the study showed that the decline in sweet potato yield may be attributed to the high nematode infestation, accompanied by an increase in vine damage by weevils and a declining soil fertility

Descriptors:sweet-potatoes. biomass. bulk-density. soil-properties. soil-fertility. crop-yield. yields. plant-pests. plant-parasitic-nematodes. pests. trends. climate. rain

Geographic Locator:Papua-New-Guinea

Organism Descriptors:Ipomoea-batatas. Cylas-formicarius. Meloidogyne. Rotylenchulus-reniformis

Supplemental Descriptors:Ipomoea. Convolvulaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants. Cylas. Apionidae. Coleoptera. insects. arthropods. invertebrates. animals. Meloidogynidae. Nematoda. Rotylenchulus. Hoplolaimidae. New-Guinea. Melanesia. Australasia. Oceania. Pacific-Islands. Developing-Countries. ACP-Countries. Commonwealth-of-Nations

Subject Codes:FF005. PP500. JJ200. FF620. JJ600. FF100

Supplementary Info:34 ref

ISSN:0167-8809

Year:2000

Journal Title:Agriculture, Ecosystems & Environment

16. Title:Nitrogen use efficiency of taro and sweet potato in the humid lowlands of Papua New Guinea

View Article: Agriculture, Ecosystems & Environment. 2000. 79 (2/3). 271-280

CD Volume:325

Print Article: Pages: 271-280

Author(s):Hartemink A E Johnston M O'Sullivan J N Poloma S

Author Affiliation:ISRIC, P.O. Box 353, 6700 AJ, Wageningen, Netherlands

Language:English

Abstract:The effects of inorganic N fertilizers on upland taro (Colocasia esculenta) and sweet potato (Ipomoea batatas) were quantified on a sandy, Typic Tropofluvent in the humid lowlands of Papua New Guinea. Fertilizer N at 0, 100, 200, 300 and 400 kg ha-1 was given in split applications. The yield of marketable taro corms was not affected by N fertilizer but non-marketable corm yield doubled at high N fertilizer rates. High N applications yielded 8-11 t ha-1 more taro tops. Marketable and non-marketable sweet potato yield was negatively affected by N fertilizers. High N applications yielded 26 t ha-1 more

vines than the control treatment. Nitrogen fertilizer significantly reduced the harvest index in both crops. When no fertilizer was applied, the total N uptake of taro was 32.0 kg ha-1 of which 9.7 kg was taken up in the marketable corms. At 400 kg N ha-1 the total N uptake was 67.5 kg ha-1 of which 23% was taken up by the marketable corms. Uptake of N in the marketable sweet potato tubers was less than 11 kg ha-1 and for most treatments more N was taken up in the non-marketable tubers than in the marketable yield. Up to 156 kg N ha-1 was taken up with the sweet potato vines. Despite the negative effect of N on sweet potato yield, sweet potato had a higher N use efficiency than taro due to a higher above-ground biomass production. The N fertilizer recovery was 25% for the sweet potato but only 9% for the taro indicating considerable N losses, probably caused by leaching

Descriptors:sweet-potatoes. use-efficiency. application-rates. biomass. biomass-production. corms. crop-production. fertilizers. harvest-index. nitrogen-fertilizers. leaching. losses. mineral-uptake. nitrogen. research. soil-fertility. treatment. uptake. yields

Geographic Locator:Papua-New-Guinea. Oceania

Organism Descriptors:Ipomoea-batatas. Colocasia-esculenta. Colocasia

Supplemental Descriptors:Ipomoea. Convolvulaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants. Colocasia. Araceae. Arales. monocotyledons. New-Guinea. Melanesia. Australasia. Oceania. Pacific-Islands. Developing-Countries. ACP-Countries. Commonwealth-of-Nations

Subject Codes:FF100. JJ700. FF061. FF003

Supplementary Info:35 ref

ISSN:0167-8809

Year:2000

Journal Title:Agriculture, Ecosystems & Environment

17. Title:Systematic method for rating soil quality of conventional, organic, and integrated apple orchards in Washington state

View Article: Agriculture, Ecosystems & Environment. 2000. 80 (1/2). 29-43

CD Volume:325

Print Article: Pages: 29-43

Author(s):Glover J D Reganold J P Andrews P K

Author Affiliation:Department of Crop and Soil Sciences, Washington State University, Pullman, WA 99163-6420, USA

Language:English

Abstract:The effects of conventional, integrated and organic apple production systems on soil physical, chemical, and biological properties were evaluated using a modified soil quality index. This index utilizes 1998 soils data from these three treatments. The study used four 0.14 ha replicates of each of the three treatments in a randomized complete block design. Experimental plots were planted to apples cv. Golden Delicious in 1994 on a commercial orchard in the Yakima Valley, Washington state, USA. Organic soil management practices included additions of composted poultry manure and bark mulches and the use of mechanical tillage for weed control. Conventional soil management practices included additions of synthetic fertilizers and the use of herbicides for weed control. The integrated system utilized practices from each of the other two systems. Increased aggregate stability, microbial biomass, and earthworm abundance were associated with improved soil quality under integrated management when compared to conventional management in 1998. Organic management resulted in lower soil bulk densities and generally improved biological soil properties compared to conventional management. Few significant differences in soil properties were measured between the integrated and organic systems. The integrated production system received a soil quality index

rating of 0.92 (out of 1.00), which was significantly higher than the index rating of 0.78 for the conventional production system; the organic production system received a rating of 0.88, which was not significantly different from the other two systems. The study indicates that a well-developed soil quality index can provide an effective framework for evaluating the overall effects of different orchard production practices on soil quality
Descriptors:apples. orchards. bark. biomass. evaluation. experimental-plots. fertilizers. herbicides. manures. measurement. mulches. organic-soils. poultry-manure. properties. soil-management. soil-properties. soil. tillage. treatment. weeds. weed-control. organic-farming. integrated-systems. indexes. soil-fertility
Geographic Locator:USA. Washington
Identifiers:soil quality
Organism Descriptors:Malus-pumila. earthworms. Oligochaeta. Malus
Supplemental Descriptors:Malus. Rosaceae. Rosales. dicotyledons. angiosperms. Spermatophyta. plants. Oligochaeta. Annelida. invertebrates. animals. North-America. America. Developed-Countries. OECD-Countries. Pacific-Northwest-States-of-USA. Pacific-States-of-USA. Western-States-of-USA. USA
Subject Codes:JJ600. FF100. FF003. FF150
Supplementary Info:8 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

18. Title:Comparison of conventional and alternative vegetable farming systems on the properties of a yellow earth in New South Wales
View Article: Agriculture, Ecosystems & Environment. 2000. 80 (1/2). 47-60
CD Volume:325
Print Article: Pages: 47-60
Author(s):Wells A T Chan K Y Cornish P S
Author Affiliation:Horticultural Research and Advisory Station, NSW Agriculture, Locked Bag 26, Gosford, NSW 2250, Australia
Language:English
Abstract:Changes in soil properties after 3.5 years of vegetable cropping are reported and the implications for sustainability are discussed. A vegetable farming-systems experiment began in 1992 in New South Wales, Australia to compare five different approaches to vegetable cropping in terms of their productivity, profitability, soil effects and environmental impact. The systems are defined by the goals and values of the farmer rather than by the management practices employed. The actual management practices - nutrition, tillage, rotations, pest and weed management, etc. - were selected to satisfy these goals and values. For instance, to satisfy the goal of 'maximize profit', fertilizers and pesticides were applied in excess to ensure high yields of large, undamaged produce which receive the best prices. Conversely, one of the management practices used to satisfy the goal 'optimize profit while minimizing environmental impact' was to grow cover crops regularly in rotation with vegetable crops. A range of chemical, physical and biological properties of surface soil (0-10 cm) from the farming-systems were measured and compared to baseline measurements. The two alternative systems, which received large inputs of compost, had higher soil organic carbon, microbial biomass, total nitrogen, total phosphorus, exchangeable nutrient cations, water-holding capacity and aggregate stability than the conventional systems. The system that received the largest mineral fertilizer inputs, and the most tillage, had the highest available phosphorus levels, the lowest phosphorus

sorption capacity and lower aggregate stability than the alternative systems. Consequently this high input system had the greatest potential to lose sediments and phosphorus to the environment. The two other conventional systems had smaller fertilizer inputs and maintained a phosphorus sorption capacity that was no different from the alternative systems. These more carefully managed conventional systems offer hope that relatively small changes in management can have significant environmental benefits. Yet the broad improvement in soil health achieved by the biological approaches should provide better long-term fertility and lower off-site impacts. It may be wise to make use of both these approaches to management in attempting to balance the short and long-term viability of intensive vegetable farming
Descriptors:farming. farming-systems. properties. biomass. capacity. carbon. cations. composts. cover-crops. environmental-impact. farms. fertilizers. improvement. measurement. nitrogen. nutrition. organic-carbon. pesticides. phosphorus. prices. productivity. profitability. rotations. sediment. soil-properties. sorption. sustainability. tillage. treatment. vegetables. viability. weeds. yields. intensive-farming
Geographic Locator:New-South-Wales. Australia
Supplemental Descriptors:Australia. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:FF150. FF100. FF003. JJ300. JJ200. JJ900. JJ700. JJ600. EE111
Supplementary Info:28 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

19. Title:On crop production and the balance of available resources
View Article: Agriculture, Ecosystems & Environment. 2000. 80 (1/2). 71-85
CD Volume:325
Print Article: Pages: 71-85
Author(s):Kho R M
Author Affiliation:International Centre for Research in Agroforestry, PO Box 30677, Nairobi, Kenya
Language:English
Abstract:A coefficient is developed that quantifies the degree of limitation of resources in crop production. The sum of the limitation coefficients of all resources equals one, making it possible to deduce non-limiting resources. The original binary concept of limitation can be regarded as a special case of this coefficient. Crop response to addition of a resource can be viewed as the product of the limitation coefficient, use efficiency and the application rate. Methods to estimate experimentally the limitation coefficients are discussed. The methods are illustrated by estimating the degree of limitation by N and P of Pennisetum glaucum growth in 1996 near N'Dounga, SW Niger. These 2 elements accounted for more than 70% of the total limitation, which is in agreement with results of other scientists in this region
Descriptors:nitrogen-fertilizers. phosphorus-fertilizers. use-efficiency. application-rates. plant-nutrition. mineral-nutrition. soil-fertility. pearl-millet
Geographic Locator:Niger
Organism Descriptors:Pennisetum-glaucum
Supplemental Descriptors:Pennisetum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa
Subject Codes:FF005. FF100. JJ200. JJ600. JJ700

Supplementary Info:27 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

20. Title:Integrated nutrient management and waste recycling for restoring soil fertility and productivity in Japanese mint and mustard sequence in Uttar Pradesh, India
View Article: Agriculture, Ecosystems & Environment. 2000. 80 (3). 267-275
CD Volume:325
Print Article: Pages: 267-275
Author(s):Patra D D Anwar M Sukhmal Chand
Author Variant:Chand-S
Author Affiliation:Central Institute of Medicinal and Aromatic Plants (CIMAP), P.O. CIMAP, Lucknow 226 015, India
Language:English
Abstract:Supplementing the nutrient requirement of crops through organic manures plays a key role in sustaining soil fertility, and crop productivity and reducing use of fossil fuels. Field experiments were conducted for 2 years at two different locations (Lucknow and Pantnagar) in Uttar Pradesh, India. The objectives of the study were to assess the herb and essential oil yields of Japanese mint (Mentha arvensis cv. Hy 77), and its nutrient accumulation under single and combined applications of organic manures and inorganic fertilizers (NPK). Changes in physical and chemical characteristics of the soils (Fluvisols, Mollisols) were also determined. Eight treatments comprising different combinations of NPK through inorganic fertilizers and farm yard manure (FYM) were compared. The distilled waste of mint after extraction of essential oil was recycled to soils in the plots to supplement the nutritional requirement of the succeeding mustard crop (Brassica juncea [Indian mustard] cv. Pusa Bold). Herb and essential oil yield of mint were significantly higher with combined application of organic and inorganic sources of nutrients as compared to single applications. Accumulation of N and P was equal under full inorganic and combined supply whereas, K accumulation was higher with the former. Soil organic C and pH after harvest of mint did not significantly differ among the treatments, but the level of mineralizable N, Olsen-P and NH4OAc extractable K were higher in soil with integrated supply of nutrients. Significant increase in soil water stable aggregates, organic C, available NPK and microbial biomass, and decrease in soil bulk density were observed with waste recycling over fertilizer application. These benefits were reflected in the seed and stubble yield of mustard which succeeded mint. This study indicates that combined application of inorganic fertilizers with organics helps in increasing the availability of nutrients and crop yield and provides a significant effect to the succeeding crop. Similarly, recycling crop residues reduces the need for fossil fuel based fertilizer, and helps in sustaining and restoring soil fertility in terms of available nutrients and major physical and chemical characteristics of the soil
Descriptors:Indian-mustard. soil-fertility. bulk-density. crop-residues. essential-oils. fertilizers. manures. mollisols. NPK-fertilizers. nutrients. soil-water. soil. stubble. crop-yield. soil-chemistry. soil-pH
Geographic Locator:India. Uttar-Pradesh
Organism Descriptors:Mentha-arvensis. Brassica-juncea
Supplemental Descriptors:Mentha. Lamiaceae. Lamiales. dicotyledons. angiosperms. Spermatophyta. plants. Brassica. Brassicaceae. Capparidales. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India

Subject Codes:FF005. JJ700. JJ200. FF100
Supplementary Info:21 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

21. Title:Land quality indicators for sustainable land management: proposed method for yield gap and soil nutrient balance
View Article: Agriculture, Ecosystems & Environment. 2000. 81 (2). 103-112
CD Volume:325
Print Article: Pages: 103-112
Author(s):Bindraban P S Stoorvogel J J Jansen D M Vlaming J Groot J J R
Author Affiliation:Research Institute for Agrobiology and Soil Fertility (AB-DLO), P.O. Box 14, NL-6700 AA Wageningen, Netherlands
Conference Title:Special Issue: Indicators of land quality and sustainable land management. Selected papers from a Satellite Symposium on Land Quality organized by the World Bank as part of the 16th International Congress of Soil Science, Montpellier, France, August 1998
Language:English
Abstract:The required increase in agricultural production to meet future food demand will further increase pressure on land resources. Integrative indicators of the current status of the agricultural production capacity of land and their change over time are needed for promoting land management practices to maintain or improve land productivity and a sustainable use of natural resources. It is argued that such land quality indicators should be obtained with a holistic systems-oriented approach. Two land quality indicators are elaborated that deal with (1) yield gaps, i.e. the difference of actual yield and yield obtained under optimum management practices, or yields determined by the land-based natural resources, and (2) a soil nutrient balance, i.e. the rate with which soil fertility is changing. The yield gap is based on the calculation of land-based cereal productivity at three different levels in terms of potential, water limited, and nutrient limited production, considering weather, soil and crop characteristics. These modelled production levels do not incorporate socioeconomic aspects, which may impede agricultural management in its effort to release stress because of inadequate soil fertility, water availability and/or occurrence of pests and diseases. Therefore, location-specific actual yield levels are also considered. Besides an evaluation of the actual status of the land, it is important to consider the rate of change. The quantification of changes in soil nutrient stocks is crucial to identify problematic land use systems. The soil nutrient balance, i.e. the net difference between gross inputs and outputs of nutrients to the system, is used as measure for the changes. The indicator for the soil nutrient balance combines this rate of soil nutrient change and the soil nutrient stock. Indicators for yield gaps and soil nutrient balances are defined, procedures for their quantification are described and their general applicability is discussed
Descriptors:indicators. land-management. sustainability. yields. crop-yield. nutrient-balance. soil. land-productivity. soil-fertility. models. conferences
Identifiers:land quality
Subject Codes:JJ600. PP300. FF100
Supplementary Info:22 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

22. Title:Linking climate change research with food security and poverty reduction in the tropics
View Article: Agriculture, Ecosystems & Environment. 2000. 82 (1/3). 371-383
CD Volume:375
Print Article: Pages: 371-383
Author(s):Sanchez P A
Conference Title:Special issue: Food and forestry: global change and global challenges. Selected papers from the GCTE Focus 3 Conference, Reading, UK, September 1999
Language:English
Abstract:A Consultative Group on International Agricultural Research (CGIAR) intercentre working group on climate change identified joint opportunities that take advantage of the comparative advantages of the CGIAR and the International Geosphere-Biosphere Programme. CGIAR centres will focus on adaptation and mitigation research in Developing Countries. A natural resource management approach is suggested, which consists of six steps: (1) identifying and quantifying the extent of food insecurity, rural poverty and resource degradation; (2) conducting technological and policy research; (3) optimizing the trade-offs between global environmental benefits and private farmer benefits; (4) extrapolating and disseminating results, including research on policy implementation; (5) assessing impact and (6) providing feedback. Two examples of current CGIAR research illustrate this approach. Agroforestry alternatives to slash and burn agriculture at tropical forest margins were identified and the trade-offs between carbon sequestration and farmer profitability provided options to policy makers. Land tenure problems were resolved with participatory policy research. Agroforestry practices sequester an additional 57 Mg C per ha. Soil nutrient capital is being replenished in subhumid tropical Africa, helping farmers to attain food security. Afterwards when farmers shift to high-value tree or vegetable crop production, poverty is reduced. The transformation of low productivity croplands to sequential agroforestry is estimated to triple system carbon stocks in 20 years
Descriptors:agricultural-policy. agricultural-research. agroforestry. carbon-sequestration. CGIAR. climatic-change. environment. environmental-policy. environmental-protection. food-security. land-management. land-use. poverty. research-policy. shifting-cultivation. soil-fertility. Tropics
Geographic Locator:Africa. Developing-Countries
Subject Codes:PP500. AA500. EE950. EE150. EE116. PP600. KK600. FF150. EE112. EE110. UU850
Supplementary Info:44 ref
ISSN:0167-8809
Year:2000
Journal Title:Agriculture, Ecosystems & Environment

23. Title:Improvement of soil fertility in hillside agriculture of Los Altos de Chiapas, Mexico
View Article: Agrociencia. 2000-. 34- (3-). 251-259
CD Volume:297
Print Article: Pages: 251-259
Author(s):Pool Novelo L Trinidad Santos A Etchevers Barra J D Perez Moreno J Martinez Garza A
Author Affiliation:Colegio de la Frontera Sur, Calle 10 por 61 #264, Colonia Centro, 24000 Campeche, Mexico
Language:English. Spanish

Abstract:In a field trial over 4 crop seasons in 1992-94 on a terraced hillside of the Chamula Karst, a region of intensive agriculture, in Los Altos de Chiapas, Mexico, maize cv. Oloton was given 105:92:60 kg NPK/ha, 10 t poultry manure/ha and 2 t dolomitic lime/ha, singly and in all possible combinations. Poultry manure gave the greatest yield increase compared with the control, with NPK giving a lesser increase and lime having little effect. NPK + poultry manure gave the best results. Poultry manure application significantly increased soil pH, organic matter, Olsen P, and exchangeable Ca, Mg and K. NPK significantly increased Olsen P and exchangeable K in the soil. Dolomitic lime application significantly increased pH and exchangeable Ca and Mg in the soil and reduced exchangeable Al and extractable Fe
Descriptors:soil-fertility. acid-soils. maize. soil-organic-matter. NPK-fertilizers. poultry-manure. soil-amendments. lime. soil-pH. phosphorus. calcium. magnesium. potassium. aluminium. iron
Geographic Locator:Mexico
Organism Descriptors:Zea-mays
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developing-Countries. Threshold-Countries. Latin-America. OECD-Countries
Subject Codes:FF005. JJ700. JJ600. FF100
Supplementary Info:23 ref
ISSN:1405-3195
Year:2000
Journal Title:Agrociencia

24. Title:Millettia ferruginea from southern Ethiopia: impacts on soil fertility and growth of maize
View Article: Agroforestry Systems. 2000. 48 (1). 9-24
CD Volume:309
Print Article: Pages: 9-24
Author(s):Hailu T Negash L Olsson M
Author Affiliation:Ministry of Agriculture, Addis Ababa, Ethiopia
Language:English
Abstract:Growing agricultural crops under Millettia ferruginea, an endemic Ethiopian tree species, is an age-old practice, but the beneficial effects of the tree on crops have not been scientifically quantified. In order to achieve this, 4 isolated and nearly identical Millettia trees growing under similar site conditions were selected and canopy coverage of each tree was divided into 4 radial transects. Four plots of 0.5x0.5 m were established on each radial transect at 0.5-1, 2.5-3, 4.5-5, and 6.5-7 m distance from the tree bases. The control plot was established at 29.5-30 m. Composite soil samples from each of the 4 plots located at a comparable distance and at 2 soil depths, 0-10 and 20-30 cm, were collected and analysed. The level of surface soil P, organic C, exchangeable base-forming cations and cation exchange capacity were all significantly higher under the trees than in the open field. Nutrient levels declined with depth and increasing distances from the tree stem. Soil pH values did not show significant horizontal or vertical variations in all the soil samples analysed. Maize plants grown on soils collected from underneath Millettia trees gave significantly better growth responses and higher dry matter yield then control plants. Socioeconomic studies indicated that Millettia trees have good standing in the region both because of their desirable biological characteristics and because of their economic benefits. A table is included listing the agricultural (field and horticultural) crops normally grown in association with Millettia in Ethiopia

Descriptors:maize. soil-fertility. canopy. cation-exchange-capacity. cations. soil-pH. soil-organic-matter. exchangeable-cations. phosphorus. forest-influences. agroforestry-systems. intercropping. agrosilvicultural-systems. field-crops. horticultural-crops
Geographic Locator:Ethiopia
Identifiers:Millettia ferruginea
Organism Descriptors:Zea-mays. Millettia
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Papilionoideae. Fabaceae. Fabales. dicotyledons. East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Millettia
Subject Codes:KK600. JJ600. JJ200. FF150. FF100. FF005. FF003
Supplementary Info:25 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems

25. Title:Charge characteristics of soil organic matter fractions in a Ferric Lixisol under some multipurpose trees
View Article: Agroforestry Systems. 2000. 48 (2). 169-188
CD Volume:309
Print Article: Pages: 169-188
Author(s):Oorts K Vanlauwe B Cofie O O Sanginga N Merckx R
Author Affiliation:Laboratory of Soil Fertility and Soil Biology, Faculty of Applied Agricultural Sciences, K. Mercierlaan 92, 3001 Leuven/Heverlee, Belgium
Language:English
Abstract:Soil organic matter (SOM) has a key role in maintaining soil fertility in weathered soils in the tropics. This study was conducted to determine the contribution of different SOM fractions to the cation exchange capacity (CEC) of a tropical soil as influenced by organic matter inputs of different biochemical composition. Soil samples were collected from a 16-yr-old arboretum established on a Ferric Lixisol (at the International Institute of Tropical Agriculture, IITA, Ibadan, Nigeria), under 5 multipurpose tree species: Leucaena leucocephala, Dactyladenia barteri [Acioa barteri], Afzelia africana, Pterocarpus santalinoides and Treculia africana. Fractions were obtained by wet sieving and sedimentation after dispersion with Na2CO3. Fractions larger than 0.053 mm were separated into mineral and organic components by flotation on water. Relationships between CEC and pH were determined using the silver-thioureum-method. For all treatments the organic fractions had the highest CEC, expressed on a dry matter basis, and the CEC of the fractions smaller than 0.053 mm was inversely related to their particle size: clay (<0.002 mm)>fine silt (0.002-0.02 mm)>coarse silt (0.02-0.053 mm). A positive correlation existed between the slope of the fitted CEC-pH relationships and the organic C concentrations of the whole soil and both silt fractions. The clay and fine silt fractions were responsible for 85-90% of the CEC of the soil. Organic inputs with a high C:N and lignin:N ratio produced fine and coarse silt sized SOM fractions with the highest charge density. Therefore, inputs of slowly decomposing organic residues seem to be promising for increasing the CEC of highly weathered soils
Descriptors:multipurpose-trees. soil-organic-matter. arboreta. cation-exchange-capacity. residues. silt. soil-fertility. soil. tropics. alfisols. soil-texture. clay-fraction. silt-fraction. soil-pH. soil-chemical-properties. weathering. particle-size. soil-micromorphological-features. forest-influences
Geographic Locator:Nigeria

Identifiers:Pterocarpus santalinoides. Lixisols. Acioa barteri. Acioa
Organism Descriptors:Afzelia. Afzelia-africana. Leucaena. Leucaena-leucocephala. Pterocarpus. Treculia. Treculia-africana. Chrysobalanaceae
Supplemental Descriptors:Caesalpinioideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Afzelia. Mimosoideae. Leucaena. Papilionoideae. Moraceae. Urticales. Treculia. Rosales. West-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Pterocarpus. Chrysobalanaceae
Subject Codes:KK100. JJ200. JJ400. KK600
Supplementary Info:32 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems

26. Title:Scattered shrubs in pearl millet fields in semiarid Niger: effect on millet production
View Article: Agroforestry Systems. 2000. 48 (3). 219-228
CD Volume:309
Print Article: Pages: 219-228
Author(s):Wezel A
Author Affiliation:Botanical Institute, University of Greifswald, 17487 Greifswald, Germany
Language:English
Abstract:Various kinds of shrub species are found in many fields and fallows in semiarid Niger. In order to understand the nature of their interactions with millet (Pennisetum glaucum) and their role in soil conservation, experiments were conducted in 1995 and 1996 in a 9-yr-old fallow site on a farmer's field in SW Niger. Guiera senegalensis was the only shrub species present, and had a height up to 2.5 m and inter-shrub distances of 3-15 m. Plot size was 15x15 m to take account of the varying shrub density over the field. Three treatments were applied, assigned randomly to different shrub densities (2-22 per plot): cutting all shrubs, cutting half of the shrubs, and leaving all the shrubs. Millet was harvested per plot and in different circular zones around selected shrubs. In addition, transects across shrubs were investigated for soil parameters and microtopographic changes. Millet yield and soil-nutrient status were higher around shrubs than in the open field. Microtopography was elevated up to 20 cm near shrubs. The positive influence of shrubs on increased millet production extended to 2 m distance from the shrub. Competition between uncut shrubs and millet plants was found within a distance of 1.2 m. An increasing yield of millet was found in plots with shrubs up to a density of about 450 shrubs per hectare. Shrubs were effective in conservation of soil fertility, and are thus important for millet production. Based on the results given, optimal shrub management in farmers' fields would be cutting half of the shrubs and leaving the other half uncut for simultaneous wood production
Descriptors:pearl-millet. semiarid-zones. shrubs. plant-competition. soil-conservation. soil-fertility. crop-yield. fallow. stand-density. cutting. agroforestry
Geographic Locator:Niger
Organism Descriptors:Pennisetum-glaucum. Pennisetum. Guiera-senegalensis
Supplemental Descriptors:Pennisetum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Guiera. Combretaceae. Myrtales. dicotyledons. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa

Subject Codes:KK600. FF150. JJ600. PP500. FF100. FF005
Supplementary Info:20 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems

27. Title:Growth and ecological impacts of traditional agroforestry tree species in Central Himalaya, India
View Article: Agroforestry Systems. 2000. 48 (3). 257-272
CD Volume:309
Print Article: Pages: 257-272
Author(s):Maikhuri R K Semwal R L Rao K S Singh K Saxena K G
Author Affiliation:G.B. Pant Institute of Himalayan Environment and Development, Garhwal Unit, PB 92, Srinagar (Garhwal) 246174, India
Language:English
Abstract:A number of multipurpose tree species are conserved as scattered trees in settled farms on terraced slopes by traditional farmers in the Central Himalaya (Uttar Pradesh), India. Knowledge of the growth rates and ecological impacts of these tree species is limited. Ten locally valued multipurpose tree species, viz. Albizia lebbeck, Alnus nepalensis, Boehmeria rugulosa, Celtis australis, Dalbergia sissoo, Ficus glomerata [F. racemosa], Grewia optiva, Prunus cerasoides, Pyrus pashia and Sapium sebiferum, were established as mixed plantations at a degraded community forest land site and an abandoned agricultural land site in a village at 1200 m altitude in District Chamoli. At the abandoned agricultural land site, annual food crops were grown, along with planted trees, with supplemental irrigation and organic manure following traditional farming practices. Survival, height, stem circumference, crown depth and width, number of branches, above-ground biomass and soil physicochemical characteristics were monitored for up to 5 years. Annual above-ground tree biomass accumulation at the abandoned agricultural land site was 3.9 t ha-1 compared with 1.1 t ha-1 at the degraded forest land site. B. rugulosa, C. australis, F. racemosa, G. optiva, P. cerasoides and S. sebiferum showed more prominent differences in growth between the 2 sites than A. lebbeck, A. nepalensis, D. sissoo and P. pashia. A. nepalensis and D. sissoo gave the best growth performance at both sites. A significant improvement in soil physicochemical characteristics was observed after 5 years at both the sites. Carbon sequestration in the soil was higher than that in bole biomass
Descriptors:agroforestry-systems. environmental-impact. agricultural-land. abandoned-land. degraded-land. altitude. biomass. carbon-sequestration. degraded-forests. irrigation. manures. forest-plantations. survival. traditional-farming. monitoring. species-trials. growth. increment. biomass-production. soil-fertility. forest-influences. multipurpose-trees. community-forestry. food-crops. agrosilvicultural-systems
Geographic Locator:India. Uttar-Pradesh
Identifiers:Boehmeria rugulosa. Prunus cerasoides
Organism Descriptors:Albizia-lebbeck. Alnus-nepalensis. Alnus. Boehmeria. Celtis-australis. Celtis. Dalbergia-sissoo. Dalbergia. Ficus-racemosa. Ficus. Grewia. Grewia-optiva. Prunus. Pyrus. Pyrus-pashia. Sapium-sebiferum. Sapium
Supplemental Descriptors:Albizia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Alnus. Betulaceae. Fagales. Urticaceae. Urticales. Celtis. Ulmaceae. Dalbergia. Papilionoideae. Ficus. Moraceae. Tiliaceae. Malvales. Grewia. Rosaceae. Rosales. Pyrus. Sapium. Euphorbiaceae. Euphorbiales. South-Asia. Asia.

Developing-Countries. Commonwealth-of-Nations. India. Boehmeria. Prunus
Subject Codes:KK600. KK110. JJ600. JJ700. JJ800. FF005. FF150
Supplementary Info:30 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems
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28. Title:Plant species of traditional Mayan homegardens of Mexico as analogs for multistrata agroforests
View Article: Agroforestry Systems. 2000. 48 (3). 303-317
CD Volume:309
Print Article: Pages: 303-317
Author(s):Clerck F A J de Negreros Castillo P
Author Variant:de-Clerck-F-A-J
Author Affiliation:Department of Forestry, Iowa State University, Ames, IA 50011-1021, USA
Language:English
Abstract:The shortened fallow period in traditional slash and burn agriculture of the Maya of Quintana Roo, Mexico, has reduced soil fertility, crop yields, biodiversity, and mature forest vegetation. Studies have shown that agroforests that mimic local ecosystem processes can be used to provide for the farmers' while protecting and preserving forest resources and biodiversity. The objective of this investigation was to identify, describe, and evaluate Mayan crop plants that could be used as analog species in agroforest design. Participant observation, interviews with farmers, and field measurements were used to collect information on the social, agricultural, and ecological aspects of the plants. Five horizontal and one vertical strata were identified in mature home gardens: the herbaceous stratum, the low shrub stratum, the tall shrub stratum, the fruit tree stratum, the timber tree stratum, and the viny stratum. 77 forbs, shrubs, and vines identified for their temporal and spatial placement in an agroforest were categorized. The plants evaluated can be placed in one of the 4 developmental stages of an agroforest - herbaceous, shrub, fruit and timber tree. By using the plants identified and the analog hypothesis, an agroecological system can be designed that provides for the farmers' needs, and efficiently utilizes the resources on-site for the production of food, timber, medicinal plants, and non-timber products in a manner that protects the natural resource base of the region
Descriptors:biodiversity. developmental-stages. ecosystems. fallow-systems. tropical-forests. forest-resources. nature-conservation. medicinal-plants. natural-resources. shrubs. shifting-cultivation. soil-fertility. agroforestry-systems. development. choice-of-species. crops. design. indigenous-knowledge. home-gardens. stand-structure. stand-development. forbs. fruit-trees. forest-trees. multipurpose-trees. climbers. sustainability. farming-systems. traditional-farming. multistorey-cropping
Geographic Locator:Mexico
Supplemental Descriptors:North-America. America. Developing-Countries. Threshold-Countries. Latin-America. OECD-Countries
Subject Codes:KK600. FF150. JJ600. KK110. PP720. ZZ331. UU850. UU450. FF003. FF005
Supplementary Info:21 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems
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29. Title:Screening of 18 agroforestry species for highly acid and aluminium toxic soils of the humid tropics
View Article: Agroforestry Systems. 2000. 49 (1). 31-39
CD Volume:309
Print Article: Pages: 31-39
Author(s):Kanmegne J Bayomock L A Duguma B Ladipo D O
Author Affiliation:IRAD/ICRAF Agroforestry research Project, P.O.Box 2067, Yaounde, Cameroon
Language:English
Abstract:A screening trial involving 18 agroforestry species planted in a hedgerow design (3 rows per species at 3x1 m spacing) was initiated on highly acidic and Al toxic soils at Nkoemvone in southern Cameroon, with the objective of identifying fast growing species suitable for improving short fallows. Selected growth parameters evaluated were plant height, stem and crown diameter, number of stems at 3, 12 and 20 months after planting (MAP), and biomass yield at the first pruning (20 MAP). Nine months regrowth was evaluated for the same parameters. Outstanding height and stem diameter were observed for Indigofera zollingeriana, Inga edulis, Grewia mollis and Pterocarpus santalinoides. They reached between 6 and 9 m height and between 8 and 10 cm diameter. The best height at 20 MAP was correlated with the best stem diameter for I. zollingeriana (8.7, 8.6), I. edulis (7.7, 10.1) and P. santalinoides (6.4, 10.3). The same 4 species developed a crown of >5 m diameter and easily outcompeted weeds in the alleys. Grewia mollis, Glyphea brevis [Glyphaea brevis], Dactyladenia barteri [Acioa barteri] and I. zollingeriana had a shrubby architecture; Grewia mollis had up to 17 stems before the first pruning. Inga edulis and Grewia mollis produced the highest total biomass, with respectively 61 and 39 t/ha dry matter. Other species with more than 20 t/ha total mass were I. zollingeriana, P. santalinoides, and Xylia xylocarpa. The first pruning stimulated shoot development, and the response of the species was similar to growth before the first pruning. Therefore, I. edulis, P. santalinoides, Grewia mollis and I. zollingeriana had the best growth performances and can be recommended for introduction in short fallows provided their contribution to soil fertility processes is assessed. The other species included in the trial were Albizia ferruginea, A. niopoides, A. zygia, Anthonotha macrophylla, Enterolobium cyclocarpum, Gliricidia sepium, Leucaena leucocephala, Millettia griffoniana, M. laurentii and Tetrapleura tetraptera
Descriptors:agroforestry. aluminium. soil-fertility. soil-toxicity. biomass-production. increment. growth. species-trials. choice-of-species. pruning. weeds. improved-fallow. acid-soils. soil-types. multipurpose-trees
Geographic Locator:Cameroon
Identifiers:Pterocarpus santalinoides. Indigofera zollingeriana. Glyphaea brevis. Acioa barteri. Acioa. Glyphaea. Albizia ferruginea. Albizia niopoides. Albizia zygia. Anthonotha macrophylla. Millettia griffoniana. Milletta laurentii. Anthonotha
Organism Descriptors:Grewia. Inga-edulis. Indigofera. Inga. Pterocarpus. Xylia. Xylia-xylocarpa. Grewia-mollis. Chrysobalanaceae. Enterolobium-cyclocarpum. Gliricidia-sepium. Leucaena-leucocephala. Tetrapleura-tetraptera. Albizia. Enterolobium. Gliricidia. Leucaena. Millettia. Tetrapleura
Supplemental Descriptors:Tiliaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Inga. Mimosoideae. Fabaceae. Fabales. Papilionoideae. Xylia. Grewia. Rosales. Enterolobium. Gliricidia. Leucaena. Tetrapleura. Central-Africa. Africa-South-of-Sahara.

Africa. Developing-Countries. ACP-Countries. Francophone-Africa. Pterocarpus. Chrysobalanaceae. Albizia. Millettia
Subject Codes:KK600. KK110. JJ400. JJ600. FF150. FF500
Supplementary Info:13 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems

30. Title:Soil properties under Acacia nilotica trees in a traditional agroforestry system in central India
View Article: Agroforestry Systems. 2000. 49 (1). 53-61
CD Volume:309
Print Article: Pages: 53-61
Author(s):Pandey C B Singh A K Sharma D K
Author Affiliation:Department of Forestry, Indira Gandhi Agricultural University, Raipur 492 012, India
Language:English
Abstract:Acacia nilotica is an important multipurpose tree used in traditional agroforestry systems in the central belt of the Indian subcontinent. The tree is reported to reduce crop yields under its canopy. However, information is lacking on the spatial variation in soil physical characters, nutrient pool sizes and their availability to crops under the canopy. This study reports the influence of three tree canopy positions (mid canopy, canopy edge and canopy gap) of Acacia nilotica (more than or equal to 12 year old) on soil texture, organic C, total and mineral N and P, and soil pH, at 0-10, 10-20 and 20-30 cm soil depth at 10 rice field sites in Bilaspur District, Madhya Pradesh. The traditional agroforestry system involved was rice cropping in the rainy season, followed by winter crops (such as Linum usitatissimum, Triticum aestivum, Lathyrus sativus); the crops are generally sown close the stems of trees in the fields, which remain fallow in the summer when they are free range grazed. Sand particles declined by 10% and 9% whereas clay particles increased by 14% and 10% under the mid canopy and canopy edge, respectively, compared with the amounts in canopy gaps. Clay particles did not decline significantly with soil depth at any canopy position. The proportion of silt particles was not influenced by the canopy position. Soil organic C, total N, total P, mineral N (NO3--N and NH4+-N) and P were greater under mid canopy and canopy edge positions than in canopy gaps. Soil organic C and N pool sizes were maximum at 0-10 cm depth and declined with increasing depth. Total and mineral P contents were nearly uniform across the depths. The C/N ratio tended to increase with soil depth whereas the C/P ratio declined
Descriptors:agroforestry-systems. agrosilvicultural-systems. silvopastoral-systems. canopy. clay-fraction. silt-fraction. soil-depth. soil-pH. spatial-variation. soil-chemical-properties. soil-texture. crop-yield. soil-physical-properties. nutrient-content. soil-fertility. nutrient-availability. soil-organic-matter. chemical-composition. phosphorus. rice. traditional-farming. grazing. fallow. nitrogen-content. wheat
Geographic Locator:India. Madhya-Pradesh
Organism Descriptors:Acacia. Acacia-nilotica. Oryza-sativa. Linum-usitatissimum. Triticum-aestivum. Lathyrus-sativus. Oryza
Supplemental Descriptors:Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Acacia. Oryza. Poaceae. Cyperales. monocotyledons. Linum. Linaceae. Linales. Triticum. Lathyrus. Papilionoideae. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India

Subject Codes:KK600. FF150. FF005. PP350. FF007. JJ600. JJ300. JJ200
Supplementary Info:19 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems

31. Title:Agroforestry performance on small farms in Amazonia: findings from the Rondonia agroforestry pilot project
View Article: Agroforestry Systems. 2000. 49 (1). 63-83
CD Volume:309
Print Article: Pages: 63-83
Author(s):Browder J O Pedlowski M A
Author Affiliation:Correspondence address: Urban Affairs and Planning Virginia Polytechnic Institute and State University, VA 24061, USA
Language:English
Abstract:Experiences from both 'successful' and 'failed' agroforestry projects provide potentially useful lessons for future agroforestry project designers. Experimental one-hectare agroforestry tree species trial plots were established on 50 small-scale farms in recently settled agricultural communities in southwestern Brazilian state of Rondonia from 1993 to 1995, as the first phase of the Rondonian Agroforestry Pilot Project (RAPP). The trials tested 25 [?20] different species (tropical hardwoods and softwoods, fruit trees and palms; all native species except for teak, Tectona grandis), and showed encouraging survival and growth performances for most species under wide ranging plot management regimes. Tropical hardwood survival rates (after 18 months) ranged from 65% for cerejeira (Torresea acreana [Amburana acreana]) to 88% for mahogany (Swietenia macrophylla). Survival rates for commercial fruit and palm species were even higher. A comparison of attributes of 2 subgroups (successful and unsuccessful planters) suggests that previous experience with perennial monocultural cropping, greater social participation, land use history, and soil chemistry are positively associated with successful agroforestry species performance, while no significant differences exist between successful and unsuccessful planters in household size, area deforested, area in pasture, and land tenure security. A closer analysis of 'failed' agroforestry plots indicates the primary importance of social factors originating at the household level (e.g. inadequate plot maintenance, improper planting techniques, illness, etc.). Twelve different causes of plot failure were cited, falling into 3 classes. Of the total number of reasons given for plot failure, household level factors represented 54% of all causes cited. Project design and implementation factors (inappropriate plot design, defective planting material, etc.) were cited in 25% of cases and environmental factors (soil fertility constraints and pasture grass invasion) in 21% of cases
Descriptors:agroforestry. environmental-factors. fruit-trees. land-use. soil-chemical-properties. soil-fertility. survival. multipurpose-trees. forest-trees. broadleaves. growth. increment. performance. farmers. socioeconomics. species-trials. small-farms. development-projects. rural-development
Geographic Locator:Brazil. Rondonia
Identifiers:broadleaved trees. Amburana acreana. Amburana
Organism Descriptors:Arecaceae. Swietenia. Swietenia-macrophylla. Pinopsida. Tectona-grandis. Fabaceae
Supplemental Descriptors:Arecales. monocotyledons. angiosperms. Spermatophyta. plants. Meliaceae. Sapindales. dicotyledons. Swietenia. gymnosperms. Tectona. Verbenaceae. Lamiales. Fabales. South-America. America.

Developing-Countries. Threshold-Countries. Latin-America. Brazil. Fabaceae
Subject Codes:KK600. KK110. FF100. FF003. UU450. JJ200
Supplementary Info:20 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems
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32. Title:Field-scale influence of karite (Vitellaria paradoxa) on sorghum production in the Sudan zone of Burkina Faso
View Article: Agroforestry Systems. 2000. 49 (2). 153-175
CD Volume:309
Print Article: Pages: 153-175
Author(s):Boffa J M Taonda S J B Dickey J B Knudson D M
Author Affiliation:Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN 47907-1159, USA
Language:English
Abstract:Sorghum (Sorghum bicolor) production in 15 transect blocks, each with a karite (Vitellaria paradoxa) tree at each end, was evaluated on-farm in a village in southern Burkina Faso in a season of below-average rainfall. Under tree crowns, plant height and grain yield were significantly lower (by a factor of 16% for grain yield) than elsewhere in transects. In addition, mean plant height, and mean biomass and grain production per area as well as per plant were higher at the outside edge of tree crowns than in the middle of the field. Soil moisture content decreased significantly with increasing distance from the tree in the 0-20 cm soil layer. Top soils were also richer in organic carbon and potassium around tree crowns than in the middle of blocks. Sorghum performance in the zone under and around canopies was projected at field scale and compared with central transect controls. Grain production in karite parklands was higher with trees of mean crown radii of 225 to 275 cm and average densities of 12 and 31 trees/ha than in areas without trees. Therefore, farmers do not improve cereal production by reducing parkland tree densities below these levels. When nut production is included in the analysis, maintaining trees in fields can be economically advantageous at all densities
Descriptors:crop-yield. plant-height. potassium. soil-water-content. soil-organic-matter. soil-fertility. canopy. agrosilvicultural-systems. agroforestry-systems. soil-chemical-properties. nutrient-content. tropical-tree-nuts. multipurpose-trees
Geographic Locator:Burkina-Faso
Organism Descriptors:Vitellaria. Vitellaria-paradoxa. Sorghum-bicolor
Supplemental Descriptors:Sapotaceae. Ebenales. dicotyledons. angiosperms. Spermatophyta. plants. Vitellaria. Sorghum. Poaceae. Cyperales. monocotyledons. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa
Subject Codes:KK600. FF150. JJ300. JJ200. JJ600. FF005. FF003
Supplementary Info:32 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems
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33. Title:Tithonia diversifolia as a green manure for soil fertility improvement in western Kenya: a review
View Article: Agroforestry Systems. 2000. 49 (2). 201-221

CD Volume:309
Print Article: Pages: 201-221
Author(s):Jama B Palm C A Buresh R J Niang A Gachengo C Nziguheba G Amadalo B
Author Affiliation:National Agroforestry Research Centre, P.O. Box 25199, Kisumu, Kenya
Language:English
Abstract:The shrub species Tithonia diversifolia is widely distributed along farm boundaries in the humid and subhumid tropics of Africa. Green biomass of tithonia has been recognized as an effective source of nutrients for lowland rice (Oryza sativa) in Asia and more recently for maize (Zea mays) and vegetables in eastern and southern Africa. This paper reviews the potential of tithonia green biomass for soil fertility improvement based on recent research in western Kenya. Green leaf biomass of tithonia is high in nutrients, averaging about 3.5% N, 0.37% P and 4.1% K on a dry matter basis. Boundary hedges of sole tithonia can produce about 1 kg biomass (tender stems+leaves) m-1 yr.-1 on a dry weight basis. Tithonia biomass decomposes rapidly after application to soil, and incorporated biomass can be an effective source of N, P and K for crops. In some cases, maize yields were even higher with incorporation of tithonia biomass than with commercial mineral fertilizer at equivalent rates of N, P and K. In addition to providing nutrients, tithonia incorporated at 5 t dry matter ha-1 can reduce P sorption and increase soil microbial biomass. Because of high labour requirements for cutting and carrying the biomass to fields, the use of tithonia biomass as a nutrient source is more profitable with high-value crops such as vegetables than with relatively low-valued maize. The transfer of tithonia biomass to fields constitutes the redistribution of nutrients within the landscape rather than a net input of nutrients. External inputs of nutrients would eventually be required to sustain production of tithonia when biomass is continually cut and transferred to agricultural land
Descriptors:green-manures. soil-fertility. biomass. hedges. maize. nutrient-content. rice. vegetables. reviews. labour-costs
Geographic Locator:Kenya
Organism Descriptors:Zea-mays. Oryza-sativa. Tithonia-diversifolia. Oryza
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Oryza. Tithonia. Asteraceae. Asterales. dicotyledons. East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
Subject Codes:KK600. JJ700. EE110. FF003. FF005. JJ600. EE900
Supplementary Info:46 ref
ISSN:0167-4366
Year:2000
Journal Title:Agroforestry Systems

34. Title:Nitrogen contribution of five leguminous trees and shrubs to alley cropped maize in Ibadan, Nigeria
View Article: Agroforestry Systems. 2000. 50 (2). 123-136
CD Volume:309
Print Article: Pages: 123-136
Author(s):Okogun J A Sanginga N Mulongoy K
Author Affiliation:International Institute of Tropical Agriculture (IITA), Oyo Road, PMB 5320, Ibadan, Nigeria
Language:English
Abstract:The nitrogen contributions were compared of 2-yr-old Albizia lebbeck, Gliricidia sepium and Leucaena leucocephala (all nitrogen fixing) and Senna corymbosa and Senna siamea (syn. Cassia siamea) (both non-

nitrogen fixing) to yield of maize grown in alley cropping systems over 4 four cropping seasons (2 seasons each in 1992 and 1993) at Ibadan, Nigeria. Pruning was done 4 times each year during the cropping seasons and the prunings were weighed and applied to evenly to the plots. Maize shoot biomass and maize grain yield in an A. lebbeck alley compared favourably with that in G. sepium and L. leucocephala alleys. Maize biomass and grain yield in S. corymbosa alleys were the lowest. Within A. lebbeck, L. leucocephala, and G. sepium alleys there were no significant differences in the maize yield in the alleys that received 0, 40 or 80 kg N/ha. Application of more than 40 kg N/ha in S. corymbosa alleys was not necessary as there was no significant increase in maize yield at the higher level of nitrogen. Maize yield and N uptake in A. lebbeck alleys were not significantly different from yield and N uptake in G. sepium and L. leucocephala alleys at the same fertilizer level. There was a significant correlation between hedgerow tree biomass and maize grain yield. At the end of 12 wk after pruning application in the first year, the organic residues of the prunings applied in the alleys ranged from 5% (G. sepium) to 44% (A. lebbeck) of the original prunings applied; the slow rate of A. lebbeck decomposition could have a beneficial effect on the soil. The maize N recovery from applied N fertilizer was low (10-22%). Percentage N recovery from the prunings was low in the non-N fixing trees (12-22%), while the recovery was high (49-59%) in A. lebbeck and in the other nitrogen fixing tree prunings. Thus A. lebbeck, apart from enhancing maize growth and grain yield like L. leucocephala and G. sepium, had an added advantage because it remained longer as mulching material on the soil because of its slow rate of decomposition. It was also able to survive frequent pruning with no dieback. This indicates that A. lebbeck is a good potential candidate for alley cropping in West Africa. S. corymbosa performed poorly compared with the other legume trees. Though it responded to N fertilizer, showing a positive interaction between the hedgerow and fertilizer application, it had a high dieback rate following pruning and termite attack

Descriptors:maize. shrubs. woody-plants. legumes. alley-cropping. biomass. intercropping. decomposition. pruning-trash. mulching. nutrient-uptake. nitrogen-fixation. pruning. crop-yield. dieback. insect-pests. forest-pests. plant-pests. agroforestry-systems. nitrogen-fertilizers. soil-fertility. plant-nutrition. Senna. nitrogen-fixing-trees

Geographic Locator:Nigeria. West-Africa

Identifiers:Senna corymbosa. Senna siamea

Organism Descriptors:Zea-mays. Albizia-lebbeck. Gliricidia-sepium. Leucaena-leucocephala. Isoptera. Cassia-siamea

Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Albizia. Mimosoideae. Fabaceae. Fabales. dicotyledons. Gliricidia. Papilionoideae. Leucaena. insects. arthropods. invertebrates. animals. Cassia. Caesalpinioideae. West-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Senna

Subject Codes:KK600. FF150. JJ700. FF005. FF620. JJ600. FF061

Supplementary Info:27 ref

ISSN:0167-4366

Year:2000

Journal Title:Agroforestry Systems

35. Title:Correlation of corn and soybean grain yield with topography and soil properties

View Article: Agronomy Journal. 2000. 92 (1). 75-83

CD Volume:297
Print Article: Pages: 75-83
Author(s):Kravchenko A N Bullock D G
Author Affiliation:Dep. of Crop Sciences, Univ. of Illinois, 1102 S. Goodwin Ave., Urbana, IL 61801, USA
Language:English
Abstract:The objective of this study was to determine how useful topographical information can be, alone or together with selected soil properties, for explaining yield variability on a field scale. Yield-topography-soil relationships were analysed using dense maize (Zea mays) and soyabean (Glycine max) yield data collected during 1994-97, a detailed terrain map, and relatively densely sampled soil organic matter (OM) content, cation exchange capacity, and P and K soil test concentration measurements from 8 fields in central Illinois and eastern Indiana, USA. Soils of the Illinois fields were classified as Haplaquolls and Argiudolls; soils of the Indiana fields were classified as Hapludalfs. Topographical land features used included elevation (measured with survey grid global positioning system and land-based laser), slope, curvature, and flow accumulation (derived from elevation data). Soil properties explained about 30% of yield variability (from 5 to 71% for different fields), with OM content influencing yield the most. The cumulative effect of the topographical features explained about 20% of the yield variability (6 to 54%). Elevation had the most influence on yield, with higher yields consistently observed at lower landscape positions. Curvature, slope, and flow accumulation significantly affected yield only in certain conditions, such as extreme topographical locations (undrained depressions or eroded hilltops) combined with very high or low precipitation. Soil properties and topography combined explained about 40% of yield variability (10 to 78%)
Descriptors:altitude. cation-exchange-capacity. crop-yield. maize. nutrient-content. phosphorus. potassium. slope. soil-organic-matter. soil-chemical-properties. soyabeans. terrain. topography. yield-correlations. yield-factors. precision-agriculture. soil-analysis. precipitation. soil-fertility. fields. soil-composition
Geographic Locator:Illinois. Indiana. USA
Organism Descriptors:Glycine-max. Zea-mays. Glycine-(Fabaceae)
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Zea. Poaceae. Cyperales. monocotyledons. East-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. FF100. JJ200. PP500. JJ600
Supplementary Info:33 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal

36. Title:Optimal spacing of soil conservation barriers: example of rock bunds in Burkina Faso
View Article: Agronomy Journal. 2000. 92 (2). 361-368
CD Volume:297
Print Article: Pages: 361-368
Author(s):Zougmore R Kabore D Lowenberg DeBoer J
Author Affiliation:INERA, 03 B.P. 7192 Ouaga-dougou 03, Burkina Faso
Language:English
Abstract:Though construction methods vary widely, use of physical or biological barriers to conserve soil and water is common throughout the world.

Rock or earthen bunds are common physical barriers. Strips of perennial grass, shrubs or trees serve as biological barriers. Often these barriers are arranged on a slope in roughly parallel contour bands. The spacing between barriers has important economic consequences, because distance from the barrier may create patterns of soil fertility and water availability that influence crop yields and because the spacing determines land available for cropping. The objective of this study was to develop a method for determining the optimal economic spacing of conservation barriers and apply that method to spacing of rock bunds in Burkina Faso. The steps in the optimization method include estimating a continuous yield response to distance between barriers, developing a mathematical expression to describe how costs change as spacing is altered, and optimizing using calculus. The method is general and can be applied to determining spacing of any conservation technique that is applied in bands. For example, this method could be adapted to spacing of grass strips, hedges, windbreaks, or terraces. This analysis suggests that the economically optimal spacing of rock bunds on the Central Plateau of Burkina Faso depends on the type of construction, materials transport cost, and how labour is organized

Descriptors:barriers. bunds. soil-conservation. spacing. analysis. construction. costs. grass-strips. hedges. optimization. responses. shrubs. slope. soil-fertility. terraces. trees. water-availability. windbreaks. economics. economic-analysis

Geographic Locator:Burkina-Faso

Organism Descriptors:grasses. Poaceae

Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa

Subject Codes:PP400. PP350. KK600. EE900. EE350. EE110. JJ600. JJ300. EE100

Supplementary Info:19 ref

ISSN:0002-1962

Year:2000

Journal Title:Agronomy Journal

37. Title:Sugarcane response to phosphorus fertilizer in relation to soil test recommendations on Everglades Histosols

View Article: Agronomy Journal. 2000. 92 (2). 375-380

CD Volume:297

Print Article: Pages: 375-380

Author(s):Glaz B Powell G Perdomo R Ulloa M F

Author Affiliation:USDA-ARS Sugarcane Field Station, HCR Box 8, Canal Point, FL 33438, USA

Language:English

Abstract:To protect habitat in the Florida Everglades (USA), legislation mandates a reduction of at least 25% in the P content of water discharged from the Everglades Agricultural Area (EAA). Accurate P fertilizer recommendations for sugarcane (interspecific hybrids of Saccharum spp.), the major crop in the EAA, are needed to help achieve this P reduction. The objective of this study was to compare two soil-tests for basing P fertilizer recommendations for sugarcane grown on Histosols in the EAA. Three yield characteristics were measured at four field locations with no added P, an often-recommended commercial rate of 24 kg P ha-1, and 48 kg P ha-1 for the plant-cane, first-ratoon, and, at three locations, the second-ratoon crop. One group of eight genotypes was planted at two locations, and two other groups of eight genotypes were each planted at one of two other locations. An acetic acid-extractable P (Pa) soil test predicted yields better than the

water-extractable P (Pw) test. However, unexpected responses in sugar and cane yields occurred for both P extraction procedures. Further studies of the effects of soil pH, factors affecting P mineralization, and sugarcane genotype response to P may explain some of the unexpected results

Descriptors:phosphorus. guidelines. water-pollution. fertilizers. phosphorus-fertilizers. application-rates. genotypes. hybrids. interspecific-hybridization. legislation. mineralization. soil-pH. sugarcane. plant-nutrition. soil-testing. soil-fertility. yield-correlations. Histosols. fertilizer-requirement-determination

Geographic Locator:USA. Florida

Organism Descriptors:Saccharum-officinarum. Saccharum

Supplemental Descriptors:Saccharum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. South-Atlantic-States-of-USA. Southern-States-of-USA. USA. Gulf-States-of-USA. Southeastern-States-of-USA

Subject Codes:FF005. JJ700. PP400

Supplementary Info:21 ref

ISSN:0002-1962

Year:2000

Journal Title:Agronomy Journal

38. Title:Effect of soil phosphorus on leaf development and senescence dynamics of field-grown maize

View Article: Agronomy Journal. 2000. 92 (3). 428-435

CD Volume:297

Print Article: Pages: 428-435

Author(s):Colomb B Kiniry J R Debaeke P

Author Affiliation:INRA, B.P. 27, 31326 Castanet Tolosan, France

Language:English

Abstract:Phosphorus deficiency generally decreases plant biomass accumulation by limiting interception of photosynthetically active radiation (PAR) rather than reducing efficiency of conversion of PAR into dry matter. To document the role of P availability in leaf growth and senescence dynamics in maize (Zea mays L.), a 3-yr. field experiment was conducted in southern France with very low, moderate, high, or very high soil test P levels. Leaf appearance rate, individual leaf area, and green fraction changes were recorded at weekly intervals. Rates and duration of expansion and senescence processes were derived independently from fitted logistic functions. Phosphorus deficiency slowed the rate of leaf appearance and reduced the final area of leaves located below the main ear by 18 to 27%, depending on year. The reduction in leaf expansion rates accounted for most of the area reduction over leaf position and years. Senescence rates of the lower leaves were reduced by 29%. The expansion and senescence dynamics of upper leaves were little affected by soil P level. The whole plant peak green leaf area was lower under P-stressed conditions (16%), and its date of occurrence was significantly delayed (6%). Plant senescence rate was reduced by 15 to 33% during most of the grain filling period. Leaf area duration from emergence to complete senescence was reduced by 13.5%. The early effects of P deficiency on leaf dynamics accounted for most of the 7 to 10% reduction in the amount of absorbed PAR, observed as soon as canopy development allowed maximum light interception

Descriptors:leaves. plant-development. maize. phosphorus. senescence. plant-nutrition. deficiency. soil-fertility. development

Organism Descriptors:Zea-mays

Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF061. JJ600. FF060
Supplementary Info:32 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

39. Title:'Georgia-5' tall fescue establishment responses to amendment of Louisiana Coastal Plain Soils
View Article: Agronomy Journal. 2000. 92 (3). 479-484
CD Volume:297
Print Article: Pages: 479-484
Author(s):Pitman W D
Author Affiliation:Louisiana State Univ. Agric. Center, Rosepine Res. Stn., P.O. Box 26, Rosepine, LA 70659, USA
Language:English
Abstract:Release of tall fescue (Festuca arundinacea) cv. Georgia-5 expanded the range of this species into the Coastal Plain of the southeastern USA. Initial plantings indicated that responses to lime and P may be greater on infertile, acid Coastal Plain soils than reported within the primary area of adaptation. Three field experiments and a greenhouse experiment were conducted on Louisiana Coastal Plain soils. In the field, all combinations of 50 kg P ha-1, 90 kg K ha-1, and 4.0 t lime ha-1 were applied. In one experiment, all treatments which included P increased establishment-year forage yield, with an increase from 310 kg ha-1 for the control to 1500 kg ha-1 with P alone. Plant responses to lime were obtained at this site in the second year. In the other experiments, drought apparently precluded responses at one site, while plant stands improved with lime at the other site. Linear plant responses to P up to 80 kg ha-1 (soil P of 142 mg kg-1) and a quadratic response to lime were obtained in the greenhouse. These results illustrate variation in responses to be expected with fertility, rainfall, and other growing conditions, but still indicate the importance of P and lime to Georgia-5 tall fescue seedlings on acid, infertile Coastal Plain soils. Responses in stand establishment are suggested to soil levels of P and Ca or pH beyond those typically recommended for other regions
Descriptors:drought. forage. seedlings. stand-establishment. coastal-plain-soils. establishment. soil-amendments. fertilizers. lime. liming. phosphorus-fertilizers. potassium-fertilizers. acid-soils
Geographic Locator:USA. Louisiana
Organism Descriptors:Festuca-arundinacea
Supplemental Descriptors:Festuca. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. West-South-Central-States-of-USA. Southern-States-of-USA. USA. Delta-States-of-USA. Gulf-States-of-USA
Subject Codes:FF007. FF100. JJ700
Supplementary Info:18 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

40. Title:Yield parameters as affected by introduction or discontinuation of catch crop use
View Article: Agronomy Journal. 2000. 92 (5). 909-914
CD Volume:297

Print Article: Pages: 909-914
Author(s):Hansen E M Kristensen K Djurhuus J
Author Affiliation:Dep. of Crop Physiology and Soil Science, Biometry Research Unit, Danish Institute of Agricultural Sciences (DIAS), Research Centre Foulum, P.O. Box 50, DK-8830 Tjele, Denmark
Language:English
Abstract:A 24-yr-old permanent field trial on coarse sand (Orthic Haplohumod) under temperate coastal climate conditions (southern Jutland, Denmark) was used to determine (i) the effect of introducing perennial ryegrass (Lolium perenne L.) as a catch crop on plots with a history of low input of organic matter, and (ii) the residual effect of long-term use of ryegrass as a catch crop on main crop yield and N uptake. The catch crop (8-10 kg ha-1) was undersown in spring wheat (Triticum aestivum L.). From 1993 to 1996, four treatments were included: catch crop since 1968, catch crop since 1993, no catch crop, and catch crop until 1993. Each treatment was conducted at two previously established N rates (60 and 120 kg N ha-1 yr-1), which were subdivided into four new N rates (0, 60, 90, and 120 kg N ha-1 yr-1). Two years after introduction of the catch crop, yields were no longer different from yields with long-term previous catch crop use. The residual effect of long-term catch crop use on yield persisted for more than 4 yr. With previous long-term use of a catch crop compared with no previous use, N fertilization could be reduced by 15 or 27 kg N ha-1 yr-1 at the 60 or 120 kg N ha-1 yr-1 rate, respectively, without yield reductions. The experiment shows that the use of ryegrass as a catch crop has the potential to benefit main crop yield and soil fertility
Descriptors:catch-crops. cropping-systems. nitrogen-fertilizers. crop-yield. residual-effects. sandy-soils. wheat
Geographic Locator:Denmark
Organism Descriptors:Lolium-perenne. Triticum-aestivum
Supplemental Descriptors:Lolium. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Triticum. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:FF005. FF150. FF100. JJ700
Supplementary Info:22 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal

41. Title:Spatial distribution of extractable phosphorus, potassium, and magnesium as influenced by fertilizer and tall fescue endophyte status
View Article: Agronomy Journal. 2000. 92 (5). 981-986
CD Volume:297
Print Article: Pages: 981-986
Author(s):Schomberg H H Stuedemann J A Franzluebbers A J Wilkinson S R
Author Affiliation:USDA-ARS, J. Phil Campbell, Sr., Natural Resources Conservation Center, 1420 Experiment Station Rd., Watkinsville, GA 30677-2373, USA
Language:English
Abstract:Animals influence nutrient cycling within grazed systems, and the effect may be greater with tall fescue (Festuca arundinacea) because of endophyte-produced alkaloids that cause fescue toxicosis and alter animal behaviour. Twelve grazed tall fescue pastures, established in a Cecil sandy loam (fine, kaolinitic, thermic Typic Kanhapludult) soil in Georgia, USA, were used to measure fertility (134-15-56 and 336-37-139 kg N-P-K ha-1 yr-1) and endophyte (low, 0 to 29% and high, 65 to 94%) effects on P and K distribution. Soil samples were collected in winter

1997 at distances of 1, 10, 30, 50, and 80 m from permanently located shade and water sources at eight depth increments down to 1.5 m. Nutrient accumulation was greatest 1 m from shade and water sources where P, K, and Mg concentrations were 1.7 to 8, 2.5 to 15, and 1.1 to 1.5 times greater than average concentrations at the remaining distances, depending on depth and fertility level. Accumulation of P, K, and Mg in the area 10 to 80 m from shade and water was limited. When summed for the 0- to 300-mm depth and estimated on a per hectare basis, extractable P was 64% greater in high than in low endophyte-infected tall fescue pastures at 1 m from shade and water sources (703 vs. 428 kg ha-1, LSD=93) and averaged 252 kg ha-1 for remaining distances. Endophyte levels did not affect K distribution and only affected Mg distribution under the low-fertility treatment. Endophyte effects accrued over a long time period, which would indicate that altering grazing and pasture management (movement of animals, fertilizer and lime applications, and location of shade and water sources) to reduce these effects would be needed only occasionally to reduce potential environmental risks

Descriptors:phosphorus. potassium. magnesium. fertilizers. endophytes. soil. nutrients
Geographic Locator:USA. Georgia
Organism Descriptors:Festuca-arundinacea
Supplemental Descriptors:Festuca. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. South-Atlantic-States-of-USA. Southern-States-of-USA. USA. Southeastern-States-of-USA
Subject Codes:FF500. JJ700. FF007. JJ200
Supplementary Info:24 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal

42. Title:Rice yield and nitrogen utilization efficiency under alternative straw management practices
View Article: Agronomy Journal. 2000. 92 (6). 1096-1103
CD Volume:297
Print Article: Pages: 1096-1103
Author(s):Eagle A J Bird J A Horwath W R Linquist B A Brouder S M Hill J E Kessel C van
Author Variant:van-Kessel-C
Author Affiliation:Dep. of Agronomy and Range Science, Univ. of California, Davis, CA 95616, USA
Language:English
Abstract:Nitrogen fertility is an important component of rice (Oryza sativa L.) cultivation systems, especially where air and soil quality issues have prompted a search for alternatives to rice straw burning. This study examined the effects of different rice straw management practices and winter flooding on yield, N uptake, and N use efficiency. The experiment, established on two sites in California, was initiated in 1993 on a Sodic Endoaquert near Maxwell and in 1994 on a Xeric Duraquert near Biggs. Main plot treatments were winter flooding and no winter flooding, and four straw management practices - straw burned, incorporated, rolled, and baled/removed - were subplot treatments. Zero N fertilizer microplots were established yearly in each plot. At currently recommended N fertilization levels, where other nutrients were sufficient, grain yield was unaffected by alternative straw management or winter flooding. However, in the third year after experiment initiation, the grain yield in zero N fertilizer plots was

greater where straw was retained, i.e., incorporated and rolled. In Years 3 through 5 at Maxwell, straw retention increased N uptake by rice by an average of 19 kg N ha-1 where no N fertilizer was applied and by 12 kg N ha-1 at recommended rate of N fertilizer application. Winter flooding further increased crop N uptake when straw was retained. The additional available soil N from straw led to increased N uptake without corresponding increased grain yield, which decreased N use efficiency and necessitates the re-evaluation of N fertilizer application rates

Descriptors:nitrogen-fertilizers. rice. use-efficiency. straw-disposal. straw-burning. crop-residues. rice-straw. straw-incorporation. flooding

Geographic Locator:USA. California

Organism Descriptors:Oryza-sativa. Oryza

Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. Pacific-States-of-USA. Western-States-of-USA. USA

Subject Codes:FF100. FF005. JJ700

Supplementary Info:41 ref

ISSN:0002-1962

Year:2000

Journal Title:Agronomy Journal

43. Title:Soil and plant influences on crop response to two African phosphate rocks

View Article: Agronomy Journal. 2000. 92 (6). 1167-1175

CD Volume:297

Print Article: Pages: 1167-1175

Author(s):Weil R R

Author Affiliation:Department of Natural Resource Sci. and Landscape Arch., Univ. of Maryland, College Park, MD 20742-4452, USA

Language:English

Abstract:Affordable technologies are needed to allow smallholder farmers to effectively use the phosphate rocks (PRs) found in many African countries. A pot study was conducted in Tanzania using two PRs (Panda and Minjingu) and two soils (an Alfisol and an Andisol) to assess responses of several types of crops to these PRs and to determine whether changes in crop responses to PR with time are due to crop sequence or merely contact time with soil. The Panda PR had no effect on growth or tissue P content in maize (Zea mays L.), bean (Phaseolus vulgaris L.), and pigeon pea (Cajanus cajan), but it nearly tripled these parameters for cabbage (Brassica oleracea) on the Alfisol. Freshly applied Minjingu PR only slightly stimulated maize and pigeon pea, but nearly tripled cabbage yield in both soils. Previous crop had a greater effect than previously applied PR on second crop maize. Yields and P content of maize were always lowest following cabbage and highest following pigeon pea. Minjingu PR, but not Panda PR, had residual benefits on maize. Severe Mn toxicity occurred in all crops on the unamended Andisol. The calcareous Minjingu PR, but not the Panda PR, increased yields dramatically on the Andisol, partly by raising the soil pH in water enough (from 4.6 to 5.6) to alleviate Mn toxicity. Future P fertility work in Africa should pay adequate attention to the effects of crop sequences and soil biological properties

Descriptors:phosphorus-fertilizers. rock-phosphate. maize. cabbages. alfisols. andisols. crop-yield. manganese. toxicity. acid-soils. pigeon-peas

Organism Descriptors:Zea-mays. Phaseolus-vulgaris. Cajanus-cajan. Brassica-oleracea-var.-capitata

Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Phaseolus. Papilionoideae. Fabaceae. Fabales.

dicotyledons. Cajanus. Brassica-oleracea. Brassica. Brassicaceae. Capparidales
Subject Codes:JJ700. FF005. FF003. FF100
Supplementary Info:38 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal
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44. Title:Evaluation of the presidedress soil nitrogen test for no-tillage maize fertilized at planting
View Article: Agronomy Journal. 2000. 92 (6). 1176-1183
CD Volume:297
Print Article: Pages: 1176-1183
Author(s):Rozas H S Echeverria H E Studdert G A Dominguez G
Author Affiliation:Facultad de Ciencias Agrarias (U.N.M.P.)-Estacion Experimental Agropecuaria Balcarce (I.N.T.A.), Unidad Integrada Balcarce, C.C. 276, 7620 Balcarce, Buenos Aires, Argentina
Language:English
Abstract:Soil N transformations under no-tillage (NT) could affect the utility of the presidedress soil nitrate test (PSNT), particularly where early season growing conditions are cool as in Balcarce, Argentina. The PSNT was evaluated for irrigated NT maize (Zea mays L.) with different N rates (Exp. 1) and for rainfed maize under NT and conventional tillage (CT) with different preceding crops and N rates (Exp. 2). In both experiments, N was surface broadcast as (NH2)2CO at planting. The reliability of the PSNT was evaluated when NH4+-N was determined and when samples were taken up to a 60-cm depth in the first experiment. In this experiment, the relative yield (RY) was highly correlated (R2=0.61-0.86) with soil NO3--N concentration (0-30 cm) at the six-leaf stage (V6). The reliability (R2) did not improve when NH4+-N was determined or when sampling was done up to a 60-cm depth. In the second experiment, there was a good relationship between the RY and NO3--N concentration (0-30 cm) at V6 (R2=0.47), and the R2 value increased (R2=0.61) when the preceding crop was wheat (Triticum aestivum L.). Soil NO3--N critical concentrations ranged between 17 and 27 mg kg-1 and were associated with a RY of 0.92 or higher in both experiments. The results of this study show that the PSNT can be used to evaluate preplant N applications as a complementary method to N budget in maize under different management practices
Descriptors:maize. soil-test-values. nitrogen-fertilizers. soil-analysis. no-tillage. nitrates. tillage. crop-yield. soil-fertility. ammonium-nitrogen. nitrate-nitrogen
Geographic Locator:Argentina
Organism Descriptors:Zea-mays
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-America. America. Developing-Countries. Threshold-Countries. Latin-America
Subject Codes:JJ600. FF005. JJ200. JJ700. FF100
Supplementary Info:50 ref
ISSN:0002-1962
Year:2000
Journal Title:Agronomy Journal
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45. Title:Contributions of nitrogen by field pea (Pisum sativum L.) in a continuous cropping sequence compared with a lucerne (Medicago sativa L.)-based pasture ley in the Victorian Wimmera
View Article: Australian Journal of Agricultural Research. 2000. 51 (1). 13-22

CD Volume:324
Print Article: Pages: 13-22
Author(s):McCallum M H Peoples M B Connor D J
Author Affiliation:Victorian Institute for Dryland Agriculture, Private Bag 260, Horsham, Vic. 3401, Australia
Language:English
Abstract:The nitrogen (N) dynamics (N2 fixation inputs, changes in soil mineral N and total N, N removed in agricultural produce) of a lucerne-based phase farming system (grazed lucerne (Medicago sativa)-annual medic (M. truncatula)-ryegrass (Lolium rigidum) pastures grown in rotation with crops) was compared with that of continuous cropping (cereals, oilseeds, and grain legume crops) on grey cracking clay soil in the Wimmera, Victoria, Australia. The contribution of biological N2 fixation to the N economy of these different systems was strongly linked with biomass production by the legume components of pastures, or field peas (Pisum sativum) in the cropping sequence. The amount of fixed N present in field pea shoots or the total amount of N2 estimated to be fixed by the whole plant (shoots and roots) (121-175 kg N and 181-262 kg N/ha for each crop, respectively) was generally greater than the combined measured annual inputs of fixed N by lucerne and annual medic during a pasture ley (40-95 kg N/ha in herbage, 80-190 kg N/ha in total plants), although large amounts of N were removed in the field pea seeds at harvesting (115-151 kg N/ha). Over 2 years (1995-96), the seasonal rainfall patterns had a much larger impact on the growth, dry matter production, and N2 fixation of annual medic compared with lucerne. Winter-cleaning of ryegrass from the pasture before cropping resulted in a greater legume content in the pasture and generally increased annual amounts of fixed N in herbage (by up to 55 kg N/ha). Total soil N at depth (0.5-1.0 m) was significantly greater after 2-4 years of pasture than under continuous cropping. In one year (1996), the amount of soil mineral N following a winter-cleaned pasture was greater (by 32-45 kg N/ha, 0-1 m) than after either canola or wheat, producing a yield benefit in a subsequent canola crop that was equivalent to pre-drilling 46 kg N/ha as fertilizer. However, despite some improvements in N fertility, large crop responses to N fertilizer were still observed following pasture. Grain yield was increased by 0.33-0.55 t/ha in canola and by 1.0 t/ha in wheat, grain protein was increased by 0.7-2.3% in canola and by 1.3% in wheat, and oil yield in canola enhanced by 124-205 kg/ha with pre-drilled applications of fertilizer N. It is speculated that more legume-dominant pastures (>80%) could provide greater flow-on N benefits to farming systems in the Wimmera than the mixed legume-grass swards used in the present study. However, it is likely that a need will remain for supplementary fertilizer N to optimize the nutrition of subsequent non-legume crops in the region
Descriptors:cropping-systems. rotations. continuous-cropping. lucerne. peas. biomass. biomass-production. rape. farming-systems. fertilizers. nitrogen-fertilizers. nitrogen-fixation. soil. nitrogen. cycling. nitrogen-cycle. plant-nutrition. mineral-nutrition. growth. grain-legumes. wheat. cereal-grains. clay-soils
Geographic Locator:Australia. Victoria
Organism Descriptors:Medicago-sativa. Medicago-truncatula. Medicago. Pisum. Pisum-sativum. Brassica-napus. Lolium. Lolium-rigidum. Triticum-aestivum. Triticum. Brassica-napus-var.-oleifera
Supplemental Descriptors:Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Pisum. Brassica. Brassicaceae. Capparidales. Poaceae. Cyperales. monocotyledons. Lolium. Triticum. Brassica-napus. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia

Subject Codes:FF150. JJ700. PP350. FF100. JJ600
Supplementary Info:45 ref
ISSN:0004-9409
Year:2000
Journal Title:Australian Journal of Agricultural Research

46. Title:Soil audit of a long-term phosphate experiment in south-western Victoria: total phosphorus, sulfur, nitrogen, and major cations
View Article: Australian Journal of Agricultural Research. 2000. 51 (6). 737-748
CD Volume:324
Print Article: Pages: 737-748
Author(s):McCaskill M R Cayley J W D
Author Affiliation:Agriculture Victoria, Private Bag 105, Hamilton, Vic. 3300, Australia
Language:English
Abstract:A nutrient audit was conducted on a long-term grazed fertilizer experiment at Hamilton in south-western Victoria, Australia, to determine the fate of applied P and S. Single superphosphate was applied at rates averaging between 1 and 33 kg P/ha per year since the start of the experiment in 1977. Soil samples were taken in 1994 by coring to a depth of 80 cm, and analysed for total soil nutrient concentration. Most (80%) applied P was in the top 43 cm of the soil profile. A further 6.5% was transferred to sheep camp areas and 6.5% was exported as a product. It was estimated that <0.4% of applied P left the site in surface water movement. Unaccounted P (6.6%) was probably in the soil, but could not be detected because of the relatively wide confidence margin for total soil P. Only 31% of applied S was detected in the top 43 cm, 3.6% had been transferred to sheep camps, and 4.9% exported in product. Unaccounted S (60%) probably moved deeper into the soil where it could not be detected from background levels of total soil S. Bulk density in the 0-5 cm layer increased by 1% for each additional ewe per ha, but decreased by up to 0.4% for each kg/ha per year of P fertilizer. Soil N accumulated at 46 kg N/ha per year at the highest P application rate. Differences in total potassium (K) between low and high fertility treatments indicated that 20 kg K/ha per year had moved out of the 5-19 cm soil layer of the high fertility treatment. This was attributed to competition for exchange sites from calcium (Ca) in the superphosphate. It was concluded that fertilizers with a higher P:S ratio and a lower Ca content than superphosphate are more appropriate for the basalt-derived duplex soils because they would reduce problems associated with displacement of K in the soil profile
Descriptors:nitrogen. phosphate. phosphorus. sulfur. application-rates. bulk-density. soil-amendments. calcium. fertilizers. potassium. soil-profiles. superphosphate. surface-water. runoff. soil-water. soil-water-movement. movement-in-soil. land-use. soil-properties. soil-chemistry. soil-physical-properties
Geographic Locator:Australia. Victoria
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:JJ200. JJ300. JJ700. PP300
Supplementary Info:38 ref
ISSN:0004-9409
Year:2000
Journal Title:Australian Journal of Agricultural Research

47. Title:Water-use efficiency on irrigated dairy farms in northern Victoria and southern New South Wales
View Article: Australian Journal of Experimental Agriculture. 2000. 40 (5). 643-653
CD Volume:324
Print Article: Pages: 643-653
Author(s):Armstrong D P Knee J E Doyle P T Pritchard K E Gyles O A
Author Affiliation:Department of Natural Resources and Environment, Kyabram Dairy Centre, Institute of Sustainable Irrigated Agriculture, 120 Cooma Road, Kyabram, Vic. 3620, Australia
Language:English
Abstract:A survey of 170 randomly selected, irrigated, dairy farms in northern Victoria and 9 in southern New South Wales was conducted to examine and benchmark the key factors influencing water-use efficiency. Water-use efficiency was defined as the amount of milk (kg milk fat plus protein) produced from pasture per megalitre of water (irrigation plus effective rainfall). Information on water-use, milk production, supplementary feeding, farm size and type, pasture management, and irrigation layout and management was collected for each farm by personal interview for the 1994-95 and 1995-96 seasons. The farms were ranked in the order of water-use efficiency with the average farm compared with the highest and lowest 10% of farms. The range in water-use efficiency was 25-115 kg milk fat plus protein/ML, with the highest 10% averaging 94 kg/ML and the lowest 10% averaging 35 kg/ML. The large range in water-use efficiency indicated potential for substantial improvement on many farms. The high water-use efficiency farms, when compared with the low group: (i) produced a similar amount of milk from less water (387 v. 572 ML) ($P<0.05$), less land (48 v. 83 ha) ($P<0.05$) and a similar number of cows (152 v. 143 cows); (ii) had higher estimated pasture consumption per hectare (11.5 v. 5.5 t DM/ha) ($P<0.01$) and per megalitre (1.0 v. 0.5 t DM/ML) ($P<0.01$); (iii) had higher stocking rates (3.2 v. 1.8 cows/ha) ($P<0.01$); (iv) used higher rates of nitrogen fertiliser (59 v. 18 kg N/ha.year) ($P<0.05$) and tended to use more phosphorus fertiliser (64 v. 34 kg P/ha.year) ($P<0.10$); (v) used similar levels of supplementary feed (872 v. 729 kg concentrates/cow); (vi) had higher milk production per cow (396 v. 277 kg fat plus protein) ($P<0.05$); and (vii) directed a higher proportion of the estimated energy consumed by cows into milk production (53 v. 46%) ($P<0.05$). The survey data confirmed that irrigated dairy farm systems are complex and variable. For example, the amount of feed brought in from outside the milking area varied from 0 to 74% of the estimated total energy used by a milking herd. There was a large range in the level of supplement input amongst the farms in the high water-use efficiency group, and in the low water-use efficiency group. This indicates that the management of the farming system has a greater impact on the efficiency of water-use on irrigated dairy farms, than the type of system. The data from the survey provide information for individual farms, a measure of the water-use efficiency of the industry, and an indication of the quality of regional land and water resources
Descriptors:dairy-farms. consumption. dairy-cattle. farming. dairy-cows. feeds. nitrogen-fertilizers. improvement. irrigation. nitrogen. pastures. grassland-management. phosphorus-fertilizers. milk-protein. seasons. stocking-rate. supplements. water-resources. farm-management. water-use-efficiency. milk-production. milk-quality. milk-fat. milk-yield. nutrients. soil-fertility
Geographic Locator:New-South-Wales. Australia. Victoria
Supplemental Descriptors:Australia. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries

Subject Codes:PP200. JJ800. QQ010. LL110. LL180. LL520. PP350
Supplementary Info:28 ref
ISSN:0816-1089
Year:2000
Journal Title:Australian Journal of Experimental Agriculture

48. Title:Comparison of four phalaris cultivars under grazing: drought survival and subsequent performance under rotational grazing versus set stocking
View Article: Australian Journal of Experimental Agriculture. 2000. 40 (8). 1047-1058
CD Volume:324
Print Article: Pages: 1047-1058
Author(s):Culvenor R A
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia
Language:English
Abstract:Four cultivars of phalaris (Phalaris aquatica) were evaluated for their ability to survive a severe drought in 1994 in an existing grazing experiment at 2 sites near Canberra. The effect of rotational grazing and set stocking on persistence of phalaris measured as basal cover, pasture composition in spring and animal production from the pastures was assessed over the next 4 years. Basal cover of all cultivars declined sharply in 1994, but had recovered by August 1995 at a site with a relatively deep soil profile. Recovery was slower at a site with a shallower soil profile. Sirosa declined more in basal cover than Holdfast and Australian at the latter site. All of the cultivars survived the drought well but Sirosa may be more sensitive to overgrazing in drought. Compared with set stocking, rotationally grazed pastures had a higher ($P<0.001$) proportion of phalaris for all cultivars 2 years after management treatments began, and a higher ($P<0.005$) basal cover for 2 winter-active cultivars after 3 years. Overall, a divergent effect of grazing management on basal cover (managementxyear interaction) could only be demonstrated at $P=0.08$ because of a large effect of site variation for another winter-active cultivar, Sirosa. Phalaris basal cover did not decline with set stocking and it was concluded that rotational grazing was beneficial, but not crucial, for the persistence of winter-active phalaris cultivars in this environment. Site factors and their manipulation by management were also important for the persistence of phalaris. A review of the persistence of phalaris over the entire 9 years of the grazing experiment concluded that all cultivars displayed good persistence under conditions of reasonable soil fertility. The importance of good establishment for a high presence of phalaris in later years was emphasised
Descriptors:persistence. grazing. cultivars. drought. grazing-systems. rotational-grazing. set-stocking
Geographic Locator:Australia. Australian-Capital-Territory
Organism Descriptors:Phalaris-aquatica
Supplemental Descriptors:Phalaris. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:FF007. FF100
Supplementary Info:40 ref
ISSN:0816-1089
Year:2000
Journal Title:Australian Journal of Experimental Agriculture

49. Title:Crop rotation effects on soil carbon and physical fertility of two Australian soils
View Article: Australian Journal of Soil Research. 2000. 38 (1). 71-84
CD Volume:322
Print Article: Pages: 71-84
Author(s):Blair N Crocker G J
Author Affiliation:Agronomy and Soil Science, University of New England, Armidale, NSW 2350, Australia
Language:English
Abstract:The effect of crop rotations, including legumes and fallows, on soil structural stability, unsaturated hydraulic conductivity, and the concentration of different carbon fractions was examined in a long-term rotation trial established in 1966 on a black earth (Pellic Vertisol) and a red clay (Chromic Vertisol) soil in New South Wales, Australia. There was a large decrease in the concentration of soil carbon fractions following cropping and cultivation on both soils. The inclusion of some legume rotation crops resulted in an increase in labile carbon concentrations compared with continuous wheat or a long fallow treatment. Aggregate stability to wetting under both immersion and tension wetting was reduced as a result of cropping and cultivation for both soil types. However, there was an improvement in aggregate stability with immersion wetting, on the red clay soil, for the lucerne (Medicago sativa), clover (Trifolium subterraneum), and continuous wheat treatments compared with the long fallow. Similar results were found for the Black Earth soil; however, on this soil the medic (M. scutella) rotation also showed an improvement in soil structure. On the red clay soil there was a decrease in hydraulic conductivity (K) with cropping, at all tensions measured. K for the black earth soil was higher at 30 and 40 mm tension on the cropped soil than on the uncropped reference soil, but at 10 mm tension the reference soil had a higher K value than all rotations except the lucerne. There was a significant correlation between labile carbon and all determinations of aggregate stability for the red clay soil. Long fallowing and no-till techniques combined with the return of residues from either the primary crop or rotation crops which have a slower breakdown rate should be encouraged, as this management is likely to have a better potential for increasing soil carbon content and improving soil structure. The investigation of ways to better increase the quantity and quality of soil organic matter and hence soil chemical and physical fertility is necessary for long-term sustainable agriculture
Descriptors:carbon. organic-carbon. soil. breakdown. clay-soils. rotations. cultivation. fallow. farmers. hydraulic-conductivity. improvement. legumes. lucerne. organic-matter. residues. soil-organic-matter. soil-structure. Vertisols. soil-types. stability. sustainability. techniques. treatment. unsaturated-hydraulic-conductivity. wetting. wheat
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Trifolium. Medicago-sativa. Medicago. Trifolium-subterraneum. Triticum. Triticum-aestivum
Supplemental Descriptors:Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Medicago. Trifolium. Poaceae. Cyperales. monocotyledons. Triticum. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:FF150. JJ200. JJ600. JJ300. JJ400
Supplementary Info:39 ref
ISSN:0004-9573
Year:2000
Journal Title:Australian Journal of Soil Research

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50. Title:Influence of organic and mineral fertilisers on soil biological and physical properties
View Article: Bioresource Technology. 72 (1). March , 2000. 9-17
CD Volume:326
Print Article: Pages: 9-17
Author(s):Marinari S Masciandaro G Ceccanti B Grego S
Author Affiliation:Dipartimento di Agrobiologia Agrochimica, University of Tuscia, Viterbo
Language:English
Language of Summary:English (EN)
Abstract:The aim of this research was to study in a field experiment the influence of different fertiliser applications on soil biological and physical properties. Vermicompost (VC) from biological sludge, stabilised dairy manure or mineral nitrogen fertiliser (NH4NO3) were applied to a corn crop (Zea mays L.) at 200 kg N ha-1. Soil enzyme activity (acid phosphatase, dehydrogenase and protease BAA) and CO2 production were measured as indices of soil biological activity. These measures of metabolic activity were correlated to soil physical properties such as soil porosity. The soluble fractions of C and N were taken as indicators of fertiliser effects on soil fertility. There were positive correlations between soil porosity, enzymatic activity and CO2 production in organic and mineral treatments. The addition of organic fertilisers improved soil physical and biological properties. The increase in macropores, ranging from 50-500 mum, in soil treated with organic fertilisers was mainly due to an increase in elongated pores, which are considered very important both in soil-water-plant relationships and in maintaining a good soil structure. Organic treatments stimulated soil biological activity probably due to an enrichment of soil organic matter. Mineral fertiliser enhanced soil porosity by increasing regular and irregular pores and caused a priming effect of native soil organic matter
Descriptors:bioresource technology; biotechnology; manure; soils: biological properties, physical properties. Agronomy (Agriculture); Soil Science. carbon; enzymes; mineral fertilizers: uses; nitrogen; organic fertilizers: uses
Organism Descriptors:Zea mays [corn] (Gramineae)
Supplemental Descriptors:Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Agronomy (Agriculture); Soil Science
ISSN:0960-8524
Year:2000
Journal Title:Bioresource Technology
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51. Title:Vermicomposting of crop residues and cattle dung with Eisenia foetida
View Article: Bioresource Technology. 73 (2). June, 2000. 95-98
CD Volume:326
Print Article: Pages: 95-98
Author(s):Bansal Sudha Kapoor K K
Author Affiliation:Department of Microbiology, Haryana Agricultural University, Hisar, 125004
Language:English
Language of Summary:English (EN)
Abstract:We studied vermicomposting with Eisenia foetida of mustard residues and sugarcane trash mixed with cattle dung in a 90-day composting experiment. Vermicomposting resulted in significant reduction in C:N

ratio and increase in mineral N, after 90 days of composting, over treatments uninoculated with earthworms. Microbial activity, as measured by dehydrogenase assay, increased up to 60 days and declined on further incubation. There was more total N in the compost prepared by earthworm inoculation. However, the differences were not significant. Total P, K and Cu contents did not differ in compost prepared with earthworm inoculation from the uninoculated treatments
Descriptors:soil fertility. Bioprocess Engineering; Waste Management (Sanitation); Soil Science. carbon; copper; nitrogen: mineral; phosphorus; potassium
Organism Descriptors:Eisenia foetida [earthworm] (Oligochaeta)
Supplemental Descriptors:Oligochaeta: Annelida, Invertebrata, Animalia. Animals; Annelids; Invertebrates
Subject Codes:Bioprocess Engineering; Waste Management (Sanitation); Soil Science
ISSN:0960-8524
Year:2000
Journal Title:Bioresource Technology

52. Title:Roles of organic soil amendments and soil organisms in the biological control of plant-parasitic nematodes: A review
View Article: Bioresource Technology. 74 (1). Aug., 2000. 35-47
CD Volume:326
Print Article: Pages: 35-47
Author(s):Akhtar Mohammad Malik Abdul
Author Affiliation:Department of Plant Protection, Institute of Agriculture, Aligarh Muslim University, Aligarh, 202 002
Language:English
Language of Summary:English (EN)
Abstract:Organic soil amendments stimulate the activities of microorganisms that are antagonistic to plant-parasitic nematodes. The decomposition of organic matter results in accumulation in the soils of specific compounds that may be nematicidal. Amendments are mainly bio-products and wastes from industrial, agricultural, biological and other activities. Control of plant-parasitic nematodes can be by improvements of soil structure and fertility, alteration of the level of plant-resistance, release of nemato- toxic compounds), parasites (fungi and bacteria) and other nematode antagonistic (biological control agents). The mode of action of organic amendments leading to plant disease control and stimulation of microorganisms is complex and dependent on the nature of the amendments
Descriptors:organic matter; organic soil amendments; soil. Ecology (Environmental Sciences); Infection; Soil Science. plant disease: disease-miscellaneous
Organism Descriptors:bacteria (Bacteria); fungus (Fungi); invertebrate (Invertebrata); microorganisms (Microorganisms); nematodes (Nematoda): phytopathogen; plant (Plantae): host
Supplemental Descriptors:Bacteria: Microorganisms; Fungi: Plantae; Invertebrata: Animalia; Microorganisms; Nematoda: Aschelminthes, Helminthes, Invertebrata, Animalia; Plantae. Animals; Aschelminths; Bacteria; Eubacteria; Fungi; Helminths; Invertebrates; Microorganisms; Nonvascular Plants; Plants
Subject Codes:Ecology (Environmental Sciences); Infection; Soil Science
ISSN:0960-8524
Year:2000
Journal Title:Bioresource Technology

53. Title:Effects of continuous use of cattle manure and fertilizer phosphorus on crop yields and soil organic phosphorus in a Vertisol
View Article: Bioresource Technology. 75 (2). November, 2000. 113-118
CD Volume:326
Print Article: Pages: 113-118
Author(s):Damodar Reddy D Subba Rao A Rupa T R
Author Affiliation:Division of Soil Chemistry and Fertility, Indian Institute of Soil Science, Nabibagh, Berasia Road, Bhopal, 462 038
Language:English
Language of Summary:English (EN)
Abstract:Soil organic phosphorus plays a significant role in phosphorus (P) nutrition of crops especially in high-fixing soils of the tropics. Soil management practices, which favour the accretion of organic P, would, therefore, help in improving soil P fertility over time. In a six-year field experiment with soybean-wheat rotation on a Vertisol, the effects of continuous additions of four rates of animal manure (0, 4, 8 and 16 t ha-1 yr-1) with and without fertilizer P (22 kg P ha-1) on crop yields and soil organic P were examined. Soybean and wheat yields, and P uptakes increased significantly with the addition of manure and fertilizer P. For the similar amount of P input, the yield increases were larger with manure P than with fertilizer P. Combined use of manure and fertilizer P resulted in a greater crop yield and P uptake than their solitary application. Irrespective of the treatment, P content in different organic P fractions followed the order: moderately-resistant organic P (MROP) > moderately-labile organic P (MLOP) > highly-resistant organic P (HROP) > labile organic P (LOP), with their relative proportion being in the ratio of 22:8:5:1. Continuous annual application of manure increased the content of all the soil organic-P fractions, except the HROP, over the control. Addition of fertilizer P together with manure promoted the accretion of soil organic P. Generally the increases in organic P fractions due to manure additions were strongly associated with a concomitant increase in the soil organic carbon. Cropping without manure and fertilizer P depleted soil organic P, while regular additions of manure and fertilizer P favoured its accumulation. The magnitude of depletion/build-up was strikingly larger in MLOP and MROP fractions compared to others, indicating that these two fractions are major sources and sinks for plant-available P in soil
Descriptors:Vertisol; cattle manure: continuous use; crop production; crop rotation; crop yields; soils: analysis. Agriculture; Nutrition; Waste Management (Sanitation); Soil Science. fertilizer phosphorus: continuous use
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; Nutrition; Waste Management (Sanitation); Soil Science
ISSN:0960-8524
Year:2000
Journal Title:Bioresource Technology

54. Title:Population dynamics response of Lupinus arcticus to fertilization, clipping, and neighbour removal in the understory of the boreal forest
View Article: Canadian Journal of Botany. 78 (6). June, 2000. 753-758
CD Volume:298
Print Article: Pages: 753-758

Author(s):Graham Stephanie A Turkington Roy
Author Affiliation:Department of Botany, University of British Columbia, Vancouver, BC, V6T 1Z4
Language:English
Language of Summary:English (EN); French (FR)
Abstract:A demographic study was conducted on field populations of Lupinus arcticus S. Wats. growing in the understory of a white spruce dominated forest, near Kluane Lake, Yukon. The relative effects of soil fertility level, neighbours, and herbivory were assessed using a factorial experiment of +- fertilizer (N-P-K), +- neighbour removal, and +- clipping. We monitored the dynamics of leaves and collected data on reproduction, survival, and size for two growing seasons. Fertilizing increased the incidence of disease on leaves and reduced reproductive efficiency. Clipping reduced leaf cohort survivorship, total leaf density, and the incidence of disease on leaves. Removing neighbours increased the percent cover of L. arcticus and decreased total leaf mortality. Treatments had no effect on the survival of leaves in early cohorts. Although there were some significant responses to treatments, the overall tendency was a lack of response, especially pertaining to leaf population dynamics. This low response to the treatments imposed is consistent with the argument that plants growing in low productivity, infrequently disturbed habitats should show little response to short-term changes in local environmental conditions. The results are also consistent with suggestions that plants in moderately stressed habitats should be more adapted to withstand grazing than competition
Descriptors:boreal forest; demography; population responses: clipping, fertilizer, neighbor removal. Terrestrial Ecology (Ecology, Environmental Sciences); Population Studies. NPK [nitrogen-phosphorus-potassium]: fertilizer
Geographic Locator:Yukon (Canada, North America, Nearctic region)
Organism Descriptors:Lupinus arcticus (Leguminosae); white spruce (Coniferopsida)
Supplemental Descriptors:Coniferopsida: Gymnospermae, Spermatophyta, Plantae; Leguminosae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Gymnosperms; Plants; Spermatophytes; Vascular Plants
Subject Codes:Terrestrial Ecology (Ecology, Environmental Sciences); Population Studies
ISSN:0008-4026
Year:2000
Journal Title:Canadian Journal of Botany

55. Title:Compensatory growth of three herbaceous perennial species: The effects of clipping and nutrient availability
View Article: Canadian Journal of Botany. 78 (6). June, 2000. 759-767
CD Volume:298
Print Article: Pages: 759-767
Author(s):Hicks Samantha Turkington Roy
Author Affiliation:Department of Botany, University of British Columbia, Vancouver, BC, V6T 1Z4
Language:English
Language of Summary:English (EN); French (FR)
Abstract:The continuum of responses model (CRM) and the growth rate model (GRM) make conflicting predictions about the effects of soil nutrient availability on the resilience of plants to herbivory. A factorial experiment was conducted in the understory of the boreal forest to examine the effects of fertilization and simulated herbivory on the

rate and amount of regrowth of three herbaceous perennial species (Achillea millefolium L., Festuca altaica Trin., and Mertensia paniculata (Aiton) G. Don.). As clipping intensity increases various measures of plant performance decrease. Fertilization reduces the ability of clipped plants to compensate for biomass loss regardless of species and growth measure. Under natural soil fertility levels in this study, M. paniculata is more likely to compensate for leaf loss than A. millefolium and F. altaica. Contrary to the findings of previous field studies, the compensatory responses of the three species studied were most consistent with the predictions of the GRM. Plants in our study sites grow in nutrient-poor soils, whereas the majority of compensatory studies have been carried out on herbaceous or woody plants in temperate regions. Resources are generally more abundant in temperate zones than in boreal forest zones, and the GRM may be a better predictor of compensatory ability of plants growing in naturally nutrient-deficient soils

Descriptors:compensatory growth: clipping, nutrient availability; growth rate model; responses model. Models and Simulations (Computational Biology); Development; Terrestrial Ecology (Ecology, Environmental Sciences)

Organism Descriptors:Achillea millefolium (Compositae): herbaceous perennial species; Festuca altaica (Gramineae): herbaceous perennial species; Mertensia paniculata (Boraginaceae): herbaceous perennial species

Supplemental Descriptors:Boraginaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Compositae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Monocots; Plants; Spermatophytes; Vascular Plants

Subject Codes:Models and Simulations (Computational Biology); Development; Terrestrial Ecology (Ecology, Environmental Sciences)

ISSN:0008-4026
Year:2000
Journal Title:Canadian Journal of Botany

56. Title:Impact of precommercial thinning in balsam fir stands on soil nitrogen dynamics, microbial biomass, decomposition, and foliar nutrition

View Article: Canadian Journal of Forest Research. 2000. 30 (2). 229-238
CD Volume:299
Print Article: Pages: 229-238

Author(s):Thibodeau L Raymond P Camire C Munson A D
Author Affiliation:Departement des sciences du bois et de la foret, Pavillon Abitibi-Price, Universite Laval, Sainte-Foy, QC G1K 7P4, Canada

Language:English
Language of Summary:french

Abstract:The effects of precommercial thinning on soil nitrogen dynamics, microbial biomass, cellulose decomposition, and foliar nutrition were studied in 20-year-old balsam fir (Abies balsamea) stands across a range of drainage conditions (good, imperfect, and poor) in Quebec. Soils are ferro-humic podzols to orthic humic podzols with sand to sandy loam textures. In the first year after thinning, initial early season ammonium (NH_4^+-N) pools in the mineral horizon were significantly higher in the thinned plots ($P=0.019$), while net nitrogen mineralization (NH_4^+-N plus NO_3^--N) decreased in these same plots ($P=0.052$). The thinning treatment significantly increased microbial biomass nitrogen (Nmic) in the organic horizon ($P=0.051$). Simple regression analysis indicated the importance of soil temperature in controlling Nmic. Decomposition of cellulose substrate in the organic horizon was significantly increased by thinning, and mass loss was

related to soil temperature. Increased decomposition and nutrient availability after thinning were reflected in improved N, P, and K nutrition in current, 1- and 2-year-old balsam fir needles. The temporal extent of this improved fertility will be verified by longer term monitoring
Descriptors:biomass. decomposition. plant-nutrition. thinning. cellulose. mineralization. nutrient-availability. soil-temperature. forest-soils. Podzols. soil-chemical-properties. ammonium. nitrate. nitrogen. soil-water-regimes. soil-flora. microorganisms. soil-organic-matter. phosphorus. potassium
Geographic Locator:Canada. Quebec
Organism Descriptors:Abies-balsamea
Supplemental Descriptors:Abies. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:KK110. JJ100. JJ200. JJ300. FF061
Supplementary Info:53 ref
ISSN:0045-5067
Year:2000
Journal Title:Canadian Journal of Forest Research

57. Title:Influence of fire on native nitrogen-fixing plants and soil nitrogen status in ponderosa pine - Douglas-fir forests in western Montana
View Article: Canadian Journal of Forest Research. 2000. 30 (2). 274-282
CD Volume:299
Print Article: Pages: 274-282
Author(s):Newland J A DeLuca T H
Author Affiliation:School of Forestry, University of Montana, Missoula, MT 59812, USA
Language:English
Language of Summary:french
Abstract:Nitrogen fixing plants have been reported to play an important role in replacing N lost from soil in fire dominated ecosystems. Exclusion of fire from ponderosa pine (Pinus ponderosa)/Douglas-fir (Pseudotsuga menziesii) forests of western Montana has led to widespread changes in forest structure, composition, and function, including a potential reduction in the occurrence of N-fixing plant species. The effect of fire exclusion and reintroduction of fire on the frequency, occurrence, and function of native N-fixing plant species was investigated at 11 paired burned and unburned sites in western Montana. These pairs had been either undisturbed since the early 1900s or had been repeatedly opened by logging and/or fire over the last 80-100 years. Nitrogen-fixing species found in study sites included Ceanothus velutinus, Lupinus argenteus, L. laxiflorus, L. leucophyllus, L. sericeus, Purshia tridentata and Shepherdia canadensis. Although the percent cover of N-fixing plants was low at all sites, the cover and frequency of N-fixing plants were significantly greater in sites exposed to fire than in the unburned sites and greater in repeatedly opened sites than in undisturbed sites. In contrast, levels of available N were significantly lower in burned sites compared with unburned sites and in repeatedly opened sites. Nitrogen-fixing plants may have played an important role in maintaining productivity in frequently burned ponderosa pine forests but now appear to be suppressed in fire-excluded forests
Descriptors:coniferous-forests. nitrogen-fixation. logging. forest-fires. fire-ecology. soil-fertility. nitrogen. forest-soils. ecological-disturbance. productivity
Geographic Locator:USA. Montana

Identifiers:nitrogen fixing plants
Organism Descriptors:Pinus-ponderosa. Pseudotsuga-menziesii
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Pseudotsuga. North-America. America. Developed-Countries. OECD-Countries. Mountain-States-of-USA. Western-States-of-USA. USA. Great-Plains-States-of-USA
Subject Codes:KK130. KK110. JJ100. JJ200. ZZ331. JJ600
Supplementary Info:48 ref
ISSN:0045-5067
Year:2000
Journal Title:Canadian Journal of Forest Research
Copyright:Copyright CAB International

58. Title:Elevated atmospheric CO2 and species mixture alter N acquisition of trees in stand microcosms
View Article: Canadian Journal of Forest Research. 2000. 30 (5). 827-836
CD Volume:299
Print Article: Pages: 827-836
Author(s):Friend A L Jifon J L Berrang P C Seiler J R Mobley J A
Author Affiliation:Department of Forestry, P.O. Box 9681, Mississippi State University, State College, MS 39762-9681, USA
Language:English
Language of Summary:french
Abstract:The potential for elevated atmospheric CO2 to increase forest growth depends on how it affects plant acquisition of soil nitrogen (N) in realistic competitive settings. Seedling microcosms were grown in large (0.6-m2) boxes of forest soil placed outdoors in CO2-controlled open-top chambers at the Center for Forest Environmental Studies, Georgia, during 1994-95. Loblolly pine (Pinus taeda) and sweetgum (Liquidambar styraciflua) were grown as single-species stands (monocultures) and as
Descriptors:carbon-dioxide-enrichment. climate. biomass. soil-fertility. forest-soils. monoculture. seedlings. soil-water. chemical-composition. plant-composition. climatic-change. nutrient-uptake. roots. shoots. root-systems. nitrogen-content
Geographic Locator:USA. Georgia
Organism Descriptors:Liquidambar-styraciflua. Pinus-taeda
Supplemental Descriptors:Liquidambar. Altingiaceae. Hamamelidales. dicotyledons. angiosperms. Spermatophyta. plants. Pinus. Pinaceae. Pinopsida. gymnosperms. North-America. America. Developed-Countries. OECD-Countries. South-Atlantic-States-of-USA. Southern-States-of-USA. USA. Southeastern-States-of-USA
Subject Codes:PP500. KK100. FF040. FF061
Supplementary Info:49 ref
ISSN:0045-5067
Year:2000
Journal Title:Canadian Journal of Forest Research
Copyright:Copyright CAB International

59. Title:The effect of temperature on site index in western Canada and Scandinavia estimated from IUFRO Pinus contorta provenance experiments
View Article: Canadian Journal of Forest Research. 2000. 30 (6). 921-929
CD Volume:299
Print Article: Pages: 921-929
Author(s):Fries A Lindgren D Ying C C Ruotsalainen S Lindgren K Elfving B Karlmats U
Author Affiliation:Department of Forest Genetics and Plant Physiology, Swedish University of Agricultural Sciences, SE-901 83 Umea, Sweden
Language:English
Language of Summary:french

Abstract:Site index was calculated for 78 experimental plantations in western Canada (British Columbia and Yukon) and northern Finland and Sweden, representing a wide range of site environments where lodgepole pine (Pinus contorta var. latifolia) is considered as a potential afforestation species. The plantations and provenances belong to the International Union of Forest Research Organizations' international provenance testing programme, and estimates of site index (projected 50-year height) were based on height growth of recommended provenances. The estimated site indices were used in regression analyses with temperature data and estimated soil fertilities to predict the change in forest production due to a warmer climate, which may follow an expected rise in atmospheric CO2. The influence of temperature was strong and considerably stronger in northern Finland and Sweden than in Canada. The relationships differed between the two continents and between sites located north of 56 deg N and south of that latitude. Soil fertility had a small but significant influence. Estimates of increases in site index and potential productivity in different scenarios for increases in temperature sum and average July temperatures are given
Descriptors:IUFRO. provenance. site-class-assessment. afforestation. atmosphere. climate. indexes. latitude. forest-plantations. productivity. soil-fertility. temperature. forest-soils. global-warming. climatic-change. provenance-trials. heat-sums. land-productivity. geographical-variation
Geographic Locator:Canada. Finland. Sweden. British-Columbia. Yukon-Territory
Identifiers:site index
Organism Descriptors:Pinus-contorta
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Scandinavia. Northern-Europe. Europe. European-Union-Countries. Canada
Subject Codes:KK110. KK100. PP500. JJ600. FF020
Supplementary Info:46 ref
ISSN:0045-5067
Year:2000
Journal Title:Canadian Journal of Forest Research

60. Title:Boreal forest ecosystem dynamics. II. Application of the model to four vegetation types in interior Alaska
View Article: Canadian Journal of Forest Research. 2000. 30 (6). 1010-1023
CD Volume:299
Print Article: Pages: 1010-1023
Author(s):Yarie J
Author Affiliation:Department of Forest Sciences, School of Agriculture and Land Resources Management, University of Alaska Fairbanks, Fairbanks, AK 99775, USA
Language:English
Language of Summary:french
Abstract:The Spatial Alaskan Forest Ecosystem Dynamics (SAFED) model was validated across four of the most common vegetation types found in interior Alaska. The vegetation types were an alder (Alnus spp.)-balsam poplar (Populus balsamifera) site (FP2), an old-growth balsam poplar and white spruce (Picea glauca) site (FP3), a mixed deciduous (primarily birch (Betula papyrifera) and aspen (Populus tremuloides)) and white spruce site (UP2), and a mature white spruce site (UP3). The FP site types are common on the floodplain along the Tanana River and the UP site types are common in the uplands in interior Alaska. SAFED is based on nitrogen productivity for vegetation growth, litter fall

quantity and quality, and microbial efficiency for forest floor decomposition. The state factors (climate, topography, and disturbance) are used to describe a broad-scale classification of the landscape to define basic limitations for the driving variables. Climate and ecosystem-level disturbances are handled as restricted stochastic processes. The model has been programmed in a spatial framework as an ARC/INFO AML within the GRID package. The current version of the model has been validated as functional from an individual tree basis (1-m2 cell size) in a number of forest types found in interior Alaska. The growth, litter fall, and forest floor decomposition were compared with data from the sites. An estimate of yearly carbon balance for the four sites was calculated

Descriptors:ecosystems. forests. vegetation-types. climate. decomposition. floodplains. forest-litter. poplars. productivity. site-types. topography. upland-areas. forest-soils. deciduous-forests. mixed-forests. coniferous-forests. carbon-nitrogen-ratio. increment. biomass. diameter. nitrogen. mineralization. soil-fertility. biological-activity-in-soil. mathematical-models. geographical-information-systems. forest-ecology. cycling. carbon-cycle

Geographic Locator:Alaska. USA

Identifiers:carbon balance. spatial analysis

Organism Descriptors:Alnus. Betula-papyrifera. Picea-glauca. Populus-balsamifera. Populus-tremuloides

Supplemental Descriptors:Betulaceae. Fagales. dicotyledons. angiosperms. Spermatophyta. plants. Betula. Picea. Pinaceae. Pinopsida. gymnosperms. Populus. Salicaceae. Salicales. Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries

Subject Codes:KK100. JJ100. JJ600. ZZ100. ZZ331

Supplementary Info:27 ref

ISSN:0045-5067

Year:2000

Journal Title:Canadian Journal of Forest Research

61. Title:Understorey competition affects tree growth and fate of fertilizer-applied 15N in a coastal British Columbia plantation forest: 6-year results

View Article: Canadian Journal of Forest Research. 2000. 30 (9). 1379-1388

CD Volume:299

Print Article: Pages: 1379-1388

Author(s):Chang S X Preston C M

Author Affiliation:Department of Forestry, P.O. Box 8008, North Carolina State University, Raleigh, NC 27695-8008, USA

Language:English

Language of Summary:french

Abstract:Growth of planted seedlings in cutovers dominated by salal (Gaultheria shallon) is poor largely because of low N availability and understorey competition. The response of tree growth and fertilizer use efficiency to understorey competition (mainly salal) was studied on a site on northern Vancouver Island, planted with western redcedar (Thuja plicata), western hemlock (Tsuga heterophylla) and Sitka spruce (Picea sitchensis). The trees were four years old when (15NH4)2SO4 (200 kg N/ha, 3.38044% enrichment) was applied in 1991 to single-tree plots, with either understorey removed from (treated) or left in (control) the plots. Half of the plots were sampled after either two (1992) or six (1996) growing seasons. Understorey competition continued to significantly reduce height and diameter growth between 1992 and 1996, except diameter growth for western redcedar. Nitrogen and 15N

concentration in both tree and understorey components decreased from 1992 to 1996 and N concentration in 1-year-old foliage in 1996 (but not in 1992) was significantly lower in the control than in the treated plots, indicating that the site was low in N supply and the effect of fertilizer application on tissue N concentration did not last for 6 years. Results strongly indicated that the trees or understorey vegetation had no net uptake of fertilizer N beyond the second growing season. Understorey vegetation components played a significant role in the uptake and recycling of fertilizer N in this forest ecosystem
Descriptors:understorey. weed-control. woody-weeds. plant-competition. nitrogen-fertilizers. fertilizers. forest-soils. forest-plantations. increment. plant-height. diameter. cycling. nitrogen. plant-composition. plant-nutrition. nutrient-uptake. soil-chemical-properties. soil-fertility. radioactive-tracers. ammonium-sulfate. weeds. woody-plants
Geographic Locator:Canada. British-Columbia
Organism Descriptors:Gaultheria-shallon. Thuja-plicata. Tsuga-heterophylla. Picea-sitchensis. plants
Supplemental Descriptors:Gaultheria. Ericaceae. Ericales. dicotyledons. angiosperms. Spermatophyta. plants. Thuja. Cupressaceae. Pinopsida. gymnosperms. Tsuga. Pinaceae. Picea. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:FF061. HH200. ZZ331. KK110. JJ600. JJ700. FF500
Supplementary Info:37 ref
ISSN:0045-5067
Year:2000
Journal Title:Canadian Journal of Forest Research

62. Title:Modeling self-thinning of unthinned Lake States red pine stands using nonlinear simultaneous differential equations
View Article: Canadian Journal of Forest Research. 2000. 30 (9). 1410-1418
CD Volume:299
Print Article: Pages: 1410-1418
Author(s):Turnblom E C Burk T E
Author Affiliation:Management and Engineering Division, College of Forest Resources, University of Washington, P.O. Box 352100, Seattle, WA 98195-2100, USA
Language:English
Language of Summary:french
Abstract:Forest management demands thorough knowledge of ecological systems. Tree interaction dynamics are one component of these ecological systems. Developing growth models which incorporate ecological "laws" such as the self-thinning rule can lead to better understanding of the laws, what is still unknown, and what is in need of refinement. To this end a system of simultaneous differential equations incorporating logical, linked hypotheses regarding growth and mortality is proposed and fit to data from red pine (Pinus resinosa) plantations in the Lake States (Minnesota, Michigan, and Wisconsin). Using this modelling framework it appears that stand initiation history has a large effect on the level of the self-thinning boundary for red pine growing in the Lake States. Stands with initially high density exhibited lower self-thinning boundaries than stands with lower densities. Site quality (as measured by site index) chiefly affected the rate at which stand dynamics progress. Higher quality sites progressed through stand development at faster rates than did sites with lower quality
Descriptors:coniferous-forests. growth-models. mathematical-models. stand-density. stand-development. natural-thinning. soil-fertility. forest-soils. forests

Geographic Locator:USA. Wisconsin. Minnesota. Michigan
Organism Descriptors:Pinus-resinosa
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. East-North-Central-States-of-USA. North-Central-States-of-USA. USA. Lake-States-of-USA. West-North-Central-States-of-USA
Subject Codes:KK110. JJ600. ZZ100. ZZ331
Supplementary Info:56 ref
ISSN:0045-5067
Year:2000
Journal Title:Canadian Journal of Forest Research
Copyright:Copyright CAB International

63. Title:Reflectance indices with precision and accuracy in predicting cotton leaf nitrogen concentration
View Article: Crop Science. 2000. 40 (6). 1814-1819
CD Volume:300
Print Article: Pages: 1814-1819
Author(s):Tarpley L Reddy K R Sassenrath Cole G F
Author Affiliation:Dep. Plant and Soil Sciences, Box 9555, Mississippi State Univ., Mississippi State, MS 39762, USA
Language:English
Abstract:Diagnostic methods assaying leaf optical properties can aid rapid site-specific screening of crop nitrogen status. A set of calibration curves relating many 1.5-nm band reflectance ratios to cotton (Gossypium hirsutum) leaf N concentration was established from plants grown in sunlit growth chambers and at a range of nitrogen levels. Predicted and actual concentrations were compared by regression for a validation set of field-grown leaf samples from diverse genotypes. Only those ratios that combined a red-edge measure (700 or 716 nm) with a waveband of high reflectance in the very near infrared region (755-920 and 1000 nm) provided good precision (correlation) and accuracy (one-to-one relationship between predicted to actual values). Other indices that included a chlorophyll-based reflectance feature also had good precision but were less accurate than those obtained from the red-edge/very-near-infrared reflectance ratios
Descriptors:techniques. cotton. nitrogen-content. reflectance. prediction. plant-nutrition. nitrogen. soil-fertility
Organism Descriptors:Gossypium-hirsutum. Gossypium
Supplemental Descriptors:Gossypium. Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. ZZ900. FF061. JJ600
Supplementary Info:21 ref
ISSN:0011-183X
Year:2000
Journal Title:Crop Science
Copyright:Copyright CAB International

64. Title:Catastrophic windthrow in the southern Appalachians: characteristics of pits and mounds and initial vegetation responses
View Article: Forest Ecology and Management. 2000. 126 (1). 51-60
CD Volume:336
Print Article: Pages: 51-60
Author(s):Clinton B D Baker C R
Author Affiliation:USDA Forest Service Southern Research Station, Coweeta Hydrologic Laboratory, 3160 Coweeta Lab Road, Otto, NC 28763, USA
Language:English
Abstract:Pit and mound (PM) topography resulting from catastrophic wind in the Coweeta Basin in western North Carolina, USA, was characterized, and 48

PMs located across a variety of forest types. Measurements made included pit length, width, and depth, and mound height, thickness, and width. Species of fallen trees were identified, and DBH (diameter at breast height) was measured for biomass determination. Five distinct microsites were identified at each PM: mound face, mound top, pit bottom, pit-wall, and intact forest floor. On each microsite, photosynthetically active radiation (PAR), soil temperature, and soil moisture were measured, and soil samples taken from 4 microsites (intact forest floor, pit wall, pit bottom, mound top) to determine carbon and nitrogen concentrations. Treefall direction was marginally non-random. Three PM dimensions were significantly related to fallen tree biomass: mound width, mound height, and pit width. Other relationships failed because (1) rooting depth of the fallen tree was not necessarily proportional to tree size, and (2) trees that fell striking other trees often slid back into the pit, altering its dimensions. PAR was highest at the mound top (250 micro mol m-2 s-1) and lowest in the pit bottom (70 micro mol m-2 s-1). Mean soil temperature varied approx equal to 3 deg C across microsites, and soil moisture ranged from 24% on the mound top and mound face to 34% in the pit bottom. Nitrogen and carbon concentrations were significantly higher on the forest floor (N 0.23%, C 4.73%) than on the other 3 microsites (N 0.08-0.10%, C 1.4-2.2%). Over time, soil nutrition and microsite instability, due to erosion and settling, may be the most influential factors determining rates of vegetative establishment in PMs. Initial vegetative recovery was characterized at 27 blowdown sites. Trees were placed in one of 2 damage classes: direct wind damage (direct), and damage due to the fall of another tree (indirect). Basal and/or bole sprouting, and live or dead crowns were noted. Blowdown areas ranged from 181 to 4043 m2 and averaged 1175 m2. Mean diameter of indirectly damaged trees was 50% of the mean for trees directly damaged, but both had similar minimum diameters. Overall, the biomass of indirectly damaged trees accounted for <10% of total biomass but 33% of the total number of stems. Of the indirectly damaged trees, 38% were topped, 82% exhibited basal or bole sprouting, and 21% had live crowns. In contrast, of the directly damaged trees, only 5% were topped, <50% were sprouting, and only 11% had live crowns

Descriptors:erosion. forest-soils. rooting. rooting-depth. soil-water. soil-temperature. sprouting. topography. wind-damage. soil-morphological-features. mounds. pits. microrelief. solar-radiation. light. microclimate. soil-chemical-properties. soil-fertility. forest-damage. forest-trees. injuries. dead-trees. natural-regeneration

Geographic Locator:North-Carolina. USA

Supplemental Descriptors:Appalachian-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. South-Atlantic-States-of-USA

Subject Codes:PP400. KK100. JJ300. FF700. PP800. PP500. JJ400. JJ600. JJ200. PP720. ZZ800

Supplementary Info:37 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

65. Title:Decomposition and nutrient release from Picea abies (L.) Karst. and Pinus sylvestris L. logging residues

View Article: Forest Ecology and Management. 2000. 126 (2). 97-112

CD Volume:336

Print Article: Pages: 97-112

Author(s):Hyvonen R Olsson B A Lundkvist H Staaf H

Author Affiliation:Department of Ecology and Environmental Research, Swedish University of Agricultural Sciences, P.O. Box 7072, S-75007, Uppsala, Sweden
Language:English
Abstract:The long-term dynamics were analysed of the decomposition of different fractions of forest litters by using models derived from a theory on decomposition and element cycling in organic matter. The analysis of decomposition was done (i) by measuring decomposition rates of, and nutrient changes in, needles, twigs, and branches in field experiments at 4 coniferous forest sites in Sweden (3 clear felled sites - 2 dominated by Norway spruce, Picea abies, and one by Scots pine, Pinus sylvestris, before clear felling; and one thinned Norway spruce monoculture), and (ii) by estimating parameters used in the models with information derived from these experiments. The analysis showed that variability in decomposition rate decreases with increasing substrate diameter. The models were also used to predict the long-term dynamics of carbon, nitrogen, and phosphorus in logging residues. The predictions made suggest that from a short-term perspective, the nutrient-rich needles and twigs are a more important nutrient source for the subsequent forest generation than branches. However, in the long run the nutrient concentration of the coarse litter fractions will also be important. The predicted amounts of carbon and nitrogen in logging residues were compared with measured amounts in the humus layer. On a productive Norway spruce site 16 years after clear-felling, the remaining logging residues were predicted to increase carbon amounts in the forest floor by 50%; on a low productive Scots pine site this figure was 100%. The corresponding nitrogen amounts in the forest floor should have been 30% higher at the spruce site and 70-80% higher at the pine site
Descriptors:logging. slash. clear-felling. decomposition. forest-litter. humus. soil-organic-matter. phosphorus. cycling. nutrients. mathematical-models. conifer-needles. branches. coniferous-forests. thinning. carbon-cycle. nitrogen-cycle. dead-wood. soil-fertility. soil-chemical-properties. nutrient-content. pines
Geographic Locator:Sweden
Identifiers:twigs
Organism Descriptors:Picea. Picea-abies. Pinus. Pinus-sylvestris
Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Picea. Pinus. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK100. JJ100. JJ200. JJ600. ZZ100
Supplementary Info:45 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

66. Title:Effect of liming on the ectomycorrhizal status of oak
View Article: Forest Ecology and Management. 2000. 126 (2). 121-131
CD Volume:336
Print Article: Pages: 121-131
Author(s):Bakker M R Garbaye J Nys C
Author Affiliation:Equipe Cycles Biogeochimiques, INRA-Nancy, F-54280, Champenoux, France
Language:English
Abstract:The potential for nutrient uptake by forest trees is a function of site fertility, fine roots and mycorrhizal symbionts. This study focuses on the effects of moderate doses of liming on the mycorrhizal status of oak (Quercus petraea and Q. robur) roots. In 10 in situ trials (8 sites

in France with Q. petraea, and 2 in the Netherlands with Q. robur), where liming had been applied 1-27 yr before sampling, the effects on fine roots and their mycorrhizal status were assessed from 1994 to 1996. All sites except one were situated on acidic soils with low base saturation. Fine roots were evaluated in terms of fine root biomass, length and specific root length. Mycorrhizal status was evaluated in terms of total number of mycorrhizal tips, number of tips per root length and main ectomycorrhizal morphotypes, both in absolute numbers and in relative proportion. At 2 of these sites, in close vicinity to each other, consecutive sampling was carried out during 4 periods between 1995 and 1996. The fact that some variation existed between the sampling seasons was verified, but lime-induced treatment effects were similar for all seasons. Data from all 10 sites showed liming to slightly but significantly increase total number of mycorrhizal tips (ranging from 5.81 to 109.3x109 ha-1 and from 9.63 to 125.6x109 ha-1 for the controls and liming treatments, respectively). However, this was mainly an effect of a significantly increased total fine root length (ranging from 26.8 to 104.9x106 m-1 ha-1 and from 23.6 to 112.2x106 m-1 ha-1 for the controls and liming treatments, respectively) than of a higher number of tips per metre of root length. The latter variable was not significantly affected by liming on an overall basis (ranging in general between 100 and 600 tips m-1, with a highest value up to 1700 tips m-1). Liming in general decreased the relative proportion of smooth mycorrhizae in favour of hairy types (increasing significantly on average from 0.5 to 1.0% in the controls to 2 to 6% in the lime treatments). Furthermore, within the smooth types, some changes occurred. Hence, the absorption surface of the uptake system was enhanced by an increase in fine root length and a differential stimulation of hairy types of ectomycorrhizas, but not by a greater number of mycorrhizal tips per unit of root length. Soil pH explained part of the shift within the smooth types, but not the increase in the hairy types. In this study, liming consistently modified the mycorrhizal status of the oak roots and stimulated fine root development

Descriptors:liming. biomass. forests. mycorrhizas. soil-pH. soil-fungi. mycorrhizal-fungi. soil-amendments. roots. length. ectomycorrhizas. plant-pathology

Geographic Locator:France. Netherlands

Organism Descriptors:Quercus. Quercus-robur. Quercus-petraea

Supplemental Descriptors:Fagaceae. Fagales. dicotyledons. angiosperms. Spermatophyta. plants. Quercus. Western-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries. Benelux

Subject Codes:KK100. JJ100. JJ700. JJ200

Supplementary Info:26 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

67. Title:Nutrient conditions in drained peatlands along a north-south climatic gradient in Sweden

View Article: Forest Ecology and Management. 2000. 126 (2). 149-161

CD Volume:336

Print Article: Pages: 149-161

Author(s):Sundstrom E Magnusson T Hanell B

Author Affiliation:Department of Silviculture, Swedish University of Agricultural Sciences, Umea 901 83, Sweden

Language:English

Abstract:Soil nutrient conditions were investigated in a series of 5 peatland afforestation trials established in 1971 along a north-south gradient in Sweden. All areas were drained low-sedge mires and planted with Scots pine (Pinus sylvestris). Soil samples from the topsoil (0-20 cm) were collected 22 yr after drainage with 2 ditch spacings (7.5 and 60 m) and 3 PK-fertilizing regimes. Total and available nutrient concentrations were determined. Results indicated that pH and total concentrations of N, P and Ca in the topsoil of extensively drained areas increased with decreasing temperature sum in similar site types. Concentrations of K and Mg were not correlated with temperature sum. Tree height and volume were positively correlated with concentrations of P, K and Ca, but not with N, and only for temperature sums more than or equal to 950 d.d. (day degrees). Hence, it appeared that P and/or K directly or through their effects on N mineralization, limited tree growth in the south, whereas another growth factor was limiting in the north. The available/total concentration ratios of soil nutrients were examined, with the intention of revealing possible climate-dependent trends in those ratios. The available/total ratios of P and Ca increased with increasing temperature sum. For Ca in southern areas the ratios were higher in intensively drained and PK-fertilized plots than in the extensively drained and unfertilized treatment, possibly indicating that peat mineralization had been more intensive. The Ca-ratios for the 2 northernmost areas, which showed little or no tree growth reaction, did not increase even in the intensively drained and fertilized treatments. It is hypothesized that the treatment-induced changes in available/total Ca ratio along the climate gradient also reflect post-drainage intensity of N-mineralization. Hence, the absence of increased Ca-ratios at temperature sums below 950 d.d. may indirectly indicate that tree growth is limited by the microbial release of organically bound N
Descriptors:peatlands. afforestation. climate. drainage. mineralization. nutrient-content. site-types. heat-sums. soil-chemical-properties. soil-fertility. phosphorus-potassium-fertilizers. ditches. spacing. soil-pH. nitrogen. phosphorus. calcium. peat-soils. plant-height. volume. increment. growth. pines
Geographic Locator:Sweden
Organism Descriptors:Pinus. Pinus-sylvestris
Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Pinus. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK110. JJ200. PP320. KK100. JJ800. JJ700
Supplementary Info:37 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

68. Title:Site preparation for establishing lodgepole pine in the sub-boreal spruce zone of interior British Columbia: the Bednesti trial, 10-year results
View Article: Forest Ecology and Management. 2000. 126 (2). 227-238
CD Volume:336
Print Article: Pages: 227-238
Author(s):Bedford L Sutton R F
Author Affiliation:Forest Practices Branch, British Columbia Ministry of Forests, 1st Floor, 1450 Government Street, Victoria, BC V8W 9C2, Canada
Language:English

Abstract:Nine site preparation techniques for reestablishing productive lodgepole pine (Pinus contorta var. latifolia) forest in the Stuart Dry Warm Sub-Zone of the Sub-Boreal Spruce Zone (SBSdw3) of interior British Columbia (Canada) on 'NSR backlog' sites (i.e. by provincial criteria, sites Not-Sufficiently-Regenerated) were compared in a randomized block experiment at Bednesti, with one 48-tree, 750 m2 plot of each treatment in each of 5 blocks. Low fertility, compact subsoil, and low water-holding capacity in a rooting zone as thin as 10 cm in lower slope and level positions were the main limiting factors at the site. The 9 treatments were none (control), burned windrow, Bracke patch scarification, mineral mounds, delta disk trenching and hinge-planting or furrow planting, Wadell cone scarifying, breaking ploughing (to create irregular berms), and bedding ploughing (to create raised planting beds). After 10 growing seasons, pine survival was 90-97%; mean stem volumes in 7 treatments were 41-235% higher than the control, and one treatment gave 29% less volume. The best results were obtained with the burned windrow treatment, followed by bedding ploughing; results from mounding and patch scarification were virtually identical. Data are also given on the occurrence of rust diseases in the different treatments. The results indicate that while site preparation can increase early growth of lodgepole pine, especially on the more poorly drained parts of sites such as Bednesti, planting directly into sheared, windrowed ground will give satisfactory survival and growth
Descriptors:forest-plantations. rooting. scarification. site-preparation. survival. growth. increment. rust-diseases. fungal-diseases. plant-pathogenic-fungi. soil-fertility. pines
Geographic Locator:British-Columbia. Canada
Identifiers:Pinus contorta var. latifolia
Organism Descriptors:Pinus-contorta. Pinus
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Pinus-contorta
Subject Codes:KK110. JJ900. FF610. KK100. JJ600
Supplementary Info:33 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

69. Title:Edaphic controls on mosaic structure of the mixed deciduous broadleaf/conifer forest in northern Japan
View Article: Forest Ecology and Management. 2000. 127 (1/3). 169-179
CD Volume:336
Print Article: Pages: 169-179
Author(s):Namikawa K Okamoto S Sano J
Author Affiliation:Biological Laboratory, Sapporo College, Hokkaido University of Education, 5-3-1 Ainosato, Kita-ku, Sapporo, 002-8502, Japan
Language:English
Abstract:An aerial photograph and field data were used to investigate the relationship between the dominance ratio of conifers to hardwoods and edaphic conditions in the mixed deciduous broadleaved/coniferous forest of Mt. Horoiwa (376 m altitude), eastern Hokkaido, northern Japan. The aerial photograph of the study area was set out on 154 grids (1 ha, 100x100 m2/grid) and their vegetation was classified into 3 types by the dominance ratio of conifers to hardwoods: broadleaved, mixed, and coniferous. The topography of the grids was categorized into ridge, valley, and slope, and the aspect of the slopes was determined in 8 directions. Broadleaved or mixed forests and coniferous forests were primarily distributed in valleys or on slopes facing north, northeast,

or east (collectively, the NE-slope) and on ridges or slopes facing south, southwest, or west (collectively, the SW-slope,), respectively. Tree species, relative dominance, and edaphic conditions were recorded for 18 plots on various slope aspects. Differences in dominant species among plots were well represented by the first axis of detrended component analysis. Scores of the first axis correlated with soil moisture and chemical properties (pH, C/N ratio, and total exchangeable cation), which collectively indicate site fertility. Correlation between scores of the first axis and slope aspects was also found, that is soils of the NE-slope were fertile, but those of the SW-slope were infertile. There was also a negative correlation between the dominance ratio of conifers (mainly Abies sachalinensis) and site fertility. These facts suggest that edaphic conditions play a role in the development of the 3 vegetation types found at the study site. Regeneration patterns of the main component species were investigated by population structure and distribution of seedlings and saplings in gaps and closed stands on the NE- and the SW-slopes. Deciduous broadleaved species relegated the conifers to lower strata in gaps of the NE-slope, whereas the inverse relation was found in gaps of the SW-slopes. Moreover, the conifers regenerated successively beneath canopy-closed stands independent of site fertility. Therefore, the regeneration patterns of component species with different life forms were also responsible for the development of three vegetation types

Descriptors:mixed-forests. stand-structure. soil-properties. natural-regeneration. soil-water. soil-fertility. topography. aspect. aerial-photography. edaphic-factors. plant-communities. deciduous-forests. coniferous-forests. valleys. slopes. ridges. synecology. soil-chemical-properties. stand-characteristics

Geographic Locator:Japan. Hokkaido

Organism Descriptors:Abies. Abies-sachalinensis

Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Abies. East-Asia. Asia. Developed-Countries. OECD-Countries. Japan

Subject Codes:KK100. PP500. JJ300. JJ200. JJ600. ZZ331

Supplementary Info:39 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

70. Title:Dynamics of biomass and nutrient accumulation in a clonal plantation of Eucalyptus in Congo

View Article: Forest Ecology and Management. 2000. 128 (3). 181-196

CD Volume:336

Print Article: Pages: 181-196

Author(s):Laclau J P Bouillet J P Ranger J

Author Affiliation:UR2PI/CIRAD Foret, B.P. 1291, Pointe-Noire, Republique du Congo, France

Language:English

Abstract:Since 1978 43 000 ha of clonal plantations have been planted around Pointe-Noire in the Congo. Due to very low soil fertility in this region, getting maximum sustainable production is fundamental. The aim of this work was to obtain quantitative data on the biogeochemical functioning of an Eucalyptus ecosystem. The dynamics of biomass and nutrient accumulation were studied using a chronosequence approach for a single hybrid clone, Eucalyptus 'PF1' (clone 1-41, from natural hybrids between E. alba and a group of poorly identified hybrids from a Brazilian arboretum). Twelve trees were sampled in each of the 5 study stands at ages 1, 2, 4, 5, and 7 (logging age). For the root system, 3

trees were studied in each of the 1-, 4- and 7-year-old stands. Models were established to predict biomass and nutrient content from CBH (circumference at breast height) and ages of the trees. They were applied to the inventory of the different stands to evaluate biomass and nutrient content for each component. The results showed different dynamics of biomass and nutrient accumulation: P and Ca accumulation was proportional to biomass of the trees throughout the rotation; Mg was mainly accumulated during the first and the second year of the rotation, in connection with crown establishment; N and K were characterized by an intermediate dynamics, with 50% of N and 65% of K already accumulated by the time the trees were 2 years old. The models were validated using 18 other trees sampled in the 7-year-old stand of the chronosequence. Nutrient removal by harvesting was also evaluated for different logging scenarios. The results confirm the need to debark on site. This technique reduces the removal of Ca and Mg by >50%. The quantities exported with pulpwood and fuelwood were ca. 100 kg N, 30 kg P, 39 kg K, 33 kg Ca and 19 kg Mg per hectare
Descriptors:biomass-production. fuelwood. forest-plantations. harvesting. logging. nutrient-content. nutrient-uptake. plant-nutrition. pulpwood. soil-fertility. hybrids. cycling. nutrients. age-of-trees. barking. phosphorus. calcium. magnesium. nitrogen. potassium. models. sustainability
Geographic Locator:Congo
Organism Descriptors:Eucalyptus
Supplemental Descriptors:Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants. Central-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Francophone-Africa
Subject Codes:KK100. FF061. KK110. ZZ100. JJ100
Supplementary Info:40 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

71. Title:Production and root uptake of mineral nitrogen in a chronosequence of Douglas-fir (Pseudotsuga menziesii) in the Beaujolais Mounts
View Article: Forest Ecology and Management. 2000. 128 (3). 197-209
CD Volume:336
Print Article: Pages: 197-209
Author(s):Jussy J H Colin Belgrand M Ranger J
Author Affiliation:INRA Centre de Nancy, Equipe Cycles Biogeochimiques, 54280 Champenoux, France
Language:English
Abstract:Nitrogen cycle dynamics were studied in a chronosequence of Douglas fir (Pseudotsuga menziesii) plantations, aged 20, 40 and 60 years, respectively, in the Aiguillettes forest, NE Massif Central (France). Mineralizing capacity was high in the 3 stands. After mineralization, nitrogen was mainly nitrified. Mineralization and nitrification were independent of stand age. Root uptake of nitrogen was high but lower than mineralization. Consequently, losses by leaching were high, especially in the younger stand. Nitrate leaching was accompanied by cation leaching, resulting from soil acidification. The destabilization of organic matter following the introduction of a non-native species may have been reinforced by former land use. Soils were in the process of losing nutrients, especially in the young stand. As nutrient losses decrease with increasing stand age, forest rotations of over 60 years are recommended, as fertility budgets are closer to equilibrium
Descriptors:nutrient-uptake. acidification. forest-influences. land-use. leaching. losses-from-soil. mineralization. nitrification. nutrients.

soil-organic-matter. forest-plantations. rotations. soil-chemical-properties. soil-acidity. soil-pH. stand-age. age-of-trees. nitrogen-cycle. plant-nutrition. nitrate-nitrogen. cations
Geographic Locator:France
Organism Descriptors:Pseudotsuga. Pseudotsuga-menziesii
Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Pseudotsuga. Western-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK100. JJ100. FF061. JJ200
Supplementary Info:39 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

72. Title:Use of understory vegetation in classifying soil moisture and nutrient regimes
View Article: Forest Ecology and Management. 2000. 129 (1/3). 93-100
CD Volume:336
Print Article: Pages: 93-100
Author(s):Wang G G
Author Affiliation:Department of Biology, University of Winnipeg, Winnipeg, Man., R3B 2E9, Canada
Language:English
Abstract:One-hundred-and-two white spruce (Picea glauca) stands sampled in the sub-boreal spruce biogeoclimatic zone of British Columbia (Canada) were used to examine the role of understorey vegetation in assessing soil moisture and nutrient regimes. Based on existing knowledge, each species of indicator value was assigned into one of 6 indicator species groups for soil moisture and/or one of 3 indicator species groups for soil nitrogen. In each stand, the frequency of each indicator species group was calculated using % covers of all indicator species. Soil moisture and nutrient regimes were then classified based on calculated frequencies following the criteria proposed in the study. As a result, 16 stands were classified as moderately dry, 27 stands slightly dry, 25 stands fresh, 15 stands moist, 12 stands very moist, and 7 stands as wet; 10 stands were classified as very poor, 20 stands poor, 41 stands medium, 24 stands rich, and 7 stands as very rich. These classifications compared favourably with the 2 soil-based classifications (a field approach and an analytical approach) reported earlier for the same data (Wang et al. (1994) Guide to estimating interior spruce site index from edaphic factors in the sub-boreal spruce zone, Contract Report - Northwood Pulp and Timber Ltd., Prince George, BC; Wang & Klinka, K. Environmental Monitoring and Assessment (1996) 39, 451-459; Wang, Canadian Journal of Forest Research (1997) 27, 679-685) with 47-59% of stands in agreement and 38-46% of stands in disagreement by only one class. Testing the classification against soil moisture and nutrient measures and white spruce foliage nitrogen and site index further supported the indicator plant approach to soil moisture and nutrient regime classification. It is concluded that the indicator plant approach is a good alternative to the soil-based approaches that have been commonly applied in site classification systems across Canada
Descriptors:soil-water-regimes. soil-classification. indicator-plants. indicator-species. site-class-assessment. boreal-forests. forest-soils. soil-fertility. soil-chemical-properties. nutrient-content. understorey. botanical-composition. synecology. chemical-composition. foliar-diagnosis. plant-nutrition. plant-composition. foliage. leaves. edaphic-factors. nitrogen-content

Geographic Locator:Canada. British-Columbia
Organism Descriptors:Picea. Picea-glauca
Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Picea. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:KK100. JJ400. JJ300. JJ200. JJ600. PP720. ZZ331. ZZ900. FF061. FF040
Supplementary Info:39 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

73. Title:Establishment, growth and survival of natural regeneration after clearcutting and drainage on forested wetlands
View Article: Forest Ecology and Management. 2000. 129 (1/3). 253-267
CD Volume:336
Print Article: Pages: 253-267
Author(s):Roy V Ruel J C Plamondon A P
Author Affiliation:Centre de Recherche en Biologie Forestiere, Universite Laval, Sainte-Foy, Que., G1K 7P4, Canada
Language:English
Abstract:Natural regeneration may be disrupted by the rise of the water table in surface layers after clear felling forested wetlands. A study was initiated on 8 forested wetlands in the Foret de Beaurivage in Quebec, Canada, that were successively clear felled and drained 3 yr later. The objectives were (1) to assess conifer and deciduous regeneration on waterlogged clear felled sites, (2) to determine the effect of water table level changes after clear felling and drainage on the growth rate of advance regeneration, and (3) to determine if sphagnum moss growth rate was influenced by clear felling, drainage and microrelief. 3 years after strip clear felling, the area based inventory showed that softwood regeneration was abundant in the clearcut, but 84% of the seedlings were smaller than 30 cm and vulnerable to suppression from the competition. Indeed, the opening of the forest cover promoted massive invasion of pioneer species such as trembling aspen (Populus tremuloides) and white birch (Betula papyrifera). Black spruce (Picea mariana) and red spruce (Picea rubens) had difficulties maintaining their presence after clear felling. The ratio hardwood stems:softwood stems changed from 1.1 in the forest to 3.8 in the clearcut. Balsam fir (Abies balsamea), larch (Larix laricina) and cedar (Thuja occidentalis) represented 93% of the softwood regeneration. 3 years after clear felling, balsam fir advance regeneration had a significantly lower growth rate in the middle of the clearcut than near the edges of the clearcut. 2 years after drainage, seedling growth at 10 m from the drainage ditch was significantly greater than at 70 m from ditch. No significant differences were found between mineral and organic soil types, but height growth was positively correlated with C: N ratios of the individual site types. Abundant competition on richer sites limits the development of softwood regeneration. On a short-term basis, competition more than watering-up seems a threat to softwood regeneration. Sphagnum growth rates measured with the crank-wire method showed no effect of clear felling or drainage, but a higher growth rate in hollows (3.2 cm per year) than in hummocks (2.0 cm per year). These growth rates indicate that sphagnum should not affect regeneration but could overgrow yearlings of slow growing species
Descriptors:drainage. natural-regeneration. survival. wetlands. clear-felling. plant-competition. drainage-channels. mixed-forests. growth-rate. mounds. growth. pioneer-species. seedlings. seedling-growth. site-

types. soil-types. water-table. groundwater-level. increment. advance-growth. topography. invasion. plant-succession. plant-colonization. soil-fertility
Geographic Locator:Quebec. Canada
Organism Descriptors:Abies. Abies-balsamea. Populus. Betula. Betula-papyrifera. Larix. Larix-laricina. Picea. Picea-mariana. Picea-rubens. Populus-tremuloides. Sphagnum. Thuja. Thuja-occidentalis
Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Abies. Salicaceae. Salicales. dicotyledons. angiosperms. Betulaceae. Fagales. Betula. Larix. Picea. Populus. Sphagnaceae. mosses. Bryophyta. Cupressaceae. Thuja. Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:KK100. JJ800. KK110. PP200. PP320. JJ400. PP500. JJ600. PP720
Supplementary Info:53 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

74. Title:Phosphorus fertilisation causes durable enhancement of phosphorus concentrations in forest soil
View Article: Forest Ecology and Management. 2000. 130 (1/3). 69-76
CD Volume:336
Print Article: Pages: 69-76
Author(s):Fransson A M Bergkvist B
Author Affiliation:Department of Ecology, Soil-Plant Research, Ecology Building, Lund University, S-223 62 Lund, Sweden
Language:English
Abstract:The duration of P fertilizer in acid forest soil was investigated in a Norway spruce (Picea abies) plantation established in south-central Sweden in 1957 after clear felling in 1956. Soil fertilizing started in 1967, but no P has been applied since 1988, although N fertilizing is still continuing. In total, 300 kg P/ha as superphosphate, and/or 1090 kg N?ha as ammonium nitrate, was applied. In 1997, concentrations of extractable P extracted both by 0.05 M Na2SO4+0.02 M NaF and by 0.5 M H2SO4 in the Of, Oh, E and top B horizons of fertilized soils were increased compared with control values. The P fractions considered to be extracted are adsorbed and some Al-bound phosphate in the case of Na2SO4+NaF, and Ca phosphates in the case of H2SO4. Some 3-4% of the added P was recovered as Na2SO4+NaF extractable P, and 10-22% was recovered as H2SO4 extractable P in the soil profile down through the first 5 cm of the B horizon. Still continuing ammonium nitrate fertilizing has reduced the H2SO4 extractable P concentration in this soil. Cumulative P fertilizer application of 300 kg P/ha has counteracted this decrease
Descriptors:forest-plantations. phosphorus-fertilizers. ammonium-nitrate. nitrogen-fertilizers. phosphates. soil-chemical-properties. residual-effects. superphosphate. nitrogen-phosphorus-fertilizers. phosphorus. soil-depth. forest-soils. retention. soil-fertility
Geographic Locator:Sweden
Organism Descriptors:Picea-abies. Picea
Supplemental Descriptors:Picea. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK110. JJ700. JJ200. JJ600
Supplementary Info:25 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

75. Title:Long-term soil potassium availability from a Kanhapludult to an aggrading loblolly pine ecosystem
View Article: Forest Ecology and Management. 2000. 130 (1/3). 109-129
CD Volume:336
Print Article: Pages: 109-129
Author(s):Markewitz D Richter D D
Author Affiliation:Nicholas School of the Environment, Duke University, Durham, NC 27707, USA
Language:English
Abstract:A long-term (1962-90) forest biogeochemistry study in the southeastern Piedmont of the USA provided estimates of soil K release in response to forest regrowth. The study was in the Calhoun Experimental Forest, Sumter National Forest, South Carolina, on former agricultural land, where loblolly pine (Pinus taeda, native to the area) had been planted in 1956-57 after a 3-yr fallow. An investigation was made of the sources of soil K that buffered the exchangeable K pools during forest growth and soil K release rates were estimated through greenhouse and acid extraction studies for comparison with the field estimate. In the acid Kanhapludults of the area, which are derived from granitic-gneiss, the disparity between measured depletions of soil exchangeable K and estimated forest removals indicated a buffering of exchangeable K of the order of 0.31 kmolc ha-1 per year. Non-exchangeable K extracted by boiling with 1 M HNO3 exceeded exchangeable K by up to 40-fold. Non-exchangeable K was not depleted during the 3 decades of stand growth, however, thus was not the long-term source of exchangeable K buffering. Total K in these soils ranged from 0.4 to 3.8% by weight. Mineralogical data indicated a presence of hydroxy-interlayered vermiculite throughout the upper 4 m of soil for <2 micro m clay fraction and a presence of micaceous minerals in the 2-45 micro m silt fraction. XRD analysis of micaceous flakes extracted from 4 to 8 m in the soil indicated a presence of muscovite mica. Estimated K releases in the greenhouse and extraction studies were generally consistent with long-term results. The accumulation of K during 2 rotations of pine seedling growth in the greenhouse exceeded the measured depletions in exchangeable and non-exchangeable K over all soil depths tested by 0.007 to 0.026 cmolc kg-1. Potassium removal by sequential extraction/incubations with 1 mM HCl and 1 mM oxalic acid continued through 24 extractions and K recovered in extract solutions exceeded the sum of depletions in exchangeable and non-exchangeable K pools by 0.001 to 0.028 cmolc kg-1. These excess removals in plant uptake or solution recovery indicate a release of mineral K. Thirty-day extractions with H+-resins in both 1 mM HCl and 1 mM oxalic acid were well fitted by the Elovich equation but were not well correlated with plant K uptake in the greenhouse study. The release rate coefficients ranged from 0.012 to 0.025 (cmolc kg-1) h-1. Extrapolations to annual releases of K in the greenhouse and sequential extraction studies were a similar order of magnitude as long-term releases estimated at the long-term Calhoun plots. Surface soil (0 to 15 cm) releases ranged from 0.15 to 0.65 kmolc ha-1 per year while that for deeper soils ranged up to 1.54 kmolc ha-1 per year. Results indicate that soils similar to those at Calhoun that contain a similar micaceous and HIV component will be able to supply K at rates adequate to keep pace with demands of forest regrowth even under intensive forest management
Descriptors:potassium. biogeochemistry. clay-fraction. forest-plantations. forest-soils. minerals. regrowth. rotations. seedlings. seedling-growth. silt-fraction. exchangeable-potassium. soil-chemical-properties. soil-types-(genetic). acid-soils. granite. gneiss. soil-

parent-materials. vermiculite. nutrient-uptake. plant-nutrition. nutrient-availability. bioavailability. Ultisols. cycling. artificial-regeneration. soil-fertility
Geographic Locator:USA. South-Carolina
Organism Descriptors:Pinus-taeda
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. South-Atlantic-States-of-USA. Southern-States-of-USA. USA. Southeastern-States-of-USA
Subject Codes:KK110. KK100. JJ200. JJ600. JJ400. JJ300. FF061
Supplementary Info:64 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

76. Title:Cost-analysis for a sustainable nutrient management of fast growing-tree plantations in East-Kalimantan, Indonesia
View Article: Forest Ecology and Management. 2000. 131 (1/3). 239-253
CD Volume:336
Print Article: Pages: 239-253
Author(s):Mackensen J Folster H
Author Affiliation:Institute of Soil Science and Forest Nutrition, Busgenweg 2; 37077 Gottingen, Germany
Language:English
Abstract:Without fertilizer application, intensively managed tree plantations generally have a negative nutrient balance - within one rotation more nutrients are lost from the system than are gained. Constant nutrient exports result in a distinctive depletion of soil nutrient storage. In order to maintain a balanced nutrient budget, and thus sustain site productivity it is necessary to compensate nutrient losses. In this study, calculations were made of the quantities of mineral fertilizer required to compensate management-dependent nutrient losses for a plantation site in East Kalimantan, Indonesia, established in 1992, and at first planted mostly with Eucalyptus deglupta, but now planted with 80% Acacia mangium. The calculations are based on estimated nutrient losses for 3 management scenarios: high-, medium- and low-impact management. Fertilizer compensation for nutrient losses incurred due to tree harvest will increase standard plantation establishment cost by 18-33% and total investment costs by 9-15%. Considering additional nutrient losses due to leaching and erosion as assumed for a low-impact management scenario, standard plantation establishment costs were increased by 20-35% and total investment costs increased by 9-16%, respectively. Fertilizer compensation for a high-impact management scenario, including large nutrient losses resulting from burning of residual phytomass, leaching and erosion, increased standard plantation establishment costs by 29-62%, while total investment costs increased by 13-29%. As a consequence, the internal rate of return (IRR) of the plantation investment dropped from 14% to 9-12%. Major differences were calculated in the fertilizer expenses between species. Fertilization costs for Eucalyptus deglupta were generally higher than for Acacia mangium. Considering the high costs of fertilizing, it is concluded that strategies should be developed to reduce management-dependent nutrient losses. A low-impact management including alternatives to slash burning and soil-conserving harvesting techniques, as well as appropriate site selection, are recommended. It is advised that nutrient costs be considered in investment calculations for industrial plantations

Descriptors:forest-plantations. burning. erosion. harvesting. leaching. losses-from-soil. nutrient-balance. nutrients. productivity. fertilizers. costs. economic-analysis. returns. sustainability. soil-fertility. forest-management. slash. soil-conservation
Geographic Locator:Indonesia. Kalimantan
Organism Descriptors:Acacia-mangium. Eucalyptus-deglupta
Supplemental Descriptors:Acacia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Eucalyptus. Myrtaceae. Myrtales. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Indonesia. Borneo
Subject Codes:KK110. JJ700. EE145. EE110. JJ600. PP400. JJ900
Supplementary Info:58 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

77. Title:European forest ecosystems: building the future on the legacy of the past
View Article: Forest Ecology and Management. 2000. 132 (1). 5-20
CD Volume:337
Print Article: Pages: 5-20
Author(s):Farrell E P Fuhrer E Ryan D Andersson F Huttl R Piussi P
Author Affiliation:Forest Ecosystem Research Group, Department of Environmental Resource Management, University College Dublin, Belfield, Dublin 4, Irish Republic
Document Editor:Fuhrer-E. Andersson-F. Farrell-E-P
Conference Title:Special issue. Pathways to the wise management of forests in Europe
Language:English
Abstract:The viability of the many civilizations of Europe has depended, to a very large extent, on an adequate supply of wood. In the Ancient World, this supply was secured through the exploitation of forest reserves, the conquest of new territories and, when these opportunities no longer presented themselves, through the conservation of diminishing resources. Ultimately, civilizations collapsed because of the shortage of wood. Although some silvicultural techniques were known in the pre-Christian era, the scientific management of forests was not widely practised until the late 18th century. It is argued that the controlled exploitation of 'nature', on sustained yield principles, only became possible when men came to view the forest, not as a nuisance, an Arcadia or a pagan horror, but as a centre of wood production, a biological factory. The emergence of scientific forestry, however, did not put an end to the exploitation of forest resources. Unregulated felling and traditional practices such as litter raking exerted an insidious, negative influence on the fertility of the soil. The impact of human exploitation has often been underestimated by scientists, in recent decades in particular, in the context of forest decline. While sustainable management, seen as sustained yield of wood supply, has been practised in forestry for centuries modern ideas of sustainability are broader in scope, embracing all the goods and services of the forest. Increasingly, forests are being managed as multifunctional ecosystems, often for amenity purposes. Forest ecosystem research, which developed from a range of traditional, highly focused disciplines, requires, if it is to make a meaningful contribution to forest management, long-term interdisciplinary studies. It provides the basis for ecologically intelligent management decisions and as such, is central to the development of sustainable forestry management. Central to the successful implementation of research findings is their

efficient transfer from the researcher to the manager. If the research community identifies such an interchange as an important part of their duties, it will be a decisive step towards the better use of forests in Europe. It is only by deepening our knowledge of the past, accepting the challenge of the present and acknowledging that, as researchers, we have also a responsibility to communicate with users, that we can foster the growth in wisdom which is fundamental to the wise use of Europe's forests in the next millennium
Descriptors:ecosystems. forests. emergence. forest-decline. forest-management. forest-resources. forestry. research. sustainability. diffusion-of-information. multiple-use. history. human-activity
Geographic Locator:Europe
Subject Codes:KK100. KK110. PP700. PP300. BB500
Supplementary Info:3 pp. of ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

78. Title:Biomass estimation and nutrient pools in four Quercus pyrenaica in Sierra de Gata Mountains, Salamanca, Spain
View Article: Forest Ecology and Management. 2000. 132 (2/3). 127-141
CD Volume:337
Print Article: Pages: 127-141
Author(s):Santa Regina I
Author Affiliation:Instituto de Recursos Naturales y Agrobiologia, C.S.I.C. Apdo. 257, 37071, Salamanca, Spain
Language:English
Abstract:Analyses of the above-ground biomass and nutrient pools in relation to soil properties and litter fall were performed in 4 Mediterranean oak forests across a rainfall and altitudinal gradient in the Sierra de Gata Mountains, Spain. The sites were at Fuenteguinaldo (granite), Villasrubias (slate), El Payo (granite) and Navasfris (slate); these had, respectively, 720, 872, 1245 and 1580 mm rainfall p.a., and were at 870, 900, 940 and 1000 m altitude. All the soils were classified as Humic Cambisols. Various regression equations were tested for estimating biomass from DBH (diameter at breast height) and H (height); the best fit was obtained by applying the allometric equation Y=aXb, where Y =total above-ground biomass, and X = DBH. Nutrient concentrations (except Ca) were highest in the leaves, although the highest percentage was stored in the stem owing to the elevated percentage of total above-ground mass (73%). The leaves were found to accumulate a qualitatively important fraction of mobile nutrients as compared with their low percentage in total above-ground biomass (3%). The soil organic matter contents were related to the rainfall factor, but this did not appear to affect the complete decomposition process decisively, since the limiting factor was soil moisture. The rainfall distribution was similar for all plots studied, the main differences essentially being seen in the amount of water received during the rainy season (in each case with sufficient moisture for nutrient release). Between the plots, the main difference was seen for P, which was retranslocated to a much greater extent at Navasfrias, where the availability of this nutrient in the soil was lower. The acidity of the parent material seemed to affect the potential turnover of N, P and K. Nutrient management seemed to be related to the availability to the trees of elements such as P and K. Nutrients present in lower amounts in the soil were recycled through the plant-soil system in much higher proportions than other nutrients present in greater amounts. The parent material mostly affected the soil content of assimilable Ca and P,

while the climate (mostly rainfall) affected the organic matter content, total N, cation exchange capacity and the percentage of base saturation of the soil epipedons. The plots with the lowest fertility (those located on slates) had the lowest production of litter and the lowest decay rate. Their cycles were, therefore, slowed down with respect to those of plots located on granites (more fertile)

Descriptors:mountain-forests. biomass. cation-exchange-capacity. climate. rain. precipitation. decomposition. nutrient-content. soil-organic-matter. phosphorus. potassium. soil-water. soil-chemical-properties. altitude. soil-parent-materials. granite. plant-nutrition. plant-composition. spatial-distribution. foliage. leaves. forest-litter. chemical-composition. nutrient-availability. calcium. soil-fertility. Cambisols. forest-soils. nitrogen-content

Geographic Locator:Spain

Identifiers:Humic Cambisols. slate

Organism Descriptors:Quercus. Quercus-pyrenaica

Supplemental Descriptors:Fagaceae. Fagales. dicotyledons. angiosperms. Spermatophyta. plants. Quercus. Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries

Subject Codes:KK100. JJ600. JJ200. JJ300. PP500. FF061. KK110. JJ100. FF040

Supplementary Info:2 pp. of ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

79. Title:Spatiotemporal distribution of an ectomycorrhizal community in an oligotrophic Swedish Picea abies forest subjected to experimental nitrogen addition: above- and below-ground views

View Article: Forest Ecology and Management. 2000. 132 (2/3). 143-156

CD Volume:337

Print Article: Pages: 143-156

Author(s):Jonsson L Anders D Tor Erik B

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Language:English

Abstract:The effects of enhanced nitrogen availability in formerly nitrogen-limited forest ecosystems on the species diversity of sporocarps and mycorrhizas of ectomycorrhizal (EM) fungi were studied in a nitrogen addition experiment at Gardsjon, an oligotrophic Norway spruce (Picea abies) forest in SW Sweden. The experiments were performed by comparing plots that had received additions of nitrogen-enriched water (35 kg N ha-1, as ammonium nitrate, annually since 1991) by means of a sprinkling system, with plots only receiving ambient (about 12 kg N ha-1 per year) nitrogen deposition. The above-ground EM sporocarp production was recorded in 1992-96; the number of mycorrhizas and their gross morphotype differentiation were registered in 1992-95, and the mycobionts of randomly selected mycorrhizas were identified in detail by ITS-RFLP analyses in 1994. The addition of nitrogen did not affect the species richness or diversity of below-ground EM fungal species. In total, 50 RFLP-taxa were distinguished, of which 15 occurred in both treatments and 29 occurred only in single plots. However, the species richness and diversity of sporocarps of EM species were lower in the nitrogen-treated stand. Spatial distribution patterns of below-ground EM fungal taxa were assessed at various scales, from centimetres to tens of metres. Aggregations of mycorrhizal morphotypes were apparent on the centimetre scale, whereas no apparent spatial pattern could be

discerned in the below-ground community on the metre scale. In accordance with the survey of below-ground taxa, the sporocarp analysis revealed that most species were rare, and only a few were widely distributed. The number of mycorrhizas per unit area differed among years, whereas the relative abundance of Cenococcum geophilum and Piloderma croceum appeared to be stable

Descriptors:coniferous-forests. deposition. ecosystems. mycorrhizas. spatial-distribution. species-diversity. nitrogen. acid-deposition. ectomycorrhizas. mycorrhizal-fungi. chemical-composition. nutrient-availability. soil-fertility. forest-soils. molecular-taxonomy. species-richness. soil-fungi. nitrogen-content

Geographic Locator:Sweden

Identifiers:Piloderma. Piloderma croceum. sporocarps. Atheliaceae. Stereales. Basidiomycetes

Organism Descriptors:Picea-abies. Cenococcum. Cenococcum-geophilum. Basidiomycotina

Supplemental Descriptors:Picea. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Deuteromycotina. Eumycota. fungi. Cenococcum. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries. Basidiomycotina

Subject Codes:KK100. JJ100. JJ200. JJ700. PP600. ZZ333. ZZ395. JJ600

Supplementary Info:53 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

80. Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998

View Article: Forest Ecology and Management. 2000. 133 (1/2). ii + 165 pp

CD Volume:337

Print Article: Pages: ii + 165

Author(s):Lousier J D

Author Affiliation:University of Northern British Columbia, Prince George, BC, Canada

Document Editor:Lousier-J-D

Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998

Language:English

Abstract:The conference addressed the ecology and management of forest soils and forest floors in boreal, sub-boreal and montane ecosystems throughout the northern hemisphere. In conjunction with the conference a pre-conference workshop (Methods of studying soil organisms and processes), and various field tours, were held. Forest soil researchers from Canada, Finland and Sweden delivered nearly 75 oral and poster presentations on the following themes: the ecology of northern hemisphere soils (biodiversity, process diversity, seasonal variation, etc.); methods of studying and characterizing soil organisms, especially mycorrhizas, rhizosphere bacteria and protozoa; methods of determining soil organism responses to ecological factors; ecological impacts of forest management on soil biology, the structure and dynamics of the forest floor, and forest floor microclimate and biology; and the impacts of rehabilitation treatments on soil structure and processes, nutrient status, and seedling survival and growth. This special issue comprises 14 selected papers from the conference, all of which are noticed separately on the CAB ABSTRACTS database

Descriptors:boreal-forests. forest-soils. soil-biology. forest-ecology. forest-management. mountain-forests. taiga-soils. mountain-soils. methodology. biodiversity. seasonal-variation. mycorrhizas. rhizosphere-bacteria. soil-fungi. mycorrhizal-fungi. microbial-flora. soil-flora. forest-litter. microclimate. rehabilitation. soil-fertility. seedling-growth. forest-trees. forest-influences
Geographic Locator:Canada. Finland. Sweden
Organism Descriptors:Protozoa
Supplemental Descriptors:invertebrates. animals. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Scandinavia. Northern-Europe. Europe. European-Union-Countries
Subject Codes:KK100. JJ400. JJ100. KK110. PP400. ZZ900. JJ600
Supplementary Info:many ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

81. Title:Sensitivity of soil processes in northern forest soils: are management practices a threat?
View Article: Forest Ecology and Management. 2000. 133 (1/2). 5-11
CD Volume:337
Print Article: Pages: 5-11
Author(s):Setala H Haimi J Siira Pietikainen A
Author Affiliation:Department of Biological and Environmental Science, University of Jyvaskyla, P.O. Box 35, FIN-40351, Jyvaskyla, Finland
Document Editor:Lousier-J-D
Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998
Language:English
Abstract:There is evidence that forest management practices influence soil-decomposer communities. It is also established that changes in the trophic structure and composition of these communities can induce changes in soil-nutrient dynamics, thereby affecting plant growth. Whether forest productivity is affected by management-induced changes in, e.g. soil faunal structure, is, however, yet to be shown. The aim of this study was (1) to determine the resolution of the ecological hierarchy (e.g. species, functional groups, trophic levels) at which a change in soil fauna would alter biotically controlled processes in soils, and (2) to examine the sensitivity of soil fauna of the boreal forest floor to various kinds of forest management practices. A review of laboratory miniecosystem experiments carried out at the University of Jyvaskyla is presented to examine the diversity-ecosystem function relationship. The response of tree growth to manipulation of soil-faunal composition was measured. A field experiment was conducted in central Finland in Norway spruce [Picea abies] stands, including several stand management treatments in addition to the untreated controls. The fellings took place in winter 1996, and various groups of soil animals have been sampled since 1995. Laboratory experiments revealed that soil processes and plant growth are largely insensitive to changes taking place at the species level of soil fauna. Some important keystone species may exist, but a change in the functional group architecture seems to be a prerequisite for altered rates in soil processes. Predators high up in the detrital food web had no detectable influence on any of the ecosystem-level processes. In the field, all of the faunal groups studied proved to be highly insensitive to the stand management practices. As compared to the untreated controls, numbers of enchytraeid worms, collembolans and most of the

macroarthropods in the managed stands were not significantly different. It is concluded that management practices with minor impacts on the soil organic layer, which buffers soil biota against drastic changes in their environment, have little influence on biotically-controlled soil processes
Descriptors:forest-soils. taiga-soils. soil-fauna. boreal-forests. forest-litter. forest-management. predators. productivity. forest-influences. food-webs. decomposition. soil-fertility. nutrients. cycling. trophic-levels. impact. ecosystems. species-diversity. growth. increment. felling. soil-arthropods. soil-invertebrates. forest-ecology
Geographic Locator:Finland
Identifiers:animal communities
Organism Descriptors:Picea-abies. Collembola. Enchytraeidae
Supplemental Descriptors:Picea. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. insects. arthropods. invertebrates. animals. Oligochaeta. Annelida. Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK100. KK110. JJ100. JJ600. JJ200
Supplementary Info:34 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

82. Title:Humus in northern forests: friend or foe?
View Article: Forest Ecology and Management. 2000. 133 (1/2). 23-36
CD Volume:337
Print Article: Pages: 23-36
Author(s):Prescott C E Maynard D G Laiho R
Author Affiliation:Faculty of Forestry, University of British Columbia, Vancouver, BC, V6T 1Z4, Canada
Document Editor:Lousier-J-D
Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998
Language:English
Abstract:Organic matter is of primary importance to the sustainability of long-term site productivity in forest ecosystems. In boreal forests, organic matter accumulates at the surface as mor humus. This may represent a substantial portion of the total nutrient capital of a site, and its decomposition is essential for the short-term availability of nutrients for tree growth and long-term site fertility. However, organic matter accumulation at the soil surface can also effect the forest ecosystem by immobilizing nutrients making them unavailable for plant uptake, and by creating physical and environmental conditions that can impede seedling establishment and survival. Therefore, it is necessary to understand the processes of humus formation and decomposition in order to manage these soils in a manner that will maintain or improve site productivity. This paper provides an overview of (i) the composition of humus, (ii) the conditions in the boreal forest that result in the surface accumulation of humus, (iii) decomposition processes, and (iv) the effects of humus on nutrient (especially nitrogen) availability. Questions relating to the detrimental role of surface organic matter accumulation, the effects of natural disturbances (e.g. fire) and harvesting disturbances on humus loss and accumulation and management practices that can maintain long-term site productivity (site preparation, fertilizing, liming, stand conversion) are also discussed, as are peatlands (as a special case)

Descriptors:forest-soils. boreal-forests. taiga-soils. decomposition. harvesting. humus. chemical-composition. soil-chemical-properties. nutrient-availability. soil-organic-matter. productivity. seedlings. soil. survival. sustainability. disturbed-soils. peat-soils. site-preparation. fertilizers. liming. silvicultural-conversion. soil-amendments. logging. forest-fires. reviews
Subject Codes:KK100. JJ100. JJ200. KK110. JJ700. JJ900
Supplementary Info:4 pp. of ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

83. Title:Impacts of forest management on northern forest soils
View Article: Forest Ecology and Management. 2000. 133 (1/2). 37-42
CD Volume:337
Print Article: Pages: 37-42
Author(s):Ballard T M
Author Affiliation:Faculties of Agricultural Sciences and Forestry, University of British Columbia, 2357 Main Mall, Vancouver, BC, V6T 1Z4, Canada
Document Editor:Lousier-J-D
Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998
Language:English
Abstract:A brief overview is given of management impacts on boreal forest soils. Many effects of forest management on northern soil environments are characteristic of other latitudes as well. Nutrient removals in harvested timber are substantial, and on some sites this may influence not only the amount but also the balance of remaining plant-available nutrients in the long term. Canopy removal during harvesting influences soil temperature and moisture regimes. Physical effects of ground-based skidding may include soil structural change, influencing water retention and flow, and reducing aeration and root penetration. Higher soil temperatures in the daytime and during the growing season tend to result from forest floor displacement and other disturbances which may result from harvesting and site preparation activities. Impairment of soil gas exchange, due to management activities, can result in increased leaching of nutrient cations where soil pH is not very low, as a consequence of carbonic acid formation. Impaired gas exchange also results in anoxic microenvironments and may result in denitrification and the reduction of manganese, iron and sulfate. Prescribed fire results in substantial nutrient losses through volatilization (notably of N and S) and, in some cases, fly-ash losses. Slash burning yields base oxides in the ash. Hydrolysis of these oxides results in increased soil pH and both the magnitude and the duration of the pH change are influenced by soil-buffering capacity. Many of the remaining ash nutrients are soluble, plant-available, and highly susceptible to leaching. However, increased pH and sorption after burning may limit availability of micronutrient metals and phosphorus in the soil. Hydrological behaviour can be influenced by fire effects on soil hydrophobicity. Urea fertilizer use can increase soil pH in the short run and lead to increased leaching of metals and biocides associated with dispersible organic colloids. In the longer run, the soil acidification resulting from nitrification of fertilizer N can result in leaching of some heavy metal cations
Descriptors:reviews. boreal-forests. forest-management. forest-soils. taiga-soils. soil-acidity. forest-influences. acidification. soil-air. burning. denitrification. fire-effects. forest-litter. gas-exchange.

harvesting. logging. losses-from-soil. leaching. nitrification. nutrient-availability. site-preparation. soil-pH. soil-temperature. urea. urea-fertilizers. soil-fertility. soil-water-regimes. skidding. disturbed-soils. nutrients. soil-chemical-properties
Subject Codes:KK100. KK110. JJ600. JJ200. JJ100. KK515. JJ300. KK130. JJ900. JJ700
Supplementary Info:43 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

84. Title:Impacts of forest harvesting on biological processes in northern forest soils
View Article: Forest Ecology and Management. 2000. 133 (1/2). 43-60
CD Volume:337
Print Article: Pages: 43-60
Author(s):Marshall V G
Author Affiliation:Applied Research Division, Royal Roads University, Victoria, BC, V9B 5Y2, Canada
Document Editor:Lousier-J-D
Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998
Language:English
Abstract:Soil is the habitat of plant roots and the home of numerous microflora, including viruses, bacteria, fungi and blue-green algae, and a host of animals from unicellular protozoans to small vertebrates. Simple communities of soil organisms, present from the earliest stages of forest soil genesis, become more complex and grow to astronomical numbers in mature forest soils. Here, they are essential for the maintenance and productivity of these soils, which unlike agricultural systems, generally receive less mechanical treatments and chemical inputs. The soil microflora and fauna complement each other in the comminution of litter, mineralization of essential plant nutrients, and conservation of these nutrients within the soil system. Harvesting directly affects these processes through the reduction and redistribution of organic matter, compaction, changes in plant cover, and modification of microclimate, all of which affect the distribution, composition and activity of the soil biological communities. Although most information is available for clear felled forests, the limited data from other systems indicate that the severity of impacts of forest harvesting practices generally follow the sequence: clearcuts > shelterwood systems > extended rotation systems. However, all practices generally affect soil organisms over the short term. Changes over the longer term are less obvious because of gradual recovery of most biological components with canopy closure. Long-term impacts are more difficult to interpret because these are often influenced by natural changes in population dynamics of soil organisms with forest succession, drought, and the invasion of exotic species. Responses are complex, with various groups being affected differently. Even within a taxon, individual species may behave differently. Although the relationships among floral composition, faunal diversity and sustained soil fertility are not always clear, there are indications that a simplified soil biological system will adversely affect nutrient cycling, tree growth, and forest health. Decomposition rate is generally positively correlated with faunal biomass, and a diverse fauna is required for interacting with microorganisms to enhance microbial diversity. Also, feeding on microflora by the fauna

concurrently controls certain plant pathogens. Destruction of mycorrhizas, essential for the establishment of coniferous seedlings, can lead to serious reforestation problems. It is, therefore, prudent to discourage any qualitative or quantitative changes in the soil biota. Concepts in 'new forestry' attempt to mitigate against adverse affects of conventional forest harvesting practices on soil organisms by maintaining plant biodiversity, minimizing soil compaction, avoiding extreme microclimatic conditions, providing refugia for recolonization by the biota, and directly introducing desirable microflora and fauna
Descriptors:reviews. boreal-forests. forest-soils. taiga-soils. harvesting. logging. forest-influences. soil-biology. silvicultural-systems. biodiversity. biomass. clear-felling. community-ecology. decomposition. forest-health. microclimate. microbial-flora. mineralization. mycorrhizas. soil-fungi. afforestation. seedlings. soil-compaction. soil-fertility. soil-flora. soil-fauna. soil-bacteria. forest-litter. soil-organic-matter. shelterwood-system. rotations. forest-management. nutrients. cycling
Subject Codes:KK110. KK515. KK100. JJ100. JJ400
Supplementary Info:5 pp. of ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

85. Title:Cations in solution from forest soils subjected to forest floor removal and compaction treatments
View Article: Forest Ecology and Management. 2000. 133 (1/2). 71-80
CD Volume:337
Print Article: Pages: 71-80
Author(s):Arocena J M
Author Affiliation:Forestry Program, Faculty of Natural Resources and Environmental Studies, University of Northern British Columbia, 3333 University Way, Prince George, BC, V2N 4Z9, Canada
Document Editor:Lousier-J-D
Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998
Language:English
Abstract:The degree of compaction and loss of organic matter from the forest floor have direct influence on the weathering rates of minerals, nutrient mineralization and consequently of plant growth. However, due to the complicated nature of nutrient depletion and uptake, continued study is essential in order to quantify the components involved in the long-term effects of forest operations (e.g. harvesting and site preparation) on nutrient supply. The objective of this investigation is to compare the amounts of Ca2+, Mg2+, K+, and Al3+ in leachates from forest soils subjected to forest floor removal and soil compaction treatments in the long-term boreal forest productivity sites of the British Columbia Ministry of Forests (Canada) at Log Lake and Topley. A leaching experiment was conducted to simulate the long-term impacts of forest operations on soil fertility on 15 cm diameter undisturbed soil core collected from surface soil down to the lower boundary of Ae horizons. Approximately 25 litres of water were leached through each column from October 1997 to April 1998. Leachates collected during the experiment were analysed for Ca2+, K+, Mg2+ and Al3+ and other cations using inductively coupled plasma-atomic emission spectrometry. Results showed that the amounts of Ca2+, K+, Mg2+ and Al3+ in soil solution were highest in the treatment where forest floor was retained and the soil was not compacted and least in soils stripped of forest floor and

subjected to compaction treatments. The availability indices for K+ and Ca2+ also decreased with the removal of forest floor. The slopes of linear fits between the amount of cations leached against cumulative volume of leachates could be used as indicators for the long-term effects of forest operations on soil fertility. For instance, and based on these slopes in Topley site, the long-term reduction in the concentration of K+ in soil solution due to forest floor removal and compaction treatments could be as high as 88%

Descriptors:boreal-forests. forest-litter. forest-soils. taiga-soils. cations. harvesting. leachates. leaching. mineralization. soil-organic-matter. productivity. site-preparation. soil-compaction. soil-fertility. soil-solution. weathering. logging-effects. losses-from-soil. forestry-practices. calcium. magnesium. potassium. aluminium. disturbed-soils. forest-influences

Geographic Locator:British-Columbia. Canada

Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries

Subject Codes:KK100. KK110. KK515. JJ200. JJ600

Supplementary Info:40 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

86. Title:Tree growth on rehabilitated skid roads in southeast British Columbia

View Article: Forest Ecology and Management. 2000. 133 (1/2). 145-156

CD Volume:337

Print Article: Pages: 145-156

Author(s):Dykstra P R Curran M P

Author Affiliation:B.C. Ministry of Forests, Forest Sciences Section, Nelson Forest Region, 518 Lake St., Nelson, B.C., V1L 4C6, Canada

Document Editor:Lousier-J-D

Conference Title:Special Issue: Ecology of northern forest soils. Selected papers from the International forest soils conference, held Prince George, BC, Canada, 13-18 June 1998

Language:English

Abstract:Implementation of The Forest Practices Code of British Columbia Act (FPC) in 1995 made skid road rehabilitation mandatory on many sites effective immediately and on all sites by December 1999. This requirement implies that skid road rehabilitation will restore slope hydrology and site productivity. These assumptions require verification. Tree growth on excavated and bladed trail (skid road) rehabilitation was examined at 10 sites in the East and West Kootenays of SE British Columbia. Height and diameter growth of lodgepole pine (Pinus contorta), Engelmann spruce (Picea engelmannii), and Douglas fir (Pseudotsuga menziesii) trees were monitored at retrospective and new research sites established between 1984 and 1994. The study examined several 'worst case' scenarios with regard to soil and climatic conditions, and rehabilitation techniques. Soil conditions included fine and coarse textured material; a number of these sites have unfavourable subsoils such as calcareous, high pH parent materials. Site climates ranged from relatively dry and warm to cold and wet. Older rehabilitation techniques resulted in the subsoil mixed with the forest floor during excavation and recontouring, and the original running surface not decompacted prior to recontouring the slope. In contrast, newer techniques involve separate topsoil handling during excavation and rehabilitation, and decompacting of the skid road running surface. Growth on 4 disturbance types was compared: the undisturbed area adjacent to the skid road and 3 recontoured road

locations equivalent to the previous inner track, mid-road, and berm/sidecast. Data were analysed using ANOVA and disturbance type contrasts in regional and biogeoclimatic groupings. The trees growing on the berm and undisturbed treatments commonly displayed better growth than the trees growing on the inner track and mid-road treatments. For example, in the analysis of all 10 blocks for 3-year height increment, trees growing on the berm were either the leading or second ranked treatment in 7 out of 10 blocks, with differences in growth relative to the undisturbed area ranging from 89 to 161%. Height growth of trees growing on the berm, and on the berm and undisturbed area together, was also significantly better in the biogeoclimatic analysis. Diameter and volume growth followed the same trend as height for all analyses. Poorer growth on inner track and mid-road trees was similar to but not as pronounced as in previous studies on unrehabilitated skid roads, suggesting that the characteristics of the original skid road are still affecting the growth of trees on recontoured slopes. However, the results suggest that for the site conditions studied, rehabilitated skid roads will support trees of merchantable quality, particularly with improved rehabilitation techniques

Descriptors:bioclimate. productivity. rehabilitation. forestry-law. growth. increment. disturbed-soils. soil-compaction. soil-texture. soil-parent-materials. subsoil. topsoil. soil-fertility. skidding. forest-roads

Geographic Locator:British-Columbia. Canada

Identifiers:skid roads

Organism Descriptors:Pinus-contorta. Picea-engelmannii. Pseudotsuga-menziesii

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

Subject Codes:KK110. PP400. KK100. KK515. PP600. DD500. JJ300. JJ600

Supplementary Info:24 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

87. Title:Effect of spacing and age on nitrogen and phosphorus distribution in biomass of Eucalyptus camaldulensis, Eucalyptus pellita and Eucalyptus urophylla plantations in southeastern Brazil

View Article: Forest Ecology and Management. 2000. 133 (3). 167-177

CD Volume:337

Print Article: Pages: 167-177

Author(s):Harrison R B Reis G G Reis M D G F Bernardo A L Firme D J

Author Affiliation:Correspondence address: College of Forest Resources, University of Washington, Seattle WA 91895-2100, USA

Language:English

Abstract:The nitrogen and phosphorus accumulation in different tree parts (foliage, branches, bole bark and wood, and roots) of Eucalyptus camaldulensis, Eucalyptus urophylla and Eucalyptus pellita planted at 3 spacings (3x1.5, 3x3 and 4x3 m) and at 3 ages (15, 31 and 41 months) were evaluated in the savanna region of central Minas Gerais state, SE Brazil, in order to assess potential removals of these nutrients at harvesting. A series of equations were produced to estimate per-tree nitrogen and phosphorus from age, spacing, diameter and height, and per-hectare nitrogen and phosphorus using age, spacing and a tally of tree diameters and heights. The highest N and P concentrations were observed in foliage (15-23 g N kg-1 and 0.8-1.1 g P kg-1) and the lowest N concentration in bolewood (2.4-4.1 g N kg-1), while the lowest P concentration was observed in the taproot (0.16-0.29 g P kg-1). Total

biomass N at age 41 months was greatest in E. urophylla (378-457 kg N ha-1), lower in E. pellita (238-326 kg N ha-1) and lowest in E. camaldulensis stands (204-240 kg N ha-1), depending on spacing. Total biomass P at age 41 months was also greatest in E. urophylla (16.6-21.8 kg P ha-1), and about equal in E. pellita (10.4-12.8 P ha-1) and E. camaldulensis stands (10.4-12.2 kg P ha-1), depending on spacing. As age and spacing increased, individual stems increased in diameter and total N and P, but the relationship between total N and P pools and age and spacing was more variable

Descriptors:biomass. phosphorus. forest-plantations. spacing. root-systems. savannas. nitrogen. age-of-trees. harvesting. soil-fertility. plant-composition. plant-nutrition. nutrient-content. chemical-composition. foliage. stems. roots. branches. bark. wood-chemistry. nitrogen-content

Geographic Locator:Brazil. Minas-Gerais

Organism Descriptors:Eucalyptus. Eucalyptus-camaldulensis. Eucalyptus-pellita. Eucalyptus-urophylla

Supplemental Descriptors:Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants. Eucalyptus. South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Brazil

Subject Codes:KK100. KK600. FF061. FF040. KK110. JJ600

Supplementary Info:23 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

88. Title:Simulations on impacts of different management strategies on long-term site productivity in lodgepole pine forests of the central interior of British Columbia

View Article: Forest Ecology and Management. 2000. 133 (3). 217-229

CD Volume:337

Print Article: Pages: 217-229

Author(s):Wei X Liu W Waterhouse J Armleder M

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Language:English

Abstract:Impacts of different management strategies on long-term site productivity over a period of 240 years were simulated using the ecosystem Model FORECAST for lodgepole pine (Pinus contorta subsp. [var.] latifolia) montane and sub-boreal spruce forests of the central interior of British Columbia, Canada (where lodgepole pine dominates in forests which have had past high fire frequencies). Results suggested that the sustainable management strategies for maintaining long-term site productivity in lodgepole pine forests would be 80-120-year rotation lengths, with either stem-only or whole-tree harvesting. However, because of its greater nutrient conservation stem-only harvesting can achieve higher productivity (3.5-8.5%) than whole-tree harvesting. The thinning strategy (from 4000 to 1000 stems/ha) simulated would not increase total productivity over a period of 240 years. Thinning, however, can increase the habitat value for caribou. The best thinning strategies await further simulations on the effects of various stocking levels in a broader context. The simulations also showed that soil organic matter and below-ground woody debris are critical for maintaining long-term site productivity in lodgepole pine forests in the study area, and that a significant removal of such material may cause yield decline

Descriptors:boreal-forests. coniferous-forests. productivity. ecosystems. harvesting. soil-organic-matter. thinning. whole-tree-logging. tree-

length-logging. simulation. yield-forecasting. sustainability. forest-management. multiple-use. wildlife-management. rotations. dead-wood. soil-fertility
Geographic Locator:British-Columbia. Canada
Identifiers:Pinus contorta var. latifolia
Organism Descriptors:Pinus-contorta. reindeer
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Rangifer. Cervidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates. Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Pinus-contorta
Subject Codes:KK110. KK515. ZZ332. JJ600
Supplementary Info:30 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

89. Title:Change in organic carbon in forest plantation soils in eastern Australia
View Article: Forest Ecology and Management. 2000. 133 (3). 231-247
CD Volume:337
Print Article: Pages: 231-247
Author(s):Turner J Lambert M
Author Affiliation:Forsci Pty Ltd., 14/124 Rowe St., Eastwood, NSW 2122, Australia
Language:English
Abstract:Effects on soil organic carbon of establishing forest plantations were assessed using paired plot and chronosequence techniques. Paired plots were located in radiata pine (Pinus radiata) plantation sites located over a wide range of soil fertilities, in New South Wales, Victoria and Australian Capital Territory. In each case, one plot in each pair was located in relatively mature plantation and the other in adjacent existing native forest. Soil organic carbon under plantation was lower than under adjacent (original) native forest and a model was developed to relate the declines in carbon to the soil fertility range. Two chronosequences were studied, one located in a series of relatively fertile P. radiata unthinned plantations, 0-24 years of age, and the other in 0-35 years old Eucalyptus grandis plantations, also unthinned (both in New South Wales). In these studies, there was an apparent rapid decline in organic carbon in surface soil (0-10 cm) for ca. 12 years after plantation establishment. Soil organic carbon then stabilized with some indication of increases ca. 20 years after plantation establishment. There was a larger loss of carbon from the deeper horizon (to 50 cm) within 2 years of plantation establishment and carbon continued to decline over the length of the 2 chronosequences. The net effect was a loss of soil organic carbon in the plantations over the duration of the study periods. Analysis was also undertaken on carbon input processes and the varying impacts of management. Soil disturbances involved in the establishment of plantations result in decomposition of soil carbon, and losses of carbon occurred at different rates in different parts of the soil profile. The losses will be offset by accumulation of carbon in vegetation. However, the period where the net effect is zero varies with different plantations but is of the order of decades. That is, net accumulation in the total system does not occur for approx equal to 10-20 years after plantation establishment. These results have significant implications for fast growing, short rotation plantations (<15 years old) for pulpwood or biofuels, and soil carbon decline can be expected

to continue over subsequent rotations. Plantation management systems can be modified to reduce carbon losses and modify the period up to the time when net accumulation commences
Descriptors:forest-soils. soil-organic-matter. forest-plantations. losses-from-soil. soil-fertility. intensive-silviculture. forest-influences. age-of-trees. stand-age. short-rotation-forestry
Geographic Locator:Australia. New-South-Wales. Victoria. Australian-Capital-Territory
Organism Descriptors:Eucalyptus-grandis. Pinus-radiata
Supplemental Descriptors:Eucalyptus. Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants. Pinus. Pinaceae. Pinopsida. gymnosperms. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:KK110. KK100. JJ600. KK600
Supplementary Info:52 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

90. Title:Interannual and spatial variation in maximum leaf area index of temperate deciduous stands
View Article: Forest Ecology and Management. 2000. 134 (1/3). 71-81
CD Volume:337
Print Article: Pages: 71-81
Author(s):Dantec V le Dufrene E Saugier B
Author Variant:le-Dantec-V
Author Affiliation:Laboratoire d'Ecophysiologie Vegetale, Universite de Paris XI, 91405 Orsay Cedex, France
Language:English
Abstract:The aim of this study was to quantify both spatial and temporal variations of maximum leaf area index (LAI) and to interpret LAI variation according to stand characteristics and meteorological conditions. A comparison was made of maximum LAI (measured using the LI-COR LAI-2000 PCA) over 4 years and 420 ha of a temperate forest (Fontainebleau forest, SE of Paris, France) across a range of stand structures (density, biomass, age) and site fertilities (soil nutrient and water availability). LAI values ranged from 0.5 to 8 m2 m-2, and maximal LAI was relatively stable between years. However, although water stress did not affect LAI development in the current year, it reduced LAI of the following year only in stands with high LAI (above 5.5 m2 m-2). Spatial variations of maximal LAI were mainly dependent on forest management which affected tree density and stand diameter at breast height (DBH) through thinning and harvesting. Among the 34 deciduous stands studied, maximal LAI increased with tree density up to a value of about 1000 stems ha-1 and then it reached a plateau between 6 and 8 m2 m-2. Total leaf area per tree had a strong correlation with DBH for species with different sap conducting systems (r2=0.94). Decreases of maximal LAI with humus quality were observed, suggesting that although forest management appears to be the main cause of LAI variations between stands and between years, soil fertility may also be a determinant of stand LAI
Descriptors:leaf-area-index. spatial-variation. temporal-variation. biomass. deciduous-forests. forest-management. harvesting. humus. meteorological-factors. soil-fertility. stand-characteristics. stand-structure. thinning. water-availability. water-stress. soil-water-content. stand-density. age-of-trees. stand-age
Geographic Locator:France

Supplemental Descriptors:Western-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK110. JJ600. PP500. JJ300
Supplementary Info:55 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

91. Title:Indices of forest floor nitrogen status along a climate gradient in Maine, USA
View Article: Forest Ecology and Management. 2000. 134 (1/3). 177-187
CD Volume:337
Print Article: Pages: 177-187
Author(s):Fernandez I J Simmons J A Briggs R D
Author Affiliation:Department of Plant, Soil and Environmental Sciences, University of Maine, Orono, ME 04469-5722, USA
Language:English
Abstract:Nitrogen has long been recognized as the most commonly limiting nutrient for plant production throughout the world. Yet, air pollution has created a modern chemical climate that has sometimes resulted in excess ecosystem N due to N deposition. In addition, climate warming could accelerate N cycling and N export from forested ecosystems. The result is increasing interest in understanding forest ecosystem N dynamics. This study used recently delineated climatic regions in Maine (USA) to investigate the possible influences of forest species composition, and energy and moisture gradients, on laboratory indices of forest floor N cycling. Concentrations of N and C, and potential net nitrification, potential net ammonification, and potential net N mineralization, were measured on forest floor samples from 20 sites distributed across Maine in both hardwood and softwood stands. Both forest types had nearly identical concentrations of N in the forest floor (approx equal to 1.6%), but the mean C/N ratio (28) under softwoods was significantly higher than that under hardwoods (24) due to higher concentrations of total C in soils under conifers. Forest floor N concentration was a better predictor of potential net N mineralization than was total C or C/N ratio. Although the most northerly region in this study was predictably the coldest, it was also the region with the highest values for total N and N cycling indices. Wet N deposition for the region indicates that N deposition differences are not responsible for this spatial pattern, and further work is warranted to explain these results. Laboratory incubation measures of potential net N mineralization were significantly correlated with in situ annual net N mineralization, which supports the use of these techniques for forest soil N status evaluations. Most site measures of mean temperatures were negatively correlated with soil N indices indicating that warmer sites had lower rates of N cycling. Although differences existed in forest floor N characteristics between climatic regions, they could not be predicted by simple relationships with temperature
Descriptors:climate. climatic-change. deciduous-forests. coniferous-forests. forest-litter. air-pollution. acid-deposition. ecosystems. mineralization. nitrification. nitrogen-cycle. climatic-zones. soil-fertility. chemical-composition. global-warming. forest-ecology. ammonification. forest-soils. soil-organic-matter. temperature. soil-chemical-properties. nitrogen-content
Geographic Locator:Maine. USA
Supplemental Descriptors:New-England-States-of-USA. Northeastern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries

Subject Codes:KK100. JJ100. PP500. JJ600. JJ200
Supplementary Info:37 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

92. Title:Accumulation in above-ground biomass and soil storage of mineral nutrients in pure and mixed plantations in a humid tropical lowland
View Article: Forest Ecology and Management. 2000. 134 (1/3). 257-270
CD Volume:337
Print Article: Pages: 257-270
Author(s):Montagnini F
Author Affiliation:Management and Conservation of Forests and Biodiversity, Centro Agronomico Tropical de Investigacion y Ensenanza, CATIE, 7170 Turrialba, Costa Rica
Language:English
Abstract:As fast-growing, short-rotation plantations are being planted in the tropics on low fertility soils, the problem of sustaining soil fertility becomes an important management issue. Above-ground biomass, nutrient concentration of above-ground tree tissues, and soil nutrients were examined in 2 young plantations of 8 indigenous tree species grown in pure and mixed designs in a low fertility site in the humid lowlands of Costa Rica. The species used were: in Plantation 1, Calophyllum brasiliense, Jacaranda copaia, Stryphnodendron microstachyum and Vochysia guatemalensis; and in Plantation 2, Albizia guachapele [Pseudosamanea guachapele], Dipteryx panamensis, Terminalia amazonia and Virola koschnyi. The goal was to assess the role of nutrient accumulation in above-ground biomass on potential site nutrient decline, and to draw recommendations to conserve site nutrients in the long term. In Plantation 1, Jacaranda copaia pure stands had higher above-ground tree N, P, and Mg than the other treatments, while Vochysia guatemalensis had the greatest accumulation of K and Ca. For J. copaia, stem harvest would remove about 54% of total above-ground tree N, but about 80% of P, K, Ca and Mg. For V. guatemalensis, stem harvest would remove <30% of N but from 50 to 60% of total above-ground tree Ca, K, Mg and P. Branches and foliage summed together were 25 to 35% of total above-ground tree biomass, but they generally represented about 50% of above-ground tree nutrients. In Plantation 2, the mixed stands had the highest above-ground nutrient content for all nutrients, and both the mixture and Terminalia amazonia pure stands had the highest stem P and Mg. Five years after planting, decreases in soil P, K and Ca were apparent in pure plots of the fastest growing species with the largest accumulation of nutrients in above-ground biomass, such as J. copaia and V. guatemalensis. However, in other cases, beneficial effects on some soil nutrients were noted, for example, increases in soil Ca under T. amazonia and Virola koschnyi, both species with high Ca content in foliage and high rates of annual litterfall. The mixed plots showed intermediate values for the nutrients examined, and even improved soil conditions, as for P in Plantation 1. This suggests that in mixed conditions it may take longer to deplete soil nutrients than in monospecific stands of fast-growing species. Results of continued sampling will be needed to assess the long-term effects of plantation treatments on soil chemistry, especially near the end of the rotation (estimated at 12-15 years, depending on the species). The calculation of whole-stand nutrient budgets can help in the selection of tree species and plantation management strategies to favour nutrient recycling mechanisms and site nutrient conservation

Descriptors:biomass. nutrient-content. forest-plantations. cycling. soil-chemical-properties. soil-fertility. short-rotation-forestry. sustainability. monoculture. mixtures. nitrogen. phosphorus. magnesium. potassium. calcium. harvesting. stems. branches. foliage. forest-influences
Geographic Locator:Costa-Rica
Identifiers:Terminalia amazonia. Virola koschnyi. Vochysia guatemalensis. Stryphnodendron microstachyum. Pseudosamanea guachapele. Pseudosamanea. Annonales
Organism Descriptors:Jacaranda. Jacaranda-copaia. Terminalia. Virola. Vochysia. Calophyllum-brasiliense. Stryphnodendron. Dipteryx-panamensis. Fabaceae
Supplemental Descriptors:Bignoniaceae. Scrophulariales. dicotyledons. angiosperms. Spermatophyta. plants. Jacaranda. Combretaceae. Myrtales. Myristicaceae. Magnoliales. Vochysiaceae. Polygalales. Calophyllum. Clusiaceae. Theales. Mimosoideae. Fabaceae. Fabales. Dipteryx. Papilionoideae. Central-America. America. Developing-Countries. Threshold-Countries. CACM. Latin-America. Terminalia. Virola. Vochysia. Stryphnodendron
Subject Codes:KK110. JJ600. FF061. FF040. JJ200. KK600
Supplementary Info:34 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

93. Title:Height growth patterns of Scots pine and Norway spruce in the coastal areas of western Finland
View Article: Forest Ecology and Management. 2000. 135 (1/3). 205-216
CD Volume:337
Print Article: Pages: 205-216
Author(s):Karlsson K
Author Affiliation:Finnish Forest Research Institute, Kannus Research Station, Box 44, FIN-69101 Kannus, Finland
Conference Title:Special issue. Selected papers from the IUFRO conference 'Wind and other abiotic risks to forests', held in Joensuu, Finland, August 1998
Language:English
Abstract:Stem analysis data of 46 Scots pine (Pinus sylvestris) and 38 Norway spruce (Picea abies) trees from various stands along the coast of the Gulf of Bothnia in western Finland were used to construct height curves for naturally regenerated and cultivated Scots pine and for naturally regenerated Norway spruce. The curves were compared with each other, with models for 28 naturally regenerated pine trees growing further from the coast (40 to 60 km) and with general site index curves for the two species in southern Finland. The height growth pattern for coastal pine exhibited a strong stagnation over age compared to general site indexes. Spruce height development was dominated by a slow early development followed by an increase in height increment compared to general index curves. There was a large variation in the height growth patterns of coastal spruce and a growth pattern variable was needed in the functions in order to make reliable predictions. Even simple models provided relatively good predictions for coastal pine. It is argued that strong wind, temperature and moisture regimes caused these differences to occur between trees growing on the western coast and those growing in inland Finland. The soil provides poor rooting conditions at the coast and this increases the susceptibility of trees to the effects of climate events. The variation in height growth patterns within the coastal area could partly be explained with

location in relation to the sea and stoniness for pine, and humus layer thickness for spruce. The number of years trees had grown to breast height was used as a predictor, which explained the growth patterns very well. This variable did not describe causal relationships, since it depends both on the original status of the site and of management intensity. This variable could be used to improve predictions when such data are available. The rate of early development (growth) was correlated with the carbon : N (C/N) ratio of the humus in spruce stands. This indicated that the growth patterns of coastal spruce may change along an ecological gradient from dry, stony moraines with thick humus, to moist, dense sorted soils with poor quality humus. The use of soil variables in predicting height development is difficult, since they usually are time dependent and affected by stand characteristics and management

Descriptors:forest-trees. height. increment. growth. effects. soil. humus. horizons. site-factors. wind. temperature. coastal-areas. variation. analysis. soil-fertility. carbon. nitrogen. soil-water

Geographic Locator:Finland

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:KK100. KK110. JJ300. JJ400. PP500. FF900

Supplementary Info:40 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

94. Title:The larch casebearer and its host tree: I. Population dynamics of the larch casebearer (Coleophora laricella Hbn.) from latent to outbreak density in the field

View Article: Forest Ecology and Management. 2000. 136 (1/3). 11-22

CD Volume:337

Print Article: Pages: 11-22

Author(s):Habermann M

Author Affiliation:Institut fur Forstzoologie, Universitat Gottingen, Niedersachsische Forstliche Versuchsanstalt, Abteilung Waldschutz, Gratzelstr. 2 D-37079 Gottingen, Germany

Language:English

Abstract:Changes in 2 larch casebearer (Coleophora laricella) populations were analysed under field conditions in Germany from 1991 to 1995 using a differential analysis: one insect species feeding at the same time on two needle types (spurshoot and longshoot needles) of two host species (European larch Larix decidua, and Japanese larch Larix leptolepis [L. kaempferi]) in two different environments (the Solling hills, a resource-rich stand; and the lowlands, a resource-poor stand). Casebearer density in the lowlands was always significantly lower than in the Solling hills. The main factors regulating casebearer density were obviously the same for both populations, although feeding intensity and environmental conditions differed. The most important factors influencing density changes were the mortality of the mining young larvae, and to a lesser degree, the hibernation and spring mortality of the L3/L4 larvae. The rates of pupal parasitism were low in the Solling hills (max. 8.7%) although density was much higher than in the lowlands where pupal parasitism was higher (max. 18.5%). There was no evidence for regulatory effects of parasites or predators in either population. It is supposed that larval mortality mainly depends on needle physiology, which in turn is supposed to be influenced by

environmental conditions. Different environmental conditions seemed to determine the feeding tolerance levels of the infested host trees. Therefore, larch trees growing under optimal conditions may be able to tolerate periodic defoliation by the casebearer but trees growing under suboptimal conditions may have to reduce the risk of defoliation to a sustainable degree
Descriptors:population-dynamics. conifer-needles. plant-morphology. site-factors. soil-fertility. population-density. hill-land. lowland-areas. environmental-factors. insect-pests. forest-pests. plant-pests. mortality. parasites. natural-enemies. predators. plant-physiology. infestation. pest-resistance. defoliation. outbreaks. pupae. larvae
Geographic Locator:Germany
Organism Descriptors:Coleophora-laricella. Larix-decidua. Larix-kaempferi. insects
Supplemental Descriptors:Coleophora. Coleophoridae. Lepidoptera. insects. arthropods. invertebrates. animals. Western-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries. Larix. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants
Subject Codes:KK100. FF620. JJ600. HH600. HH100. YY700. FF060. YY200
Supplementary Info:22 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

95. Title:The larch casebearer and its host tree. II. Changes in needle physiology of the infested trees
View Article: Forest Ecology and Management. 2000. 136 (1/3). 23-34
CD Volume:337
Print Article: Pages: 23-34
Author(s):Habermann M
Author Affiliation:Institut fur Forstzoologie, Universitat Gottingen, Gottingen, Germany
Language:English
Abstract:The population dynamics of the larch casebearer (Coleophora laricella) in the field and the physiology of larch needles serving as their feeding basis were analysed from 1991 to 1995 using a differential analysis: one insect species feeding at the same time on two needle types (spurshoot and longshoot needles) of two host species (European larch Larix decidua, and Japanese larch Larix leptolepis [L. kaempferi]) at 2 sites in Germany under different environmental conditions (in the Solling hills, a resource-rich site; and in the lowlands, a resource-poor site). Resistance mechanisms were found that allow a coexistence of the tree and of the insect population at an economically 'bearable' cost for the host trees. With increasing casebearer densities, physiological changes within the intra-annual course of the tree's needle physiology were induced. However, they did not prevent the further growth of the casebearer population. High mortality rates of the sensitive needle mining L1-larvae resulted from specific local defence mechanisms of the single needle followed by a premature leaf abscission. A decrease of casebearer densities was initiated when L4-densities in the spring exceeded a tolerance level which seemed to be adjusted to the environmental conditions. The induced physiological changes led to a sudden deterioration of the digestibility of the needles, caused by an increase of procyanidin and tannin contents and a decrease of protein-amino acid contents. The strong disadvantageous effect of these mechanisms on the casebearer

population coincided with the highest consumption rates of the casebearer larvae
Descriptors:population-dynamics. conifer-needles. plant-physiology. plant-morphology. environmental-factors. hill-land. lowland-areas. pest-resistance. insect-pests. plant-pests. forest-pests. mortality. larvae. defence-mechanisms. population-density. abscission. defoliation. tannins. amino-acids. proteins. cyanidin. feeding-behaviour. infestation. soil-fertility
Geographic Locator:Germany
Identifiers:procyanidin
Organism Descriptors:Coleophora-laricella. Larix-decidua. Larix-kaempferi. insects
Supplemental Descriptors:Coleophora. Coleophoridae. Lepidoptera. insects. arthropods. invertebrates. animals. Larix. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Western-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK100. FF620. FF060. HH600. JJ600. YY200. YY500
Supplementary Info:42 ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

96. Title:Relationships between vegetation, site type and stand structure in coniferous plantations in Britain
View Article: Forest Ecology and Management. 2000. 136 (1/3). 35-51
CD Volume:337
Print Article: Pages: 35-51
Author(s):Ferris R Peace A J Humphrey J W Broome A C
Author Affiliation:Forestry Commission Research Agency, Alice Holt Lodge, Wrecclesham, Farnham, Surrey GUI0 4LH, UK
Language:English
Abstract:Plant communities (ground and field layer species) within a wide range of coniferous forest stands across Britain were classified using the National Vegetation Classification, and community composition and diversity were related to stand structure and site characteristics. Data were collected from 12 plantation forest sites, encompassing a range of climatic conditions (uplands, foothills, and lowlands), crop types (Scots pine Pinus sylvestris, Sitka spruce Picea sitchensis, Norway spruce Picea abies, and Corsican pine Pinus nigra var. maritima [P. nigra subsp. laricio]), and crop ages (pre-thicket, mid-rotation, mature and over-mature). Vegetation communities in lowland sites were poorly correlated with semi-natural woodland analogues, with 'goodness-of-fit' coefficients of less than 40%. The highest coefficients were obtained for mature and over-mature pine and spruce stands in the uplands and foothills climatic zones. These stands were matched most closely with semi-natural pinewoods and oakwood (Quercus petraea) communities. Principal components analysis produced 4 summary soil vectors and 4 habitat structure vectors, that described 84 and 79% of the variability in the site and stand structure data, respectively. These vectors were related to plant community composition, species richness and species diversity using canonical correspondence analysis and correlation analysis. Variation in community composition was related principally to a soil fertility gradient, defined by increasing pH, exchangeable Ca, and available N in NO3- form, coupled with decreases in soil organic matter and N in NH4+ form. Vascular plant and bryophyte species diversity was inversely related to available N. Uplands and foothills Scots pine and Sitka spruce sites had plant communities typical of acid, infertile soils, whereas lowland Norway

spruce sites had communities associated with high soil fertility. Plant community composition and diversity was also significantly related to measures of vertical stand structure. Pre-thicket plots, with high values for field layer vertical cover, had distinctive communities and were more diverse than mid-rotation and mature plots, which had high canopy cover values, and low shrub and field layer cover. A positive relationship was recorded between deadwood volume and bryophyte species diversity, with over-mature Sitka spruce stands in the uplands having particularly high volumes of deadwood due to windthrow. This influence of stand structure suggests that plant community diversity can be enhanced in commercial conifer forests by extending rotation lengths, introducing alternative silvicultural systems such as shelterwood, and increasing deadwood volumes

Descriptors:vegetation-types. plant-communities. coniferous-forests. botanical-composition. synecology. forest-plantations. climatic-zones. upland-areas. lowland-areas. age-of-trees. stand-age. stand-development. classification. stand-structure. site-factors. woodlands. edaphic-factors. soil-fertility. soil-chemical-properties. exchangeable-calcium. nutrient-availability. nitrogen-content. ammonium-nitrogen. nitrate-nitrogen. soil-organic-matter. species-diversity. canopy. shrubs. ground-vegetation. dead-wood. rotations. silvicultural-systems. shelterwood-system. habitats. forest-ecology. site-types. forest-management. biodiversity. wind-damage

Geographic Locator:UK

Identifiers:foothills. Pinus nigra subsp. laricio

Organism Descriptors:Pinus-sylvestris. Picea-sitchensis. Picea-abies. Bryophyta. Quercus-petraea. Pinus-nigra

Supplemental Descriptors:British-Isles. Western-Europe. Europe. Developed-Countries. Commonwealth-of-Nations. European-Union-Countries. OECD-Countries. Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Picea. Quercus. Fagaceae. Fagales. dicotyledons. angiosperms

Subject Codes:KK100. PP720. ZZ331. JJ600. JJ200. PP500. KK110. FF700

Supplementary Info:many ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

97. Title:The effect of soil nutrition, soil acidity and drought on northern red oak (Quercus rubra L.) growth and nutrition on Pennsylvania sites with high and low red oak mortality

View Article: Forest Ecology and Management. 2000. 136 (1/3). 199-207

CD Volume:337

Print Article: Pages: 199-207

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:Unexplained mortality of northern red oak (Quercus rubra.) has occurred on the Laurel Hill in southwestern Pennsylvania, USA. An attempt was made to characterize this mortality and determine its relationship to soil acidity, soil nutrient status and droughts. Three blocks with high and low mortality of northern red oak were selected. Basal area increment, terminal elongation and leaf mass were measured along with soil chemistry. Basal area growth patterns were compared with historic drought records. Both living and standing dead trees on high mortality plots had been responsive to most of these droughts. After 2 years of droughts in the 1960s, basal area growth rate of trees

on high mortality plots did not recover. In addition, the standing dead trees on high mortality plots were historically a less vigorous subset. After this mortality, the living trees did not respond with increased growth due to thinning of competitors. Basal area growth on low mortality plots did recover after these same droughts and mortality was limited. In addition, the trees on the high mortality plots showed foliar deficiency of K and low levels of Ca while trees on the low mortality plots did not. Furthermore, the A- and B- horizons of the soils on the high mortality plots had lower levels of soil bases, higher levels of available Al and lower Ca/Al ratios. The results of this study suggest that nutrient deficiency and associated Al toxicity may be causing stress for northern red oaks and is related to the mortality and reduced growth of northern red oak in this region

Descriptors:forest-decline. soil-acidity. soil-fertility. nutrient-content. drought. soil-chemical-properties. soil-pH. mortality. basal-area. growth. increment. shoots. foliage. biomass. dead-trees. growth-rate. vigour. plant-competition. foliar-diagnosis. nutrient-deficiencies. potassium. calcium. plant-nutrition. aluminium. soil-toxicity

Geographic Locator:Pennsylvania. USA

Organism Descriptors:Quercus-rubra

Supplemental Descriptors:Quercus. Fagaceae. Fagales. dicotyledons. angiosperms. Spermatophyta. plants. Middle-Atlantic-States-of-USA. Northeastern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries

Subject Codes:KK100. JJ200. FF061. FF700. PP500. FF062. KK110

Supplementary Info:45 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

98. Title:Growth, nutrition, and water relations of ponderosa pine in a field soil as influenced by long-term exposure to elevated atmospheric CO2

View Article: Forest Ecology and Management. 2000. 137 (1/3). 1-11

CD Volume:337

Print Article: Pages: 1-11

Author(s):Walker R F Johnson D W Geisinger D R Ball J T

Author Affiliation:Knudtsen Renewable Natural Resource Center, University of Nevada, Reno, NV 89512, USA

Language:English

Abstract:Atmospheric CO2 enrichment effects on growth, nutrition and water relations of ponderosa pine (Pinus ponderosa) were investigated in a field study of 5 years duration which included a soil N fertility variable in order to assess interactions of CO2 and N on tree responses. Open-top chambers permitted creation of atmospheres with 700 or 525 micro l litre-1 CO2, or ambient CO2. Trees were reared from seed in a mid-elevation Sierra Nevada forest soil at Placerville, California, USA, with a total N concentration of 856 micro g g-1 or in soil amended with sufficient (NH4)2SO4 to increase total N by 100 or 200 micro g g-1. The intermediate CO2 treatment within the intermediate N treatment was omitted from the study. Height and diameter measurements at the conclusions of each of the 5 growing seasons revealed significant growth enhancement by atmospheric enrichment, initially more pronounced in the 525 micro l litre-1 than in the 700 micro l litre-1 CO2 treatment. Final measurements indicated that the twice-ambient atmosphere ultimately proved the most stimulatory, however, but the magnitude of the growth responses to increased CO2 was somewhat dependent on soil N availability throughout the study. Foliar analysis revealed reductions in N, P, and S concentrations during the

second season and in Mg in the third season in the above-ambient CO2 treatments, while P was increased by high CO2 in high soil N but decreased by high CO2 in low N during the third season. Among micronutrients, foliar Fe was increased in high CO2, a response that also extended to Al, while Mn and B concentrations were reduced in this atmosphere, but significant treatment effects on micronutrients and Al were found in the second season only and were evident primarily in low soil N. During the fourth growing season, foliar N was initially higher but then later become lower in the above-ambient atmospheres. Predawn and midday measurements of xylem water potential made at intervals during the fifth season indicated substantial variability in responses to treatment, but increased moisture stress in trees reared in the enriched atmospheres was periodically evident

Descriptors:carbon-dioxide-enrichment. soil-chemical-properties. nitrogen-content. ammonium-fertilizers. forest-soils. growth. increment. foliar-diagnosis. plant-nutrition. nitrogen. phosphorus. sulfur. magnesium. iron. aluminium. manganese. boron. xylem-water-potential. water-stress. plant-water-relations. climatic-change. soil-fertility

Geographic Locator:California. USA

Organism Descriptors:Pinus-ponderosa

Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Pacific-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries

Subject Codes:KK100. PP500. FF061. FF062. JJ700. JJ600. JJ200

Supplementary Info:40 ref

ISSN:0378-1127

Year:2000

Journal Title:Forest Ecology and Management

99. Title:Impacts of wild fire severity and salvage harvesting on the nutrient balance of jack pine and black spruce boreal stands

View Article: Forest Ecology and Management. 2000. 137 (1/3). 231-243

CD Volume:337

Print Article: Pages: 231-243

Author(s):Brais S David P Ouimet R

Author Affiliation:Universite du Quebec en Abitibi-Temiscamingue, Rouyn-Noranda, Quebec, J9X 5E4, Canada

Language:English

Abstract:In August 1995, wildfires burnt over 50 000 ha of jack pine (Pinus banksiana) and black spruce (Picea mariana) boreal forest in northwestern Quebec, Canada. A balance sheet approach was used in order to assess the long-term effects of fire and subsequent salvage harvesting operations on nutrient site capital. Following a validation of burn severity indices and maps, an evaluation was conducted of soil nutrient pools in (1) lightly to moderately, (2) severely burned, and (3) unburned stands with similar biophysical characteristics. Above-ground biomass values for unburned stands, precipitation and N biological fixation inputs were drawn from the literature. Weathering rates were drawn from previous work and estimated with the PROFILE model. Fire significantly reduced forest floor dry weight by 41% in the light/moderately burned class and by 60% in the severe class while forest floor total Ca concentrations increased following both types of burn. Forest floor exchangeable Ca and total Mg concentrations increased following a light/moderate burn. Fire increased exchangeable K concentrations in the 0-10 cm mineral layer but had no other effects on mineral soil concentrations or characteristics. Forest floor nutrient content was significantly reduced on severely burned areas only. Kjeldahl N content was reduced by 44%, exchangeable Mg by 53% and

exchangeable K and total K by 60 and 51%, respectively. Reduction of K soil content was important enough that inputs through weathering and precipitation would take 278 years to compensate for soil losses following a severe fire. The projected effects of salvage harvesting on severely burned sites indicated that Ca, Mg and K would not return to their pre-burn level in the course of a 110-year rotation
Descriptors:boreal-forests. forest-fires. fire-effects. salvage-felling-and-logging. nutrient-availability. nutrient-content. soil-fertility. soil-chemical-properties. forest-soils. biomass. forest-litter. nitrogen-fixation. weathering. losses-from-soil. nutrients. exchangeable-calcium. calcium. magnesium. exchangeable-potassium. nitrogen-content. exchangeable-magnesium. potassium. precipitation. deposition. cycling. rotations. forest-management. taiga-soils. exchangeable-cations
Geographic Locator:Quebec. Canada
Identifiers:wildfires
Organism Descriptors:Pinus-banksiana. Picea-mariana
Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Picea
Subject Codes:KK130. JJ200. JJ600. ZZ331. KK515. KK110
Supplementary Info:many ref
ISSN:0378-1127
Year:2000
Journal Title:Forest Ecology and Management

100. Title:Recovering soil productivity attributes from experimental data: a statistical method and an application to soil productivity dynamics
View Article: Geoderma. 2000. 96 (3). 239-259
CD Volume:329
Print Article: Pages: 239-259
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 St., Madison, WI 53706, USA
Language:English
Abstract:A means is presented to recover information about soil quality trends from data sets, such as those from long-term crop experiments, in which time series of direct measures of soil properties may be unavailable. The first objective was to develop a method to recover information about the evolution of soil quality attributes from a limited range of data. The second objective was empirical: focusing on the productivity component of soil quality, to apply a dynamic statistical estimation method to infer a measure of soil productivity and its evolution from a time series of data on yields, nutrient inputs and management techniques. The results of the empirical analysis confirm well-known input-productivity relationships, and reveal new information about their dynamics. For example, more intensive cropping reduces soil productivity, but the dynamic effects of crop choice on productivity in a given period decline over time. N fertilizer can substitute for soil productivity in the short term, but in the long term, soil productivity decline due to intensive cultivation cannot be alleviated by higher N application rates. Simulations of soil productivity evolution across differing land management regimes show that continuous cropping of maize rapidly reduces soil productivity even at high N application rates, while rotational choices, especially the use of legumes, can lead to rapid soil productivity regeneration. Both the

conceptualization of the soil productivity measure and the approach to its measurement have the advantage of making use of only limited longitudinal data
Descriptors:productivity. analysis. application-rates. continuous-cropping. cultivation. evolution. intensive-cropping. land-management. legumes. properties. regeneration. research. soil-properties. sustainability. agriculture. land-productivity. nitrogen-fertilizers. soil-fertility. statistical-analysis. maize. models
Geographic Locator:USA
Organism Descriptors:Zea-mays
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:JJ600. JJ700. FF150. FF005. ZZ100
Supplementary Info:25 ref
ISSN:0016-7061
Year:2000
Journal Title:Geoderma
Copyright:Copyright CAB International

101. Title:Functional substrate biodiversity of cultivated and uncultivated A horizons of vertisols in NW New South Wales
View Article: Geoderma. 2000. 96 (4). 321-343
CD Volume:329
Print Article: Pages: 321-343
Author(s):Yan F McBratney A B Copeland L
Author Affiliation:Department of Agricultural Chemistry and Soil Science, Ross St Building A03, The University of Sydney, Sydney, NSW 2006, Australia
Language:English
Abstract:Concern over the effects of anthropogenic activities on soil 'quality' has fuelled efforts to identify and measure those factors that affect soil quality. Soil microbial diversity is one of many possible factors. Our objective was to compare the functional diversity of microbial communities in the A horizons of cultivated and uncultivated Vertisols in NW New South Wales, Australia. Samples from two cultivated and two uncultivated sites were tested using the community level physiological profiles (CLPP) method. Substrate richness, the rate of substrate use and the diversity of substrate use, as measured by the Shannon index, were significantly larger in the uncultivated sites than in the cultivated sites. The CLPP indicated a higher rate of substrate use in the uncultivated sites, although this may have been due to greater initial inoculum densities. When diversity values for each site were compared with several soil physical and chemical properties, a relationship between organic carbon and functional diversity was apparent. The fit to a broken-stick model showed that diversity increased up to 1.76% organic carbon and remained constant above that value. The implications of these results for soil quality will depend upon future investigations on the significance of soil microbial diversity as a component of soil quality
Descriptors:A-horizons. biodiversity. horizons. Vertisols. carbon. chemical-properties. communities. diversity. microbial-flora. organic-carbon. properties. soil-fertility. soil-properties
Geographic Locator:New-South-Wales. Australia
Supplemental Descriptors:Australia. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:JJ100. JJ600. JJ400
Supplementary Info:42 ref
ISSN:0016-7061
Year:2000

Journal Title:Geoderma
Copyright:Copyright CAB International

102. Title:Study of spatial relationships among some soil physico-chemical properties of a field in central Italy using multivariate geostatistics
View Article: Geoderma. 2000. 97 (1/2). 39-60
CD Volume:329
Print Article: Pages: 39-60
Author(s):Castrignano A Giugliarini L Risaliti R Martinelli N
Author Affiliation:Istituto Agronomico Sperimentale, via Celso Ulpiani 5 70125, Bari, Italy
Language:English
Abstract:Soil variability within fields results from complex geological and pedological processes, therefore soil variables are expected to be correlated in a scale dependent way. An accurate soil characterization, taking into account soil and spatial variability, will allow the farmer to follow crop management practices fitted with the real soil situation. The study of the scale-dependent correlation structure of some variables was investigated by means of Factorial Kriging Analysis (FKA) developed by Matheron. This analysis consists: modelling of the co-regionalization, analysing the correlation structure between the variables, estimating and mapping the regionalized factors. The present study was conducted in a 4-ha field located in central Italy. Soil samples were collected at 0-10 and 10-30 cm depth and were then analysed for pH, CEC (cation exchange capacity), total N, Olsen P, exchangeable K, and Na. The analytical results were submitted to classical statistical and geostatistical analysis which showed that plant macro- and micro-nutrients coming from fertilization had led to short-range variation, especially in Na, N, and CEC. The effects of these were superimposed on long-range processes, producing systematic patterns in soil fertility
Descriptors:statistical-analysis. physicochemical-properties. properties. analysis. soil-pH. nitrogen. phosphorus. potassium. sodium. cation-exchange-capacity. characterization. crop-management. fertilizers. kriging. mapping. soil-fertility. structure. variation. soil-variability. spatial-variation
Geographic Locator:Italy
Supplemental Descriptors:Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:JJ200. ZZ100. JJ400. JJ600
Supplementary Info:23 ref
ISSN:0016-7061
Year:2000
Journal Title:Geoderma
Copyright:Copyright CAB International

103. Title:Integrated Toposequence Analyses to combine local and scientific knowledge systems
View Article: Geoderma. 2000. 97 (1/2). 103-123
CD Volume:329
Print Article: Pages: 103-123
Author(s):Gobin A Campling P Deckers J Feyen J
Author Affiliation:Institute for Land and Water Management, Katholieke Universiteit Leuven, Vital Decosterstraat 102, 3000 Leuven, Belgium
Language:English
Abstract:Integrated Toposequence Analysis (ITA) was used to integrate scientific and local knowledge on land resources and land use systems and to identify factors determining land use and land resource management. The application of ITA at different toposequence types resulted in a

nested, geo-referenced information system relevant to different decision-making levels, and demonstrated the variation in soils, land cover/use and cropping systems between landform complexes (macro), unit landforms (meso) and facets (micro) at the Nsukka Agricultural Zone (SE Nigeria). The local soil classification was coupled to the World Reference Base for Soil Resources using the results of three toposequences and eight soil profile pits. Despite the overall low soil fertility, distinct differences in cropping systems and cultivation techniques were practised. Local land use and management decisions were guided by the local soil classification and depended on the position in the landscape, the soil texture, occurrence of ironstone and soil colour to tillage depth. The local knowledge provided insights in present management strategies, whereas the scientific information demonstrated the constraints on present land use systems

Descriptors:indigenous-knowledge. analysis. classification. cropping-systems. cultivation. land-resources. land-use. landforms. resource-management. soil-classification. soil-colour. soil-fertility. soil-profiles. soil-resources. soil-texture. soil. techniques. tillage. toposequences. variation. World. land-management

Geographic Locator:Nigeria

Identifiers:complexes

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

Subject Codes:JJ400. PP300. ZZ800. JJ300

Supplementary Info:55 ref

ISSN:0016-7061

Year:2000

Journal Title:Geoderma

104. Title:A geostatistical approach to estimate probability of occurrence of Tuber melanosporum in relation to some soil properties

View Article: Geoderma. 2000. 98 (3/4). 95-113

CD Volume:330

Print Article: Pages: 95-113

Author(s):Castrignano A Goovaerts P Lulli L Bragato G

Author Affiliation:Istituto Sperimentale Agronomico, Via Celso Ulpiani 5, 70125 Bari, Italy

Language:English

Abstract:This study concerned an experimental truffle bed of downy oaks (Quercus pubescens) infected by the ectomycorrhizal fungus Tuber melanosporum and planted in 1983 at a site in the Apennines, Italy. The presence of T. melanosporum created rounded areas with little herbaceous cover, termed 'brulis', where carpophores are found. The investigation was aimed at relating the occurrence and carpophore production of T. melanosporum to soil properties, i.e. organic matter, structure, aeration and fertility, expressed in terms of total organic C, aggregate size classes, DTPA-extractable Fe and Mn, and host plant height. Data were processed by multivariate geostatistical techniques. A linear model of coregionalization including (i) a nugget effect, (ii) a short-range spherical structure with a range of 7 m and (iii) a long-range spherical structure with a range of 32 m, was fitted to the experimental direct and cross-variograms of the investigated properties. Factorial kriging analysis was used to separate the sources of variation of the data according to the spatial scale at which they operate, and to summarize and map them in terms of spatial factors. An indicator approach was adopted to estimate and map the conditional probability of presence and fructification of T.

melanosporum. The visual comparison between the spatial pattern of the long-range structure of the first regionalized factor with the probability map of finding brulis plus carpophore production suggested that T. melanosporum may prefer a soft and well-aerated soil environment in which to grow
Descriptors:soil-properties. truffle-soils. organic-carbon. aggregates. size. iron. manganese. height. host-plants. kriging. aeration. soil-structure
Geographic Locator:Italy
Identifiers:carpophores
Organism Descriptors:Tuber-melanosporum. Quercus-pubescens
Supplemental Descriptors:Tuber. Pezizales. Ascomycotina. Eumycota. fungi. Quercus. Fagaceae. Fagales. dicotyledons. angiosperms. Spermatophyta. plants. Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:FF100. JJ200. KK100. JJ300
Supplementary Info:36 ref
ISSN:0016-7061
Year:2000
Journal Title:Geoderma

105. Title:Comparison of growth of Pinus radiata over two rotations in the central North Island of New Zealand
View Article: International Forestry Review. 2000-. 2- (2-). 84-89, 148-149
CD Volume:318
Print Article: Pages: 84-89, 148-149
Author(s):Woollons R C
Author Affiliation:School of Forestry, University of Canterbury, Christchurch, New Zealand
Language:English
Language of Summary:french. spanish
Abstract:A series of 33 replacement plots, first established in 1933, is available to assess the growth of Pinus radiata over two rotations in forests around Tokoroa, in the Central North Island of New Zealand. The New Zealand forestry sector is now required to produce evidence of sustainability; accordingly, data on their growth in successive rotations assume a special significance. The second set of plots was re-established on exactly the same sites as the first in the early 1970s. Analyses of mean top height growth irrefutably demonstrated that height growth is ahead for the second rotation - at site index age 20 by over 3 m. The basal area data are difficult to analyse, but it is very probable that basal area growth is higher in the second rotation. Growth of the second crop trees has not been enhanced by fertilizers, herbicides or better establishment practices, and superior genetic stock is not a contributing factor. These results are not used to claim soil amelioration; instead the faster growth in the second rotation may be attributed to more favourable climatic conditions
Descriptors:rotations. basal-area. forest-plantations. sustainability. plant-height. increment. climatic-change. growth-rate. soil-fertility
Geographic Locator:New-Zealand
Organism Descriptors:Pinus-radiata
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:KK110. JJ600. PP500
Supplementary Info:37 ref
ISSN:1465-5489
Year:2000

Journal Title:International Forestry Review
Copyright:Copyright CAB International

106. Title:Identifying and grading limiting factors of upland rice yields in farmers' fields of northern Thailand
View Article: International Rice Research Notes. 2000. 25 (1). 31-33
CD Volume:318
Print Article: Pages: 31-33
Author(s):Keer K van Leuven K U Trebuil G Goze E
Author Variant:van-Keer-K
Author Affiliation:Laboratory for Soil Fertility and Soil Biology, 3001 Leuven, Belgium
Language:English
Abstract:Upland rice crop populations, environmental conditions, and farmers' practices for the whole crop cycle were investigated in a1993-96 trial at Mae-Haeng in upper northern Thailand (600-800 m asl). Main system variables causing major yield limitations under farmers' circumstances and management practices were identified, dated, and ranked by principal component analysis. Panicle formation and spikelet differentiation, both influenced by vegetative biomass accumulation, were identified as key periods of yield differentiation. Strong negative relationships were observed for (1) number of panicles per plant and number of spikelets per panicle vs. rice root aphid [Rhopalosiphum rufiabdominalis] infestation, (2) plant density vs. late weed competition and late maturing cultivars, and (3) percentage of filled spikelets and 1000-grain weight vs. 1995 wet season. Weak negative relationships were observed for number of panicles per plant vs. slope angle, erosion, number of successive upland rice crops, minimum tillage, and early weed stress. The older forest type of fallow and upland rice grain yield exhibited a weak positive correlation. Brown spot [Cochliobolus miyabeanus?] was the only disease with yield limiting importance, especially on late maturing varieties. Rice root aphid infestation was the major yield-limiting factor, followed by weed competition and soil erosion. It is concluded that close attention should be given to soilborne upland rice pests when prioritizing issues for improving upland rice-based cropping systems in upper northern Thailand
Descriptors:crop-management. cultivation. insect-pests. crop-yield. erosion. fallow. limiting-factors. minimum-tillage. panicles. plant-density. plant-diseases. plant-pathogenic-fungi. plant-pathogens. plant-pests. rice. slope. spikelets. upland-rice. crop-weed-competition. weeds. wet-season. yield-components
Geographic Locator:Thailand
Identifiers:Rhopalosiphon rufiabdominalis
Organism Descriptors:Cochliobolus-miyabeanus. Oryza-sativa. Oryza
Supplemental Descriptors:Cochliobolus. Dothideales. Ascomycotina. Eumycota. fungi. Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries
Subject Codes:FF005. FF100. FF150. FF610. FF620. JJ900
Supplementary Info:3 ref
ISSN:0115-0944
Year:2000
Journal Title:International Rice Research Notes
Copyright:Copyright CAB International

107. Title:Influence of shrubs on soil characteristics and their function in Sahelian agro-ecosystems in semi-arid Niger
View Article: Journal of Arid Environments. 44 (4). April, 2000. 383-398

CD Volume:322
Print Article: Pages: 383-398
Author(s):Wezel A Rajot J L Herbrig C
Language:English
Language of Summary:English (EN)
Abstract:Soil beneath shrubs form 'fertile islands' in fallow sites and millet fields in semi-arid Niger. To gain more information about this phenomena different shrub species in fallow sites following a gradient from 350-650 mm precipitation were examined. For each shrub two different areas were distinguished: an area under the canopy of the shrubs and an area in the nearby open land. Soil samples were taken from a depth of 0-10 cm and analysed for Corg, Ntotal, PBray, pH(H2O), exchangeable cations, effective cation exchange capacity (ECEC) and soil texture. Significantly higher concentrations between 38-51% for C, N, P and 22% on ECEC for K+ were found in the soil under the shrubs. The pH showed only slight but significant differences, whereas A13+ and H+ rates on ECEC under the shrubs were increased by 44-55%. For Guiera senegalensis, the most common shrub of the studied area, enrichment ratios of most soil properties increased relatively more with increasing aridity. In general, enrichment ratios decreased with the age of the fallows, whereas concentrations showed no clear evolution. The chemical composition of the shrub litter seems to influence the degree of soil enrichment. The main step of fertile island formation takes place during the cultivation period by trapping wind-blown sediment. This work shows that shrubs are of vital importance for the accumulation of nutrients and maintenance of soil fertility within agro-ecosystems of Niger
Descriptors:agro-ecosystems; effective cation exchange capacity; soil texture. Agronomy (Agriculture); Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science. nitrogen: nutrient; phosphorus: nutrient
Geographic Locator:Niger (Ethiopian region); Sahel (Ethiopian region)
Organism Descriptors:Guiera senegalensis (Combretaceae)
Supplemental Descriptors:Combretaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Agronomy (Agriculture); Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science
ISSN:0140-1963
Year:2000
Journal Title:Journal of Arid Environments

108. Title:Farmers' capability and institutional incapacity in reclaiming disturbed land on the Jos Plateau, Nigeria
View Article: Journal of Environmental Management. 59 (2). June, 2000. 141-155
CD Volume:319
Print Article: Pages: 141-155
Author(s):Alexander M J Kidd A D
Author Affiliation:Department of Geography, University of Durham, South Road, Durham, DH1 3LE
Language:English
Language of Summary:English (EN)
Abstract:The approaches adopted by local farmers and official agencies to the question of reclamation of areas damaged by tin mining on the Jos Plateau, Nigeria are compared. Local farmers have been 'informally' using disturbed land for much of this century. The 'formal' (State) sector has only been operational since 1948, when regulations requiring mining companies to reinstate mined lands were introduced. Both sectors have sought to return disturbed land to productive agricultural use,

although their strategies have varied. The effectiveness of the contrasting approaches adopted by the two sectors was assessed by means of participatory interviews, archival research and field and laboratory analysis of soil. As a result of the initial failure of the formal sector to create suitable soils for sustained agriculture in the short-term, a long- term strategy of first planting restored areas with exotic Eucalypts was adopted. Evidence is presented to demonstrate the failure of this strategy both in terms of income generation for the community and the intended enhancement of soil fertility. Conversely, the small farmers have created fertile soils by using a combination of traditional organic manures, modern inorganics and town refuse ash. With the current temporary cessation of reclamation activities, the opportunity should be taken for a reappraisal of the reclamation policies adopted by the formal sector. The 'level, in-fill and plant Eucalypt' strategy should be replaced with one more understanding of farmer approaches to soil amelioration and improvement and the conditions under which reclamation activities of farmers has flourished

Descriptors:disturbed land reclamation; formal sector; government agencies; indigenous knowledge; irrigation; mined lands; soil suitability. Agriculture; Human Ecology (Anthropology)

Geographic Locator:Jos Plateau (Nigeria, Africa, Ethiopian region)

Organism Descriptors:eucalyptus (Myrtaceae); human (Hominidae): farmer

Supplemental Descriptors:Hominidae: Primates, Mammalia, Vertebrata, Chordata, Animalia; Myrtaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Animals; Chordates; Dicots; Humans; Mammals; Plants; Primates; Spermatophytes; Vascular Plants; Vertebrates

Subject Codes:Agriculture; Human Ecology (Anthropology)

ISSN:0301-4797
Year:2000
Journal Title:Journal of Environmental Management

109. Title:Hedgerows as habitat for woodland plants

View Article: Journal of Environmental Management. 60 (1 Special Issue). September, 2000. 77-90
CD Volume:320
Print Article: Pages: 77-90

Author(s):McCollin D Jackson J I Bunce R G H Barr C J Stuart R
Author Affiliation:School of Environmental Science, University College Northampton, Boughton Green Road, Park Campus, Northampton, NN2 7AL

Language:English
Language of Summary:English (EN)

Abstract:For hedgerows to act as corridors for woodland plants they must provide habitat conditions to suit species' autecological requirements. This supposition was tested by examining differences in the habitat and autecological characteristics of woodland plants according to their relative frequency in hedgerows and woodlands using a novel Habitat Preference Index (HPI). Indicator values for habitat and autecological characteristics of plant species were derived from Ellenberg and other published sources. Analyses were done separately for three main types of landscape in which hedgerows are found in Britain: (1) Lowland Arable; (2) Lowland Pastural; and (3) Marginal Upland. The relative frequency of plant species across all three landscape types was similar and significant differences between HPIs environmental indicators were found for all three landscape types. Plants more frequently found in hedgerows had significantly higher indicator scores for soil fertility, temperature, continentality together with reduced soil acidity, in comparison to those species more frequent in woodlands. Analyses of autecological indicators failed to show similar consistent trends

across landscape types except for the number of woodland types of the National Vegetation Classification (NVC) in which species occur. Plants more frequently found in hedgerows were associated with fewer woodland communities suggesting that hedgerows contain only a narrow range of recognised woodland NVC stand types. Also, a significantly higher proportion of ancient woodland indicators were found in the group of plants that were more frequent in woodlands. Overall, results suggested that the environments of hedgerows are more similar to woodland edges than interiors. Qualitative differences between the environmental characteristics of hedgerows and woodlands are such that certain woodland plant species are highly likely to be limited in their capacity to use hedgerow networks. Implications for conservation of biodiversity are considered
Descriptors:Habitat Preference Index [HPI]; National Vegetation Classification [NVC]; autoecological requirements; biodiversity conservation; continentality; ecological corridors; edge effects; environmental characteristics; habitat conditions; hedgerows: habitat; landscape types; qualitative differences; soil fertility; temperature; woodlands. Conservation; Terrestrial Ecology (Ecology, Environmental Sciences)
Organism Descriptors:plants (Plantae)
Supplemental Descriptors:Plantae. Plants
Subject Codes:Conservation; Terrestrial Ecology (Ecology, Environmental Sciences)
ISSN:0301-4797
Year:2000
Journal Title:Journal of Environmental Management

110. Title:Nutrient management planning: justification, theory, practice
View Article: Journal of Environmental Quality. 2000. 29 (1). 72-79
CD Volume:320
Print Article: Pages: 72-79
Author(s):Beegle D B Carton O T Bailey J S
Author Affiliation:Dep. of Agronomy, 116 ASI Building, Pennsylvania State Univ., University Park, PA 16802, USA
Document Editor:Sharpley-A-N
Conference Title:Practical and innovative measures for the control of agricultural phosphorus losses to water. OECD conference papers. Antrim, Northern Ireland, UK, 16-19 June 1998
Language:English
Abstract:Traditionally, nutrient management has been concerned with optimizing the economic return from nutrients used for crop production. Today, the agronomic and economic requirements of nutrient management remain central, but in addition, the process must consider the potential impact of these nutrients on environmental quality. The nutrient-management process is critical for maximizing the economic benefit from nutrients while minimizing the environmental impact. This process includes assessment, analysis, decision making, evaluation and refinement. A tactical nutrient-management plan developed from this process must be based on a firm set of strategic objectives agreed upon by the farmers and society. The nutrient-management process must also be practical to implement, if the performance goals are to be met. While nutrient-management plans have resulted in benefits to farmers and society, implementation has not been as great as desired. Several factors have been identified as key to the successful implementation of nutrient-management planning: the full participation of a broad range of stakeholders, the use of established infrastructure, targeted nutrient-management planning efforts, voluntary vs. mandatory programs, and the economics of nutrient management. Experiences in Pennsylvania

(USA), the Republic of Ireland, and Northern Ireland illustrate aspects of the implementation of the nutrient management process
Descriptors:nutrients. soil-fertility. crop-production. decision-making. economics. environmental-impact. environmental-factors. farmers
Geographic Locator:Northern-Ireland. UK. Pennsylvania. USA. Irish-Republic
Supplemental Descriptors:UK. British-Isles. Western-Europe. Europe. Developed-Countries. Commonwealth-of-Nations. European-Union-Countries. OECD-Countries. Middle-Atlantic-States-of-USA. Northeastern-States-of-USA. USA. North-America. America
Subject Codes:JJ700. JJ600. EE110
Supplementary Info:29 ref
ISSN:0047-2425
Year:2000
Journal Title:Journal of Environmental Quality

111. Title:An agri-environmental phosphorus saturation index for acid coarse-textured soils
View Article: Journal of Environmental Quality. 2000. 29 (5). 1561-1567
CD Volume:320
Print Article: Pages: 1561-1567
Author(s):Khiari L Parent L E Pellerin A Alimi A R A Tremblay C Simard R R Fortin J
Author Affiliation:Centre de Recherche en Geomatique, Dep. des Sols et de Genie Agroalimentaire, Paul-Comtois Building, Laval Univ., Sainte Foy, QC, G1K 7P4, Canada
Language:English
Abstract:Potato is a high P demanding crop contributing to P saturation of acid coarse-textured soils. The P status is commonly assessed agronomically by soil testing of P (STP) and environmentally by soil P saturation or P solubility indexes. A P fertilizer recommendation model was developed integrating P environmental risk and crop response probability, using P and Al extracted by the Mehlich-III soil testing method (mg P or Al litre-1 soil) and expressed as (P/Al)M-III percentage. The environmentally critical (P/Al)M-III percentage was 15%, corresponding to the critical degree of phosphate saturation (DPS) value of 25% (oxalate extraction procedure) proposed in the Netherlands. Using the Cate-Nelson procedure, the critical (P/Al)M-III percentage across 78 field experiments was 8.2% as determined by inductively coupled-argon plasma (ICP). Probability of potato response to P was close to 100% even above the critical STP values as shown by power tests on relative yields. The P recommendation model was computed from conditional expectations of 50 and 80% within each fertility group below 15% as (P/Al)M-III. Above 15%, the model recommended 21 kg P ha-1, the amount of P exported by a tuber harvest of approximately 42 t ha-1. Using conversion equations with 114 soil samples for STP methods, fertility groups built for Quebec (Canada) acid coarse-textured soils were comparable with those currently used in the Netherlands and Lower Saxony (Germany). The (P/Al)M-III percentage provided a reliable and unifying criterion for making environmentally acceptable and agronomically efficient P recommendations for sustainable potato production
Descriptors:phosphorus. indexes-of-nutrient-availability. coarse-textured-soils. potatoes. phosphorus-fertilizers. guidelines. models. methodology. soil-testing. soil. solubility. responses. soil-fertility
Geographic Locator:Canada. Quebec
Organism Descriptors:Solanum-tuberosum

Supplemental Descriptors:Solanum. Solanaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:JJ600. JJ700. FF005. ZZ900. FF061
Supplementary Info:37 ref
ISSN:0047-2425
Year:2000
Journal Title:Journal of Environmental Quality
Copyright:Copyright CAB International

112. Title:Cytogenetical investigations of polyploid interspecific hybrids of Nicotiana africana with different cultivars of N. tabacum
View Article: Journal of Genetics & Breeding. 2000. 54 (2). 77-82
CD Volume:321
Print Article: Pages: 77-82
Author(s):Doroszewska T Berbec A
Author Affiliation:Department of Special Crops Institute of Soil Science and Plant Cultivation Osada Palacowa, 24-100 Pulawy, Poland
Language:English
Abstract:Amphidiploid and sesquidiploid hybrids of Nicotiana tabacum x N. africana involving different N. tabacum parents were studied cytologically. Fairly regular meiosis and self-fertility was restored in the amphidiploids obtained in vitro by culturing cotyledon segments of sterile amphihaploid hybrids. Their fertility and stability over successive selfed generations was found to be influenced by the constituent tabacum genome. Sesquidiploids obtained either from direct matings of tetraploid N. tabacum with N. africana or from backcrossing the amphidiploids to N. tabacum showed some self and cross-fertility of the sesquidiploids was also affected by the genome of the tabacum parent. Occasional multivalents were observed in both amphidiploids and sesquidiploids, indicating the possibility of interchange events between the genomes of N. tabacum and N. africana
Descriptors:cultivars. hybrids. interspecific-hybridization. meiosis. self-compatibility. genomes. compatibility. recombination. chromosome-pairing. tobacco
Organism Descriptors:Nicotiana-africana. Nicotiana-tabacum
Supplemental Descriptors:Nicotiana. Solanaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF020
Supplementary Info:12 ref
ISSN:0394-9257
Year:2000
Journal Title:Journal of Genetics & Breeding
Copyright:Copyright CAB International

113. Title:The effect of three fire regimes on stream water quality, water yield and export coefficients in a tropical savanna (northern Australia)
View Article: Journal of Hydrology (Amsterdam) 2000. 229 (3/4). 118-137
CD Volume:331
Print Article: Pages: 118-137
Author(s):Townsend S A Douglas M M
Author Affiliation:Department of Lands, Planning and Environment, P.O. Box 30, Palmerston, Northern Territory 0831, Australia
Language:English
Abstract:The effects of three fire regimes: (1) burning early in the dry season (June); (2) burning late in the dry season (September); and (3) not burning (protected from wildfires) - on the water quality, water yield and export coefficients of three intermittent streams, which flow between December and June, were examined over a three year period in a

tropical savanna in Kakadu National Park, northern Australia. A comparative catchment approach was used without any pre-treatment data. The canopy cover, density of riparian vegetation, litter- and ground-cover of the catchment burnt early in the dry season (catchment E, stream E) and the unburnt catchment (catchment U, stream U) were similar. Fires lit late in the dry season (catchment L, stream L) resulted in tree mortalities, and a lower canopy cover (50% less), riparian tree density (80% less) and litter cover, and increased amounts of bare ground; thereby increasing catchment L's susceptibility to erosion. This resulted in episodic runoff events from catchment L in November and December, before continuous wet season flow. These events, absent in catchments E and U, featured high concentrations of total suspended sediment (TSS), volatile suspended sediment (VSS), N, P, Fe and Mn up to 10 times those measured later in the wet season. During continuous wet season flow between December and June, baseflow water quality of the three streams were similar. Storm runoff concentrations for N and P were similar, however stream L storm runoff concentrations of TSS, VSS, Fe and Mn were 2-5 times higher than those measured in streams E and U. Despite this, only the export coefficients for TSS from catchment L (average 61 kg ha-1) were significantly higher (average 2.4 times) than catchment E and U coefficients. This was attributed to the overwhelming influence of stream volume, relative to concentration, in determining stream load and hence catchment export coefficients (load/catchment area). The apparently negligible impact of the fire regimes on VSS, N, P, Fe and Mn export coefficients, and the overall low sediment export coefficients for the three catchments which were up to 100 times less than that reported for other tropical environments, were ascribed to the low catchment slopes (average 0.5%), low soil fertility, maintenance of a protective surface gravel lag, the negligible impact of the fire regimes on water yield, and the sometimes lengthy (maximum 6 months) period between burning and runoff
Descriptors:fire. water-quality. stream-flow. geological-sedimentation. savannas. nutrients. nitrogen. phosphorus. runoff. catchment-hydrology
Geographic Locator:Australia. Northern-Territory
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:PP800. PP200. PP400. KK100. PP350
Supplementary Info:67 ref
ISSN:0022-1694
Year:2000
Journal Title:Journal of Hydrology

114. Title:Influence of pasture management on soil biological quality
View Article: Journal of Range Management. 2000. 53 (1). 127-133
CD Volume:321
Print Article: Pages: 127-133
Author(s):Banerjee M R Burton D L McCaughey W P Grant C A
Author Affiliation:Department of Soil Science, University of Manitoba, Winnipeg, Manitoba, R3T 2N2, Canada
Language:English
Language of Summary:spanish
Abstract:The long-term sustainability of pasture management systems, whether related to structural stability or nutrient dynamics, is dependent upon maintaining soil biological properties. This study investigates the extent to which the microbiological and biochemical properties of soil can change with season and pasture management system, including their likely value as indicators of soil quality. The experiment was

conducted on a 30-ha pasture in Manitoba, Canada. Seasonal fluctuations were observed in the soil microbial and biochemical properties. In general, these fluctuations were mainly independent of the small variations in soil organic matter content but were more closely related to soil water content. The data also suggests an impact of stocking rate and grazing system on soil microbial biomass C and on N mineralization potential. However, because duration of the investigation, limited number of replications and the high soil variability encountered, it is not yet possible to recommend any particular grazing system and/or stocking rate favourable for the maintenance of soil biological quality. The trends suggest that light, continuous grazing systems had the largest microbial biomass and nutrient mineralizing activity
Descriptors:pastures. grassland-management. biomass. continuous-grazing. grazing-systems. mineralization. soil-organic-matter. soil-properties. seasonal-variation. soil-variability. soil-water. soil-water-content. nitrogen. carbon. soil-management. sustainability. soil-fertility. soil-biology
Geographic Locator:Canada. Manitoba
Supplemental Descriptors:North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:PP350. JJ100. JJ200
Supplementary Info:34 ref
ISSN:0022-409X
Year:2000
Journal Title:Journal of Range Management

115. Title:Soil quality indicator properties in mid-Atlantic soils as influenced by conservation management
View Article: Journal of Soil and Water Conservation (Ankeny) 2000-. 55- (1-). 69-78
CD Volume:321
Print Article: Pages: 69-78
Author(s):Islam K R Weil R R
Author Affiliation:Department of Natural Resource Sciences and Landscape Architecture, University of Maryland, College Park, Md., USA
Language:English
Abstract:Soil quality or condition is best assessed by soil properties that are neither so permanent as to be insensitive to management, nor so easily changeable as to give little indication of long-term alterations. Thirteen such intermediate properties were evaluated for potential inclusion in a soil quality index by comparing soils under contrasting management systems from long-term replicated field experiments and from paired field sites. Conservation (v. conventional) management was defined as some combination of reduced tillage, increased crop diversity, more perennial crops, increased crop residue return, increased soil fertility and/or increased application of organic amendments. Conservation management most consistently and markedly influenced soil quality indicator properties by increasing total and active microbial biomass carbon (CTMB and CAMB), increasing the ratio of active microbial biomass carbon to total organic carbon (CAMB/CORG), increasing aggregation and decreasing the rate of basal respiration per unit of microbial biomass carbon (qCO2). The qCO2 increased exponentially as CTMB decreased. This may indicate reduced stress on soil microbial communities under conservation management and high microbial populations
Descriptors:properties. soil. amendments. biomass. carbon. communities. diversity. microbial-flora. organic-amendments. organic-carbon.

minimum-tillage. respiration. soil-fertility. soil-properties. stress. tillage. aggregates. ecosystems. enzyme-activity. soil-management. microbial-activities. organic-matter. conservation. soil-chemical-properties. soil-physical-properties
Subject Codes:JJ600. JJ200. PP400. JJ300
Supplementary Info:48 ref
ISSN:0022-4561
Year:2000
Journal Title:Journal of Soil and Water Conservation
Copyright:Copyright CAB International

116. Title:Assessment of soil quality in fields with short and long term enrollment in the CRP
View Article: Journal of Soil and Water Conservation (Ankeny) 2000-. 55- (2-). 142-146
CD Volume:321
Print Article: Pages: 142-146
Author(s):Baer S G Rice C W Blair J M
Author Affiliation:Division of Biology, Kansas State University, USA
Language:English
Abstract:Surface (5 to 10 cm depth) soil quality was examined from fields representing short and long term enrolment in the US Conservation Reserve Program (CRP). Total carbon (C) and nitrogen (N) amounts were similar in soil with recent and long term enrolment in the CRP and were lower than a native prairie field. Active pools of C and N, however, did increase through the CRP. Soil with long term establishment of native grasses in the CRP exhibited 141% and 93% greater microbial biomass C and N, respectively, than soil recently enrolled in the CRP. Total inorganic N was significantly lower in CRP soil with ten versus no growing seasons and was more representative of levels in a native prairie due to reductions in nitrate availability. The study indicates that CRP promotes soil restoration; however, ten growing seasons are not adequate for recovery of total soil C and N pools at this depth to pre-cultivation levels
Descriptors:soil-fertility. microorganisms. biomass. carbon. nitrate. nitrogen. prairies. seasons. grasslands. soil-conservation. soil. availability
Geographic Locator:USA
Identifiers:soil quality. microbial biomass
Organism Descriptors:Poaceae. grasses
Supplemental Descriptors:Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Poaceae. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:JJ600. PP400. JJ100. JJ200. PP350
Supplementary Info:37 ref
ISSN:0022-4561
Year:2000
Journal Title:Journal of Soil and Water Conservation
Copyright:Copyright CAB International

117. Title:Effectiveness of rock phosphate and superphosphate amended with phosphate solubilizing microorganisms in soybean grown on Vertisols
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 71-75
CD Volume:323
Print Article: Pages: 71-75
Author(s):Dubey S K
Author Affiliation:All India Coordinated Research Project on Soybean, Rafi Ahmed Kidwai College of Agriculture, JNKVV, Sehore, Madhya Pradesh, 466001, India
Language:English

Abstract:A field experiment was conducted in Madhya Pradesh, India, during 1993-94 on a Vertisol with application of single superphosphate (SSP) or rock phosphate (RP) with or without different strains of phosphate solubilizing microorganisms to rainfed soyabean. Results showed that the application of SSP at 60 kg P2O5 ha-1 was superior, but it was at par with 30 kg P2O5 ha-1 as SSP combined with Pseudomonas striata (single inoculant) or P. striata + Aspergillus awamori (composite inoculant) with regard to seed and straw yield, and N, P and K uptake (seed + straw). Similarly, application of rock phosphate at 30 kg P2O5 ha-1 with single or composite inoculants of phosphate solubilizers was also equivalent to SSP at 30 kg P2O5 ha-1 (alone) with regard to all the recorded parameters. Among the inoculants, composite inoculant of P. striata + A. awamori proved superior to single inoculant of P. striata. Maximum P use efficiency of 21.6 kg ha-1 was noted with the use of SSP at 30 kg P2O5 ha-1 + composite inoculant. Fertility status after soyabean harvest indicated that available soil N was improved from 7.7 to 30.0 kg N ha-1 whereas P and K were depleted. Significant correlations between shredded residues and residual soil N, and available N with total N and P uptake were also observed
Descriptors:microorganisms. phosphate. rock-phosphate. solubilization. soyabeans. superphosphate. Vertisols. fertilizers. phosphorus. residues. strains. straw. uptake. use-efficiency. application-rates
Geographic Locator:India. Madhya-Pradesh
Identifiers:phosphate solubilizing microorganisms. inoculants
Organism Descriptors:Glycine-max. Glycine-(Fabaceae). Pseudomonas-striata. Aspergillus. Aspergillus-awamori
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Pseudomonas. Pseudomonadaceae. Gracilicutes. bacteria. prokaryotes. Deuteromycotina. Eumycota. fungi. Aspergillus. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ100. JJ700. FF100. FF005. FF061. JJ600
Supplementary Info:14 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

118. Title:Soil physical and chemical environment as influenced by duration of rice-wheat cropping system
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 75-78
CD Volume:323
Print Article: Pages: 75-78
Author(s):Balloli S S Rattan R K Garg R N Gurcharn Singh Krishnakumari M
Author Variant:Singh-G
Author Affiliation:Division of Soil Science and Agricultural Chemistry, Indian Agricultural Research Institute, New Delhi, 110012, India
Language:English
Abstract:Investigations carried out in Haryana, India, on the effect of duration of rice-wheat cropping system on some physical and chemical properties through analysis of soil samples collected periodically, showed that a continuous rice-wheat rotation has resulted in the formation of a hard pan in subsurface layers (0.15-0.30 m), build-up of available phosphorus and DTPA-extractable micronutrients and depletion in available potassium status in soils
Descriptors:analysis. chemical-properties. depletion. formation. trace-elements. phosphorus. potassium. properties. soil. subsurface-layers. pans. soil-fertility. soil-degradation. availability. rotations. continuous-cropping. rice. wheat. zinc. copper. iron. manganese

Geographic Locator:India. Haryana
Organism Descriptors:Oryza-sativa. Triticum-aestivum. Oryza. Triticum
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Triticum. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ200. JJ300. JJ600. FF150
Supplementary Info:11 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

119. Title:Fertilizer prescriptions on soil test basis for jute, rice and wheat in a Typic Ustochrept
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 79-84
CD Volume:323
Print Article: Pages: 79-84
Author(s):Ray P K Jana A K Maitra D N Saha M N Chaudhury J Saha S Saha A R
Author Affiliation:Department of Soil Science and Microbiology, Central Research Institute for Jute and Allied Fibres, Barrackpore, West Bengal, 743101, India
Language:English
Abstract:Field experiments were conducted with different fertility gradients in Gangetic alluvial soil (Typic Ustochrept), Nilganj series. The soil was low in N, low to very high in P and medium in K having pH in the neutral region. Illite was the dominant mineral with CEC of the soils ranging from 17 to 26 cmol (p+) kg-1. Basic data of jute, rice and wheat were evaluated on nutrient requirement for one quintal [0.1 t] fibre/grain production, % contribution of nutrients from soil and fertilizer sources. Targeted yield equations were generated for individual crop under jute-based cropping system. Yield targets were attained for jute (cv. JRO 7835) 2.5 to 3 t ha-1, coarse rice (cv. Pankaj) 3.5 to 5 t ha-1 and wheat (cv. Sonalika) 3 to 3.5 t ha-1 with plus or minus 10% variation from the desired yield targets. Validity of the yield targets was tested at farmers' fields through follow-up trials as frontline demonstrations which showed that prescription-based fertilizer application on testing of soils was more profitable than ad hoc recommendation. Phosphorus application to jute could be omitted in soils having available P above 10.5 kg ha-1 evaluated as a critical limit
Descriptors:jute. rice. wheat. alluvial-soils. equations. gradients. illite. nutrients. phosphorus. soil. testing. variation. yield-targets. soil-test-values. requirements. fertilizers. Inceptisols
Geographic Locator:India
Organism Descriptors:Corchorus-capsularis. Triticum-aestivum. Oryza-sativa. Corchorus. Oryza. Triticum
Supplemental Descriptors:Corchorus. Tiliaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Triticum. Poaceae. Cyperales. monocotyledons. Oryza. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:JJ700. FF100. FF005. EE145. JJ600. FF061
Supplementary Info:13 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

120. Title:Residual effect of long-term application of FYM and fertilizers on soil properties (Vertisols) and yield of soybean

View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 89-92
CD Volume:323
Print Article: Pages: 89-92
Author(s):Babhulkar P S Wandile R M Badole W P Balpande S S
Author Affiliation:Agriculture Chemistry and Soil Science Division, College of Agriculture, Nagpur, Maharashtra, India
Language:English
Abstract:A study was made of the residual effect of long-term use of fertilizers alone and in combination with FYM [farmyard manure] on properties of swell-shrink soil (Vertisols) and yield of soyabeans after five years of a soyabean-based cropping system in Maharashtra state, India. Results indicated a significant improvement in soil properties and the highest yield of soyabean with the application of 7.5 t FYM ha-1 with half the recommended rates of N and P, giving 26.81 and 20.10% increases over the control and the full recommended fertilizer rate, respectively. This treatment could save 50% of the N and P reuirement and the total Zn requirement. Soyabeans followed by gram was superior to other cropping sequences with respect to seed and straw yield and soil fertility
Descriptors:fertilizers. properties. soil-properties. soyabeans. Vertisols. improvement. soil-fertility. straw. zinc. residual-effects. farmyard-manure. application-rates. zinc-fertilizers. sequential-cropping
Geographic Locator:India. Maharashtra
Identifiers:gram
Organism Descriptors:Glycine-max. Glycine-(Fabaceae)
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ700. FF100. FF061. FF150. FF005
Supplementary Info:14 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

121. Title:Effect of long-term lantana addition on soil phosphorus fractions, crop yields and phosphorus uptake in rice-wheat cropping in north-west Himalayan acid Alfisols
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 107-112
CD Volume:323
Print Article: Pages: 107-112
Author(s):Sharma R P Verma T S
Author Affiliation:Department of Soil Science, H.P. Agricultural University, Palampur, Himachal Pradesh, 176062, India
Language:English
Abstract:The long-term effect of Lantana camara addition on overall improvement in soil productivity in rice-wheat cropping system was studied. A long-term experiment was started in the wet season (July-Nov.) of 1988 with four levels of lantana [0, 10, 20 and 30 t ha-1 (fresh)] and three levels of N in Himachal Pradesh, India. Lantana biomass was added only to rice 10 to 15 days before transplanting/puddling every year. The levels of N were 45, 67.5 and 90 kg ha-1 to rice (i.e. 50, 75 and 100% of recommended dose). The order of N levels was reversed for wheat (i.e. 100, 75 and 50% of recommended dose). Among P fractions, the greatest increase was observed in Al-P (36%), followed by Ca-P (29%), and the least in red-P (9%) with Lantana additions. The continuous additions of Lantana for six years consecutively increased the total and available P approx equal to 13 and 69%, respectively over no

addition of Lantana. Among the different P fractions, Fe-P and Al-P contributed most to P nutrition of rice and wheat grown in a sequence. The yield and P uptake by rice and wheat also increased with additions of Lantana and application of N

Descriptors:alfisols. phosphorus. uptake. yields. biomass. improvement. nutrition. productivity. rice. wheat. soil-fertility. application-rates. nitrogen-fertilizers. plant-residues

Geographic Locator:Himachal-Pradesh. India

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

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

Subject Codes:JJ200. FF100. FF061. JJ700. FF005. JJ600

Supplementary Info:17 ref

ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

122. Title:Nutrient indexing of sulphur in rainfed peanut grown in Potahar plateau of Pakistan

View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 124-129
CD Volume:323
Print Article: Pages: 124-129

Author(s):Rashid A Iqbal S Naeem M A Rafique E
Author Affiliation:Land Resources Research Institute, National Agricultural Research Center, Islamabad, Pakistan

Language:English

Abstract:A nutrient indexing of S in a groundnut crop was carried out by sampling plants and associated soils from 79 randomly selected fields in Chakwal and Attock districts of Pakistan. Total S content in plants tissues and 0.15% CaCl2 extractable soil SO4-S content indicated S deficiency in 40% of groundnut fields. Sulphur deficiency was more widespread in Attock district (approx equal to 58% fields) compared with Chakwal (approx equal to 36% fields), probably because of less soil moisture during the crop season coupled with slightly coarser textured soils in the former district. Sulphur contents in soils and plants were strongly correlated (r=0.85**) and so were the SO4-S contents in surface and subsoils (r=0.91**). Sulphur availability in soils was positively related with clay (r=0.31**), silt (r=0.26*), and organic matter content (r=0.33**), and negatively related with sand content (r=-0.31**). Plant S contents was also positively related with silt (r=0.25*) and negatively with sand fraction of the soils (r=-0.27*). Soil classification at the sub-group level of the USDA Soil Taxonomy System partially separated S-deficient and S-adequate groundnut fields. Soil SO4-S status appears to be related to the parent material. The results of this investigation suggest the need for managing adequate S fertility in rainfed fields for harvesting optimum groundnut yields

Descriptors:indexes-of-nutrient-availability. sulfur. groundnuts. classification. deficiency. harvesting. moisture. organic-matter. responses. sand. sand-fraction. silt-fraction. clay-fraction. soil-classification. soil-water. soil-testing. soil. yields. sulfate

Geographic Locator:Pakistan

Identifiers:groundnut soils

Organism Descriptors:Arachis. Arachis-hypogaea

Supplemental Descriptors:Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Arachis. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:FF100. FF005. FF061. JJ600. JJ200. JJ300
Supplementary Info:23 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

123. Title:Morphogenetic characterization of gypsiferous soils of arid Rajasthan
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 134-139
CD Volume:323
Print Article: Pages: 134-139
Author(s):Joshi D C
Author Affiliation:Central Arid Zone Research Institute, Jodhpur, 342003, India
Language:English
Abstract:Gypsiferous soils widely occur in western and northern parts of arid Rajasthan, India. Two great groups of the Gypsids suborder, Petrogypsids and Haplogypsids, were recognized and their morphogenetic characteristics discussed. The Petrogypsids, which invariably occur in inter dunes surrounded by high sand dunes are characterized by a hard indurated petrogypsic horizon formed of gypsum, CaCO3 and sand cemented together. Gypsum is mostly present as hard nodules of gypsum crystals. The overlying solum is thin having low available water capacity and low fertility. The Haplogypsids are surrounded by sandy ridges and low dunes. The solum is 50-70 cm deep, loamy fine sand and medium fertility status. The underlying gypsic horizon consists of microcrystalline form which is pervious to roots and water. The gypsiferous inter dunes have a high proportion of silt, CaCO3 and soluble salts. Severe climatic and soil constraints associated with Petrogypsids and narrow accumulative inter dunes restrict their use to silvipastures. The Haplogypsids offer good sites for arable farming both under rainfed and limited irrigation
Descriptors:characterization. gypsiferous-soils. soil. available-water. available-water-capacity. capacity. characteristics. crystals. dunes. farming. gypsum. irrigation. nodules. roots. salts. sand. silt. Aridisols. indurated-horizons. calcium-carbonate. dune-slack-soils. soil-morphology
Geographic Locator:Rajasthan. India
Identifiers:interdunes
Supplemental Descriptors:India. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:JJ400. JJ200
Supplementary Info:10 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

124. Title:Long-term effect of different cropping systems on physicochemical properties and soil fertility
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (1). 181-183
CD Volume:323
Print Article: Pages: 181-183
Author(s):Sharma M P Bali S V

Author Affiliation:Regional Agricultural Research Station, Sher-e-Kashmir University of Agricultural Sciences and Technology, R.S. Pura, Jammu, 181102, India
Language:English
Descriptors:soil. Inceptisols. cropping-systems. physicochemical-properties. properties. soil-fertility
Geographic Locator:India
Supplemental Descriptors:South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:JJ200. JJ600. FF150
Supplementary Info:4 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

125. Title:Role of Sesbania rostrata and phosphomicrobe at varying levels of N in sustaining the production and productivity of soil under rice-wheat/chickpea cropping sequence
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (2). 257-262
CD Volume:323
Print Article: Pages: 257-262
Author(s):Tiwari V N Tiwari K N Awasthi P N
Author Affiliation:Department of Soil Science and Agricultural Chemistry, C.S. Azad University of Agriculture and Technology, Kanpur, U.P., 208002, India
Language:English
Abstract:Experiments on a rice-wheat/chickpea [Cicer arietinum] cropping sequence for sustaining production and productivity of soil were carried out during 1994-95 and 1995-96 using Sesbania rostrata as green manure along with phosphomicrobe (Bacillus polymyxa [Paenibacillus polymyxa]) and phosphate carriers at different levels of N in Uttar Pradesh, India. Significantly higher increases in the production of rice were obtained as a result of the use of these inputs irrespective of N levels. The yields obtained with 60 kg N+green manure+60 kg P2O5 (SS) [single superphosphate?] +phosphomicrobe was at a par with 120 kg N+60 kg P2O5+60 kg K2O ha-1. Uptake of nutrients (NPK) almost followed the trends similar to increase in yields. There were considerable improvements in the physical properties of soil viz. water holding capacity and bulk density. The residual effect of these inputs after rice influenced the yields of wheat and chickpea likewise
Descriptors:soil. soil-fertility. productivity. bulk-density. capacity. chickpeas. green-manures. manures. nutrients. phosphate. physical-properties. soil-physical-properties. properties. research. rice. uptake. water-holding-capacity. wheat. yields. inoculation. application-rates. phosphorus-fertilizers. nitrogen-fertilizers. potassium-fertilizers
Geographic Locator:India. Uttar-Pradesh
Organism Descriptors:Sesbania. Sesbania-rostrata. Cicer-arietinum. Triticum-aestivum. Oryza-sativa. Paenibacillus-polymyxa. Oryza. Triticum
Supplemental Descriptors:Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Sesbania. Cicer. Triticum. Poaceae. Cyperales. monocotyledons. Oryza. Paenibacillus. Paenibacillaceae. Firmicutes. bacteria. prokaryotes. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ700. JJ100. JJ600. FF100. FF150. FF005. FF061. JJ300
Supplementary Info:15 ref
ISSN:0019-638X

Year:2000
Journal Title:Journal of the Indian Society of Soil Science

126. Title:Soil fertility and crop productivity changes due to cotton-based cropping systems under rainfed conditions
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (2). 282-287
CD Volume:323
Print Article: Pages: 282-287
Author(s):Jagvir Singh Venugopalan M V Mannikar N D
Author Variant:Singh-J
Author Affiliation:Crop Production, Central Institute for Cotton Research, Nagpur, Maharashstra, 440010, India
Language:English
Abstract:A field experiment was conducted for three years on a black clay soil (Typic Ustochrept) under rainfed conditions to evaluate the effect of the crop rotations cotton-jowar [sorghum]-arhar [Cajanus cajan] and their intercrops with soyabean, cotton+soyabean, jowar+soyabean and arhar+soyabean, along with monocropped cotton and soyabean at two levels of fertility and crop yields. The performance of the component crops (except jowar) was better in 1993-1994 than the previous two years owing to a more favourable rainfall distribution. The economic yields, gross returns and LER (land equivalent ratios) were higher under intercropping system than their respective sole crops. Arhar+soyabean was the most profitable system with highest LER during the years 1991-92 and 1992-93 and cotton+soyabean was the most profitable in the year 1993-1994. Application of FYM improved the yields of jowar, cotton and arhar by 33.8, 20.4 and 16.6% over NPK alone. Farmyard manure application for three years increased the soil available N to 239 kg ha-1 from 229 kg ha-1 and available P to 13.6 kg ha-1 from 8.7 kg ha-1
Descriptors:cropping-systems. productivity. cotton. rotations. intercropping. intercrops. NPK-fertilizers. soyabeans. yields. farmyard-manure. nitrogen. availability. soil. phosphorus. Inceptisols. clay-soils. pigeon-peas
Geographic Locator:India. Maharashtra
Organism Descriptors:Gossypium. Glycine-max. Glycine-(Fabaceae). Sorghum. Cajanus-cajan
Supplemental Descriptors:Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. Poaceae. Cyperales. monocotyledons. Cajanus. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ600. FF150. FF100. FF005. EE110. JJ700. JJ200
Supplementary Info:8 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

127. Title:Application of fertility capability classification system in soils of a watershed in semi-arid tropics
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (2). 329-338
CD Volume:323
Print Article: Pages: 329-338
Author(s):Jagdish Prasad
Author Variant:Prasad-J

Author Affiliation:National Bureau of Soil Survey and Land Use Planning, Amravati Road, Nagpur, Maharashtra, 440010, India
Language:English
Abstract:The fertility capability classification (FCC) system has been used to group soils with same kind of limitations from the point of view of fertility management in a watershed in Solapur district, Maharashtra, India. The information on twenty soil series identified during detailed soil survey was grouped into twelve FCC units. Eight series are loamy and remaining 12 series are clayey soils. Thirteen series had weathered rock as substrata type while one series is associated with clayey strata. Swell-shrink properties, calcareousness, redder hue, moisture regime and gravelliness are the condition modifiers used. By computing FCC units an attempt has been made to highlight the fertility constraints and measures to revert the situation for sustainable production
Descriptors:classification. semiarid-zones. soil. tropics. watersheds. moisture. soil-properties. soil-surveys. soil-fertility. land-capability. loam-soils. clay-soils
Geographic Locator:Maharashtra. India
Supplemental Descriptors:India. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations
Subject Codes:JJ600. JJ400. JJ500
Supplementary Info:11 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

128. Title:Influence of biogas slurry and farmyard manure application on the changes in soil fertility under rice-wheat sequence
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (3). 500-505
CD Volume:323
Print Article: Pages: 500-505
Author(s):Gupta R K Arora B R Sharma K N Ahluwalia S K
Author Affiliation:Department of Soils, Punjab Agricultural University, Ludhiana, Punjab, India
Language:English
Abstract:Changes in soil fertility status as a consequence of differential levels of urea and manure addition to rice or wheat alone or to both the crops after the completion of two cycles of rice-wheat sequence in a sandy loam Typic Ustipsamment are reported, from a field experiment initiated in 1994 in the Indian Punjab. Organic carbon (O.C.) content of the soil registered an increase over its initial status. The increase in O.C. status was directly related with the quantity of urea and manures addition. Available N status increased with increasing N addition. Combined application of urea and FYM significantly enhanced O.C. and available N status over similar N addition through urea alone. Available P and K content of the soil decreased with successive rise in levels of N addition through urea whereas the status of these nutrients increased in plots receiving combined application of urea and manures. The influence of urea and manures addition was more pronounced in the continuous manuring phase than in the direct and residual manuring phases. DTPA-extractable Fe, Mn and Cu decreased from their respective initial status. The magnitude of decline of these micro-nutrients slowed down when 30 or 60 kg N was supplemented through manures, more so with FYM. On the other hand, the available Zn status increased from its initial status since both the crops received basal dressings of ZnSO4

Descriptors:application. application-rates. availability. biogas-slurry. copper. entisols. farmyard-manure. iron. manganese. manures. nitrogen-fertilizers. rice. sandy-loam-soils. sequential-cropping. soil-fertility. urea. wheat. zinc. zinc-fertilizers. zinc-sulfate
Organism Descriptors:Oryza. Oryza-sativa. Triticum. Triticum-aestivum
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Triticum
Subject Codes:XX300. XX100. JJ700. JJ600. FF150. JJ200
Supplementary Info:6 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

129. Title:Effects of manure-fertilizer schedules on the yield and uptake of nutrients by cereal fodder crops and on soil fertility
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (3). 510-515
CD Volume:323
Print Article: Pages: 510-515
Author(s):Vasanthi D Kumaraswamy K
Author Affiliation:Department of Soil Science and Agricultural Chemistry, Agricultural College and Research Institute (TNAU), Madurai, 625104, India
Language:English
Abstract:In field experiments conducted during 1993 and 1994 in Tamil Nadu, India, on a clay loam soil, three cereal crops of sorghum (Co. 27), maize (African tall) and pearl millet (Co. 8) were grown in main plots with eighteen subplots treatments involving four manures (poultry manure, sheep-goat manure, biogas manure and FYM) at 5 and 10 t ha-1 and NPK at 50 and 100% of recommended levels (60-40-20 kg of N, P2O5 and K2O ha-1). The green and dry fodder yields of the cereal fodders, the soil fertility status, and the content and uptake of N, P and K were significantly higher in the treatments that received poultry manure or sheep-goat manure at 10 t ha-1 with 50% of the recommended NPK schedule than the yields in the treatment that had received NPK alone. Among the manures, poultry manure and sheep-goat manure seemed to be more efficacious than the other two
Descriptors:application-rates. biogas. clay-loam-soils. crop-yield. farmyard-manure. maize. manures. NPK-fertilizers. nutrient-uptake. nutrients. pearl-millet. plant-composition. poultry-manure. sheep-manure. soil-fertility
Geographic Locator:India. Tamil-Nadu
Organism Descriptors:Pennisetum-glaucum. sorghum. Zea-mays
Supplemental Descriptors:Pennisetum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Zea. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ600. FF040. FF005. JJ700. XX100. FF061
Supplementary Info:10 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

130. Title:Effect of crop residues and biogas slurry incorporation in wheat on yield and soil fertility
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (3). 515-520
CD Volume:323

Print Article: Pages: 515-520
Author(s):Tiwari V N Tiwari K N Upadhyay R M
Author Affiliation:Department of Soil Science and Agricultural Chemistry, C.S. Azad University of Agriculture and Technology, Kanpur, Uttar Pradesh, 208002, India
Language:English
Abstract:A field experiment was conducted during 1993-94 and 1994-95 in Uttar Pradesh, India, to evaluate the effect of varying levels of crop residues (0, 2.5, 5.0 and 7.5 t ha-1) and N (50 and 100 kg ha-1) along with biogas slurry applied in the ratio of 1:4 or at 2.0 L kg-1 material against no fertilizer (control) and 100% NPK on crop yield and soil fertility. The grain yield increased significantly due to crop residues and biogas slurry at both the levels of applied nitrogen. Wheat straw nodes at 7.5 t ha-1 and biogas slurry applied along with 50 kg N ha-1 significantly increased the grain yield over 50 kg N alone and was equivalent to an application of 100 kg N ha-1. Nitrogen applied at 100 kg ha-1 along with 5.0 t wheat straw ha-1 and biogas slurry further increased the yield which was comparable to NPK applied at 120:60:60 kg ha-1. On the basis of two years experimentation, it is concluded that application of 7.5 t ha-1 wheat straw nodes along with biogas slurry in the ratio of 1:4 can effectively be utilized in wheat for higher yield and nutrient economy. Physicochemical and biological properties of the soil showed marked improvement with the addition of wheat straw nodes and biogas slurry. The residual effect on mung bean (Vigna radiata) was however non-significant with crop residues, biogas slurry and nitrogen
Descriptors:application-rates. biogas-slurry. crop-residues. crop-yield. incorporation. nitrogen-fertilizers. NPK-fertilizers. residual-effects. soil-fertility. wheat. wheat-straw
Geographic Locator:India. Uttar-Pradesh
Organism Descriptors:Triticum. Triticum-aestivum. Vigna-radiata
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Vigna. Papilionoideae. Fabaceae. Fabales. dicotyledons. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ700. FF005. JJ600. XX100
Supplementary Info:11 ref
ISSN:0019-638X
Year:2000
Journal Title:Journal of the Indian Society of Soil Science

131. Title:Aquepts of Indo-Gangetic Plain of Bihar and their suitability for some major crops
View Article: Journal of the Indian Society of Soil Science. 2000. 48 (3). 561-566
CD Volume:323
Print Article: Pages: 561-566
Author(s):Dipak Sarkar Sahoo A K
Author Variant:Sarkar-D
Author Affiliation:National Bureau of Soil Survey and Land Use Planning (ICAR), Regional Centre, Sector-II, Block-DK, Salt Lake, Calcutta, 700091, India
Language:English
Abstract:Six pedons, typical of the different kinds of Aquepts occurring in Indo-Gangetic Plain of Bihar were studied to characterize, classify and evaluate their suitability for crop production. The soils, in general, were deep, imperfectly drained to poorly drained, greyish in colour with redoximorphic features, variable in texture, neutral to slightly

alkaline in reaction, low to medium in CEC with low content of organic carbon. These soils were classified as Aeric Epiaquepts, Vertic Epiaquepts and Typic Epiaquepts. The major limitations of these soils were impeded drainage, slow to very slow permeability, moderate to severe flooding hazards and low fertility. Soil-site suitability evaluation revealed that these soils were moderately to marginally suitable for cultivation of rice and wheat and unsuitable for cultivation of sugarcane

Descriptors:characterization. field-crops. inceptisols. land-evaluation. rice. soil-morphology. soil-properties. soil-suitability. sugarcane. wheat

Geographic Locator:Bihar. India

Identifiers:aquepts

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

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

Subject Codes:FF005. JJ400. JJ500. JJ600

Supplementary Info:9 ref

ISSN:0019-638X

Year:2000

Journal Title:Journal of the Indian Society of Soil Science

132. Title:Biological N2 fixation and residual N benefit of pre-rice leguminous crops and green manures

View Article: Netherlands Journal of Agricultural Science. 2000. 48 (1). 19-29

CD Volume:334

Print Article: Pages: 19-29

Author(s):Toomsan B Cadisch G Srichantawong M Thongsodsaeng C Giller K E Limpinuntana V

Author Affiliation:Department of Agronomy, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand

Language:English

Abstract:A pre-rice crop experiment, including groundnut, mung bean (Vigna radiata), Sesbania rostrata, and a mixture of Sesbania and multipurpose cowpea (Vigna unguiculata) was conducted on a characteristic sandy soil of NE Thailand. The Sesbania-cowpea intercrop gave a similar total plant biomass as the Sesbania green manure alone (7 t ha-1) but with the advantage of yielding an edible product. The direct economic yield of cowpea was 1.3 t ha-1 green beans and greater than that achieved with groundnut or mung bean. The Sesbania-cowpea combination also enhanced rice yields by 0.8 t ha-1. The benefits in rice production were similar to the Sesbania green manure alone but surpassed the yields with the other grain crops or urea fertilizer of 30-60 kg N ha-1. Sesbania dry matter production increased with increasing planting density. The resulting variation in plant quality, e.g. lignin, however, was low. Rice responses to treatments were more related to the total residue N yields than to changes in plant quality. Apart from mung bean (25%) the pre-rice leguminous crops were able to obtain a considerable (>39%) proportion of their N from N2 fixation. The green manure Sesbania however fixed a larger proportion (79-89%) of its N than the grain crops (25-62%). This led not only to high amounts of N2 fixed by Sesbania but together with a N harvest index of zero yielded a large systems N benefit. With grain legumes this benefit was moderated by the N export in harvestable products. In the case of mung bean this may even result in effective soil N mining. Residue N use efficiency varied between 19-29% and was similar to that obtained from a single application of chemical N fertilizer (17-28%). For the farmer the

Sesbania-cowpea intercrop option seems thus the most promising one not only regarding rice yield benefits but also in terms of soil fertility enhancement and generation of edible products
Descriptors:nitrogen-fixation. residual-effects. nitrogen. sequential-cropping. legumes. green-manures. groundnuts. cowpeas. sandy-soils. intercropping. rice. yields. nitrogen-fertilizers. use-efficiency. cover-crops
Geographic Locator:Thailand
Organism Descriptors:Arachis-hypogaea. Sesbania-rostrata. Vigna-unguiculata. Phaseolus-vulgaris. Vigna-radiata. Oryza-sativa. Oryza
Supplemental Descriptors:Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Sesbania. Vigna. Phaseolus. Oryza. Poaceae. Cyperales. monocotyledons. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries
Subject Codes:JJ100. FF100. FF005. FF150. JJ700
Supplementary Info:19 ref
ISSN:0028-2928
Year:2000
Journal Title:Netherlands Journal of Agricultural Science

132. Title:Dynamics of density fractions of macro-organic matter after forest conversion to sugarcane and woodlots, accounted for in a modified Century model
View Article: Netherlands Journal of Agricultural Science. 2000. 48 (1). 61-73
CD Volume:334
Print Article: Pages: 61-73
Author(s):Sitompul S M Hairiah K Cadisch G Noordwijk M van
Author Affiliation:Agronomy Department, Faculty of Agriculture, Brawijaya University, Malang 65145, Indonesia
Language:English
Abstract:Soil organic matter (SOM) is the major controlling factor of soil fertility for low external input agriculture. However, most models describing SOM dynamics are based upon pools which are not directly measurable. A SOM submodule was developed for the CENTURY model based on Ludox particle size density fractions. The turnover rates of these easily measurable fractions were determined by assessing their 13C isotope signatures in a chronosequence under sugarcane after rainforest conversion in Sumatra, Indonesia. The net monthly decomposition rates of light (L), intermediate (I) and heavy (H) fractions of macro-organic matter (150 micro m-2 mm size) under sugarcane cultivated for 2-10 years following forest removal ranged from 0.0162 and 0.0154 month-1 for forest-derived L and I fractions to 0.0118 month-1 for H fractions, while for unfractionated forest soil organic matter it was 0.0068 month-1. The soil carbon of the CENTURY model was reconstructed and the 'slow' (SOM2) pool was divided into L, I, H and R fractions, where the R (resistant) fraction represents the 50-150 micro m size fraction. The modified CENTURY model simulated the dynamics of L, I and H fractions as well as total organic carbon (C%) under sugarcane with a coefficient of determination (R2) of 0.90, 0.95 and 0.98, respectively. Without further adjustments the model was applied to woodlots of Gliricidia sepium and Peltophorum dasyrrachis. The model accounted for 60% of the variation in measured light (L) fraction in the 0-5 cm layer under Gliricidia and Peltophorum, but only for 40% of the variation in the I and H fraction data. Results thus show some progress in linking SOM models to measurable soil organic matter fractions, but are not yet satisfactory for the heavier fractions, more strongly associated with mineral particles. Experimental data for these fractions show a

considerable spatial variability, possibly linked to activity of soil fauna, not covered by the model
Descriptors:soil-organic-matter. dynamics. models. decomposition. fractionation. sugarcane. deforestation. organic-carbon. private-forestry. soil
Geographic Locator:Indonesia. Sumatra
Identifiers:Peltophorum dasyrrachis. woodlots
Organism Descriptors:Saccharum-officinarum. Gliricidia-sepium. Peltophorum. Saccharum
Supplemental Descriptors:Saccharum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Gliricidia. Papilionoideae. Fabaceae. Fabales. dicotyledons. Caesalpinioideae. Peltophorum. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Indonesia
Subject Codes:KK600. JJ200. JJ100. ZZ100. FF100. FF005
Supplementary Info:31 ref
ISSN:0028-2928
Year:2000
Journal Title:Netherlands Journal of Agricultural Science

133. Title:Soil organic matter and nitrogen transformation mediated by plant residues of different qualities in sandy acid upland and paddy soils
View Article: Netherlands Journal of Agricultural Science. 2000. 48 (1). 75-90
CD Volume:334
Print Article: Pages: 75-90
Author(s):Vityakon P Meepech S Cadisch G Toomsan B
Author Affiliation:Department of Land Resources and Environment, Faculty of Agriculture, Khon Kaen University, Khon Kaen 40002, Thailand
Language:English
Abstract:Organic matter management is believed to solve many of the chemical and physical problems of coarse-textured, low fertility soils of NE Thailand. The influence of different plant residues available in this area on soil C and N dynamics in upland (Oxic Paleustult) and lowland (Aeric Paleaquult) soils was tested. Residues included groundnut (upland) or Sesbania rostrata stover (lowland), rice straw, Tamarindus indica and Dipterocarpus tuberculatus leaves applied at 10 t ha-1 (dry matter). For the former three residues additional application rates of 20 t ha-1 were included as well as a mixture (50:50) of groundnut/Sesbania - rice straw treatment. Groundnut stover and Sesbania had C:N ratios <28:1 and low lignin, and polyphenol contents whereas rice straw had the highest C:N ratio of 79:1. Dipterocarp and tamarind leaves were characterized by high lignin (>17%) and polyphenol (>4.5%) contents. These latter residues, despite slow decomposition, apparently resulted in only moderate soil C (<1 mm) build-up after one year due to the fact that a large proportion of their residues remained in particulate form (>1 mm). Thus the mixture of groundnut/Sesbania with straw was among those residue treatments that led to the highest soil C (<1 mm) build-up under both upland and lowland conditions. Groundnut stover under upland condition resulted in immediate net N mineralization but also an early decline in soil mineral N presumably due to leaching. By mixing groundnut or Sesbania with rice straw with a high C:N ratio residue N mineralization could be delayed and prolonged, improving potentially the synchrony of N release and plant demand. Additions of dipterocarp and tamarind resulted in an initial N immobilization phase and net mineral N release remained low thereafter. Dynamics of microbial biomass N were closely related to N mineralization and immobilization cycles in both upland and lowland experiments. Residue N concentration was the most significant factor

controlling N release in both systems. While extractable polyphenols exhibited a significant influence on N release in upland conditions their effect was not evident in the lowland
Descriptors:soil-organic-matter. nitrogen. transformation. plant-residues. carbon. nitrogen. soil. upland-soils. lowland-areas. paddy-soils. acid-soils. Ultisols. groundnut-haulm. rice-straw. leaves. application-rates. mineralization. carbon-nitrogen-ratio. microorganisms. biomass. release. polyphenols. cropping-systems. lignin. rice. groundnuts. tamarinds
Geographic Locator:Thailand
Identifiers:Dipterocarpus tuberculatus. microbial biomass
Organism Descriptors:Sesbania-rostrata. Tamarindus-indica. Dipterocarpus. Oryza-sativa. Arachis-hypogaea. Oryza
Supplemental Descriptors:Sesbania. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Tamarindus. Caesalpinioideae. Dipterocarpaceae. Theales. Dipterocarpus. Malvales. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Oryza. Poaceae. Cyperales. monocotyledons. Arachis
Subject Codes:JJ100. JJ200. JJ700. XX200. JJ400. FF100. FF150. KK100
Supplementary Info:26 ref
ISSN:0028-2928
Year:2000
Journal Title:Netherlands Journal of Agricultural Science

134. Title:Agro-ecological strategies in North Lampung, Indonesia: social constraints to biological management of soil fertility
View Article: Netherlands Journal of Agricultural Science. 2000. 48 (1). 91-104
CD Volume:334
Print Article: Pages: 91-104
Author(s):Gauthier R
Author Affiliation:Environment Department, Wye College, University of London, Wye, Kent, TN25 5AH, UK
Language:English
Abstract:The article examines the socio-cultural and political factors which affect the adoption of biological management of soil fertility in Javanese and Lampungese farming communities of the Province of Lampung, Indonesia. The research was carried out using a hybrid methodological framework, thus blending quantitative and qualitative analysis to provide a holistic picture of the agro-environmental and social conditions of the area. Analysis was carried out to identify relations between ethnic group and agro-ecological strategy. These strategies were then analysed and contrasted to assess the acceptability and possible constraints to the adoption of biological soil management. Land tenure issues and inter-community social dynamics are analysed and their impacts on long-term adoption of biological means of soil fertility management are investigated. Implications for policies and programme are drawn
Descriptors:adoption. soil-fertility. agroforestry. cropping-systems. soil-management. land. tenure-systems. policy. sociology. farmers. communities
Geographic Locator:Indonesia. Sumatra
Identifiers:agroecology
Supplemental Descriptors:South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Indonesia
Subject Codes:EE165. EE120. UU450. JJ600. KK600. FF150. JJ900
Supplementary Info:35 ref
ISSN:0028-2928
Year:2000

Journal Title:Netherlands Journal of Agricultural Science
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135. Title:An analysis of the economic values of novel cropping systems in N. E. Thailand and S. Sumatra
View Article: Netherlands Journal of Agricultural Science. 2000. 48 (1). 105-114
CD Volume:334
Print Article: Pages: 105-114
Author(s):Whitmore A P Cadisch G Toomsan B Limpinuntana V Noordwijk M van Purnomosidhi P
Author Variant:van-Noordwijk-M
Author Affiliation:Wageningen University & Research Centre, Research Institute for Agrobiology and Soil Fertility (AB), P.O. Box 14, NL-6700 AA Wageningen, Netherlands
Language:English
Abstract:The use of food-crop intercropping, hedgerow intercropping and secondary or cover cropping to increase incomes of resource-poor farmers in South East Asia was investigated. Since all systems improve conservation of nutrients and most give extra marketable produce, they were expected to increase farm profitability. On upland farms in Lampung, South Sumatra, both inter- and secondary crops were found to improve yields compared with cassava monocropping and thus the income derived from growing cassava or rice with maize. These increases were equivalent to between 70 and 440 US dollars per hectare. An economic analysis of the lowland rice-producing systems in North East Thailand suggested that with the exception of growing cowpea, the use of pre-rice cover crops was not profitable despite a substantial increase in rice yield, because the additional labour cost more than the additional income was worth. A benefit of leguminous crops, however, can be the extra marketable product. Groundnut in Indonesia and cowpea in Thailand gave an attractive extra US$ 400-1150 total income increase per hectare per year (i.e. extra yield of the main food crop plus extra marketable produce from the secondary crop) even after the additional costs were deducted. Hedgerow intercropping gave smaller profit margins of about US$ 90. Although both hedgerow intercropping and secondary cropping represent a considerable investment of labour by farmers, this investment may be more feasible than paying for fertilizer on credit. On balance the most attractive option tested was the use of a leguminous secondary crop, e.g. groundnut or multipurpose cowpea, within the food crop cycle
Descriptors:cropping-systems. alley-cropping. intercropping. cover-crops. economic-analysis. profitability. cassava. rice. groundnuts. income. maize. cowpeas
Geographic Locator:Sumatra. Indonesia. Thailand
Organism Descriptors:Oryza-sativa. Vigna-unguiculata. Arachis-hypogaea. Zea-mays. Manihot-esculenta. Oryza
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Vigna. Papilionoideae. Fabaceae. Fabales. dicotyledons. Arachis. Indonesia. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Zea. Manihot. Euphorbiaceae. Euphorbiales
Subject Codes:EE110. FF150. FF005
Supplementary Info:10 ref
ISSN:0028-2928
Year:2000
Journal Title:Netherlands Journal of Agricultural Science
Copyright:Copyright CAB International

136. Title:The biological management of soil fertility project
View Article: Netherlands Journal of Agricultural Science. 2000. 48 (1). 115-122

CD Volume:334
Print Article: Pages: 115-122
Author(s):Whitmore A P
Author Affiliation:Wageningen University & Research Centre, Research Institute for Agrobiology and Soil Fertility (AB), P.O. Box 14, NL-6700 AA Wageningen, Netherlands
Language:English
Abstract:Cover cropping, hedgerow intercropping, additional food-crop cropping and combinations of these with monocropping were studied as whole systems in SE Asia. The benefits of each system in terms of nutrient retention or supply, the sustainability of levels of organic matter and fertility were assessed, along with the financial rewards or penalties and the constraints to adoption of each cropping system in terms of extra labour, conflicts with off-farm labour and farmers' attitudes. Leguminous pre- and post-crops such as groundnut increased the yield of a food crop and provided enough marketable produce itself to increase a farmer's income significantly. The residues also helped maintain levels of soil organic carbon and nitrogen in soil. Analysis suggested a good price for the secondary crop to be key, however, as is sufficient water to grow it and availability of or tenure on the land for a farmer to be willing to invest. Hedgerow intercropping boosted soil fertility but did not increase incomes sufficiently, monocropping was profitable but yields and soil fertility declined rapidly. Monocropping remains popular with farmers with little land or without tenure, however. Nitrogen fixation was sufficient to match offtake in a moderately yielding food-crop in these systems; more intensive production requires additional input. Overall leguminous secondary cropping has the least against it of the improved cropping systems investigated and probably stands the best chance of being adopted by farmers in the region
Descriptors:cover-crops. hedgerow-plants. intercropping. monoculture. soil-fertility. soil-organic-matter. legumes. nitrogen. soil. organic-carbon. plant-residues. cropping-systems. economics. projects. farmers'-attitudes. labour. conflict
Geographic Locator:South-East-Asia
Organism Descriptors:plants
Supplemental Descriptors:Asia
Subject Codes:EE110. JJ900. KK600. JJ200. JJ600. FF150
Supplementary Info:14 ref
ISSN:0028-2928
Year:2000
Journal Title:Netherlands Journal of Agricultural Science

137. Title:Prairie vegetation and soil nutrient responses to ungulate carcasses
View Article: Oecologia (Berlin).. 122 (2). Feb., 2000. 232-239
CD Volume:322
Print Article: Pages: 232-239
Author(s):Towne E Gene
Author Affiliation:Division of Biology, Kansas State University, Ackert Hall, Manhattan, KS, 66506-4901
Language:English
Language of Summary:English (EN)
Abstract:The impact of large ungulate carcasses on grassland dynamics was investigated by monitoring vegetation and soil nutrients in 50-cm circular zones around the center of bison (Bos bison), cattle (B. taurus), and deer (Odocoileus virginianus) carcasses. An ungulate carcass creates an intense localized disturbance that varies with animal size and the season of death. Unlike other natural disturbances, carcasses deposit a concentrated pulse of nutrients into the soil. One

year after death, inorganic nitrogen concentrations were significantly higher in the inner 50 cm at both adult and juvenile carcass sites than in surrounding prairie. Areas around a carcass became zones of fertility that favored different components of the vegetation and stimulated biomass production. Species richness and diversity at the center of carcass sites were lowest 1 year after death, but increased significantly in subsequent years. However, warm-season perennial grasses declined near the center of carcass sites and did not recover. Five years after death, ungulate carcass sites remained disturbed patches that harbored vegetation characteristically different in composition and stature from surrounding prairie. By providing a niche for species not normally found in undisturbed prairie, carcasses increased community heterogeneity and may play an important role in adding spatial complexity to grassland ecosytems

Descriptors:biomass production; community heterogeneity; grassland dynamics; grassland ecosystem; prairie vegetation; soil nutrient response; spatial complexity; ungulate carcass. Terrestrial Ecology (Ecology, Environmental Sciences); Soil Science

Organism Descriptors:Bos bison [bison] (Bovidae); Bos taurus [bison] (Bovidae); Odocoileus virginianus [deer] (Cervidae)

Supplemental Descriptors:Bovidae: Artiodactyla, Mammalia, Vertebrata, Chordata, Animalia; Cervidae: Artiodactyla, Mammalia, Vertebrata, Chordata, Animalia. Animals; Artiodactyls; Chordates; Mammals; Nonhuman Mammals; Nonhuman Vertebrates; Vertebrates

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

ISSN:0029-8549
Year:2000
Journal Title:Oecologia

138. Title:Respiration from C3 plant green manure added to a C4 plant carbon dominated soil

View Article: Plant and Soil. 2000. 218 (1/2). 83-89
CD Volume:309
Print Article: Pages: 83-89

Author(s):Nyberg G Ekblad A Buresh R J Hogberg P
Author Affiliation:Department of Forest Ecology, Swedish University of Agricultural Sciences, S-90183 Umea, Sweden

Language:English

Abstract:Application of tree leaves (C3 plants) on maize (C4 plant) fields is an agroforestry management technology to restore or maintain soil fertility. The in situ decomposition of Sesbania sesban leaves or C3 sugar was studied for 4-8 days after application to a maize field in Kenya. By using the difference of approx equal to 10o/oo in natural abundance of 13C between the endogenous soil C (mainly C4) and the applied C (C3), the contributions of the two C sources to soil respiration were calculated. The delta 13C value of the basal respiration was from -15.9 to -16.7o/oo. The microbial response to the additions of leaves and sugar to this tropical soil was immediate. Application of sesbania leaves gave an initial peak in respiration rates that lasted from one to less than 6 days, after which it levelled off and remained approx equal to 2-3 times higher (230-270 mg C m-2 h-1) than the control respiration rates throughout the rest of the experiment (5-8 days). In the sugar treatment, there was no initial peak in respiration rate. The respiration rate was 170 mg C m-2 h-1 after 4 days. At the end of the experiments, after 4-8 days, as much as 14-17% of the added C had been respired and approx equal to 60% of the total respiration was from the added sesbania leaves or C3 sugar. This

non-destructive method allows repeated measurements of the actual rate of C mineralization and facilitates decomposition studies with high temporal resolution in the field
Descriptors:carbon. green-manures. manures. agroforestry. decomposition. maize. measurement. mineralization. nondestructive-testing. respiration. responses. soil-fertility. tropics. tropical-soils. sugar. soil. leaves
Geographic Locator:Kenya
Organism Descriptors:Zea-mays. Sesbania. Sesbania-sesban
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Papilionoideae. Fabaceae. Fabales. dicotyledons. Sesbania. East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
Subject Codes:JJ700. XX200. KK600. JJ100
Supplementary Info:33 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

139. Title:Repeated beneficial effects of rice inoculation with a strain of Burkholderia vietnamiensis on early and late yield components in low fertility sulphate acid soils of Vietnam
View Article: Plant and Soil. 2000. 218 (1/2). 273-284
CD Volume:309
Print Article: Pages: 273-284
Author(s):Van V T Berge O Ngo Ke S Balandreau J Heulin T
Author Affiliation:Ecologie Microbienne du Sol, UMR 5557 CNRS-Universite Lyon 1, 43 Bd du 11 Novembre, 69622 Villeurbanne cedex, France
Language:English
Abstract:TVV75, a strain of Burkholderia vietnamiensis, was isolated from an acid sulphate soil of south Vietnam, and selected for its high in vitro nitrogen fixation potential. This plant growth-promoting rhizobacterium had been used in a previously reported pot experiment. It was used in two new pot experiments and four field experiments to inoculate lowland rice at sowing and at transplanting, in three different South Vietnam acid sulphate soils. The effect of inoculation during early plant growth in nurseries was studied first. Seedlings were then transplanted both to field and pots. Treatments included two levels of inoculation (inoculated vs. uninoculated) and three levels of N fertilizer (0, recommended rate and half this rate), in a randomized block design with six replicates. In all four experiments nitrogen appeared to be the limiting factor for yield. Inoculation had already had a strong beneficial effect at the transplanting stage (day 24), as measured by shoot weight (+33%) root weight (+57%), and leaf surface (+30% at day 14). Final results indicated that inoculation of rice with B. vietnamiensis TVV75 significantly increased several yield components, resulting in a final 13 to 22% increase in grain yield. A late yield component, 1000 grain weight, was significantly increased by inoculation, but not by nitrogen fertilizers, in all pot and field experiments, indicating a long-lasting effect of the inoculated bacteria. It was possible to evaluate the nitrogen fertilizer equivalent of inoculation (NFEI): at the medium rate of N fertilizer, inoculation ensured a yield equivalent to that obtained in the uninoculated control with 25 to 30 kg more nitrogen fertilizer. Comparison of the local cost of NFEI kg N-fertilizer and the cost of inoculation would help in making the decision to inoculate

Descriptors:acid-sulfate-soils. inoculation. rice. soil. yield-components. fertilizers. fixation. grain. in-vitro. nitrogen. nitrogen-fertilizers. nitrogen-fixation. nurseries. seedlings. sowing. transplanting. treatment. soil-fertility
Geographic Locator:Vietnam
Identifiers:Burkholderia vietnamiensis. plant growth
Organism Descriptors:Oryza-sativa. Oryza
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Indochina. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Burkholderia. Burkholderiaceae. Gracilicutes. bacteria. prokaryotes
Subject Codes:JJ100. FF100. FF005. JJ700. JJ600. FF061
Supplementary Info:28 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

140. Title:Carbon dioxide enrichment and nitrogen fertilization effects on cotton (Gossypium hirsutum L.) plant residue chemistry and decomposition
View Article: Plant and Soil. 2000. 220 (1/2). 89-98
CD Volume:309
Print Article: Pages: 89-98
Author(s):Booker F L Shafer S R Wei CaiMiao Horton S J
Author Variant:Wei-C-M
Author Affiliation:U.S. Department of Agriculture, Agricultural Research Service, Air Quality, Plant Growth and Development Research Unit, North Carolina State University, 3908 Inwood Road, Raleigh, North Carolina 27603, USA
Language:English
Abstract:The effect of elevated CO2 and N fertility-induced changes in residue quality on decomposition rates was tested. Cotton was grown in 8-litre pots and exposed to two concentrations of CO2 (390 or 722 micro mol mol-1) and two levels of N fertilization (1.0 or 0.25 g litre-1 soil) within greenhouse chambers for 8 weeks. Plants were then chemically defoliated and air-dried. Leaf, stem and root residues were assayed for total non-structural carbohydrates (TNC), lignin (LTGA), proanthocyanidins (PA), C and N. Respiration rates of an unsterilized sandy soil (Lakeland Sand) mixed with residues from the various treatments were determined using a soda lime trap to measure CO2 release. At harvest, TNC and PA concentrations were 17 to 45% higher in residues previously treated with elevated CO2 compared with controls. Leaf and stem residue LTGA concentrations were not significantly affected by either the elevated CO2 or N fertilization treatments, although root residue LTGA concentration was 30% greater in plants treated with elevated CO2. The concentration of TNC in leaf residues from the low N fertilization treatment was 2.3 times greater than that in the high N fertilization treatment, although TNC concentration in root and stem residues was suppressed 13 to 23% by the low soil N treatment. PA and LTGA concentrations in leaf, root and stem residues were affected by less than 10% by the low N fertilization treatment. N concentration was 14 to 44% lower in residues obtained from the elevated CO2 and low N fertilization treatments. In the soil microbial respiration assay, cumulative CO2 release was 10 to 14% lower in soils amended with residues from the elevated CO2 and low N fertility treatments, although treatment differences diminished as the experiment progressed. Treatment effects on residue N concentration and C:N ratios appeared to be the most important factors affecting soil microbial

respiration. The results suggest that, although elevated CO2 and N fertility may have significant impact on post-harvest plant residue quality of cotton, neither factor is likely to substantially affect decomposition. Thus, C cycling might not be affected in this way, but via simple increases in plant biomass production
Descriptors:cotton. decomposition. carbon-dioxide-enrichment. fertilizers. nitrogen. nitrogen-fertilizers. assays. atmosphere. biomass. biomass-production. carbohydrates. carbon. carbon-dioxide. composition. cycling. effects. lignin. lime. productivity. residues. respiration. sand. sandy-soils. soil. treatment. application-rates. crop-residues
Identifiers:proanthocyanidins
Organism Descriptors:Gossypium. Gossypium-hirsutum
Supplemental Descriptors:Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Gossypium
Subject Codes:PP600. JJ700. XX200. JJ100. FF100
Supplementary Info:31 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil
Copyright:Copyright CAB International

141. Title:Effects of afforestation on phosphorus dynamics and biological properties in a New Zealand grassland soil
View Article: Plant and Soil. 2000. 220 (1/2). 151-163
CD Volume:309
Print Article: Pages: 151-163
Author(s):Chen C R Condron L M Davis M R Sherlock R R
Author Affiliation:Soil, Plant and Ecological Sciences Division, P.O. Box 84, Lincoln University, Canterbury, New Zealand
Language:English
Abstract:Selected chemical, biochemical and biological properties of mineral soil (0-30 cm) were measured under a 19 year old forest stand (mixture of Pinus ponderosa and P. nigra) and adjacent unimproved grassland at a site in South Island, New Zealand. The effects of afforestation on soil properties were confined to the 0-10 cm layer, which reflected the distribution of fine roots (<2 mm) in the soil profile. Concentrations of organic C, total N and P and all organic forms of P were lower under the forest stand, while concentrations of inorganic P were higher under forest compared with grassland, supporting the previously described suggestion that afforestation may promote mineralization of soil organic matter and organic P. On the other hand, microbial biomass C and P, soil respiration and phosphatase enzyme activity were currently all lower and the metabolic quotient was higher in soil under forest compared with grassland, which is inconsistent with increased mineralization in the forest soil. Reduced biological fertility by afforestation may be mainly attributed to changes in the quantity, quality and distribution of organic matter, and reduction in pH of the forest soil compared with the grassland soil. The lower levels of C, N and organic P found in soil under forest are thought to be due to enhanced microbial and phosphatase activity during the earlier stages of forest development. Forest floor material (L and F layer) contained large amounts of C, N and P, together with high levels of microbial and phosphatase enzyme activity. Thus, the forest floor may be an important source of nutrients for plant growth and balance the apparent reduction in C, N and P in mineral soil through mineralization and plant uptake
Descriptors:afforestation. grasslands. grassland-soils. phosphorus. properties. biomass. enzyme-activity. forests. forest-litter. mineral-soils. mineralization. nutrients. organic-matter. phosphoric-monoester-

hydrolases. respiration. roots. soil-organic-matter. soil-profiles. soil-properties. uptake. soil. biological-activity-in-soil. pines
Geographic Locator:New-Zealand
Identifiers:plant growth. biological properties
Organism Descriptors:Pinus. Pinus-nigra. Pinus-ponderosa
Supplemental Descriptors:Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Pinus. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:JJ200. JJ100. KK100. PP350. JJ400
Supplementary Info:61 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil
Copyright:Copyright CAB International

142. Title:Wheat responses to aggressive and non-aggressive arbuscular mycorrhizal fungi
View Article: Plant and Soil. 2000. 220 (1/2). 207-218
CD Volume:309
Print Article: Pages: 207-218
Author(s):Graham J H Abbott L K
Author Affiliation:University of Florida, Citrus Research and Education Center, Lake Alfred, 33850, USA
Language:English
Abstract:In SW Australia fields, colonization of wheat roots by arbuscular mycorrhizal fungi (AMF) is reduced due to repeated use of phosphate (P) fertilizers. It was predicted that AMF that aggressively colonize wheat roots at low P supply would also aggressively colonize at high P supply, but provide no additional P uptake benefit and reduce growth. Wheat (cv. Kulin) seedlings were non-mycorrhizal (NM) or inoculated separately with 10 isolates of AMF from wheat-belt soils in a glasshouse experiment. Kojonup loamy sand was supplied with P to provide suboptimal and supraoptimal P for growth of NM wheat in this soil. At low P supply, wheat growth was limited by P availability. All AMF isolates colonized wheat roots at 14 days after emergence of seedlings. At 42 days, percentage root length colonized (%RLC) was highest for two isolates of Scutellospora calospora, WUM 12(2) and WUM 12(3), followed by Glomus sp. WUM 51, G. invermaium WUM 10(1), Acaulospora laevis WUM 11(4) and Gigaspora decipiens WUM 6(1). These isolates, designated as 'aggressive colonizers', ranged from 50 to 89%RLC. A second group of AMF ranged from 1 to 19%RLC at 42 days. This group, termed 'non-aggressive colonizers', included Acaulospora spp. WUM 11(1), WUM 46, and WUM 49 and Glomus sp. WUM 44. High soil P supply increased seedling growth 2-3 fold, but reduced % RLC. Grouping of aggressive and non-aggressive AMF based on colonization rate at high P supply was similar to that at low P. At low P supply, only the two isolates of S. calospora increased wheat growth compared to the NM plant. The remaining aggressive and non-aggressive AMF reduced growth of wheat at low P, while aggressive colonizers reduced growth at high P. At low P supply, the aggressive colonizers increased shoot P concentration, while at high P, shoot P was not affected by AMF. Growth depression by aggressive colonizers was associated with reduced sucrose concentration in roots. Based on the negative growth response under low and high P fertility in the glasshouse, AMF could be expected to produce non-beneficial effects on wheat in the field depending on the P status of the soil and the aggressiveness of AMF in the community
Descriptors:mycorrhizal-fungi. colonization. emergence. fertilizers. greenhouses. seedlings. seedling-growth. soil. sucrose. uptake.

wheat. phosphorus. phosphorus-fertilizers. vesicular-arbuscular-mycorrhizas. plant-pathology
Geographic Locator:Australia
Identifiers:isolates. Glomus invermaium. Gigaspora decipiens. Gigasporaceae. Zygomycetes
Organism Descriptors:Acaulospora. Acaulospora-laevis. Gigaspora. Glomus. Scutellospora. Scutellospora-calospora. Triticum-aestivum. Triticum
Supplemental Descriptors:Endogonales. Zygomycotina. Eumycota. fungi. Acaulospora. Glomales. Scutellospora. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Gigaspora
Subject Codes:JJ100. FF100. JJ200. JJ700
Supplementary Info:33 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

143. Title:Effect of five tree crops and a cover crop in multi-strata agroforestry at two fertilization levels on soil fertility and soil solution chemistry in central Amazonia
View Article: Plant and Soil. 2000. 221 (2). 143-156
CD Volume:309
Print Article: Pages: 143-156
Author(s):Schroth G Teixeira W G Seixas R Silva L F da Schaller M Macedo J L V Zech W
Author Variant:da-Silva-L-F
Author Affiliation:University of Bayreuth, Institute of Soil Science and Soil Geography, 95440 Bayreuth, Germany
Language:English
Abstract:The spatio-temporal patterns of soil fertility and soil solution chemistry in a multi-strata agroforestry system with perennial crops were analysed as indicators for the effects of crop species and management measures on soil conditions under permanent agriculture in central Amazonia, Brazil. The study was carried out in a plantation with locally important tree crop species and a leguminous cover crop at two fertilization levels on a Xanthic Ferralsol. Soil fertility to 2 m soil depth was evaluated 3.5 years after the establishment of the plantation, and soil solution chemistry at 10, 60 and 200 cm soil depth was monitored over 2 years. Several soil fertility characteristics exhibited spatial patterns within the multi-strata plots which reflected the differing properties of the plant species and their management, including the fertilizer input. Significant differences between species could be detected to 150 cm depth, and between fertilization treatments to 200 cm depth. Favourable effects on nutrient availability in the soil were found for annatto (Bixa orellana) (P, K) and cupuacu (Theobroma grandiflorum) (Ca, Mg) in comparison with peach palm (Bactris gasipaes) and Brazil nut (Bertholletia excelsa). Nutrient concentrations of the soil solution showed pronounced fluctuations in the topsoil, corresponding to fertilizer applications. Large nutrient concentrations in the soil solution were accompanied by increased concentrations of aluminium and low pH values, caused by exchange reactions between fertilizer and sorbed acidity and reinforced by the acidifying effect of nitrification. The soil solution under the leguminous cover crop Pueraria phaseoloides had relatively large N concentrations during periods when those under the tree crops were small, and this could

partly explain why no yield responses to N fertilization were observed at this site
Descriptors:agroforestry. fertilizers. soil-fertility. soil-solution. acidity. aluminium. Brazil-nuts. characteristics. Ferralsols. indicators. nitrification. nutrient-availability. properties. responses. soil-depth. topsoil. treatment. nitrogen-fertilizers. phosphorus-fertilizers. application-rates. cover-crops
Geographic Locator:Amazonia. Brazil
Identifiers:Theobroma grandiflorum
Organism Descriptors:Bactris. Bactris-gasipaes. Bertholletia. Bertholletia-excelsa. Bixa. Bixa-orellana. Pueraria. Pueraria-phaseoloides. Theobroma
Supplemental Descriptors:Arecaceae. Arecales. monocotyledons. angiosperms. Spermatophyta. plants. Bactris. Lecythidaceae. Lecythidales. dicotyledons. Bertholletia. Bixaceae. Violales. Bixa. Papilionoideae. Fabaceae. Fabales. Pueraria. Sterculiaceae. Malvales. South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Theobroma
Subject Codes:KK100. KK600. JJ600. JJ700. JJ200. FF100. FF007
Supplementary Info:28 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil
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144. Title:Land quality changes following the conversion of the natural vegetation into silvo-pastoral systems in semi-arid NE Brazil
View Article: Plant and Soil. 2000. 222 (1/2). 59-70
CD Volume:309
Print Article: Pages: 59-70
Author(s):Wick B Tiessen H Menezes R S C
Author Affiliation:Institute of Soil Science and Forest Nutrition, Georg August University Gottingen, Busgenweg 2, D-37077 Gottingen, Germany
Language:English
Abstract:The presence of trees in grasslands frequently results in resource islands of higher soil quality. Therefore, some native trees are often preserved or agroforestry species are interplanted when land is cleared for pasture. Soil quality changes associated with the conversion of a native thorn forest (caatinga) into silvo-pastoral systems in Pernambuco, Brazil were evaluated. Soil nutrients, organic matter, microbial biomass and soil enzymes under native caatinga, the canopy of two preserved native (Ziziphus joazeiro and Spondias tuberosa) and one introduced tree species (Prosopis juliflora), and under a planted pasture of Cenchrus ciliaris were compared. The two preserved tree species maintained high nutrient and organic matter contents and high biological activity levels not only relative to the grass but also relative to the native caatinga. The non-deciduous Z. joazeiro was more effective than the deciduous S. tuberosa, and enriched surface soils by 100 mg P kg-1. The complete replacement of natural caatinga with C. ciliaris pasture or a C. ciliaris-P. juliflora silvopastoral system had, after 14 years, decreased microbial biomass C and N contents, and beta -glucosidase activity, but did not affect soil nutrient or organic matter status. The biological activity under the trees of the tree-grass association was greater than under grass alone, although P. juliflora did not maintain higher nutrient or organic matter levels. The search for indigenous alternatives to the main agroforestry species may provide viable alternatives for improved land management and the conservation of biodiversity. Microbiological and biochemical parameters responded more readily to changes in land management than

chemical fertility indices. They are important indices for the impact of vegetation changes and its associated land quality changes
Descriptors:conversion. semiarid-zones. vegetation. agroforestry. biodiversity. biomass. caatinga. canopy. enzymes. forests. grasslands. indexes. islands. land-management. nutrients. organic-matter. pastures. silvopastoral-systems. soil-enzymes. soil. trees. microorganisms
Geographic Locator:Brazil. Pernambuco
Identifiers:beta -glucosidase. microbial biomass. Ziziphus joazeiro. Spondias tuberosa
Organism Descriptors:Cenchrus. Cenchrus-ciliaris. grasses. Prosopis. Prosopis-juliflora. Spondias. Ziziphus. Poaceae
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Cenchrus. Mimosoideae. Fabaceae. Fabales. dicotyledons. Prosopis. Anacardiaceae. Sapindales. Rhamnaceae. Rhamnales. South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Brazil. Ziziphus. Spondias
Subject Codes:KK600. JJ600. PP350. JJ200. KK100. JJ100
Supplementary Info:51 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

145. Title:Effects of land use on 15N natural abundance of soils in Ethiopian highlands
View Article: Plant and Soil. 2000. 222 (1/2). 109-117
CD Volume:309
Print Article: Pages: 109-117
Author(s):Eshetu Z Hogberg P
Author Affiliation:Department of Forest Ecology, Swedish University of Agricultural Sciences, S-901 83 Umea, Sweden
Language:English
Abstract:The natural abundance of 15N in soils in forests, pastures and cultivated lands in the Menagesha and Wendo-Genet areas of Ethiopia was used to make inferences about the N cycles in these ecosystems. Since we have described the history of these sites based on variations in 13C natural abundance, patterns of delta 15N and delta 13C values were compared to determine if shifts of 15N correlate with shifts of vegetation. At Menagesha, a >500-year-old planted forest, delta 15N values were from -8.8 to +3.5o/oo in litter, from -3.5 to +4.5o/oo in 0-10 cm soil layer, and from -1.5 to +6.8o/oo at >20 cm soil depth. The low delta 15N in litter and surface mineral soils suggests that a closed N cycle has operated for a long time. At this site, the low delta 13C of the surface horizon and the high delta 13C of the lower soil horizons is clear evidence of a long phase of C4 grass dominance or cultivation of C4 crops before the establishment of the forest >500 years ago. In contrast, at Wendo-Genet, high delta 13C of soils showed that most of the land has been uncovered by forests until recently. Soil delta 15N was high throughout (3.4-9.8o/oo), and there were no major differences between forested, cultivated and pasture soils in delta 15N values of surface mineral soils. The high delta 15N values suggest that open N cycles operate in the Wendo-Genet area. From the aspect of soil fertility management, tall forest ecosystems with relatively closed N cycling could be established on the fairly steep slopes at Menagesha after a long period of grass vegetation cover or cultivation
Descriptors:highlands. land-use. soil. cultivation. cycling. ecosystems. forests. horizons. litter-(plant). mineral-soils. pastures. soil-depth. soil-fertility. vegetation. nitrogen. arable-land

Geographic Locator:Ethiopia
Organism Descriptors:grasses. Poaceae
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries
Subject Codes:JJ200. KK100. PP350. JJ600
Supplementary Info:38 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

146. Title:Influence of gap size and soil properties on microbial biomass in a subtropical humid forest of north-east India
View Article: Plant and Soil. 2000. 223 (1/2). 185-193
CD Volume:309
Print Article: Pages: 185-193
Author(s):Arunachalam A Kusum Arunachalam
Author Variant:Arunachalam-K
Author Affiliation:Restoration Ecology Laboratory, North Eastern Regional Institute of Science and Technology, Nirjuli-791109, Arunachal Pradesh, India
Language:English
Abstract:The effects were examined of treefall gap size and soil properties on microbial biomass dynamics in an undisturbed mature-phase humid subtropical broadleaved forest in NE India. Canopy gaps had low soil moisture and low microbial biomass suggesting that below-ground dynamics accompanied changes in light resources after canopy opening. High rainfall in the region causes excessive erosion/leaching of topsoil and eventually soil fertility declines in treefall gaps compared to the understorey. Soil microbial population was less during periods when temperature and moisture conditions are low, while it peaked during rainy season when the litter decomposition rate is at its peak on the forest floor. Greater demand for nutrients by plants during rainy season (the peak vegetative growth period) limited the availability of nutrients to soil microbes and, therefore, low microbial C, N and P. Weak correlations were also obtained for the relationships between microbial C, N and P and soil physicochemical properties. Gap size did influence the microbial nutrients and their contribution to soil organic carbon, total Kjeldahl nitrogen and available-P. Contribution of microbial C to soil organic carbon, microbial N to total nitrogen were similar in both treefall gaps and understorey plots, while the contribution of microbial P to soil available-P was lower in gap compared to the understorey. These results indicate that any fluctuation in microbial biomass related nutrient cycling processes in conjunction with the associated microclimate variation may affect the pattern of regeneration of tree seedlings in the gaps and hence be related with their size
Descriptors:canopy. trees. soil-properties. microorganisms. biomass. forests. humid-zones. broadleaves. carbon. nitrogen. phosphorus. understorey. soil-fertility. forest-soils. soil. physicochemical-properties. microclimate
Geographic Locator:India. Meghalaya
Identifiers:microbial biomass
Supplemental Descriptors:South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ100. JJ200. KK100. PP500
Supplementary Info:39 ref
ISSN:0032-079X

Year:2000
Journal Title:Plant and Soil

147. Title:Improvement of nutritional site quality 13 years after single application of fertiliser N and P on regenerating cedar [Thuja plicata]-hemlock [Tsuga heterophylla] cutovers on northern Vancouver Island, B.C
View Article: Plant and Soil. 2000. 223 (1/2). 195-206
CD Volume:309
Print Article: Pages: 195-206
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Language:English
Abstract:Post-clear-felled silvicultural treatments to improve tree growth and reduce salal (Gaultheria shallon) competition, were established in five different forest blocks on northern Vancouver Island, British Columbia, Canada, in 1984. Plots were either left untreated, brushed of competing salal vegetation, fertilized [(250 kg N+100 kg P) ha-1], or brushed+fertilized. Three of these blocks were revisited 13 years later, in the summer of 1997, and various chemical, biochemical and microbial parameters were measured in forest floor humus samples to determine long-term effects of treatments on nutritional site quality. Brushing resulted in lower humus pH and extractable base cations, whereas fertilization increased Bray-extractable P. Over a 20-week aerobic incubation, significantly more N was mineralized in humus from fertilized plots than from brushed plots. Over a 14-d anaerobic incubation, significantly more N was mineralized in humus from the fertilized treatment than other treatments. Similarly, gross transformation rates of NH4+ and NO3-, measured by 15N-dilution, were higher in humus from the fertilized treatment than other treatments. Ecophysiological indices of microbial communities (basal respiration, specific death rate, metabolic quotient, and energy deficiency index), derived by humus respirometry, suggested that there was higher available C in fertilized and brushed+fertilized treatments than in the brushed and control treatments. Total microbial biomass was equal to C-limited microbial biomass, which further confirmed that available C was the growth-limiting factor for microbial communities in all treatments. The prokaryotic fractions of microbial biomass in all treatments were approximately equal (approx equal to 65%). PCA [?principal components analysis] ordination of microbial communities, based on C source utilization patterns, showed a distinct clustering of humus samples taken from one of the sites. Within the cluster of samples taken from the other two sites, samples from fertilized plots scored separately from those from control plots. In salal foliage, concentrations of condensed tannins were higher in brushed and control plots than in fertilized and brushed+fertilized plots. In spite of other studies that have reported increased tree height following fertilization and/or removal of salal, results of the present study suggest improvement in nutritional site quality occurs only with fertilization, whereas brushing may in fact be detrimental. The long-term growth of hemlock observed in fertilized plots may be the result of changes to key ecosystem structures and processes brought about by increased speed of succession and accelerated canopy closure
Descriptors:clear-felling. regeneration. application. nitrogen-fertilizers. phosphorus-fertilizers. tannins. leaves. humus. nitrogen. ammonium. nitrate. transformation. soil-fertility
Geographic Locator:Canada. British-Columbia

Organism Descriptors:Thuja-plicata. Tsuga-heterophylla. Gaultheria-shallon
Supplemental Descriptors:Thuja. Cupressaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Tsuga. Pinaceae. Gaultheria. Ericaceae. Ericales. dicotyledons. angiosperms. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:KK110. JJ700. JJ100. JJ600. JJ200
Supplementary Info:48 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil
Copyright:Copyright CAB International

148. Title:Decomposition of leaf and root tissue of three perennial grass species grown at two levels of atmospheric CO2 and N supply
View Article: Plant and Soil. 2000. 224 (1). 75-84
CD Volume:309
Print Article: Pages: 75-84
Author(s):Gorissen A Cotrufo M F
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Document Editor:Canadell-J. Norby-R. Cotrufo-F. Nosberger-J
Conference Title:GCTE-COST workshop. Litter quality and decomposition under elevated atmospheric CO2, Capri, Italy, 24-27 September 1998
Language:English
Abstract:Leaf and root tissue of Lolium perenne, Agrostis capillaris and Festuca ovina grown under ambient (350 micro l litre 1 CO2) and elevated (700 micro l litre 1) CO2 in a continuously 14C-labelled atmosphere and at two soil N levels, were incubated at 14 deg C for 222 days. Decomposition of leaf and root tissue grown in the low N treatment was not affected by elevated [CO2], whereas decomposition in the high N treatment was significantly reduced by 7% after 222 days. Despite the increased C:N ratio (g g 1) of tissue cultivated at elevated [CO2] when compared with the corresponding ambient tissue, there was no significant correlation between initial C:N ratio and 14C respired. This finding suggests that the CO2-induced changes in decomposition rates do not occur via CO2-induced changes in C:N ratios of plant materials. The decomposition data were combined with data on 14C uptake and allocation for the same plants, and show that elevated [CO2] has the potential to increase soil C stores in grassland via increasing C uptake and shifting C allocation towards the roots, with an inherent slower decomposition rate than the leaves. An overall increase of 15% in 14C remaining after 222 days was estimated for the combined tissues, i.e. the whole plants; the leaves made a much smaller contribution to the C remaining (+6%) than the roots (+26%). This shows the importance of clarifying the contribution of roots and leaves with respect to the question whether grassland soils act as a sink or source for atmospheric CO2
Descriptors:decomposition. leaves. roots. carbon-dioxide-enrichment. nitrogen. soil. carbon-nitrogen-ratio. grasslands. grassland-soils. uptake. carbon. nitrogen-fertilizers. application-rates
Organism Descriptors:Lolium-perenne. Agrostis-capillaris. Festuca-ovina
Supplemental Descriptors:Lolium. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Agrostis. Festuca
Subject Codes:JJ100. JJ200. FF007. PP600. JJ700. FF040. FF061
Supplementary Info:29 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil
Copyright:Copyright CAB International

149. Title:Patterns of nitrogen conservation in shrubs and grasses in the Patagonian Monte, Argentina
View Article: Plant and Soil. 224 (2). 2000. 185-193
CD Volume:309
Print Article: Pages: 185-193
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Language:English
Language of Summary:English (EN)
Abstract:We analysed the main plant strategies to conserve nitrogen in the Patagonian Monte. We hypothesized that the two main plant functional groups (xerophytic evergreen shrubs and mesophytic perennial grasses) display different mechanisms of nitrogen conservation related to their structural and functional characteristics. Evergreen shrubs are deep-rooted species, which develop vegetative and reproductive growth from spring to late summer coupled with high temperatures, independently from water inputs. In contrast, perennial grasses are shallow-rooted species with high leaf turnover, which display vegetative growth from autumn to spring and reproductive activity from mid-spring to early-summer, coupled with precipitation inputs. We selected three evergreen shrubs (Larrea divaricata Cav., Atriplex lampa Gill. ex Moq. and Junellia seriphioides (Gilles and Hook.) Moldenke) and three perennial grasses (Stipa tenuis Phil., S. speciosa Trin. and Rupr. and Poa ligularis Nees ex Steud.), characteristic of undisturbed and disturbed areas of the Patagonian Monte. N concentration in expanded green and senesced leaves was estimated in December 1997 (late spring) and June 1998 (late autumn). Deep- rooted evergreen shrubs displayed small differences in N concentration between green and senesced leaves (low N-resorption efficiency), having high N concentration in senesced leaves (low N- resorption proficiency). Shallow-rooted perennial grasses, conversely, showed high N-resorption efficiency and high N-resorption proficiency (large differences in N concentration between green and senesced leaves and very low N concentration in senesced leaves, respectively). The lack of a strong mechanism of N resorption in evergreen shrubs apparently does not agree with their ability to colonize N-poor soils. These results, however, may be explained by lower N requirements in evergreen shrubs resulting from lower growth rates, lower N concentrations in green leaves, and lower leaf turnover as compared with perennial grasses. Long- lasting N-poor green tissues may, therefore, be considered an efficient mechanism to conserve N in evergreen shrubs in contrast with the mechanism of strong N resorption from transient N-rich tissues displayed by perennial grasses. Evergreen shrubs with low N- resorption efficiency provide a more N-rich substrate, with probably higher capability of N mineralization than that of perennial grasses, which may eventually enhance N fertility and N availability in N-poor soils
Descriptors:arid ecosystem; plant functional types; reproductive activity; shrubland; vegetative growth. Ecology (Environmental Sciences); Nutrition. nitrogen: conservation pattern, resorption efficiency, resorption proficiency
Geographic Locator:Patagonian Monte (Argentina, South America, Neotropical region)
Organism Descriptors:Atriplex lampa (Chenopodiaceae); Junellia seriphioides (Verbenaceae); Larrea divaricata (Zygophyllaceae); Poa ligularis (Gramineae); Stipa speciosa (Gramineae); Stipa tenuis (Gramineae); grasses (Gramineae); shrubs (Spermatophyta)

Supplemental Descriptors:Chenopodiaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae; Spermatophyta: Plantae; Verbenaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae; Zygophyllaceae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Ecology (Environmental Sciences); Nutrition
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

150. Title:Nitrogen fertilizer replacement indexes of legume cover crops in the derived savanna of West Africa
View Article: Plant and Soil. 224 (2). 2000. 287-296
CD Volume:309
Print Article: Pages: 287-296
Author(s):Tian G Kolawole G O Kang B T Kirchhof G
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Language:English
Language of Summary:English (EN)
Abstract:Legume cover crops are a potential means for overcoming N depletion in the derived savanna of West Africa. A 3-year trial was, therefore, conducted near Ibadan, southwestern Nigeria to measure the N contribution of 13 legume cover crops as compared to urea -N, using a N fertilizer replacement index for a maize test crop. Two series of trials involved the following legume cover crop species: Aeschynomene histrix, Centrosema brasilianum, Centrosema pascuorum, Chamaecrista rotundifolia, Cajanus cajan, Crotalaria verrucosa, Crotalaria ochroleuca, Lablab purpureus, Mucuna pruriens, Psophocarpus palustris, Pseudovigna argentea, Pueraria phaseoloides and Stylosanthes hamata. Trials were undertaken using a complete block design. Cover crops were planted in 1994 (Series 1) and 1995 (Series 2) in separate sites and each series was subsequently slashed and planted for one season with maize (Zea mays) in 1995 and 1996. At the 50% flowering stage, N concentration of above- ground vegetation of cover crops ranged from 21 to 38 g N kg-1. Nitrogen accumulated by 4.5-month old cover crops ranged from 14 to 240 kg N ha-1, depending on species and year. Cover crops increased grain yield of the subsequent maize crop by 25-136% over the control without N application. Nitrogen uptake by the maize crop was higher following cover crops than after maize or natural grass. The N fertilizer replacement index of cover crops for maize ranged from 11 (A. histrix) to 96 kg N ha-1 (C. cajan) in Series 2. Perennial (C. brasilianum, S. hamata, C. cajan, P. phaseoloides and C. verrucosa) and annual (C. rotundifolia, M. pruriens, C. ochroleuca and L. purpureus) species could potentially save 50 to 100 kg N ha-1 for maize crops. The cover crops accumulated more N in the wetter than in the drier year. However, the N fertilizer replacement index was higher for subsequent maize grown in the drier year. The cover crop-N recovery in maize was also higher than the urea-N uptake in the drier year. The N fertilizer replacement indexes can be predicted using the above-ground biomass amount of cover crops at 20 weeks after planting (drier year) or the N concentration at that stage (wetter year)
Descriptors:biomass production; crop yield. Agronomy (Agriculture); Nutrition. nitrogen: concentration, fertilizer, fertilizer replacement index
Geographic Locator:West Africa (Ethiopian region)
Organism Descriptors:Aeschynomene histrix (Leguminosae): cover crop; Cajanus cajan (Leguminosae): cover crop; Centrosema brasilianum (Leguminosae):

cover crop; Centrosema pascuorum (Leguminosae): cover crop; Chamaecrista rotundifolia (Leguminosae): cover crop; Crotalaria ochroleuca (Leguminosae): cover crop; Crotalaria verrucosa (Leguminosae): cover crop; Lablab purpureus (Leguminosae): cover crop; Mucuna pruriens (Leguminosae): cover crop; Pseudovigna argentea (Leguminosae): cover crop; Psophocarpus palustris (Leguminosae): cover crop; Pueraria phaseoloides (Leguminosae): cover crop; Stylosanthes hamata (Leguminosae): cover crop; Zea mays [maize] (Gramineae): crop
Supplemental Descriptors:Gramineae: Monocotyledones, Angiospermae, Spermatophyta, Plantae; Leguminosae: Dicotyledones, Angiospermae, Spermatophyta, Plantae. Angiosperms; Dicots; Monocots; Plants; Spermatophytes; Vascular Plants
Subject Codes:Agronomy (Agriculture); Nutrition
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

151. Title:Tillage, crop residue, legume rotation, and green manure effects on sorghum and millet yields in the semiarid tropics of Mali
View Article: Plant and Soil. 2000. 225 (1/2). 141-151
CD Volume:309
Print Article: Pages: 141-151
Author(s):Kouyate Z Franzluebbers K Juo A S R Hossner L R
Author Affiliation:Cinzana Research Station, Institute of Rural Economy (IER), Cinzana, Segou, Mali
Language:English
Abstract:Alternative soil management practices are needed in semiarid West Africa to sustain soil fertility and cereal production while reducing the need for extended fallow periods and chemical fertilizers. An experiment was conducted at the Cinzana Station near Segou, Mali to assess the effects of tillage, crop residue incorporation and legume rotation on the growth and yield of sorghum and pearl millet (Pennisetum glaucum) for a period of eight years on a loamy sand and a loam soil. The following treatments were compared under tied ridging and the traditional open ridging: continuous cereal with crop residue removed, continuous cereal with crop residue incorporated, cereal in rotation with cowpea (Vigna unguiculata), cereal in rotation with sesbania (Sesbania rostrata), and cereal in rotation with dolichos (Dolichos lablab [Lablab purpureus]). Legumes in rotation were incorporated as green manures except cowpea which was removed after each harvest. Tied ridging improved cereal grain yield from 1022 kg ha-1 with open ridging to 1091 kg ha-1 on the loamy sand and from 1554 kg ha-1 to 1697 kg ha-1 on the loam, when averaged across management regimes and years of cropping. Incorporation of cereal residue at the beginning of the rainy season every other year had only small and inconsistent effects on cereal yield. Rotation with cowpea increased cereal grain and stover yields by 18 and 25%, respectively, on the loamy sand, and by 23% and 27%, respectively, on the loam compared to continuous cereal, when averaged across tillage regimes and years. Sesbania and dolichos performed similarly as green manures on both soils. Incorporation of these legumes as green manure at the end of the rainy season increased cereal grain and stover yields by 37% and 49%, respectively, on the loamy sand, and by 27% and 30%, respectively, on the loam, compared to cereal monoculture without organic amendment, when averaged across tillage regimes and years. A significant linear increase in cereal yield was observed during the eight years of the study on the loam soil when sesbania and dolichos green manures were incorporated

Descriptors:tillage. crop-residues. incorporation. legumes. rotations. loam-soils. sandy-soils. ridging. traditional-technology. continuous-cropping. cereals. green-manures. crop-yield. cowpeas
Geographic Locator:Mali. Sahel
Organism Descriptors:sorghum. Sorghum-bicolor. Pennisetum-glaucum. Vigna-unguiculata. Sesbania-rostrata. Lablab-purpureus. Fabaceae
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Sorghum. Pennisetum. Vigna. Papilionoideae. Fabaceae. Fabales. dicotyledons. Sesbania. Lablab. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa
Subject Codes:JJ900. JJ700. FF100. FF150. FF005. JJ400
Supplementary Info:20 ref
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

151. Title:The importance of integration and scale in the arbuscular mycorrhizal symbiosis
View Article: Plant and Soil. 226 (2). 2000. 295-309
CD Volume:309
Print Article: Pages: 295-309
Author(s):Miller R M Kling M
Author Affiliation:Environmental Research Division, Argonne National Laboratory, Argonne, IL, 60439: rmiller@anl.gov
Language:English
Language of Summary:English (EN)
Abstract:The arbuscular mycorrhizal (AM) fungus contributes to system processes and functions at various hierarchical organizational levels, through their establishment of linkages and feedbacks between whole-plants and nutrient cycles. Even though these fungal mediated feedbacks and linkages involve lower-organizational level processes (e.g. photo-assimilate partitioning, interfacial assimilate uptake and transport mechanisms, intraradical versus extraradical fungal growth), they influence higher-organizational scales that affect community and ecosystem behavior (e.g. whole- plant photosynthesis, biodiversity, nutrient and carbon cycling, soil structure). Hence, incorporating AM fungi into research directed at understanding many of the diverse environmental issues confronting society will require knowledge of how these fungi respond to or initiate changes in vegetation dynamics, soil fertility or both. Within the last few years, the rapid advancement in the development of analytical tools has increased the resolution by which we are able to quantify the mycorrhizal symbiosis. It is important that these tools are applied within a conceptual framework that is temporally and spatially relevant to fungus and host. Unfortunately, many of the studies being conducted on the mycorrhizal symbiosis at lower organizational scales are concerned with questions directed solely at understanding fungus or host without awareness of what the plant physiologist or ecologist needs for integrating the mycorrhizal association into larger organizational scales or process levels. We show by using the flow of C from plant-to-fungus-to-soil, that through thoughtful integration, we have the ability to bridge different organizational scales. Thus, an essential need of mycorrhizal research is not only to better integrate the various disciplines of mycorrhizal research, but also to identify those relevant links and scales needing further investigation for understanding the larger-organizational level responses

Descriptors:carbon cycling; symbiosis: integration, scale. Chemical Coordination and Homeostasis; Ecology (Environmental Sciences); Infection
Organism Descriptors:arbuscular mycorrhizal fungi (Phycomycetes). hyphae
Supplemental Descriptors:Phycomycetes: Fungi, Plantae. Fungi; Microorganisms; Nonvascular Plants; Plants
Subject Codes:Chemical Coordination and Homeostasis; Ecology (Environmental Sciences); Infection
ISSN:0032-079X
Year:2000
Journal Title:Plant and Soil

152. Title:Classification of vegetational diversity in managed boreal forests in eastern Finland
View Article: Plant Ecology. 2000-. 146- (1-). 11-28
CD Volume:310
Print Article: Pages: 11-28
Author(s):Pitkanen S
Author Affiliation:University of Joensuu, Faculty of Forestry, P.O. Box 111, FIN-80101 Joensuu, Finland
Language:English
Abstract:A classification based on forest stand structure, the abundances of vegetation species and variations in these abundances is developed and diversity indices are calculated for the classes to describe the diversity of the vegetation within the classes in managed boreal forests of eastern Finland. The classes were formed using detrended correspondence analysis (DCA), global nonmetric multidimensional scaling (GNMDS) and TWINSPAN classification. Discriminant analysis was used to determine the environmental variables differentiating between the classes, and Duncan's multiple range test was used to examine the ability of the diversity measures to distinguish the classes. Beta diversity was estimated with Okland's method based on DCA ordination of the sample plots. The results point to fertility and the successional stage of the stand as the main factors affecting species diversity, in addition to which soil type, the number of tree species, crown cover, basal area and certain variables describing the management of the stand were relevant to the classification. The most distinct diversity indices were the reciprocal of Simpson, Pielou's J' and species richness, while the highest alpha diversity was found in young stands with a low crown cover on herb-rich or mesic forest sites. Beta diversity was quite high, its highest values of all for the whole data being recorded along the fertility gradient
Descriptors:boreal-forests. basal-area. classification. canopy. soil-types. species-diversity. stand-structure. forest-soils. statistical-analysis. soil-fertility. stand-characteristics. forest-management. botanical-composition. synecology. forest-ecology. species-richness. stand-age. plant-succession
Geographic Locator:Finland
Supplemental Descriptors:Scandinavia. Northern-Europe. Europe. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:KK100. PP720. ZZ331. KK110. JJ400. JJ600
Supplementary Info:53 ref
ISSN:1385-0237
Year:2000
Journal Title:Plant Ecology

153. Title:Vertical structure of a species-rich grassland canopy, treated with additional illumination, fertilization and mowing
View Article: Plant Ecology. 2000-. 146- (2-). 185-195
CD Volume:310
Print Article: Pages: 185-195
Author(s):Liira J Zobel K
Author Affiliation:Department of Botany and Ecology, Tartu University, 40 Lai St., Tartu EE 51005, Estonia
Language:English
Abstract:A study was conducted in the Laelatu calcicolous wooded meadow in W. Estonia to determine how the position of species within the canopy of a species-rich grassland depends on nutrient availability, light availability, and mowing regime. To enhance the generality of the results, species were classified into four growth-form groups according to two important morphological traits - narrow vs. wide leaves, leafy vs. leafless stem - grasses, sedges, upright forbs and rosette forbs. Vertical structure of the canopy was examined by point quadrat sampling of 40x40 cm permanent plots, treated by fertilization, additional illumination and mowing. As expected, fertilization and cessation of mowing allowed plants to grow taller, while an effect of additional illumination was not detected. The relative height of species in the canopy was related to their leaf and stem morphology - species with narrow leaves and/or with a leafy stem were significantly taller. In addition, each growth-form group had a characteristic relative height: grasses > sedges > upright forbs > rosette forbs. All the experimental treatments led to a smaller number of more clearly distinguishable canopy strata with certain growth-form group(s) dominating in each. In (non-fertilized, non-illuminated and mown) control plots the dominance of grasses in the upper canopy layers was the most obvious, and the remaining plants tended to improve their vertical position with all manipulations. The two contrasting growth-form groups - grasses and rosette forbs - responded similarly to illumination, becoming relatively shorter with added light. Sedges and upright forbs used additional light to 'improve' their position in the canopy
Descriptors:canopy. grasslands. cutting. forbs. light. meadows. fertilizers. soil-fertility. plant-height. habit. plant-morphology
Geographic Locator:Estonia
Organism Descriptors:grasses. Cyperaceae. Poaceae
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Baltic-States. Northern-Europe. Europe. Developed-Countries
Subject Codes:PP350. JJ700
Supplementary Info:67 ref
ISSN:1385-0237
Year:2000
Journal Title:Plant Ecology

154. Title:Defining species guilds in the central hardwood forest, USA
View Article: Plant Ecology. 2000-. 147- (1-). 1-19
CD Volume:310
Print Article: Pages: 1-19
Author(s):Sutherland E K Hale B J Hix D M
Author Affiliation:Northeastern Research Station, Delaware, Ohio 43015-8640, USA
Language:English
Abstract:Tree regeneration outcomes are challenging to generalize and difficult to predict. Many tree species can establish new propagules in a variety of post-disturbance environments and many different reproductive mechanisms may be used. In order to develop conceptual models that

accurately reflect reproductive potential, a better understanding is needed of the similarities in regeneration ecology among species. Information from the forest ecology literature was used to evaluate the reproductive attributes of 62 tree species in the central hardwood region of the eastern USA. Each species was classified categorically for features such as flowering, seed production and dispersal, seed dormancy, germination requirements, seedling characteristics and vegetative reproduction. Cluster analysis (Jaccard's similarity coefficient, complete linkage method) and ordination (homogeneity analysis) were used to separate 9 groups (guilds) of species that had similar reproductive attributes. Individual attributes that had high variance in the first and second dimensions included: seed banking, seed dispersal, seedling shade tolerance and seedbed requirements. Members of each guild had similar levels of reproductive specialization and guilds were either pioneer-like, opportunistic, or persistent. Pioneer guilds included: short-lived or fugitive species that colonize sites rapidly and are too shade intolerant to replace themselves; shade-tolerant species that colonize frequently disturbed sites; and stress-tolerant pioneers that survive on dry or nutrient-poor sites. Opportunistic guilds contained species that are remarkably versatile in their reproductive effort. The most flexible opportunists can colonize new sites, maintain seed in a seed bank, sprout from existing stems and persist as a seedling or sapling bank. Persistent guilds contain species that develop and maintain advance regeneration. These include: species with moderate understorey tolerance that regenerate via cycles of dieback and resprouting; and more tolerant species that maintain seedling or sapling banks. These regeneration guilds may provide a useful approach for more realistically representing large and diverse sets of tree species in forest ecosystem models

Descriptors:deciduous-forests. ecosystems. forest-ecology. seed-germination. natural-regeneration. seed-dispersal. seed-dormancy. seed-production. seedbeds. seedlings. plant-succession. seral-stages. advance-growth. pioneer-species. shade. tolerance. models. flowering. forest-trees. species. classification. vegetative-propagation. reproductive-behaviour. seed-banks. plant-colonization. water-stress. soil-fertility. soil-water-content. adaptability. synecology. plant-physiology

Geographic Locator:USA

Identifiers:shade tolerance

Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries

Subject Codes:KK100. PP720. ZZ331. FF060. FF062. FF061. FF900. JJ600. JJ300. PP500

Supplementary Info:76 ref

ISSN:1385-0237

Year:2000

Journal Title:Plant Ecology

155. Title:Competition and coexistence of rhizomatous perennial plants along a nutrient gradient

View Article: Plant Ecology. 2000-. 147- (1-). 77-94

CD Volume:310

Print Article: Pages: 77-94

Author(s):Rebele F

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Language:English

Abstract:Competition and coexistence of three tall clonal perennial plant species, Calamagrostis epigejos, Solidago canadensis, and Tanacetum vulgare were studied along a gradient of soil productivity over five years. A replacement series field experiment was conducted with high, moderate and low fertility levels in 1 x 1 m plots. There were significant effects of soil type on ramet density (P<0.001), mean height (P<0.01), and total biomass (P<0.01). Ramet density, mean height, and total biomass increased with increasing soil fertility. There were also significant effects of mixture on ramet density (P<0.01), but not on mean height and total biomass for all species. Significant neighbour effects on ramet density and total biomass (P<0.01) were found for Solidago, showing that it is important whether Tanacetum or Calamagrostis is its neighbour within mixtures. During the five years there was only one case of competitive exclusion: Calamagrostis excluded Solidago on the most fertile substrate in the fifth growing season. In most cases species coexisted over the five years. Each of the three species was able to dominate in at least one combination of substrate type and mixture. The experiment showed that asymmetric competition for light on substrates of high fertility, symmetric competition for nutrients on nutrient-poor soil and positive interactions especially on substrates of intermediate fertility played a role. A founder effect was evident in aggregated mixtures of Calamagrostis and Solidago on the nutrient-rich substrate. A conceptual model of the relative importance of root competition for soil nutrients, shoot competition for light, and positive interactions along the fertility gradient is presented. The model emphasizes that positive interactions play an important role over a broad range of the productivity scale with a peak at intermediate levels of fertility. On the substrate of high productivity shoot competition for light is more important than positive interactions and root competition for soil nutrients as well. The competitive superiority of Calamagrostis on the most productive substrate was evident only in the long run. Rare events like extreme summer drought or selective herbivore pressure caused a switch in dominance in mixtures with Solidago, respectively Tanacetum. The guerrilla growth strategy of Calamagrostis and interference competition through a dense cover of aboveground biomass and litter could further cause competitive exclusion
Descriptors:plant-competition. drought. herbivores. nutrients. productivity. soil-fertility. soil-types
Organism Descriptors:Calamagrostis-epigejos. Solidago-canadensis. Tanacetum-vulgare
Supplemental Descriptors:Calamagrostis. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Solidago. Asteraceae. Asterales. dicotyledons. Tanacetum
Subject Codes:ZZ331. JJ600
Supplementary Info:90 ref
ISSN:1385-0237
Year:2000
Journal Title:Plant Ecology

156. Title:Patterns of abundance of a narrow endemic species in a tropical and infertile montane habitat
View Article: Plant Ecology. 2000-. 147- (2-). 205-218
CD Volume:310
Print Article: Pages: 205-218
Author(s):Ribeiro K T Fernandes G W

Author Affiliation:Ecologia Evolutiva de Herbivoros Tropicais, DBG/ICB/Universidade Federal de Minas Gerais, CP 486, Belo Horizonte MG 30161-970, Brazil
Language:English
Abstract:The spatial distribution of a narrow endemic shrub (Coccoloba cereifera) was examined in Serra do Cipo, Brazil. It was hypothesized that the narrow endemic species would show a gradual decline in either size and density towards the edges of its distribution. The contribution of soil specificity and post-fire growth to C. cereifera abundance and distribution were investigated. C. cereifera showed multimodal and highly aggregated distribution pattern at several scales, from 25 m2 to 3000 m2 (blocked quadrat variance analyses). This pattern seems to be strongly related to the predominance of clonal recruitment and to the close association of the species to sandfields, which have discrete distribution between gallery forests and rocky outcrops. Population density did not decline towards the edge of the species distribution. Plants near the distribution boundaries had slightly more leaves and more inflorescences per plant ($P<0.005$), but there was no significant change in the mean number of ramets per clone. The absence of large plants in some populations at the centre of the species distribution may be related to the higher frequency of fire in this region, killing aerial plant parts. Nearly all aggregations had inverse-J shaped size-distribution, suggesting effective recruitment of ramets, most frequently via asexual reproduction. Similar patterns of plant abundance may be common in fire-prone habitats characterized by infertile, and well-drained soils since these areas generally have high numbers of endemic plants, with strong soil specificity. Possible mechanisms for the observed pattern are discussed considering current models concerning distribution of abundance of species
Descriptors:fire. forest-fires. habitats. population-density. soil-fertility. spatial-distribution. soil-physical-properties. soil-properties. forest-trees. mountain-forests
Geographic Locator:Mexico
Identifiers:Coccoloba cereifera
Organism Descriptors:Coccoloba. Polygonaceae
Supplemental Descriptors:Polygonaceae. Polygonales. dicotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developing-Countries. Threshold-Countries. Latin-America. OECD-Countries
Subject Codes:KK100. KK130. JJ600. PP300. JJ300
Supplementary Info:48 ref
ISSN:1385-0237
Year:2000
Journal Title:Plant Ecology

157. Title:Multiscale soil and vegetation patchiness along a gradient of herbivore impact in a semi-arid grazing system in West Africa
View Article: Plant Ecology. 2000-. 148- (2-). 207-224
CD Volume:310
Print Article: Pages: 207-224
Author(s):Rietkerk M Ketner P Burger J Hoorens B Olff H
Author Affiliation:Wageningen Agricultural University, Dept. Environmental Sciences, Erosion and Soil and Water Conservation Group, Nieuwe Kanaal 11, 6709 PA Wageningen, Netherlands
Language:English
Abstract:We studied the degree and scale of patchiness of vegetation and selected soil variables along a gradient of herbivore impact. The gradient consisted of a radial pattern of 'high', 'intermediate' and 'low' herbivore impact around a watering point in a semi-arid

environment in Burkina Faso (West Africa). We hypothesised that, at a certain range of herbivore impact, vegetated patches alternating with patches of bare soil would occur as a consequence of plant-soil feedbacks and run-off-run-on patterns. Indeed, our transect data collected along the gradient showed that vegetated patches with a scale of about 5-10 m, alternating with bare soil, occurred at intermediate herbivore impact. When analysing the data from the experimental sites along the gradient, however, we also found a high degree of patchiness of vegetation and soil variables in case of low and high herbivore impact. For low herbivore impact, most variation was spatially explained, up to 100% for vegetation biomass and soil temperature, with a patch scale of about 0.50 m. This was due to the presence of perennial grass tufts of Cymbopogon schoenanthus. Patterns of soil organic matter and NH4-N were highly correlated with these patterns of biomass and soil temperature, up to r=0.7 (P<0.05) for the in situ correlation between biomass and NH4-N. For high herbivore impact, we also found that most variation was spatially explained, up to 100% for biomass and soil temperature, and 84% for soil moisture, with three distinct scales of patchiness (about 0.50 m, 1.80 m and 2.80 m). Here, microrelief had a corresponding patchy structure. For intermediate herbivore impact, again most variation was spatially explained, up to 100% for biomass and soil temperature, and 84% for soil moisture, with a patch scale of about 0.95 m. Here, we found evidence that vegetated patches positively affected soil moisture through less run-off and higher infiltration of rainwater that could not infiltrate into the bare soil elsewhere, which was not due to microrelief. Thus, we conclude that our findings are in line with our initial hypothesis that, at intermediate herbivore impact, vegetated patches alternating with patches of bare soil persist in time due to positive plant-soil feedbacks

Descriptors:grazing. herbivores. semiarid-zones. data-collection. infiltration. organic-matter. runoff. soil-water. soil-organic-matter. soil-temperature. semiarid-grasslands. soil-fertility. grasslands. spatial-variation

Geographic Locator:Burkina-Faso

Organism Descriptors:Cymbopogon. grasses. Poaceae

Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa

Subject Codes:PP350. JJ200. JJ300

Supplementary Info:32 ref

ISSN:1385-0237

Year:2000

Journal Title:Plant Ecology

158. Title:Physio-climatic classification of South Africa's woodland biome

View Article: Plant Ecology. 2000-. 149- (1-). 71-89

CD Volume:310

Print Article: Pages: 71-89

Author(s):Fairbanks H K

Author Affiliation:CSIR Division of Water, Environment and Forestry, Pretoria 0001, South Africa

Language:English

Abstract:In an effort to develop more holistic ecosystem approaches to resource assessment and management, landscapes need to be stratified into homogeneous geographic regions. These regions can then be used in a monitoring framework to develop reliable estimates of ecosystem

productivity. A regional characterization of the woodland biome has been developed for South Africa, delineated by satellite imagery and using environmental data and a rigorous statistical methodology. Distribution maps of key environmental variables are analyzed by factor analysis, an iterative clustering technique and maximum likelihood classification to quantify and identify homogeneous physio-climatic units. A spatial clustering technique was used to identify regions, which are statistically different with regard to five physiographic, climatic and edaphic variables deemed important within southern African savanna woodlands. The woodland biome of South Africa at 1 km resolution was successively divided. Thirty year mean monthly temperature, total plant-available water balance of soil, elevation, landscape topographic position, and landscape soil fertility were used as input classification variables. The map data were submitted to a factor analysis and varimax axis rotation. The factor analysis removes correlations from the input variables, reduces the dimensionality, and normalizes the axis measurements. A cluster analysis was performed on the three principal factor scores using a modified iterative optimization clustering procedure to determine the finest level of classes statistically permitable. Twenty-seven identified unimodal cluster signatures were then submitted to a maximum likelihood classification where the statistical probability of the GIS cell assignment is carried out to determine class membership. The final map of custom physio-climatic regions is described, and these custom regions are compared with a vegetation potential map of the woodland types identified in the South African summer rainfall zone

Descriptors:woodlands. characterization. ecosystems. geographical-information-systems. measurement. methodology. monitoring. satellite-imagery. savannas. savanna-woodlands. landscape-ecology. remote-sensing. resource-management

Geographic Locator:Africa. South-Africa

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

Subject Codes:KK100. ZZ331. ZZ900. PP720. KK110

Supplementary Info:62 ref

ISSN:1385-0237

Year:2000

Journal Title:Plant Ecology

159. Title:Biomass partitioning, architecture and turnover of six herbaceous species from habitats with different nutrient supply

View Article: Plant Ecology. 2000. 149 (2). 219-231

CD Volume:310

Print Article: Pages: 219-231

Author(s):Schippers P Olff H

Author Affiliation:Department of Theoretical Production Ecology, Wageningen, Netherlands

Language:English

Abstract:Three grasses (Holcus lanatus, Anthoxanthum odoratum and Festuca ovina) and three herbs (Rumex obtusifolius, Plantago lanceolata and Hieracium pilosella) were grown in a greenhouse at 3 nutrient levels in order to evaluate plant allocation, architecture and biomass turnover in relation to fertility level of their habitats. Four harvests were done at intervals of 4 weeks. Various plant traits related to biomass partitioning, plant architecture, biomass turnover and performance were determined. Differences in nutrient supply induced a strong functional response in the species shoot:root allocation, but architecture and

turnover showed little or no response. Architectural parameters like specific leaf area and specific root length, however, in general decreased during plant development. Species from more nutrient-rich successional stages were characterized by a larger specific leaf area and longer specific shoot height (height/shoot biomass), resulting in a higher RGR and total biomass in all nutrient conditions. There was no evidence that species from nutrient-poor environments had a longer specific root length or any other superior growth characteristic. The only advantage displayed by these species was a lower leaf turnover when expressed as the fraction of dead leaves and a shorter specific shoot height (SSH) which might prevent herbivory and mowing losses. The dead leaf fraction, which is a good indicator for biomass and nutrient loss, appeared to be not only determined by the leaf longevity, but was also found to be directly related to the RGR of the species. This new fact might explain the slow relative growth rates in species from a nutrient-poor habitat and should be considered in future discussions about turnover

Descriptors:plant-nutrition. soil-fertility. habitats. growth-analysis. dry-matter-distribution. growth. growth-rate

Organism Descriptors:Holcus-lanatus. Anthoxanthum-odoratum. Festuca-ovina. Rumex-obtusifolius. Plantago-lanceolata. Hieracium-pilosella

Supplemental Descriptors:Holcus. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Anthoxanthum. Festuca. Rumex. Polygonaceae. Polygonales. dicotyledons. Plantago. Plantaginaceae. Plantaginales. Hieracium. Asteraceae. Asterales

Subject Codes:JJ600. FF061. PP350

Supplementary Info:28 ref

ISSN:1385-0237

Year:2000

Journal Title:Plant Ecology

160. Title:Site parameters, species composition, phytomass structure and element stores of a Terra-firme forest in East-Amazonia, Brazil

View Article: Plant Ecology. 2000. 151 (2). 101-119

CD Volume:311

Print Article: Pages: 101-119

Author(s):Mackensen J Tillery Stevens M Klinge R Folster H

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Language:English

Abstract:Our objective was to assess site parameters, species diversity, phytomass structure and element stores of a Terra-firme forest prior to subsequent studies on nutrient fluxes during forest conversion. The principal parts of the study were conducted from August 1992 to January 1993 at a site 17 km east of Belem, Para. The soil was classified as a Xanthic Ferralsol, with a low effective cation exchange capacity (ECEC), low nutrient status and a deeply weathered solum. On 0.75 ha, including all trees with a DBH >7 cm, we identified 222 tree species belonging to 58 families. The above-ground phytomass was estimated using logarithmic regression analysis on two plots of 0.25 ha each. Despite differences in forest structure and species composition, no major differences were found in terms of total phytomass or overall element stores. The mean living above-ground phytomass (LAGP) was 257 Mg ha-1, and mean quantity of litter 14 Mg ha-1, while dead wood contributed between 10 to 17% of total above-ground phytomass (32-56 Mg ha-1). Element store in LAGP was medium to high compared to other studies on tropical forest systems, while LAGP itself was comparatively low. Comparing 26 humid tropical forest stands recorded in literature,

no correlation was found between LAGP and the amount of N and base cations stored in LAGP. However, a correlation between LAGP and P storage in LAGP (R2 = 0.76) indicates the important role P may play in phytomass accumulation on zonal tropical soils. More then 60% of C, 20% of total N, 10% of total P and 66-88% of total K, Ca and Mg of the system (including the first meter of soil) were concentrated in the above-ground phytomass, including deadwood and litter. Consequently, phytomass destruction in form of forest conversion will lead to major element losses from the system
Descriptors:forest-soils. tropical-rain-forests. site-factors. species-diversity. Ferralsols. soil-fertility. cation-exchange-capacity. soil-properties. biomass. nutrients. phosphorus. plant-nutrition. nutrient-uptake. forests
Geographic Locator:Brazil. Para
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Brazil
Subject Codes:KK100. JJ200. JJ300. JJ400. JJ600. FF061
Supplementary Info:Many ref
ISSN:1385-0237
Year:2000
Journal Title:Plant Ecology

161. Title:Effect of deep-tillage and nitrogen fertilization interactions on dryland corn (Zea mays L.) productivity
View Article: Soil & Tillage Research. 2000. 54 (1/2). 11-19
CD Volume:330
Print Article: Pages: 11-19
Author(s):Diaz Zorita M
Author Affiliation:EEA INTA Gral. Villegas, CC 153 (6230) Gral.Villegas, Argentina
Language:English
Abstract:The effects of different tillage and fertility treatments in a loamy Typic Hapludoll soil, and the interactions of N fertilization with several soil properties and dryland maize productivity were determined. An experiment, conducted in 1995 and in 1997, had a split-plot design consisting of three tillage systems (MB=mouldboard ploughing, CH=chisel ploughing or NT=no-tillage) in a maize-soyabean rotation since 1991 as main treatments. Four subtreatments: (i) subsoil (paratill subsoiler to 40 cm depth in fallow 1995)+N fertilization (100 kg N ha-1 as ammonium nitrate, at the V6 development stage of maize), (ii) subsoil+no N fertilization, (iii) no subsoiling+N fertilization, and (iv) no subsoiling+no N fertilization. Chemical and physical properties in the topsoils were determined at seeding in 1995. Penetration resistance was measured at seeding, flowering and at harvest in 1995 and at seeding in 1997. Maize shoot dry matter during vegetative stages and grain yield components were also determined. The preparation of seedbed using either mouldboard or chisel ploughing with or without deep-tillage, increased the vegetative biomass by 27% and the grain yield of the maize crops by 9% over the no-tillage system. Subsoiling no-till plots improved the vegetative growth of the crops, but the effect of the deep-tillage did not modify the maize grain yields. Grain yields were strongly related to the N fertilization treatments. Although bulk density values (BD) ranged between 1.05 and 1.33 t m-3, differences in crop yields were attributed to differences in the BD and the N fertilization. In the western Pampas Region of Argentina, the production of high yielding maize crops, under no water stress conditions, is independent of the tillage systems but negatively

related with the soil BD values, and positively dependent on N fertilization
Descriptors:tillage. mouldboards. subsoiling. no-tillage. nitrogen-fertilizers. maize. ammonium-nitrate. biomass. bulk-density. compact-soils. soyabeans. nutrient-availability. soil-physical-properties. water-stress. yields. soil-types. sandy-loam-soils. Mollisols
Geographic Locator:Argentina
Organism Descriptors:Zea-mays. Glycine-max. Glycine-(Fabaceae)
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. South-America. America. Developing-Countries. Threshold-Countries. Latin-America
Subject Codes:JJ900. JJ700. JJ600
Supplementary Info:36 ref
ISSN:0167-1987
Year:2000
Journal Title:Soil & Tillage Research

162. Title:Managing legume leys, residues and fertilisers to enhance the sustainability of wheat cropping systems in Australia. 1. The effects on wheat yields and nutrient balances
View Article: Soil & Tillage Research. 2000. 54 (1/2). 63-75
CD Volume:330
Print Article: Pages: 63-75
Author(s):Whitbread A M Blair G J Lefroy R D B
Author Affiliation:CSIRO, Tropical Agriculture PO Box 102, Toowoomba, Qld 4350, Australia
Language:English
Abstract:Farming activities practiced on many Australian soils have resulted in substantial losses of soil organic matter (SOM) and nutrients, soil structural degradation and declines in cereal yield and quality. Field trials, consisting of a legume or fallow phase followed by three wheat crops, were established on a degraded Ferric Luvisol (red earth) soil in New South Wales to investigate the effect of crop residue and fertilizer management on wheat yield and nutrient balances. There were no effects of a chickpea (Cicer arietinum cv. Amethyst), barrel medic (Medicago truncatula cv. Sephi), or fallow phase on the grain yields of three subsequent wheat crops. Grain yield was depressed by 12% following a lucerne (Medicago sativa cv. Trifecta) crop from which the plant residues had been removed, relative to when residues were returned or grazed. Consecutively, higher wheat grain yield losses of 7.4 and 8.6% in 1994 and 1995 were found on treatments from which wheat stubble was annually removed from the system. Grain yield losses of 6, 7 and 13% in three consecutive wheat crops were found where no fertilizer was applied at sowing. Nutrient balances, based on inputs of nutrients in fertilizers and residues, and the export of nutrients in grain and crop residue were useful in describing the flow of nutrients in a farming system and predicting possible soil nutrient depletion. Fallow systems provide no nutrient inputs and result in N losses of up to -189 kg ha-1 over three wheat crops. The balance of nutrients such as potassium (K), which are contained in larger proportions in stubble, were -102 kg ha-1 on the wheat stubble removed treatments and +8 kg ha-1 on the stubble retained treatments. Better recycling of crop residues and improving ley system to increase nutrient and C inputs have the potential to improve soil fertility and grain production
Descriptors:wheat. chickpeas. lucerne. cropping-systems. fertilizers. leys. crop-residues. sustainability. yields. soil-degradation. soil-

fertility. soil-organic-matter. nutrients. potassium. stubble. yield-losses
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Triticum-aestivum. Cicer-arietinum. Medicago-truncatula. Medicago-sativa. Triticum. Medicago
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Cicer. Papilionoideae. Fabaceae. Fabales. dicotyledons. Medicago. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:JJ600. FF150. JJ700. FF005
Supplementary Info:18 ref
ISSN:0167-1987
Year:2000
Journal Title:Soil & Tillage Research

163. Title:Managing legume leys, residues and fertilisers to enhance the sustainability of wheat cropping systems in Australia. 2. Soil physical fertility and carbon
View Article: Soil & Tillage Research. 2000. 54 (1/2). 77-89
CD Volume:330
Print Article: Pages: 77-89
Author(s):Whitbread A M Blair G J Lefroy R D B
Author Affiliation:CSIRO, Tropical Agriculture, PO Box 102, Toowoomba, Qld 4350, Australia
Language:English
Abstract:Soil organic matter (SOM) is considered as a key indicator of sustainability, therefore measurements of SOM changes under various forms of management are needed for the development of sustainable systems. In this study both total carbon (CT) measured by combustion and labile carbon (CL) determined by oxidation with 333 mM potassium permanganate (KMnO4) were measured. Field trials, consisting of a legume phase followed by three wheat cv. Janz crops, were established on a degraded Ferric Luvisol (red earth) soil in New South Wales, to investigate the effect of crop residue and fertilizer management on wheat yield, soil physical properties and SOM. Total and labile C increased following a lucerne (Medicago sativa cv. Trifecta) phase, however, chickpea (Cicer arietinum cv. Amethyst), barrel medic (Medicago truncatula cv. Sephi) and fallow leys resulted in no increases in soil C concentrations. During the wheat phase the concentration of CL significantly increased on the treatments with wheat stubble retention. This resulted in the C Management Index (CMI), an index comparing changes in labile and total C fractions relative to an uncropped reference soil, increasing from 19 to 27. The greatest treatment effect on soil physical properties was the retention of wheat stubble on the soil surface over the summer fallow period which increased hydraulic conductivity (K) by >65%, relative to the stubble removed treatment. Mean weight diameter (MWD) increased from 799 to 920 micro m and a significant relationship was found between hydraulic conductivity and water stable aggregates >500 micro m. Soil strength at 15 cm decreased from 2713 in the non-return to 2064 kPa in the stubble retained treatments with both treatments having a similar water content at the time of measurement. Although legume species are widely used as a rotation phase, their use in combination with cereal stubble retention is more likely to improve the overall fertility of the farming system
Descriptors:soil-organic-matter. organic-carbon. wheat. cropping-systems. fertilizers. leys. crop-residues. sustainability. aggregates.

chickpeas. fallow. hydraulic-conductivity. lucerne. soil-physical-properties. soil-strength. stubble
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Triticum-aestivum. Medicago-truncatula. Cicer-arietinum. Medicago-sativa. Triticum. Medicago
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. Cicer. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:FF005. FF150. JJ600. JJ700
Supplementary Info:33 ref
ISSN:0167-1987
Year:2000
Journal Title:Soil & Tillage Research

164. Title:Soil and maize response to plow and no-tillage after alfalfa-to-maize conversion on a clay loam soil in New York
View Article: Soil & Tillage Research. 2000. 55 (1/2). 31-42
CD Volume:330
Print Article: Pages: 31-42
Author(s):Karunatilake U Es H M van Schindelbeck R R
Author Variant:van-Es-H-M
Author Affiliation:Department of Crop and Soil Sciences, Cornell University, Ithaca, NY 14853-1901, USA
Language:English
Abstract:The performance of reduced tillage systems after rotation from a perennial sod crop was studied in an experiment involving spring and autumn mouldboard plough till (PT), no-till (NT)/zone till (ZT), and ridge till (RT) under maize production following alfalfa (Medicago sativa) on a Kingsbury clay loam soil (Gleyic Luvisol) in Northern New York state, USA. Soil water content, strength and temperature, plant height, leaf area and number, leaf, stem and root biomass, and root distribution were measured during the 1992 and 1993 growing seasons for spring PT and NT, while from 1994 to 1999 only yield measurements were made. Tillage in 1992 occurred under adequately dry conditions, but in 1993 under partially plastic consistency state, resulting in an underconsolidated plough layer. Soil water contents were generally higher for NT than PT in 1992, but equal in 1993. Root proliferation was good in the subsoil although soil strengths were generally above the 2 MPa level, suggesting that penetrometer measurements are not a good indicator of rooting potential in a well structured soil. Soil strength was higher in both years under NT, and under both tillage treatments was negatively related to soil water content, except in the surface layer where soil penetrability appears mostly affected by aggregate arrangement. NT recorded higher plant heights, leaf area index and leaf numbers in 1993, while PT recorded higher per plant leaf area, stem and root biomass. Roots were generally more abundant under PT than NT at all depths, and were reduced in trafficked inter-row areas. Maize yield was significantly higher under PT in 1992, but similar to NT in 1993. Further yield data from 1994 to 1999 indicate that reduced tillage systems can perform equally or better compared to autumn PT on this soil type. Spring PT generally yields lower than autumn PT, NT/ZT, and RT. In general, long-term use of reduced tillage systems is economical on well-structured clay loam soils if adequate consideration is given to maintaining soil structure
Descriptors:clay-loam-soils. conversion. maize. no-tillage. responses. biomass. climate. conservation-tillage. crop-production. leaf-area. leaf-area-

index. measurement. penetrometers. plant-height. reduced-tillage. rooting. roots. seasons. soil-strength. soil-structure. soil-types. soil-water. soil-water-content. soil. structure. subsoil. tillage. treatment. water-content. yields. mouldboards. ploughing. Luvisols. soil-compaction. soil-fertility. rotations. lucerne
Geographic Locator:New-York. USA
Identifiers:ridge tillage. zone tillage. soil quality
Organism Descriptors:Zea-mays. Medicago-sativa. Medicago
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. Middle-Atlantic-States-of-USA. Northeastern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries
Subject Codes:FF100. FF005. JJ900. FF030. JJ300. JJ600. FF150
Supplementary Info:43 ref
ISSN:0167-1987
Year:2000
Journal Title:Soil & Tillage Research

165. Title:Evaluation of non-puddling under shallow water tables and alternative tillage methods on soil and crop parameters in a rice-wheat system in Uttar Pradesh
View Article: Soil & Tillage Research. 2000. 55 (1/2). 99-106
CD Volume:330
Print Article: Pages: 99-106
Author(s):Bajpai R K Tripathi R P
Author Affiliation:Department of Soil Science and Agricultural Chemistry, Indira Gandhi Agricultural University, Raipur 492012, India
Language:English
Abstract:A shallow water table (surface to 0.54 m from June to October) is common in the Tarai (foothills of the Himalaya) of Uttar Pradesh, India. This shallow water table can be effectively utilized to avoid puddling operations for the seeding of rice and reduce the degree of tillage required for the following wheat crop. An investigation was made in a silty clay loam (Chernozem), for two consecutive years (1992-1993 and 1993-1994) in a rice-wheat cropping system. The treatments for rice were puddling and non-puddling with two fertility levels (NPK: 120:40:40 and 180:60:60) and for wheat two tillage systems (conventional and zero tillage) in puddled and non-puddled rice field with two fertility levels. Puddling significantly reduced the bulk density of the surface (0-0.06 m) soil at the tillering stage of rice, compared to non-puddling, whereas it was significantly higher after harvest. The hydraulic conductivity of the 0-0.06 m soil depth also reduced to one-sixth and one-half due to puddling at tillering and harvesting stages, respectively. Infiltration rate was decreased from 0.68 to 0.46 mm h-1 at tillering and 1.78 to 0.94 mm h-1 at harvest due to puddling. The puddling only in rice enhanced the root length density by 12% but affected adversely the wheat crop and minimized the root length density by 28%. Both puddling and non-puddling were equally effective for grain yield of rice. However, non-puddling of rice produced a significantly higher wheat grain yield than that of wheat followed by puddled rice. Conventional tillage of wheat produced significantly higher (25%) grain yield than that of zero tillage. This study indicated that in shallow water table conditions, direct drilling of rice in place of puddled rice and conventional tillage for wheat is an alternative cultivation practice in a rice-wheat system
Descriptors:tillage. bulk-density. cultivation. density. direct-sowing. grain. harvesting. hydraulic-conductivity. infiltration. NPK-fertilizers. rice. puddling. soil-depth. tillering. treatment. wheat. water-table.

cereal-grains. no-tillage. roots. growth. clay-loam-soils. Chernozems. tarai-soils. high-water-tables. cropping-systems
Geographic Locator:India. Uttar-Pradesh
Organism Descriptors:Oryza. Oryza-sativa. Triticum. Triticum-aestivum
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Oryza. Triticum. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:JJ900. JJ300. FF150. FF100. FF005. FF030. JJ700
Supplementary Info:20 ref
ISSN:0167-1987
Year:2000
Journal Title:Soil & Tillage Research

166. Title:Variations in soil microbial biomass and N availability due to residue and tillage management in a dryland rice agroecosystem
View Article: Soil & Tillage Research. 2000. 56 (3/4). 153-166
CD Volume:330
Print Article: Pages: 153-166
Author(s):Kushwaha C P Tripathi S K Singh K P
Author Affiliation:Department of Botany, Banaras Hindu University, Varanasi 221005, India
Language:English
Abstract:Seasonal changes in the levels of soil microbial biomass C (MBC) and N (MBN), N-mineralization rate and available-N concentration were studied in rice-barley supporting tropical dryland (rainfed) agroecosystem under six combinations of tillage (conventional, minimum and zero tillage) and crop residue manipulation (retained or removed) conditions. Highest levels of soil MBC and MBN (368-503 and 38.2-59.7 micro g/g, respectively) were obtained in minimum tillage residue retained (MT+R) treatment and lowest levels (214-264 and 20.3-27.1 micro g/g, respectively) in conventional tillage residue removed (CT-R, control) treatment. Along with residue retention tillage reduction from conventional to zero increased the levels of MBC and MBN (36-82 and 29-104% over control, respectively). The proportion of MBC and MBN in soil organic C and total N contents increased significantly in all treatments compared to control. This increase (28% in case of C and 33% N) was maximum in MT+R and minimum (10% for C and N both) in minimum tillage residue removed (MT-R) treatment. In all treatments, concentrations of N in microbial biomass were greater at the seedling stage. In residue removed treatments, N-mineralization rates were maximum during the seedling stage of crops and decreased through crop maturity. In residue retained treatments, however, N-mineralization rates were lower than in residue removed treatments at the seedling stage of both crops. At the grain-forming stage in all instances the N-mineralization rates in residue retained treatments exceeded the rates in corresponding residue removed treatments. Tillage reduction and residue retention increased the proportion of organic C and total N present in soil organic matter as microbial biomass. Microbial immobilization of available-N during the early phase of crops and its pulsed release enhanced the degree of synchronization between crop demand and N supply. The maximum enhancement effects were recorded in the minimum tillage along with residue retained treatment. In the dryland agroecosystem studied, two management practices in combination were more advantageous than either practice alone in maintaining soil fertility levels. For soil fertility amelioration in dryland agroecosystems with least dependence upon chemical fertilizer input, post-harvest retention of about 20 cm shoot biomass (accounting for 25-40% aboveground biomass) of previous crop and its incorporation in soil

through minimum tillage in the succeeding crop is suggested, especially in the case of cereal
Descriptors:rice. barley. tillage. immobilization. carbendazim. minimum-tillage. organic-matter. seedlings. seedling-growth. soil-fertility. soil-organic-matter. no-tillage. mineralization. soil-flora. microbial-activities. nutrient-availability. soil-management
Identifiers:microbial biomass
Organism Descriptors:Oryza-sativa. Hordeum-vulgare. Oryza
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Hordeum
Subject Codes:JJ900. JJ100. JJ200. JJ600. FF005. FF061
Supplementary Info:45 ref
ISSN:0167-1987
Year:2000
Journal Title:Soil & Tillage Research
Copyright:Copyright CAB International

167. Title:Soil organic C and N pools under long-term pasture management in the Southern Piedmont USA
View Article: Soil Biology & Biochemistry. 2000. 32 (4). 469-478
CD Volume:330
Print Article: Pages: 469-478
Author(s):Franzluebbers A J Stuedemann J A Schomberg H H Wilkinson S R
Author Affiliation:US Department of Agriculture, Agricultural Research Service, J. Phil Campbell Sr. Natural Resource Conservation Center, 1420 Experiment Station Road, Watkinsville, GA 30677-2373, USA
Language:English
Abstract:Soil organic matter pools under contrasting long-term management systems provide insight into potentials for sequestering soil C, sustaining soil fertility and functioning of the soil-atmospheric interface. Soil C and N pools (total, particulate and microbial) were compared under pastures (1) varying due to harvest technique (grazing or haying), species composition (cool- or warm-season), stand age and previous land use and (2) in comparison with other land uses. Grazed tall fescue [Festuca arundinacea]-common bermudagrass [Cynodon dactylon] pasture (20 yr old) had greater soil organic C (31%), total N (34%), particulate organic C (66%), particulate organic N (2.4 fold) and soil microbial biomass C (28%) at a depth of 0-200 mm than adjacent land in conservation-tillage cropland (24 yr old). Soil organic C and total N at a depth of 0-200 mm averaged 3800 and 294 g/m2, respectively, under grazed bermudagrass and 3112 and 219 g/m2, respectively, under hayed bermudagrass. A chronosequence of grazed tall fescue suggested soil organic N sequestration rates of 7.3, 4.4 and 0.6 g/m2 per yr to a depth of 200 mm during 0-10, 10-30 and 30-50 yr, respectively. Soil C storage under long-term grazed tall fescue was 85 to 88% of that under forest, whereas soil N storage was 77 to 90% greater under grazed tall fescue than under forest. Properly grazed pastures in the Southern Piedmont USA have great potential to restore natural soil fertility, sequester soil organic C and N and increase soil biological activity
Descriptors:organic-carbon. nitrogen. soil-types. grassland-soils. pastures. grassland-management. forest-soils. land-use. soil-organic-matter. soil-fertility
Organism Descriptors:Cynodon-dactylon. Festuca-arundinacea
Supplemental Descriptors:Cynodon. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Festuca
Subject Codes:JJ200. JJ100. PP350
Supplementary Info:39 ref
ISSN:0038-0717

Year:2000
Journal Title:Soil Biology & Biochemistry
Copyright:Copyright CAB International

168. Title:Biochemical properties of acid soils under climax vegetation (Atlantic oakwood) in an area of the European temperate-humid zone (Galicia, NW Spain): general parameters
View Article: Soil Biology & Biochemistry. 2000. 32 (6). 733-745
CD Volume:330
Print Article: Pages: 733-745
Author(s):Leiros M C Trasar Cepeda C Seoane S Gil Sotres F
Author Affiliation:Departamento de Edafologia y Quimica Agricola, Universidad de Santiago de Compostela, E-15706 Santiago de Compostela, Spain
Language:English
Abstract:The concept of sustainable development suggests that soil quality should be measured on the basis of the most environmentally sensitive properties of native soils under climax vegetation. The most relevant properties are biochemical. The general biochemical parameters of the O and Ah horizons of 40 native Umbrisols are described under climax Atlantic oakwood in Galicia (NW Spain). The properties studied were: microbial biomass C (O horizons 1935 plus or minus 450 mg C/kg, Ah horizons 781 plus or minus 253 mg C/kg), N flush (68 plus or minus 20 and 26 plus or minus 13 mg/kg), soil respiration (12.9 plus or minus 4.5 and 2.6 plus or minus 0.8 micro g CO2-C/g per h), ATP (8.91 plus or minus 3.20 and 2.77 plus or minus 1.38 micro g/g), dehydrogenase activity (555 plus or minus 205 and 207 plus or minus 58 nmol INTF/g per h), catalase activity (3.9 plus or minus 1.1 and 2.0 plus or minus 0.9 mmol H2O2 consumed/g per h), N mineralization capacity (113 plus or minus 66 and 30 plus or minus 13 mg N/kg per 10 d), and arginine ammonification rate (11.1 plus or minus 5.9 and 4.9 plus or minus 2.2 micro g N-NH+4/g per h). The values reported are generally within the ranges found in the literature. The correlations between biochemical parameters and chemical variables show in these soils microbial population size and activity directly related to both organic matter and available nutrient contents
Descriptors:ammonification. ATP. catalase. horizons. mineralization. organic-matter. respiration. sustainability. forest-soils. soil-types. soil-fertility. Mollisols. acid-soils. soil-properties. chemical-properties. vegetation-types. biological-activity-in-soil. climax-communities. ecology. biochemistry
Geographic Locator:Spain
Supplemental Descriptors:Southern-Europe. Europe. Mediterranean-Region. Developed-Countries. European-Union-Countries. OECD-Countries
Subject Codes:JJ100. JJ200. JJ400. KK100. ZZ900
Supplementary Info:53 ref
ISSN:0038-0717
Year:2000
Journal Title:Soil Biology & Biochemistry
Copyright:Copyright CAB International

169. Title:Microbial biomass and size-density fractions differ between soils of organic and conventional agricultural systems
View Article: Soil Biology & Biochemistry. 2000. 32 (6). 757-768
CD Volume:330
Print Article: Pages: 757-768
Author(s):Fliessbach A Mader P
Author Affiliation:Research Institute of Organic Agriculture (FiBL), Ackerstrasse, 5070 Frick, Switzerland
Language:English

Abstract:Agricultural production systems have to combine management practices in order to sustain soil quality and also profitability. Microbial biomass and size-density fractions of soils were investigated from a long-term field trial set up in 1978 at Therwil, Switzerland. It compares the economic and ecological performance of organic and conventional agricultural systems. Main differences of the systems were the amount and form of fertilizer as well as the plant protection strategy, whilst crop rotation and soil tillage were the same. Microbial biomass C and N as well as their ratios to the total and light fraction C and N pools in soils of the organic systems were higher than in conventional systems. This is interpreted as an enhanced decomposition of the easily available light fraction pool of soil organic matter (SOM) with increasing amounts of microbial biomass. The role of microbial biomass as a regulator and light fraction organic matter as an indicator of decomposition is discussed. The presented results indicate that labile pools of SOM are distinctly affected by long-term management practices
Descriptors:farming-systems. biomass. rotations. soil-management. fertilizers. organic-matter. plant-protection. profitability. soil-organic-matter. tillage. soil-fertility. microbial-flora. soil-biology. soil-chemistry. carbon. nitrogen. carbon-nitrogen-ratio. organic-farming. sustainability. cultural-methods
Geographic Locator:Switzerland
Supplemental Descriptors:Western-Europe. Europe. Developed-Countries. EFTA. OECD-Countries
Subject Codes:FF100. JJ600. JJ100. JJ200. JJ700
Supplementary Info:44 ref
ISSN:0038-0717
Year:2000
Journal Title:Soil Biology & Biochemistry

170. Title:Decomposition of de-inking paper sludge in agricultural soils as characterized by carbohydrate analysis
View Article: Soil Biology & Biochemistry. 2000. 32 (11/12). 1561-1570
CD Volume:331
Print Article: Pages: 1561-1570
Author(s):Chantigny M H Angers D A Beauchamp C J
Author Affiliation:Agriculture et Agroalimentaire Canada, Centre de recherche et de developpement sur les sols et les grandes cultures, 2560 Hochelage Blvd., Ste-Foy, Que., G1V 2J3, Canada
Language:English
Abstract:Chemical fractionation and carbohydrate characterization to determine the transformation and decay rates of de-inking paper sludge (DPS) in different soils when large loading rates are applied. In a field experiment, DPS was added to a well-drained silty clay loam (Typic Dystrochrept) and a poorly-drained clay loam (Typic Humaquept) at rates of 0 (control), 50 or 100 t dry matter ha-1. Soil samples were obtained periodically during 726 days after sludge incorporation. Soil organic matter was fractionated into hot-water extractable (HWC), mild-acid extractable (MAC) and strong-acid extractable carbohydrates (SAC), and acid-resistant carbon (ARC). The MAC fraction mostly contained hemicellulosic sugars, whereas SAC fraction included most cellulosic glucose. The contribution of microbial saccharides to the different carbohydrate fractions increased during DPS decomposition. The carbohydrate composition indicated that the chemical fractions reflected the net balance between disappearance of sludge carbohydrates and appearance of newly synthesized microbial carbohydrates. The MAC, SAC and ARC fractions in DPS-amended soils, had relative

degradabilities of SAC>MAC>ARC. The sludge used, appeared to decompose according to a two-phase pattern, with an initial rapid-decay phase mostly determined by SAC and ARC disappearance (mean residence time 0.1 and 0.3 year, respectively), and a second slow-decay phase: largely characterized by ARC disappearance (mean residence time 8.5 years). DPS decomposed more slowly at the highest application rate, presumably because the capacity of soil microbes to decompose C was temporarily limited by nutrient deficiency. Chemical fractionation and carbohydrate analysis proved useful to study quantitatively and qualitatively the decomposition and transformation of wood-derived residues in agricultural soils

Descriptors:agricultural-soils. analysis. carbohydrates. characterization. sludges. soil. application-rates. capacity. carbon. composition. decomposition. deficiency. dry-matter. fractionation. incorporation. organic-matter. residues. soil-fertility. soil-organic-matter. sugars. transformation. paper-mill-sludge. clay-loam-soils. Inceptisols. soil-amendments

Subject Codes:XX400. KK520. JJ700. JJ100. ZZ900

Supplementary Info:32 ref

ISSN:0038-0717

Year:2000

Journal Title:Soil Biology & Biochemistry

171. Title:Regeneration of earthworm populations in a degraded soil by natural and planted fallows under humid tropical conditions

View Article: Soil Science Society of America Journal. 2000. 64 (1). 222-228

CD Volume:323

Print Article: Pages: 222-228

Author(s):Tian G Olimah J A Adeoye G O Kang B T

Author Affiliation:Soil Fertility Unit, Resource and Crop Management Div., International Inst. of Tropical Agriculture (IITA), Ibadan, Nigeria

Language:English

Abstract:Earthworm populations (predominantly Hyperiodrilus africanus and Eudrilus eugeniae) were sampled monthly for 1 yr during 1994 and 1995 in natural regrowth vegetation fallow (dominated by the natural fallow shrub Chromolaena odorata), planted fallow (the woody species Senna siamea, Leucaena leucocephala, and Acacia leptocarpa), and intercropped maize-cassava (Manihot esculenta) established in 1989 in a degraded Alfisol (Oxic Paleustalf) in SW Nigeria. Compared to leaves of Chromolaena (3.3% N), N concentrations were lower in those of Senna and Acacia, and higher in Leucaena. Acacia and Leucaena had higher polyphenol relative to the natural fallow (2%). The lignin was lower in Leucaena than the natural fallow leaves (14%). For 65% of the sampling dates, earthworm numbers under all fallows were significantly higher than under continuous maize-cassava. The mean earthworm numbers (no. m-2) during the rainy season (April-October) decreased in the following order: Chromolaena (147), Senna (131), Leucaena (92), Acacia (80), and maize-cassava (14). Earthworm fresh weights in fallow plots were higher than in the maize-cassava plot, though this was significant for only 4 out of 11 sampling dates. Higher earthworm numbers and biomass in fallow plots were attributed to higher litterfall, lower soil temperature, and higher soil moisture. The mean earthworm numbers were directly correlated with the mean soil moistures ($r^2=0.80$, $P<0.05$) in fallow plots and N:polyphenol ratios of fallow litterfall ($r^2=0.95$, $P<0.05$). Increase in earthworm population by fallows led to an increase in leaf-litter decomposition, soil organic matter, available P, and extractable cations and pH; and a decrease in soil bulk density and penetrometer resistance in the fallow plots

Descriptors:humid-zones. tropics. alfisols. biomass. bulk-density. cations. decomposition. density. fallow. lignin. maize. moisture. organic-matter. penetrometers. regrowth. resistance-to-penetration. soil-water-content. soil-organic-matter. soil-temperature. vegetation. woody-weeds. forest-litter. intercropping. improved-fallow. cassava
Geographic Locator:Nigeria
Identifiers:Hyperiodrilus africanus. Hyperiodrilus
Organism Descriptors:earthworms. Oligochaeta. Acacia. Acacia-leptocarpa. Chromolaena. Chromolaena-odorata. Eudrilus-eugeniae. Leucaena. Leucaena-leucocephala. Zea-mays. Manihot. Manihot-esculenta
Supplemental Descriptors:Oligochaeta. Annelida. invertebrates. animals. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Acacia. Asteraceae. Asterales. Chromolaena. Eudrilus. Eudrilidae. Leucaena. Zea. Poaceae. Cyperales. monocotyledons. Euphorbiaceae. Euphorbiales. Manihot. West-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa
Subject Codes:JJ100. FF150. KK100. KK600. FF100. FF005. JJ200. JJ300
Supplementary Info:27 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

172. Title:Performance of soil condition indicators across taxonomic groups and land uses
View Article: Soil Science Society of America Journal. 2000. 64 (1). 300-311
CD Volume:323
Print Article: Pages: 300-311
Author(s):Schipper L A Sparling G P
Author Affiliation:Landcare Research, Private Bag 3127, Hamilton, New Zealand
Language:English
Abstract:Information on soil conditions in New Zealand is needed to assess soil quality at a national scale. We tested a standard set of 16 primary indicators at 29 sites (0-10 cm depth) across nine soil great groups with matched examples of indigenous forest, plantation forest, pastures, and crops. Soils under indigenous forest were acidic (pH 5.5-5.7), low in Olsen P (5-14 micro g cm-3), with high microbial C (814-1228 micro g cm-3), respiration (1.1-1.4 micro g C cm-3 h-1), total C (31.8-52.9 mg cm-3), macroporosity (9.6-11.7% v/v), and total available water (29.2-31.5% v/v). Plantation forest soils had generally similar characteristics. Pasture soils were less acidic (pH 5.3-6.9) than forest soils, but with more available P (5.5-43.0 micro g cm-3), higher total C (30.7-141.5 mg cm-3), total N (2.7-9.0 mg cm-3), and mineralizable N (68-175 micro g cm-3). The physical condition was similar to forest soils. Cropped soil had low total C (20-34 mg cm-3), microbial C (160-956 micro g cm-3), respiration (0.29-1.33 micro g C cm-3 h-1), and total available water (6.7-30.1% v/v), but high pH (5.8-7.2), Olsen P (11.2-199 micro g cm-3), and bulk density (0.96-1.3 g cm-3). Principal component analysis identified outlier sites and grouped land uses independently of soil great groups. Some indicators were less useful because of high variability (unsaturated hydraulic conductivity), correlation to other indicators (microbial C) or interpretation difficulties (respiration). Overall, the standardized approach provided useful information about soil conditions on a national scale
Descriptors:indicators. soil-types-(genetic). analysis. available-water. bulk-density. characteristics. density. forests. forest-soils. hydraulic-conductivity. pastures. principal-component-analysis. respiration.

soil. unsaturated-hydraulic-conductivity. land-use. crops. soil-properties. soil-fertility
Geographic Locator:New-Zealand
Identifiers:soil quality
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:KK100. JJ400. PP350. JJ200. JJ100. JJ300. FF100. JJ600
Supplementary Info:55 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

173. Title:Soil quality assessment after weed-control tillage in a no-till wheat-fallow cropping system
View Article: Soil Science Society of America Journal. 2000. 64 (1). 339-346
CD Volume:323
Print Article: Pages: 339-346
Author(s):Kettler T A Lyon D J Doran J W Powers W L Stroup W W
Author Affiliation:USDA-ARS, 119 Keim Hall, Lincoln, NE 68583-0934, USA
Language:English
Abstract:Adoption of reduced-tillage fallow systems in the western USA is limited by winter annual grass weeds such as downy brome (Bromus tectorum). Mouldboard ploughing is an effective means of controlling downy brome in winter wheat-fallow systems. The purpose of this study was to assess the influence of ploughing and secondary tillage operations, for the purpose of weed control, on soil quality attributes of a silt loam soil that had been cropped in a sub-till or no-till (NT) winter wheat-fallow system for more than 20 years in Nebraska, USA. Compared with undisturbed NT, downy brome populations in ploughed NT decreased 97 and 41% in the first and third crops following tillage, respectively. Wheat yields in ploughed NT treatments were 30 and 9% greater in the first and third crops following tillage, respectively, compared with undisturbed NT. Soil quality indicators assessed were organic C (OC), total N, inorganic N, pH, electrical conductivity, bulk density, water infiltration rate, and pore-size distribution. Five years after tillage, soil OC decline in the 0-7.5 cm depth was 20% in ploughed compared with undisturbed NT; however, OC increased 15% in the 7.5-15 cm depth and was not different in the 0-30 cm depth. Total soil N followed similar trends. Soil inorganic N in ploughed NT decreased 37%, and soil pH increased 9%, compared with undisturbed NT, at the 0-7.5 cm depth. Occasional tillage with the mouldboard plough in a reduced- or no-tillage management system will help control winter annual grass weeds, while retaining many of the soil quality benefits of conservation-tillage management
Descriptors:assessment. tillage. bulk-density. density. electrical-conductivity. fallow. indicators. infiltration. no-tillage. silt-loam-soils. soil-pH. treatment. weeds. weed-control. wheat. winter. yields. soil-fertility. reduced-tillage. soil-chemical-properties. cereals
Geographic Locator:USA. Nebraska
Identifiers:soil quality
Organism Descriptors:Bromus. Bromus-tectorum. grasses. Triticum-aestivum. Poaceae. Triticum
Supplemental Descriptors:Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Bromus. Triticum. North-America. America. Developed-Countries. OECD-Countries. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. Great-Plains-States-of-USA

Subject Codes:FF500. JJ900. JJ600. JJ200. FF150
Supplementary Info:39 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

174. Title:Water use and yield of limited-irrigated and dryland corn
View Article: Soil Science Society of America Journal. 2000. 64 (1). 365-370
CD Volume:323
Print Article: Pages: 365-370
Author(s):Norwood C A
Author Affiliation:Southwest Research-Extension Center, 4500 E. Mary, Garden City, KS 67846, Kansas, USA
Language:English
Abstract:Maize is grown on more irrigated hectares than any crop in the US Great Plains. Much of this area is irrigated from the Ogallala aquifer, which is being depleted in some areas, particularly in the central and southern portions of the region. Research was conducted at Garden City, Kansas, USA, from 1994 to 1997 to evaluate the effects of various combinations of irrigation, N rate, and plant population on water use and yield of maize and to determine if limited irrigation is a viable alternative to returning irrigated hectares to dryland in an area of declining groundwater. Treatments were zero, one, two, and three irrigations, each consisting of 150 mm of water, applied to maize grown with conventional tillage (CT) and no-tillage (NT). Appropriate N rates and plant populations were used with each irrigation treatment to give the management systems S0, S1, S2, and S3. The single irrigation was at tassel (VT) and the two irrigation treatment was at VT and at the dough stage of grain fill (R4). Maize irrigated three times received a vegetative irrigation at the 9 to 10 leaf stage (V9) plus irrigations at VT and R4. Management system S1 increased yield by an average of 1.76 t ha-1 or 29%. On average S2 and S3 increased yields an additional 11 and 13%, respectively. No till increased yield and water-use efficiency (WUE) in 2 of 4 yr. On average NT increased yield by 0.56 t ha-1, and WUE by 0.96 kg ha-1 mm-1. Conclusions are that maize will produce adequate yields with one or more irrigations; thus, limited irrigation combined with proper fertility and plant population is a viable alternative to dryland in an area of declining groundwater
Descriptors:aquifers. grain. groundwater. irrigation. plant-density. research. tillage. treatment. water-use. yields. maize. irrigation-scheduling. no-tillage. dry-farming
Geographic Locator:USA. Kansas
Organism Descriptors:Zea-mays
Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. Great-Plains-States-of-USA
Subject Codes:FF062. FF100. FF005. JJ800. JJ900
Supplementary Info:27 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

175. Title:Nitrate leaching in a tile-drained silt loam soil
View Article: Soil Science Society of America Journal. 2000. 64 (2). 517-527
CD Volume:323

Print Article: Pages: 517-527
Author(s):Vos J A de Hesterberg D Raats P A C
Author Variant:de-Vos-J-A
Author Affiliation:Wageningen Univ. and Research Centre, Res. Inst. for Agrobiology and Soil Fertility, P.O. Box 14, 6700 AA Wageningen, Netherlands
Language:English
Abstract:Nitrate (NO3) leaching was studied for a winter leaching period in layered calcareous silt loam in the Netherlands with tile-drains at approx equal to 1-m depth and 2-m spacing. Groundwater levels, drain discharge rates, and NO3 concentrations in the drainage water were monitored, and the soil hydraulic characteristics were measured for the different soil layers. The data were interpreted using the two-dimensional water flow and solute transport model SWMS_2D. This model uses Darcy's law for water flow and the convection-dispersion equation for solute transport for both the saturated and unsaturated zones. A nitrogen-production term of 39 kg N ha-1 was used to account for the net N mineralization in the topsoil during the leaching period. The model was calibrated by varying the hydraulic conductivity at saturation (K3) for the different soil layers, using the measured groundwater level-drain discharge rate relationship as calibration target. Peaks in NO3 concentrations in the drainage water are well explained by the temporal two-dimensional behaviour of convective transport. Measured NO3 leaching was 11 kg N ha-1 yr-1 and simulated NO3 leaching was 15 kg N ha-1 yr-1 in the relatively dry winter leaching period 1991-1992. The two-dimensional transport model SWMS_2D is a useful tool to evaluate the relative effects of management practices to reduce N leaching
Descriptors:leaching. silt-loam-soils. characteristics. tile-drainage. drainage-water. groundwater. hydraulic-conductivity. mineralization. saturation. solutes. transport-processes. movement-in-soil. spacing. topsoil. water-flow. monitoring. winter
Subject Codes:JJ200. JJ300. JJ800
Supplementary Info:44 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

176. Title:Influence of time on soil response to no-till practices
View Article: Soil Science Society of America Journal. 2000. 64 (2). 700-709
CD Volume:323
Print Article: Pages: 700-709
Author(s):Rhoton F E
Author Affiliation:USDA-ARS, National Sedimentation Laboratory, P.O. Box 1157, Oxford, MS 38655, USA
Language:English
Abstract:The number of growing seasons required for no-till practices to improve soil properties should be considered before changing management systems. To evaluate this time factor, an 8-year tillage study was conducted in Mississippi, USA, on a Grenada silt loam (fine-silty, mixed, active, thermic Glossic Fragiudalfs) using cotton, grain sorghum-maize, and soyabean-wheat as test crops. Soil samples were characterized for soil organic matter (SOM), pH, exchangeable Ca and Mg, extractable P, K, Fe, Mn, Cu, and Zn, aggregate stability (AS), water dispersible clay (WDC), total clay (TC), and modulus of rupture (MR) at time 0, 4, and 8 years. Within 4 years, no-till (NT) resulted in statistically significant (Pless than or equal to 0.05) differences compared to conventional tillage (CT). The surface 2.5 cm of the NT

treatments had higher levels of SOM, exchangeable Ca, and extractable P, Mn, and Zn, but lower extractable K, Fe, and Cu. Tillage had no effect on exchangeable Mg and pH. No-till also resulted in higher AS, and lower MR, WDC, and TC in the top 2.5 cm, relative to CT. The differences in soil properties between tillage treatments were essentially independent of crop. Instead, the results are controlled by relative amounts of SOM and clay, and the extent to which these properties change with time. Undoubtedly, NT practices can improve several fertility and erodibility-related properties of this soil within 4 years, and enhance its sustainability

Descriptors:responses. characterization. cotton. iron. grain. manganese. organic-matter. properties. rupture. seasons. silt-loam-soils. Alfisols. soil-organic-matter. soil-properties. sustainability. tillage. treatment. wheat. maize. zinc. soyabeans. aggregates. stability. no-tillage. soil-fertility. calcium. phosphorus. potassium. copper. magnesium. soil-pH. long-term-experiments

Geographic Locator:USA. Mississippi

Identifiers:modulus of rupture

Organism Descriptors:Gossypium. Gossypium-hirsutum. Triticum. Triticum-aestivum. Zea-mays. Sorghum. Sorghum-bicolor. Glycine-max. Glycine-(Fabaceae)

Supplemental Descriptors:Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Gossypium. Poaceae. Cyperales. monocotyledons. Triticum. Zea. Sorghum. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. North-America. America. Developed-Countries. OECD-Countries. East-South-Central-States-of-USA. Southern-States-of-USA. USA. Delta-States-of-USA. Gulf-States-of-USA

Subject Codes:JJ900. FF100. JJ200. JJ300. JJ600

Supplementary Info:30 ref

ISSN:0361-5995

Year:2000

Journal Title:Soil Science Society of America Journal

177. Title:Soil sampling strategies for precision agriculture research under Sahelian conditions

View Article: Soil Science Society of America Journal. 2000. 64 (5). 1674-1680

CD Volume:323

Print Article: Pages: 1674-1680

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Language:English

Abstract:The cost of soil samples to characterize field variability is a key problem in precision agriculture. This study was conducted to investigate whether yield maps can be used to optimize soil sampling for characterizing soil variables that determine yield variability. Using an inexpensive, low-tech scoring technique, yield maps of pearl millet (Pennisetum glaucum) were produced for a zero-input farm in Niger. The soil was classified as a Typic Plinthustalf. The Spatial Simulated Annealing algorithm was used to optimize three sampling schemes. Scheme 1 optimized coverage over the whole area. Scheme 2 covered the whole yield range. Scheme 3 covered the low-producing areas. Yield varied from 0 to 2500 kg ha-1, measured per planting hill. Using correlation coefficients, Scheme 2 found significant correlations between five soil variables and yield. Scheme 1 found only one significant correlation and explained 37% of the variation in yield using multivariate regression of yield on soil variables. Scheme 2 explained 70% of the variation in yield. Differences between Scheme 3 and Scheme 1 proved to be significant for distance to shrubs, relief,

soil pH, and cation-exchange capacity. We concluded that shrubs are the main factor influencing millet yield by means of catching eroded materials and improving soil fertility. The possibilities of planting shrubs to improve soil fertility should be investigated. Variograms of relief and yield suggested that spatial correlation is largely confined to distances of 3 to 5 m. Since Scheme 2 was most effective in establishing soil-yield relationships, we concluded that yield maps can be used to optimize soil sampling

Descriptors:sampling. soil. precision-agriculture. research. maps. yields. soil-properties. shrubs. relief. soil-fertility. soil-pH. cation-exchange-capacity. Alfisols

Geographic Locator:Sahel. Niger

Organism Descriptors:Pennisetum-glaucum

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

Subject Codes:ZZ900. FF150. JJ600. FF005. JJ200

Supplementary Info:20 ref

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Journal Title:Soil Science Society of America Journal

178. Title:Ten-year responses of soil quality and conifer growth to silvicultural treatments

View Article: Soil Science Society of America Journal. 2000. 64 (5). 1815-1826

CD Volume:323

Print Article: Pages: 1815-1826

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Language:English

Abstract:The development of sustainable forestry practices and credible certification systems relies on continuous monitoring of indicators. In the present study, carried out at the Petawawa Research Forest (Ontario, Canada), we evaluated the impacts of three intensive silvicultural treatments: scarification, fertilization, and herbicide treatment, applied alone or in combination - on indicators of organic layer quality, foliar nutrition, and tree growth - 10 years after establishment of eastern white pine (Pinus strobus) and white spruce (Picea glauca) plantations. We compared these 10-year results with measurements made 3 to 4 years after plantation establishment. In both 1989 and 1996, the herbicide treatment had the greatest effect on organic layer quality. In 1996, compared with the no-treatment control, herbicide application reduced organic C mass by 46%, total N mass by 15%, and acid phosphatase activity by 64%. These negative effects were offset when herbicide was applied in combination with fertilizer. The negative impact of herbicide on microbial biomass C noted in 1990 was no longer evident in 1996. In herbicide-treated plots, the nitrate-dominated cycle observed 1989-1990 was replaced by an ammonium-dominated cycle in 1996. Although herbicide application negatively affected soil quality, it increased tree growth and generally improved foliar nutrition; thus organic layer and tree responses were not correlated. The indicators used were sensitive to changes in the ecosystem over time and signalled soil impacts that could have consequences for long-term productivity

Descriptors:silviculture. scarification. fertilizers. herbicides. organic-horizons. quality. soil. foliar-nutrition. trees. growth. plantations. organic-carbon. nitrogen. acid-phosphatase. enzyme-activity. application. indicators. soil-fertility. forestry
Geographic Locator:Canada. Ontario
Identifiers:soil quality
Organism Descriptors:Pinus-strobus. Picea-glauca
Supplemental Descriptors:Pinus. Pinaceae. Pinopsida. gymnosperms. Spermatophyta. plants. Picea. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Canada
Subject Codes:JJ600. KK100. KK110. JJ700. HH400. FF061. JJ100. JJ200
Supplementary Info:55 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

179. Title:Soil color as an indicator of slash-and-burn fire severity and soil fertility in Sumatra, Indonesia
View Article: Soil Science Society of America Journal. 2000. 64 (5). 1826-1833
CD Volume:323
Print Article: Pages: 1826-1833
Author(s):Ketterings Q M Bigham J M
Author Affiliation:Environmental Science Graduate Program, Ohio State Univ., 2021 Coffey Road, Columbus OH 43210, USA
Language:English
Abstract:Fire is widely used to convert forest to agricultural land in many developing countries, and correlations are thought to exist between fire severity, burned soil colour, and soil fertility. To test this hypothesis, field experiments were conducted in Sepunggur, Jambi Province, Sumatra, Indonesia. Field burning a slashed 12- to 15-yr.-old secondary forest caused Munsell values and chromas to decrease and hues to become yellower with increasing heat severity, especially in the top 5 cm of the soil. However, at peak surface temperatures >600 deg C, soil C was mostly depleted and the soil matrix was reddened. Laboratory studies showed similar results with static heating. Moreover, colour changes were highly dependent on the duration of exposure at a given temperature. Fire induced the formation of aggregates with exteriors that had lower values and chromas and slightly redder hues than the interiors. Laboratory removal of organic matter from burned samples by chemical oxidation did not alter the colour. Soil exchangeable Ca, Mg, and K increased with fire severity, while exchangeable acidity and Al decreased 2 weeks after the burn. Soil C and N were reduced at high burn severity only. Phosphorus showed an increase in availability at low to medium fire severity and a decrease in availability at the most intense burn levels. Colours of burned areas in the field did not change significantly during the 12 weeks following the burn. However, within 12 weeks following the field burn exchangeable Ca had decreased to pre-burn levels and Al saturation had increased markedly. Using postburn colour measurements to predict the spatial patterns in soil fertility was limited by the fact that fertility changed rapidly following the burn, whereas colour parameters did not
Descriptors:soil-colour. indicators. shifting-cultivation. fire. soil-fertility. burning. secondary-forests. temperature. carbon. soil. calcium. magnesium. potassium. soil-acidity. aluminium. nitrogen. phosphorus. forests
Geographic Locator:Indonesia. Sumatra

Supplemental Descriptors:South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Indonesia
Subject Codes:JJ300. JJ600. PP800. KK130. JJ200
Supplementary Info:42 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

180. Title:Identification of regional soil quality factors and indicators: I. Central and Southern High Plains
View Article: Soil Science Society of America Journal. 2000. 64 (6). 2115-2124
CD Volume:323
Print Article: Pages: 2115-2124
Author(s):Brejda J J Moorman T B Karlen D L Dao T H
Author Affiliation:USDA-ARS, Wheat, Sorghum, and Forage Res. Unit, 344 Keim Hall, Univ. of Nebraska, Lincoln, NE 68583, USA
Language:English
Abstract:Appropriate indicators for assessing soil quality on a regional scale using the US National Resource Inventory (NRI) are unknown. Our objectives were to (i) identify soil quality factors present at a regional scale, (ii) determine which factors vary significantly with land use, and (iii) select soil attributes within these factors that can be used as soil quality indicators for regional-scale assessment. Ascalon (fine-loamy, mixed, superactive, mesic Aridic Argiustoll) and Amarillo (fine-loamy, mixed, thermic Aridic Paleustalf) soils were sampled from a statistically representative subset of NRI sample points within the Central and Southern High Plains Major Land Resource Areas (MLRA) and analysed for 20 soil attributes. Factor analysis was used to identify soil quality factors, and discriminant analysis was used to identify the factors and indicators most sensitive to land use within each MLRA. In the Central High Plains, five soil quality factors were identified, with the organic matter and colour factors varying significantly with land use. Discriminant analysis selected total organic C (TOC) and total N as the most sensitive indicators of soil quality at a regional scale. In the Southern High Plains, six factors were identified, with water stable aggregate (WSA) content, TOC, and soil salinity varying significantly with land use. Discriminant analysis selected TOC and WSA content as the most sensitive indicators of soil quality in the Southern High Plains. Total organic C was the only indicator that consistently showed significant differences between land uses in both regions
Descriptors:soil-fertility. assessment. indicators. soil-types. Alfisols. Mollisols. soil-organic-matter. soil-colour. organic-carbon. nitrogen. aggregates. stability. land-use. USA. statistical-analysis. soil-salinity
Geographic Locator:USA. Colorado. Wyoming. Nebraska. Texas. Oklahoma. New-Mexico
Identifiers:soil quality
Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries. Mountain-States-of-USA. Western-States-of-USA. USA. Great-Plains-States-of-USA. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. Gulf-States-of-USA. Southwestern-States-of-USA
Subject Codes:JJ600. JJ200. JJ300. PP300
Supplementary Info:33 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

181. Title:Identification of regional soil quality factors and indicators: II. Northern Mississippi Loess Hills and Palouse Prairie
View Article: Soil Science Society of America Journal. 2000. 64 (6). 2125-2135
CD Volume:323
Print Article: Pages: 2125-2135
Author(s):Brejda J J Karlen D L Smith J L Allan D L
Author Affiliation:USDA-ARS, Wheat, Sorghum, and Forage Res. Unit, 344 Keim Hall, Univ. of Nebraska, Lincoln, NE 68583, USA
Language:English
Abstract:Diversity of soil series present in a region may hinder identification of soil quality factors and indicators at a regional scale. Our objectives were (i) to identify soil quality factors for a diverse population of soils at the regional scale, (ii) determine which factors vary significantly with land use, (iii) to select indicators from these factors that can be used with the US National Resource Inventory (NRI) for monitoring soil quality, and (iv) to compare these results to a similar study involving only a single soil series. One hundred eighty-six points representing 75 soil series in the Northern Mississippi Valley Loess Hills and 149 points representing 58 soil series in Palouse and Nez Perce Prairies were sampled from a statistically representative subset of NRI sample points and analysed for 20 soil attributes. Factor analysis was used to identify soil quality factors and discriminant analysis was used to identify factors and indicators most sensitive to land use within each region. In the Northern Mississippi Valley Loess Hills, five soil quality factors were identified. Discriminant analysis selected potentially mineralizable N, microbial biomass C, water stable aggregates, and total organic C (TOC) as the most discriminating attributes between land uses. In the Palouse and Nez Perce Prairies, six factors were identified. Discriminant analysis selected TOC and total N as the most discriminating attributes between land uses. The soil quality factors were similar among three of the four regions, but TOC was the only indicator common to all regions for distinguishing among land uses
Descriptors:land-use. indicators. soil-fertility. nitrogen. mineralization. microorganisms. biomass. aggregates. stability. organic-carbon. soil. loess. prairies. grasslands
Geographic Locator:USA. Wisconsin. Iowa. Minnesota. Washington. Idaho. Oregon
Identifiers:soil quality. microbial biomass
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. West-North-Central-States-of-USA. Corn-Belt-States-of-USA. Pacific-Northwest-States-of-USA. Pacific-States-of-USA. Western-States-of-USA. Mountain-States-of-USA
Subject Codes:JJ600. JJ100. JJ300. JJ200. PP300
Supplementary Info:29 ref
ISSN:0361-5995
Year:2000
Journal Title:Soil Science Society of America Journal

182. Title:The response of Panicum maximum to a simulated subcanopy environment. 1. Soilxshade interaction
View Article: Tropical Grasslands. 2000. 34 (2). 110-117
CD Volume:324
Print Article: Pages: 110-117
Author(s):Durr P A Rangel J
Author Affiliation:James Cook University, Townsville, Queensland, Australia

Language:English
Abstract:The mechanisms by which increases in the biomass of Panicum maximum might occur when growing under the canopy of mature Samanea saman trees were investigated in a pot trial. The subcanopy environment was simulated using soil collected from under, near and away from the canopy of trees and variable light levels imposed by shade cloths. The soil from under the trees had a greatly enhanced nitrogen level, and gave a higher total dry weight (TDW) at all levels of shade than soil from outside the canopy. The increase in biomass was affected by level of shading, with a 200% increase in full sunlight as compared with an increase of 100% at the deepest shade level (12% relative light). Deep shade augmented shoot nitrogen concentration, but caused only a slight increase in digestibility. The results show that, in the seasonal range of shade levels corresponding with those found beneath the canopy of S. saman (10-30% relative light), there will be a steep gradient in response in TDW. Consequently, factors affecting canopy light transmission - such as the extent of leafing out and canopy shape - will be critical in determining yield response
Descriptors:biomass. canopy. shading. soil-fertility. silvopastoral-systems. agroforestry-systems
Organism Descriptors:Panicum-maximum. Samanea-saman
Supplemental Descriptors:Panicum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Samanea. Mimosoideae. Fabaceae. Fabales. dicotyledons
Subject Codes:FF007. FF100. JJ600. KK600
Supplementary Info:34 ref
ISSN:0049-4763
Year:2000
Journal Title:Tropical Grasslands

183. Title:Identifying associations among site properties and weed species abundance. II. Hypothesis generation
View Article: Weed Science. 2000. 48 (5). 576-587
CD Volume:323
Print Article: Pages: 576-587
Author(s):Dieleman J A Mortensen D A Buhler D D Ferguson R B
Author Affiliation:Department of Agronomy, University of Nebraska, Lincoln, NE 68583, USA
Language:English
Abstract:Identification of associations between site properties and weed species abundance led to the generation of hypotheses as to why weed populations occur where they do, or do not, in agricultural fields. The objective of this research was to use a multivariate statistical technique, canonical correlation analysis, to identify the associations. Two continuous maize production fields under centre-pivot irrigation in the central Platte River Valley of Nebraska, USA. were grid-sampled between 1994 and 1997 for nine site properties and six to seven weed species. Weed species were identified and counted just prior to postemergence weed control in two adjacent quadrats (1 by 0.38 m) at each grid sampling point. These quadrats represented untreated weed populations emerging between crop rows and treated populations that survived preemergence herbicide banded within the crop row. Canonical correlation analysis identified one to five significant correlations between linear combinations of site properties and weed species abundance depending on field site, years, and between- vs. on-crop row weed populations. The first pair of linear combinations consistently described an association that separated weed species across a gradient of topography and soil type. The second pair of linear combinations

described associations between weed species and soil fertility. In all cases, it was hypothesized that management practices strongly interacted with site properties to create the observed associations with weed populations. Other hypothesized mechanisms for weed patchiness include patchiness in available soil moisture that would influence weed seed germination, emergence, and seedling growth. Additional variation in plant-available preemergence herbicide concentration across the field site would vary weed control efficacy. Another mechanism would be variation in soil fertility that affects the growth, reproduction, and competitive ability of both the crop and the weed

Descriptors:weeds. population-dynamics. statistical-analysis. maize. weed-control. spatial-distribution. soil-types. soil-fertility. soil-water. seed-germination. herbicides. chemical-control. crop-weed-competition

Geographic Locator:Nebraska. USA

Organism Descriptors:Zea-mays

Supplemental Descriptors:Zea. Poaceae. Cyperales. monocotyledons. 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

Subject Codes:FF500. ZZ331. FF005

Supplementary Info:34 ref

ISSN:0043-1745

Year:2000

Journal Title:Weed Science

184. Title:Seed production on Triticum aestivum by Aegilops cylindrica hybrids in the field

View Article: Weed Science. 2000. 48 (5). 588-593

CD Volume:323

Print Article: Pages: 588-593

Author(s):Snyder J R Mallory Smith C A Balter S Hansen J L Zemetra R S

Author Affiliation:Department of Crop and Soil Science, Oregon State University, Corvallis, OR 97331, USA

Language:English

Abstract:Field experiments were conducted to determine if seeds would be produced on wheat by Aegilops cylindrica hybrids in the field and, if it were, to determine the viability of the seeds produced. One, five, or 10 hybrids were planted into varying proportions of A. cylindrica and wheat in a replacement series design. Percentage seed set ranged from 0 to 5.5% in 1996 and from 0 to 9.2% in 1997. Seeds were set in all treatments. The average seed set was 2.3% in 1996 and 3.8% in 1997. No differences in seed set were found among treatments. The seeds produced were separated according to seed condition, either full or shrivelled, and tested for germination. The germination of the seeds produced on the hybrids was not significantly different between years. The average germination for full seeds was 94% in both years and 79 and 84% for shrivelled seeds in 1995 and 1996, respectively. Greenhouse studies were conducted to evaluate the rate of self-fertility of the BC1 generation and to identify morphological characteristics that could be used to identify the probable pollen donor parent and to predict the occurrence of seed set. In 1997 4.1% and in 1998 2.1% of BC1 plants set seeds. The average seed set was 0.3% in 1997 and 0.06% in 1998. It was not possible, using any morphological characteristic measured, to determine the identity of the parent serving as the pollen donor in the previous generation or to predict the occurrence of seed set in the BC1

generation. This is the first reported study to show that hybrids between wheat and A. cylindrica have the ability, although limited, to backcross under field conditions and set seeds. Furthermore, the seeds produced are viable and will germinate and produce plants. With the millions of hectares of wheat infested with A. cylindrica, even the limited ability to backcross is of concern for the movement of a herbicide resistant gene
Descriptors:seeds. wheat. seed-set. hybrids. seed-germination. pollen. seed-set. pollen. gene-transfer. herbicide-resistance. backcrossing. genes
Organism Descriptors:Triticum-aestivum. Aegilops-cylindrica. Triticum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Aegilops
Subject Codes:FF500. FF005. FF020
Supplementary Info:16 ref
ISSN:0043-1745
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Journal Title:Weed Science