Topik : LAHAN KERING (DRYLAND)

Title:Effect of maize density, bean cultivar and bean spatial arrangement on intercrop performance
View Article: African Crop Science Journal. 2001. 9 (3). 487-497
CD Volume:352
Print Article: Pages: 487-497
Author(s):Mutungamiri A Mariga I Chivinge O
Author Affiliation:Department of Crop Science, University of Zimbabwe,P.O. Box MP 167, Mount Pleasant, Harare, Zimbabwe
Language:English
Language of Summary:English. French
Abstract:On-farm trials to determine the optimum combination of maize (Zea-mays L.) density, bean (Phaseolus vulgaris L.) cultivar and bean spatial arrangement to produce high yields of the intercrop combination were conducted in Chinyika Resettlement Area (CRA) and at Domboshava Training Centre (DTC) during the 1996/97 and 1997/98 rainy seasons. The effects of maize at 37,000 and 24,000 plants ha-1, bean cultivars "Natal Sugar" and "Carioca", and bean arranged in one or two rows between rows of maize or bean planted in the same row as maize were evaluated in a completed factorial arrangement. Maize density, bean cultivar, bean spatial arrangement and their interactions significantly (P<0.01) affected maize and bean grain yields at both locations for the two seasons. Changing the maize density from 90 x 45 cm (24000 plants ha-1) to 90 x 30 cm (37000 plants ha-1) increased maize yield by 28 and 39% and reduced bean yields by 11 and 18% in the respective seasons. Maize yield was 19% less when intercropped with Natal Sugar than with Carioca. Same row and one row bean cultivar arrangements produced similar maize yields. Land equivalent ratios (LER) were greater than one for all but one intercrop arrangements at CRA but less frequently at DTC. The maize density of 90 x 30cm with Carioca in the same row as maize produced the highest LER value at all sites, 1.73 at Chinyudze, and 1.53 at Domboshava. The same treatment gave the highest gross return of Z$12,649 ha-1 at CRA. Carioca planted in the same row as maize at the maize density of 37,000 plants ha-1 is the most ideal approach to dryland maize/bean intercropping since it achieved high yields and allows easy weeding
Geographic Locator:Zimbabwe
Organism Descriptors:Zea-mays-L. Phaseolus-vulgaris-L
Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. SADC-Countries. Anglophone-Africa
ISSN:1021-9730
Year:2001
Journal Title:African Crop Science Journal

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

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

Title:Growing season evapotranspiration from duplex soils in south-western Australia
View Article: Agricultural Water Management. 2001. 50 (2). 141-159
CD Volume:354
Print Article: Pages: 141-159
Author(s):Ward P R Dunin F X
Author Affiliation:CSIRO, Division of Plant Industry, Private Bag 5, Wembley, WA 6913, Australia
Language:English
Abstract:In the Mediterranean-type climate of southwestern Australia, evapotranspiration (ET) is of particular importance because of the expanding threat of dryland salinity. This paper reports on studies at two sites in Narrogin and Katanning, southwestern Australia, for a total of 5 years aimed at quantifying ET from pastures on duplex (sand over clay) soils within the region. A mixture of clover cultivars (Trifolium repens) were sown in 1994 at one site and the other with lucerne (Medicago sativa) in 1995. ET was assessed with

the Bowen ratio energy balance technique, and compared with potential ET and ET calculated from the water balance. ET closely matched potential ET from the break of the season (May or June) until some seasonally dependent time in spring (September or October). The date of divergence of actual from potential ET was not clearly defined, but occurred gradually during a 2-week period, and was associated with the rapid depletion of soil water at the end of the season. The gradual transition was due to natural variation in the magnitude of daily potential ET during the transition period, which ranged from 1.1 to 4.5 mm. The water balance tended to overestimate ET during winter, by assuming deep drainage was zero, whereas the energy balance tended to overestimate ET very late in the season. For duplex soils in south-western Australia, a composite approach may give a cheap and accurate estimate of growing season ET, provided that rainfall is adequate to maintain surface soil moisture. This approach assumes that ET equals potential ET until the rapid decline in soil water begins, and ET equals changes in soil water storage after this time
Descriptors:clay-soils. evapotranspiration. lucerne. mathematical-models. pastures. plant-water-relations. precipitation. rain. sandy-soils. seasonal-variation. soil-properties. soil-salinity. soil-water. water-balance. duplex-soils
Geographic Locator:Australia
Identifiers:clover
Organism Descriptors:Medicago. Medicago-sativa. Trifolium-repens
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Trifolium
Subject Codes:JJ300. FF062. FF007. ZZ100
Supplementary Info:30 ref
ISSN:0378-3774
Year:2001
Journal Title:Agricultural Water Management

Title:Alternative and opportunity dryland crops and related soil conditions in the southern Great Plains
View Article: Agronomy Journal. 2001. 93 (1). 216-226
CD Volume:338
Print Article: Pages: 216-226
Author(s):Unger P W
Author Affiliation:USDA-ARS, Conservation and Production Research Lab., P.O. Drawer 10, Bushland, TX 79012, USA
Language:English
Abstract:Dry winter wheat (Triticum aestivum) cv. TAM-101, grain sorghum (Sorghum bicolor) cultivars DK-46 and DK-44, and opportunity crop performance; alternative crop adaptability; and system effects on soil properties were determined in experiments conducted during 1994-98, in Bushland, Texas, USA. Wheat yielded 1.82 Mg ha-1 when rotated with grain sorghum or a Polish type fall rape (Brassica napus var. oleifera) and 1.21 Mg ha-1 when grown continually or rotated with spring rape cv. A.C. Elect. Soil water contents at planting resulted in the differences. Grain sorghum yielded 2.89 and 3.02 Mg ha-1 when rotated with wheat or grown continually and 2.24 Mg ha-1 when rotated with kenaf (Hibiscus cannabinus) cv. Everglades 41, although water contents at planting were similar. Kenaf produced only 2.3 Mg ha-1 plant material, but contained 327 g kg-1 protein at 32 days after planting and 195 g kg-1 when killed by frost. Rape crops failed. Triticale (x Triticosecale) cv. Trit-1 produced more forage, but less grain than wheat. Soil water contents at planting

and precipitation strongly influenced opportunity crop yields. Mean soil C contents increased from 5.52 to 5.94 g kg-1 during the study. Aggregate diameters and percentages <0.25 mm in diameter showed no definite trends. Few bulk density and no aggregate water stability results differed. Some alternative and opportunity crops produced favorably, but generally no better than wheat or grain sorghum
Descriptors:adaptability. bulk-density. crop-yield. forage. grain. kenaf. rape. rotations. soil-properties. soil-water-content. triticale. wheat. winter-wheat
Geographic Locator:Texas. USA
Organism Descriptors:Brassica-napus-var.-oleifera. Hibiscus-cannabinus. Sorghum-bicolor. Triticum-aestivum. Triticum-x-Secale
Supplemental Descriptors:Brassica-napus. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Hibiscus. Malvaceae. Malvales. Sorghum. Poaceae. Cyperales. monocotyledons. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA. Triticum
Subject Codes:FF005. FF007. FF100. FF150. JJ200
Supplementary Info:20 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Increasing water use and water use efficiency in dryland wheat
View Article: Agronomy Journal. 2001. 93 (2). 290-298
CD Volume:338
Print Article: Pages: 290-298
Author(s):Angus J F Herwaarden A F van
Author Variant:van-Herwaarden-A-F
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, 2601, Australia
Conference Title:Papers presented at the symposium, "Improving crop water use efficiency and yield: management influences", Salt Lake City, Utah, USA, 2 November 1999, during the ASA-CSSA-SSSA annual meetings
Language:English
Abstract:Water use efficiency, the ratio of grain yield to crop water use, provides a simple means of assessing whether yield is limited by water supply or other factors. Based on this assessment, yields of commercial dryland wheat (Triticum aestivum) crops in southeastern Australia are usually not limited by water. Transpiration efficiency (TE), the ratio of yield to transpiration, is relatively stable for well-managed crops, but the amount of water used is strongly affected by crop management. In a review of 13 comparisons of water use and wheat yield, providing optimum N fertilizer or suppressing cryptic root diseases with break crops increased water use by 23 mm and yields by 378 kg/ha, equivalent to 10% of the control yields. The additional soil water was extracted to levels of water potential as low as -5 MPa. A possible means of increasing yield potential of dryland crops is to manage transpiration so that relatively more water is used during the vegetative phase when vapour pressure deficit is low, and hence TE is high. However, based on budgets of soil water and soluble carbohydrates stored in the vegetative organs and available for retranslocation, this option provides lower TE than conserving soil water for transpiration until grain filling when assimilates are directed to grain. Increasing the proportion of water transpired during the vegetative phase with N fertilizer can lead to particularly inefficient water use because increasing N

status generally reduces the soluble carbohydrate reserves available for retranslocation to grain
Descriptors:carbohydrates. crop-yield. nitrogen-fertilizers. reviews. soil-water. translocation. transpiration. water-potential. water-use. water-use-efficiency. wheat
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF060. FF062. FF100. JJ700
Supplementary Info:41 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

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

Title:Dry matter yields of cool-season grass monocultures and grass-alfalfa binary mixtures
View Article: Agronomy Journal. 2001. 93 (2). 463-467
CD Volume:338
Print Article: Pages: 463-467
Author(s):Berdahl J D Karn J F Hendrickson J R
Author Affiliation:USDA-ARS, Northern Great Plains Res. Lab., P.O. Box 459, Mandan, ND 58554-0459, USA
Language:English
Abstract:Cultivars used in grass-lucerne (Medicago sativa) mixtures for hay production in the semiarid Northern Great Plains have often lacked long term productivity. This study was conducted to compare dry matter (DM) yields of grass monocultures and grass-lucerne binary mixtures receiving annual applications of 0 and 50 kg N/ha over a 5-year period. 'Reliant' and 'Manska' intermediate wheatgrass (Thinopyrum intermedium [Elymus hispidus]), 'Lincoln' smooth bromegrass (Bromus inermis), 'Nordan' crested wheatgrass (Agropyron desertorum), 'Lodorm' green needlegrass (Stipa viridula), and 'Dacotah' switchgrass (Panicum virgatum) were sown in monoculture and in binary mixtures with 'Range-lander' lucerne (M. sativa subsp. x varia) on a Parshall fine sandy loam (coarse-loamy, mixed, superactive, frigid, Pachic Haplustolls) near Mandan, North Dakota, USA. Plant stands of green needlegrass and switchgrass were inadequate, and yields were not measured. Total seasonal DM yields from two cuttings averaged 8.74 and 2.71 Mg/ha, respectively, for grass-lucerne mixtures and grass monocultures at 0 kg N/ha. At 50 kg N/ha, grass-lucerne mixtures and grass monocultures averaged 8.72 and 5.04 Mg/ha DM yield, respectively. Yields of the grass component of first cut grass-lucerne mixtures averaged 35% of total yield for intermediate wheatgrass, 33% of total yield for smooth bromegrass and 30% of total yield for crested wheatgrass in the fifth production year. Cultivars included in this study, except those of green needlegrass and switchgrass, would be suited for use in binary grass-lucerne mixtures for dryland hay production in the Northern Great Plains
Descriptors:crop-yield. dry-matter. lucerne. mixed-cropping. monoculture. stand-characteristics
Geographic Locator:North-Dakota. USA
Organism Descriptors:Agropyron-desertorum. Bromus-inermis. Elymus-hispidus. Medicago. Medicago-sativa. Panicum-virgatum. Stipa-viridula
Supplemental Descriptors:Agropyron. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Bromus. Elymus. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. 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. Panicum. Stipa
Subject Codes:FF007. FF100. FF150
Supplementary Info:27 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Irrigated wheat grazing and tillage effects on subsequent dryland grain sorghum production
View Article: Agronomy Journal. 2001. 93 (3). 504-510
CD Volume:338
Print Article: Pages: 504-510

Author(s):Winter S R Unger P W
Author Affiliation:S.R. Winter, Texas Agric. Exp. Stn., 2301 Exp. Stn. Rd., Bushland, TX 79012, USA
Language:English
Abstract:Use of conservation tillage has improved S. bicolor grain yield 10 to 20% in ungrazed wheat (Triticum aestivum)-fallow-S. bicolor production systems. Our objective in this 2-year (1994 and 1995) field study conducted in Texas, USA was to develop tillage guidelines for systems where wheat was grazed. Grazing duration on winter wheat and tillage during the fallow period preceding dryland grain S. bicolor were treatments on Pullman clay loam (Torrertic Paleustoll). Grazing increased surface soil compaction and reduced wheat residues. Surface soil (0-5 cm) penetration resistance was 0.36, 0.52, 0.75, and 0.92 Mpa, and wheat residue in 1996 was 6.0, 4.8, 3.5, and 1.2 Mg/ha for ungrazed and early, normal, and late cattle removal dates, respectively. As a result, S. bicolor grain yield in 1996, an exceptionally wet season, was 7.9, 7.5, 7.0, and 3.8 Mg/ha, respectively, with no tillage (NT). In 1997, a dry season with low runoff, only the late cattle removal with NT had reduced yield (3.4 Mg/ha compared with 3.9 Mg/ha for ungrazed NT). Use of one-time sweep tillage early in fallow resulted in an increase in sorghum grain yield of 1.9 Mg/ha in 1996 for the late cattle removal treatment compared with NT, but it had no effect on yield with the normal cattle removal treatment. In 1997, one-time sweep tillage increased yield by 0.3 Mg/ha with late removal. When wheat residue was less than or equal to 2.4 Mg/ha following grazing, sweep tillage reduced surface compaction, increased soil water at planting an average of 26 mm over 2 years, and improved grain yield of S. bicolor compared with NT. If wheat residues were more than or equal to 3.5 Mg/ha after grazing, NT was as effective as any tillage treatment. Results agree with conservation tillage guidelines developed on ungrazed wheat
Descriptors:crop-production. crop-yield. grain. grazing. irrigation. sequential-cropping. soil-compaction. tillage. trampling. wheat
Geographic Locator:Texas. USA
Organism Descriptors:Sorghum-bicolor. Triticum. Triticum-aestivum
Supplemental Descriptors:Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA. Triticum
Subject Codes:FF005. FF100. FF150. JJ300. JJ800
Supplementary Info:14 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Dryland corn in Western Kansas: effects of hybrid maturity, planting date, and plant population
View Article: Agronomy Journal. 2001. 93 (3). 540-547
CD Volume:338
Print Article: Pages: 540-547
Author(s):Norwood C A
Author Affiliation:Southwest Res. Ext. Cent., 4500 E. Mary, Garden City, KS 67846, USA
Language:English
Abstract:Dryland maize (Zea mays) yield in western Kansas, USA is limited by high temperatures and low rainfall. The number of hectares has increased in recent years due to improved hybrids, acceptance of reduced- and no-till practices, changes in the farm programme, and

favorable weather conditions. Research was conducted near Garden City, Kansas from 1996 through 1999 to determine the effects of hybrid maturity, planting date, and plant population on the yield of dryland maize. Five hybrids with maturities of 75 (H1), 92 (H2), 98 (H3), 106 (H4), and 110 d(H5) were planted in mid-April (D1) and early May (D2) of each year (H1 and H2 were not planted in 1996) and thinned to populations of 30 000 (P1), 45 000 (P2), and 60 000 (P3) plants/ha in a wheat (Triticum aestivum)-maize-fallow rotation. The early May planting date (D2) produced an average of 1.51 Mg/ha (31.9%) more grain than did D1. In the year of the poorest rainfall distribution, D2 resulted in 2.83 Mg/ha (96.8%) more grain. Yield usually increased with relative maturity and plant population. The average yield increases were 13.5% from P1 to P2 and 4.3% from P2 to P3. Yield increases with higher populations were greater for earlier hybrids than for later ones. Yield of H5 was 32.6% lower at P3 than P1 in the dryest year. Dryland maize should be planted in early May in western Kansas. To minimize yield reductions in dry years, relative maturities should not exceed 106 days, and populations should not exceed P2
Descriptors:crop-yield. fallow. hybrids. maize. maturity. plant-density. planting-date. sequential-cropping. wheat
Geographic Locator:Kansas. USA
Organism Descriptors:Triticum. Triticum-aestivum. Zea-mays
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Zea
Subject Codes:FF005. FF100. FF150
Supplementary Info:27 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Production functions for chickpea, field pea, and lentil in the Central Great Plains
View Article: Agronomy Journal. 2001. 93 (3). 563-569
CD Volume:338
Print Article: Pages: 563-569
Author(s):Nielsen D C
Author Affiliation:USDA-ARS, Central Great Plains Res. Stn., 40335 County Rd. GG, Akron, CO 80720, USA
Language:English
Abstract:A short-season legume grown in rotation with winter wheat (Triticum aestivum) is needed to diversify and enhance dryland crop rotations in the central Great Plains. This study was conducted in Akron, Colorado, USA during 1996-99 to determine the potential of chickpea (Cicer arietinum cv. UC5), field pea (Pisum sativum cv. Profi), and lentil (Lens culinaris cv. Brewer) as such rotational legumes based on yield responses to water and soil water extraction patterns. The legumes were planted under a line-source gradient irrigation system to provide a range of available water conditions. Soil water content, crop water use, and seed yield were measured to determine relationships between water use and yield. Distributions of estimated yields were produced using these relationships and the local historical rainfall record. Chickpea exhibited the greatest rate of increase in yield with increases in water use (10.6 kg ha-1 mm-1), followed by field pea (8.0 kg ha-1 mm-1) and lentil (3.3 kg ha-1 mm-1). Yields estimated from the historical rainfall record ranged from 951 to 3782 kg/ha (mean of 2092 kg/ha) for chickpea, 523

to 2718 kg/ha (mean of 1406 kg/ha) for field pea, and 286 to 1247 kg/ha (mean of 654 kg/ha) for lentil. All three legumes have agronomic potential to be used as dryland crops ahead of winter wheat in the central Great Plains
Descriptors:chickpeas. crop-production. crop-yield. irrigation. lentils. seeds. soil-water. water-use. wheat
Organism Descriptors:Cicer-arietinum. Lens-culinaris. Pisum-sativum. Triticum. Triticum-aestivum
Supplemental Descriptors:Cicer. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lens. Pisum. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF062. FF100. JJ300
Supplementary Info:36 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Analysis of seedbeds and maturity groups for dryland soybean on clayey soil
View Article: Agronomy Journal. 2001. 93 (4). 827-835
CD Volume:338
Print Article: Pages: 827-835
Author(s):Popp M P Keisling T C Oliver L R Dillon C R Manning P M
Author Affiliation:Dep. of Agric. Econ. and Agribusiness, 220 Agric. Building, Univ. of Arkansas, Fayetteville, AR 72701, USA
Language:English
Abstract:Soyabean (Glycine max) production systems on clayey soils are difficult to manage. With improvements in no-till planting equipment and herbicide technologies in the early 1990s, no-till production has become a viable alternative to the traditional tilled seedbed. Therefore, the relative economic performance of tilled and no-till seedbeds with respect to profitability, sensitivity to input price changes, and risk is assessed for maturity group (MG) IV, V, and VI soyabean. Field experiments using split plots (main plots were MG and subplots were seedbeds) and a randomized complete block design with four replications were conducted from 1992 to 1994 at Rohwer, Arkansas, USA and from 1990 to 1997 at Keiser, Arkansas on Sharkey and Sharkey silty clay, respectively. The importance of weather conditions is highlighted in the varied seedbed preparation effect on grain yields, with no clear advantage to either method. On average, yields were higher for MG IV at Rohwer and MG VI at Keiser. The breakeven price and yield analysis suggested that MG selection had a larger economic impact than seedbed preparation, regardless of location. This analysis also showed the extent of production cost differences and associated risk of loss by location. Risk analysis revealed that optimal production strategies changed when input costs were added to yield information and further confirmed that MG selection affects profitability more than seedbed preparation. Production practices that better exploit the yield potential of various MG cultivars (as related to weather conditions) therefore deserve further research attention
Descriptors:clay-soils. crop-yield. economic-analysis. no-tillage. seedbed-preparation. seedbeds. soyabeans. tillage
Geographic Locator:Arkansas. USA
Organism Descriptors:Glycine-(Fabaceae). Glycine-max
Supplemental Descriptors:West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Delta-States-of-USA. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants

Subject Codes:EE110. FF005. FF100. JJ900
Supplementary Info:18 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

Title:Tillage and nitrogen fertilization influence grain and soil nitrogen in an annual cropping system
View Article: Agronomy Journal. 2001. 93 (4). 836-841
CD Volume:338
Print Article: Pages: 836-841
Author(s):Halvorson A D Wienhold B J Black A L
Author Affiliation:USDA-ARS, P.O. Box E, Fort Collins, CO 80522, USA
Language:English
Abstract:Increasing the frequency of cropping in dryland systems in the northern Great Plains requires the application of N fertilizer to maintain optimum crop yields. A 12-year (1985-96) annual cropping rotation (spring wheat-winter wheat-sunflower) under dryland conditions (in North Dakota, USA) was monitored to determine the influence of tillage system (conventional till (CT), minimum till (MT), and no-till (NT)) and N fertilizer rates (34, 67, and 101 kg N ha-1) on N removed in grain and annual changes in postharvest soil NO3-N. Nitrogen removal in the grain increased with increasing N rate in most years. Total grain N removal was lowest with NT at the lowest N rate and highest with NT at the highest N rate compared with CT. Total grain N removal after 12 cropping seasons was 144, 84, and 61% of the total N applied for the 34, 67, and 101 kg N ha-1 fertilizer rates, respectively. Residual soil NO3-N levels were not affected by N rate or tillage system in the first 3 years, but they increased significantly following consecutive drought years. Residual NO3-N in the 150-cm soil profile tended to be higher with CT and MT than with NT. Soil NO3-N movement below the crop root zone may have occurred in 1 or 2 years when precipitation was above average. Results indicate that NT, with annual cropping, may reduce the quantity of residual soil NO3-N available for leaching compared with MT and CT systems
Descriptors:application-rates. chemical-composition. cropping-systems. minimum-tillage. nitrogen-content. nitrogen-fertilizers. no-tillage. plant-composition. residues. rotations. sunflowers. tillage. wheat
Geographic Locator:North-Dakota. USA
Organism Descriptors:Helianthus-annuus. Triticum. Triticum-aestivum
Supplemental Descriptors:Helianthus. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF040. FF061. FF150. JJ200. JJ700. JJ900
Supplementary Info:28 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal
Copyright:Copyright CAB International

Title:Planting date, hybrid maturity, and plant population effects on soil water depletion, water use, and yield of dryland corn
View Article: Agronomy Journal. 2001. 93 (5). 1034-1042
CD Volume:338
Print Article: Pages: 1034-1042

Author(s):Norwood C A
Author Affiliation:Southwest Research-Extension Center, 4500 E. Mary, Garden City, KS 67846, USA
Language:English
Abstract:Dryland maize (Zea mays) yield in western Kansas is limited by high temperatures and low rainfall. The number of maize hectares has increased in recent years due to improved hybrids, acceptance of reduce- and no-till practices, and favorable weather conditions. Research was conducted near Garden City, Kansas, USA, from 1996 to 1999 to determine the effects of hybrid maturity, planting date, and plant population on soil water depletion, water use efficiency (WUE), and yield of dryland maize. Five hybrids with relative maturities of 75 (H1), 92 (H2), 98 (H3), 106 (H4), and 110 (H5) days were planted in mid-April (D1) and early May (D2) of each year (the 75- and 92-days hybrids were not planted in 1996) and thinned to populations of 30 000 (P1), 45 000 (P2), and 60 000 (P3) plants/ha in a wheat (Triticum aestivum)-maize-fallow rotation. Depletion of soil water increased with hybrid maturity. In addition, higher populations tended to remove more water from the lower portion of the profile. Hybrids usually yielded more at the D2 planting date. In the most stressful year, grain yield averaged 97% more for D2 and water use efficiency averaged 85% more. For the 1997 through 1999 period, WUEs for D2 were 43, 45, 29, 30 and 37% higher vs. D1 for H1 through H5, respectively. In summary, earlier planting decreased yield and WUE. The highest yields and WUEs were achieved with the later planting date, combined with later-maturing hybrids and higher plant populations
Descriptors:crop-yield. hybrids. maize. maturity-groups. plant-density. planting-date. soil-water. water-use-efficiency
Geographic Locator:Kansas. USA
Organism Descriptors:Zea-mays
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF062. FF100. JJ300
Supplementary Info:25 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Tillage and nitrogen fertilization influences on grain and soil nitrogen in a spring wheat-fallow system
View Article: Agronomy Journal. 2001. 93 (5). 1130-1135
CD Volume:338
Print Article: Pages: 1130-1135
Author(s):Halvorson A D Wienhold B J Black A L
Author Affiliation:USDA-ARS, P.O. Box E, Fort Collins, CO 80522, USA
Language:English
Abstract:Spring wheat (Triticum aestivum) is generally produced in the northern Great Plains using tillage and a crop-fallow system. This study evaluated the influence of tillage system (conventional-till (CT), minimum-till (MT), and no-till (NT)) and N fertilizer rate (0, 22, and 45 kg N/ha) on grain N, grain N removal from cropping system, and changes in residual postharvest soil NO3-N during six rotation cycles (from 1985 to 1996) of a dryland spring wheat-fallow (SW-F) cropping system in a field experiment conducted in North Dakota, USA. Grain N concentration increased with increasing N rate and was higher with CT (33.3 g/kg) at 45 kg N/ha. Grain N removal per

crop was greater with CT (70 kg N/ha) and MT (68 kg N/ha) than with NT (66 kg N/ha) than with NT (66 kg N/ha) and tended to increase with increasing N rate, but varied with rotation cycle. Total grain N removal in six rotation cycles was in the order: CT > MT > NT. Total grain N removal by six SW crops was increased by N fertilizer application, with only 21 and 17% of the applied N removed in the grain for the 22 and 45 kg N/ha, respectively. Postharvest soil NO3-N levels in the 150-cm profile varied with N rate and rotation cycle, with residual NO3-N increasing during consecutive dry crop cycles. In contrast, some leaching of NO3-N below the SW root zone may have occurred during wetter crop cycles. Soil profile NO3-N levels tended to be greater with CT and MT than with NT. Variation in precipitation during rotation cycles and N fertilization impacted grain N removal and residual soil NO3-N levels are more than tillage system within this SW-F cropping system
Descriptors:application-rates. chemical-composition. cropping-systems. fallow. nitrogen-fertilizers. plant-composition. rotations. soil-fertility. tillage. wheat
Geographic Locator:North-Dakota. USA
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF040. FF100. FF150. JJ600. JJ700
Supplementary Info:27 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Maize and sorghum simulations with CERES-Maize, SORKAM, and ALMANAC under water-limiting conditions
View Article: Agronomy Journal. 2001. 93 (5). 1148-1155
CD Volume:338
Print Article: Pages: 1148-1155
Author(s):Xie Yun Kiniry J R Nedbalek V Rosenthal W D
Author Variant:Xie-Y
Author Affiliation:Beijing Normal Univ., Open Res. Lab. of Environ., Change and Nat. Disaster of the State Educ. Commission, Beijing, China
Language:English
Abstract:While crop models often are tested against long-term mean grain yields, models for aiding decision making must accurately simulate grain yields in extreme climatic conditions. In this study, we evaluated the ability of a general crop model (ALMANAC) and two crop-specific models (CERES-Maize and SORKAM) to simulate maize (Zea mays hybrids Garst 8285 and Garst 8325) and sorghum (Sorghum bicolor hybrids Garst 5616 and Garst 5319) grain yields in a dry growing season at several sites in Texas, USA during 1998. The root mean square deviation values were 0.36 Mg/ha for sorghum with ALMANAC, 0.71 for sorghum with SORKAM, 0.56 for maize with ALMANAC, and 0.83 for maize with CERES-Maize. For maize, values for coefficient of determination (r2) between measured and simulated grain yields were 0.95 for ALMANAC and 0.88 for CERES-Maize. For sorghum, r2 values were 0.86 for ALMANAC and 0.45 for SORKAM. ALMANAC and SORKAM should be useful tools to simulate dryland sorghum in drought, as indicated by their root mean square deviation values of <0.8 Mg/ha. The mean errors for irrigated maize were 2.0% for CERES and 6.2% for ALMANAC. For dryland maize, mean errors were 6.2% for ALMANAC and -2.2% for

CERES. In CERES, simulated leaf area index (LAI) and kernel weight appeared to be overly sensitive to drought stress. Further study on the response of LAI and kernel weight to drought in CERES would be valuable. The soil, weather, and crop parameter data sets developed for this study could be useful guidelines for model applications in similar climatic regions and on similar soils
Descriptors:crop-yield. drought. maize. simulation-models. stress
Geographic Locator:Texas. USA
Organism Descriptors:Sorghum-bicolor. Zea-mays
Supplemental Descriptors:Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA. Zea
Subject Codes:FF005. FF100. ZZ100
Supplementary Info:34 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Dairy compost, variety, and stand age effects on kenaf forage yield, nitrogen and phosphorus concentration, and uptake
View Article: Agronomy Journal. 2001. 93 (5). 1169-1173
CD Volume:338
Print Article: Pages: 1169-1173
Author(s):Muir J P
Author Affiliation:Texas Agric. Exp. Stn., 1229 U.S. Hwy 281, Stephenville, TX 76401-9698, USA
Language:English
Abstract:The dairy and beef industries are looking for alternative forages with high yields that are capable of efficient manure-P recycling when soil moisture is limiting. Three cultivars of kenaf (Hibiscus cannabinus) were grown under dryland conditions and harvested at 60, 90, and 120 days after planting (DAP) with yearly applications of 0, 10 (56 kg P), and 20 (112 kg P) Mg DM/ha of dairy manure compost in a field experiment conducted during 1998 and 1999 in Stephenville, Texas, USA. Kenaf cultivar India was less productive but had as high or higher N and P concentrations than either Guatemala 4 or Everglades 41 during the second year of the trial. Yields tended to increase and N or P concentrations decrease with DAP, but were affected by rainfall patterns. In 1998, when rainfall was concentrated during the first 60 DAP and the last 30 DAP, the 120 DAP harvest averaged 5.28 Mg DM ha-1 yr-1, 2.2 times the 90 DAP average. In 1999, when rainfall fell exclusively during the first 90 DAP, the 90 DAP harvest averaged 5.06 Mg DM ha-1 yr-1, 1.6 times the 120 DAP average. Plant P concentration tended to increase and N concentration to decrease with compost application the second year. The cumulative effect of compost application increased forage DM yields as well as P and N uptake during the second year. Average P removal by kenaf in the 10 and 20 Mg compost DM/ha plots was 10.4 and 6.8%, respectively, of the P equivalent added by the compost. This indicates that the average forage P concentration of 2.11 g/kg from the plots that received compost would result in insufficient forage P uptake to avoid excessive soil P buildup with sustained yearly compost application
Descriptors:chemical-composition. composts. crop-yield. cultivars. dry-matter. kenaf. mineral-uptake. nitrogen-content. phosphorus. plant-composition. stand-age
Geographic Locator:Texas. USA
Organism Descriptors:Hibiscus-cannabinus

Supplemental Descriptors:Hibiscus. Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA
Subject Codes:FF007. FF040. FF062. FF100. JJ700
Supplementary Info:20 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Performance of annual medic species (Medicago spp.) in Southeastern Wyoming
View Article: Agronomy Journal. 2001. 93 (6). 1249-1256
CD Volume:338
Print Article: Pages: 1249-1256
Author(s):Walsh M J Delaney R H Groose R W Krall J M
Author Affiliation:WAHRI, Faculty of Agric., Univ. of Western Australia, Nedlands, WA 6907, Australia
Language:English
Abstract:Annual medic (Medicago spp.) pastures that produce high levels of good quality forage are well suited to grazing and are used extensively throughout dryland farming regions of the world. In these regions, they are normally an integral component of cropping rotations because they allow for reductions in weed and disease problems in addition to increasing soil N levels for subsequent crops. The paper investigates the performance of 17 annual medic cultivars and experimental lines for their potential use as self-regenerating annual pastures in the dryland cropping region of southeastern Wyoming, USA. Dry matter and seed production capabilities were recorded over three seasons, 1996 to 1998. Growth phase development following different emergence times was evaluated in two seasons, and the forage quality was assessed for medic cultivars and lines grown in the 1997 season. Results revealed that the M. rigidula line, SA10343, consistently produced the greatest level of dry matter, with more than double the amount of forage than nearly all other cultivars. Dry matter production was related to the period of growth and development where higher yielding cultivars showed extended periods of vegetative growth. In general, the southeastern Wyoming climate substantially reduced the growth and development periods of medic cultivars bred in southern Australia. Given the overall performance of all cultivars, it was determined that the M. rigidula species had the greatest potential for further development in this environment
Descriptors:biomass-production. crop-quality. cultivars. dry-farming. dry-matter-accumulation. growth. lines. rotations. seed-production
Geographic Locator:USA. Wyoming
Organism Descriptors:Medicago. Medicago-rigidula
Supplemental Descriptors:Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Medicago. North-America. America. Developed-Countries. OECD-Countries. Mountain-States-of-USA. Western-States-of-USA. USA. Great-Plains-States-of-USA
Subject Codes:FF007. FF060. FF100. FF150. PP350. RR300
Supplementary Info:18 ref
ISSN:0002-1962
Year:2001
Journal Title:Agronomy Journal

Title:Effects of soil strength on root growth of rice crop for different dryland tillage methods
View Article: AMA, Agricultural Mechanization in Asia, Africa and Latin America. 2001. 32 (2). 23-26
CD Volume:356
Print Article: Pages: 23-26
Author(s):Md Ashraful Haque Sarker R I Murshed Alam
Author Variant:Haque-M-A. Alam-M
Author Affiliation:Dept. of Farm Power and Machinery, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh
Language:English
Abstract:The present study summarizes the effects of soil strength on root growth of rice plants in different plots ploughed by bullock-operated country plough, power tiller-mounted rotary plough and tractor mounted mouldboard plough under dry soil condition. The influence of soil strength on root growth of rice variety BR-8 in silty loam soil in Bangladesh was studied. A soil penetrometer was used to observe and measure the soil strength. A glass box was used to measure the root growth. The root growth was measured at 7-day interval for a period of 64 days at different soil strengths. The relationship between soil strength (affected by tillage) and plant root growth was expressed by a linear equation. It was observed that the root growth was not significantly affected by the different tillage methods and that higher soil strength impeded the root growth. Statistical F-tests also show that there was no significant difference between tillage methods on soil strength and root growth of the rice crop
Descriptors:growth. loam-soils. mouldboards. ploughing. ploughs. rice. roots. soil-strength. soil-types. tillage
Geographic Locator:Bangladesh
Organism Descriptors:Oryza. Oryza-sativa
Supplemental Descriptors:South-Asia. Asia. Least-Developed-Countries. Developing-Countries. Commonwealth-of-Nations. Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF060. JJ300. JJ900
Supplementary Info:6 ref
ISSN:0084-5841
Year:2001
Journal Title:AMA, Agricultural Mechanization in Asia, Africa and Latin America
Copyright:Copyright CAB International

Title:Econometric-Process Models for Integrated Assessment of Agricultural Production Systems
View Article: American Journal of Agricultural Economics. 83 (2) 2001. 389-401
CD Volume:355
Print Article: Pages: 389-401
Author(s):Antle J M Capalbo S M
Author Affiliation:MT State U and Resources for the Future. MT State U
Language:English
Abstract:This article develops the conceptual and empirical basis for a class of empirical economic production models that can be linked to site-specific biophysical models for use in integrated assessment research. Site-specific data are used to estimate econometric production models, and these data and models are then incorporated into a simulation model that represents the decision-making process of the farmer as a sequence of discrete and continuous land-use and input-use decisions. An econometric-process model of the dryland grain production system of the Northern Plains demonstrates the

capabilities of this type of model to simulate decision making both within and outside the range of observed data
Descriptors:Micro Analysis of Farm Firms, Farm Households, and Farm Input Markets
Geographic Locator:U.S.
Subject Codes:EE110
ISSN:0002-9092
Year:2001
Journal Title:American Journal of Agricultural Economics

Title:The relationship between yield, mainstem number, and tuber number in five maincrop and two early-maturing cultivars
View Article: American Journal of Potato Research. 2001. 78 (2). 83-90
CD Volume:368
Print Article: Pages: 83-90
Author(s):Lynch D R Kozub G C Kawchuk L M
Author Affiliation:Agriculture and Agri-Food Canada, Lethbridge Research Centre, PO Box 3000, Lethbridge, Alberta T1J 4B1, Canada
Language:English
Language of Summary:spanish
Abstract:Using data from an 11-year period (1985-95), total and marketable yield were related, using regression analysis, to mainstem and tuber number for five maincrop varieties (Russet Burbank, Shepody, Atlantic, Norchip, and Norland) and two early-maturing varieties (Conestoga and Carlton), at irrigated and dryland sites in western Canada (Alberta, Saskatchewan and Manitoba). Mainstem number by itself was a poor predictor of total and marketable yield. Highly significant regressions of yield on the derived variable tuber number per mainstem were evident for all cultivars grown at the dryland sites. In general, the proportion of the total variation in yield accounted for by the regression models was much higher at the dryland than at the irrigated sites, indicating that the relationship between yield and its predictor variables was more complex for irrigated sites. While the study suggests that the use of tuber number per mainstem may be useful as an early-season predictor of tuber yield for cultivars, particularly under dryland conditions, a model using the predictor variables mainstem and tuber number will generally be superior due to the additional information it provides when competitive effects are present for light energy within the canopy or for assimilates among developing tubers. Contour plots provide a useful way to study the yield response to changes in tuber number at specific stem density levels
Descriptors:crop-yield. cultivars. irrigated-sites. mathematical-models. potatoes. regression-analysis. relationships. stems. tubers. yield-forecasting
Geographic Locator:Alberta. Canada. Manitoba. Saskatchewan
Organism Descriptors:Solanum-tuberosum
Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Solanum. Solanaceae. Solanales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF020. FF100. ZZ100
Supplementary Info:17 ref
ISSN:1099-209x
Year:2001
Journal Title:American Journal of Potato Research

Title:Dew point hygrometers for irrigation scheduling in fine-textured soils
View Article: Applied Engineering in Agriculture. 2001. 17 (1). 17-25
CD Volume:357
Print Article: Pages: 17-25
Author(s):Irmak S Haman D Z Irmak A
Author Affiliation:Agricultural and Biological Engineering Dept., Univ. of Florida, Rogers Hall, PO Box 110570, Gainesville, FL 32611-0570, USA
Language:English
Abstract:The competition for water in irrigated agriculture with other water users has increased demand for accurate determination of soil water status for efficient irrigation. There has been much interest in measuring topsoil hydraulic properties, including soil matric potential (SMP), as a tool for irrigation scheduling. Currently, many methods are available to measure SMP, including tensiometers, electrical resistance units, heat dissipation, and filter paper techniques. However, their acceptance is limited because of limitations in different applications (i.e., soil type, measurement range, accuracy, etc.). Soil hygrometers may be better-suited instruments to measure SMP when they are used in fine-textured soils (i.e., clay). The objectives of this experiment were: (1) to determine the mean SMP in topsoil (0-0.30 m) at the onset of irrigation, resulting in maximum maize (Zea mays) grain yield using a dew point soil hygrometer; (2) to relate these SMP values to the full profile (0-0.90 m) available water (AW) to determine the optimum value of SMP for scheduling irrigations for summer-grown maize under a Mediterranean climate; and (3) to determine the number of soil samples required for a valid representation of SMP measured with a dew point hygrometer under field conditions. An experiment with three furrow irrigation treatments (S1, S2, and S3) was conducted on a clay soil (47% clay) in Antalya, Turkey, during the summer of 1995. Three irrigation treatments were based on replenishing the 0.90 m root zone to the field capacity when the soil water dropped to 75 (S1), 50 (S2), and 25% (S3) of available water holding capacity. A dryland treatment (S4) was also included. The mean SMPs for topsoil at the onset of irrigation were -303, -406, and -635 kPa for S1, S2, and S3 treatments, with grain yields of 5333, 6058, and 4570 kg/ha, respectively. The dryland treatment resulted in the minimum yield of 740 kg/ha. Results showed that the mean SMP value of -406 kPa can be a reliable point to apply irrigations for maize grown in this soil. The relationship between 0-0.30 m depth SMP versus full profile (crop root zone) AW was found to
Descriptors:available-water. clay-soils. crop-yield. field-capacity. furrow-irrigation. hygrometers. irrigation-scheduling. maize. matric-potential. Mediterranean-climate. rhizosphere. soil-depth. soil-types. soil-water-content. topsoil. water-holding-capacity
Geographic Locator:Turkey
Organism Descriptors:Zea-mays
Supplemental Descriptors:West-Asia. Asia. Mediterranean-Region. Developing-Countries. OECD-Countries. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF100. JJ300. JJ800. NN400
Supplementary Info:50 ref
ISSN:0883-8542
Year:2001
Journal Title:Applied Engineering in Agriculture

Title:Ecology of herbaceous perennial legumes: a review of characteristics that may provide management options for the control of salinity and waterlogging in dryland cropping systems
View Article: Australian Journal of Agricultural Research. 2001. 52 (2). 137-151
CD Volume:338
Print Article: Pages: 137-151
Author(s):Cocks P S
Author Affiliation:Plant Sciences, Faculty of Agriculture, The University of Western Australia, Nedlands, WA 6907, Australia
Language:English
Abstract:Salinity is a widespread problem caused by an imbalance between rainfall and transpiration in the dryland cropping systems of southern Australia. The need to use more perennials was identified and this review paper examines the possibility of replacing annual with perennial pasture legumes and the available germplasm. While lucerne (Medicago sativa) is already used widely in eastern Australia, it has only recently been adopted in the wheat belt of Western Australia. There are doubts about its adaptation to acid soils and to climates where summer rainfall is low and ambient temperatures are high. There is also a need to diversify the species available to reduce the likelihood of invasion by exotic diseases and insects. Several genera are likely to be of value in this respect, although few will be as widely adapted as lucerne. Perennial legumes are found in environments ranging from alpine to desert. Targeted collections of genera from the dry areas, especially where soils are acid, are likely to yield species of value. These may include perennial species of Astragalus, Hedysarum, Lotus, Onobrychis, Psoralea and Trifolium. Some Australian genera, i.e., Swainsona, Glycine and Cullen may also be of value. Most of these genera are from alkaline soils, and the need to cope with acid soils that are often high in free aluminium is seen to limit their use in southern Australia. However, since virtually nothing is known of the ecology and ecophysiology of species from the dry areas, it is possible that through selection and the use of adapted rhizobia, some at least may be of value in Australian conditions. Cropping in rotation with perennial legumes is likely to involve several changes in farming systems. It is impossible to predict their nature but it is essential that we understand what these changes are before the species are widely introduced. Account must also be taken of their ability to use water. It is entirely possible that perennials from dry areas are dormant in summer despite the fact that there is no evidence in the literature to this effect. It was concluded that although lucerne is suitable for phase farming, alternatives to lucerne are needed. They will have to match the water-using and nitrogen-fixing capacities of lucerne, and farming systems will be required that make full use of the new germplasm. Collaboration with institutions in the Mediterranean basin and elsewhere is needed and a beginning has been made in this direction
Descriptors:acid-soils. aluminium. annual-grasslands. cropping-systems. dry-farming. grassland-management. grasslands. legumes. longevity. lucerne. permanent-grasslands. pH. plant-ecology. reviews. soil-salinity. soil-types. survival. tolerance. waterlogging
Geographic Locator:Australia
Identifiers:Cullen
Organism Descriptors:Astragalus. Fabaceae. Glycine-(Fabaceae). Hedysarum. Lotus. Medicago. Medicago-sativa. Onobrychis. Psoralea. Swainsona. Trifolium
Supplemental Descriptors:Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australasia.

Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago
Subject Codes:FF150. FF900. PP350. ZZ331. FF007
Supplementary Info:163 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Breeding lucerne for Australia's southern dryland cropping environments
View Article: Australian Journal of Agricultural Research. 2001. 52 (2). 153-169
CD Volume:338
Print Article: Pages: 153-169
Author(s):Humphries A W Auricht G C
Author Affiliation:South Australian Research and Development Institute, Primary Industries and Resources South Australia, Adelaide, Box 397, SA 5001, Australia
Language:English
Abstract:Existing lucerne (Medicago sativa) varieties were developed for the animal industries, primarily for areas with high rainfall or irrigation. The new challenge is to develop lucernes specifically for southern Australia cropping systems. This paper provides a background literature review of the breeding challenges: rhizobia compatibility, nitrogen fixation, seedling vigour and disease resistance, that are anticipated in the development of these new types of lucerne. The potential for improving grazing tolerance, growth in neutral and acid soils and waterlogging tolerance is highlighted. Some of the breeding strategies to be used to screen lucerne germplasm for tolerances to these soil conditions and diseases are addressed
Descriptors:acid-soils. disease-resistance. grazing. lucerne. nitrogen-fixation. pest-resistance. plant-breeding. reviews. rhizosphere-fungi. seedlings. soil-salinity. soil-types. tolerance. vigour. water-use. waterlogging
Geographic Locator:Australia
Organism Descriptors:Medicago. Medicago-sativa
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF007. FF062. FF900. HH600. FF020. JJ100
Supplementary Info:157 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Soil water extraction by dryland crops, annual pastures, and lucerne in south-eastern Australia
View Article: Australian Journal of Agricultural Research. 2001. 52 (2). 183-192
CD Volume:338
Print Article: Pages: 183-192
Author(s):Angus J F Gault R R Peoples M B Stapper M Herwaarden A F van
Author Variant:van-Herwaarden-A-F
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia
Language:English
Abstract:The extraction of soil water by dryland crops and pastures in south-eastern Australia was examined in 3 studies. The first was a

review of 13 published measurements of soil water-use under wheat at several locations in southern New South Wales. Of these, 8 showed significantly more water extracted by crops managed with increased nitrogen supply or growing after a break crop. The mean additional soil water extraction in response to break crops was 31 mm and to additional N was 11 mm. The second study used the SIMTAG model to simulate growth and water-use by wheat in relation to crop management at Wagga Wagga. The model was set up to simulate crops that produced either average district yields or the potential yields achievable with good management. When simulated over 50 years of weather data, the combined water loss as drainage and runoff was predicted to be 67 mm/year for poorly managed crops and 37 mm for well-managed crops. Water outflow was concentrated in 70% of years for the poorly managed crops and 56% for the well-managed crops. In those years the mean losses were estimated to be 95 mm and 66 mm, respectively. The third study reports soil water measured twice each year (1992-98) during a phased pasture-crop sequence over 6.5 years at Junee. Mean water content of the top 2.0 m of soil under a lucerne pasture averaged 211 mm less than under a subterranean clover-based annual pasture and 101 mm less than under well-managed crops. Collectively, these results suggest that lucerne (Medicago sativa) pastures and improved crop management can result in greater use of rainfall than the previous farming systems based on annual pastures, fallows, and poorly managed crops. The tactical use of lucerne-based pastures in sequence with well-managed crops can help to dry the soil and reduce or eliminate the risk of groundwater recharge
Descriptors:crop-management. dry-farming. drying. grasslands. groundwater-recharge. lucerne. plant-water-relations. simulation. soil. soil-water-content. sown-grasslands. water-use. wheat
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Medicago. Medicago-sativa. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australia. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF007. FF062. FF100. JJ300
Supplementary Info:48 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Water use by lucerne and effect on crops in the Victorian Wimmera
View Article: Australian Journal of Agricultural Research. 2001. 52 (2). 193-201
CD Volume:338
Print Article: Pages: 193-201
Author(s):McCallum M H Connor D J O'Leary G J
Author Affiliation:Victorian Institute for Dryland Agriculture, Private Bag 260, Horsham, Vic. 3401, Australia
Language:English
Abstract:Field measurements and simulation modelling were conducted during 1994-96 to determine the effect of lucerne (Medicago sativa) on the soil water regime of a farming system in the Victorian Wimmera, Australia, and evaluate yield responses post-lucerne under a range of environmental conditions likely to be experienced within the region. Soil profiles under lucerne-based pastures, which also contain annual medic (Medicago truncatula and Lolium rigidum), remained drier throughout the year compared with continuous annual

cropping. The amount of plant-available soil water (0-2 m) after 3-4 years of lucerne pasture was on average 48 mm less than after annual crops (wheat, rape and field pea), most of which (81%) was extracted at 1.0-2.0 m depth. Simulations of the yield penalty for the first wheat crop after lucerne varied from 0 to 0.87 t/ha, depending upon seasonal conditions. The analysis also predicted a median yield loss of 0.4 t/ha (15%) for the first wheat crop after lucerne. In 5 out of 100 years, the yield penalty was predicted to exceed 0.8 t/ha. In the simulation, the risk of yield loss decreased during a cropping phase with each year after lucerne as the soil profile progressively became recharged with water. The simulation study suggest that it would take 5 years of cropping after lucerne to refill the soil profile fully to levels equivalent to that under continuous cropping. Results show that including lucerne in a farming system is an effective means of increasing water use within the Wimmera region
Descriptors:available-water. continuous-cropping. crop-yield. lucerne. peas. plant-water-relations. rape. recharge. rotations. simulation-models. soil-water-content. soil-water-regimes. water-deficit. water-uptake. water-use-efficiency. wheat. yield-losses
Geographic Locator:Australia. Victoria
Organism Descriptors:Brassica-napus-var.-oleifera. Lolium-rigidum. Medicago. Medicago-sativa. Medicago-truncatula. Pisum-sativum. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica-napus. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Lolium. Poaceae. Cyperales. monocotyledons. Medicago. Papilionoideae. Fabaceae. Fabales. Pisum. Triticum. Australia
Subject Codes:FF005. FF007. FF062. FF100. FF150. JJ300. ZZ100
Supplementary Info:41 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Water balance of annual and perennial pastures on a duplex soil in a Mediterranean environment
View Article: Australian Journal of Agricultural Research. 2001. 52 (2). 203-209
CD Volume:338
Print Article: Pages: 203-209
Author(s):Ward P R Dunin F X Micin S F
Author Affiliation:CSIRO Plant Industry, Private Bag No. 5 PO, Wembley, WA 6913, Australia
Language:English
Abstract:Dryland salinity in southern Australia is largely due to inadequate water use by annual agricultural crops and pastures. Perennial pastures, such as lucerne (Medicago sativa), have been proposed as a possible means of increasing water use whilst maintaining flexibility in agricultural rotations. In a trial located on a duplex soil near Katanning, Western Australia, lucerne and subterranean clover (Trifolium subterraneum) pastures both used water at rates indistinguishable from potential evapotranspiration during the winter and early spring of 3 consecutive years (1995-97), and completely exhausted water stored in the A horizon. Lucerne, through a deeper rooting pattern and by maintaining activity in the summer and autumn, used approximately 50 mm more water than the annual pasture during each 12-month period. This resulted in reduced deep drainage below 1.2 m in the 1996 season (30 mm compared with 80 mm under annual pasture). With average regional groundwater recharge in

the range 10-50 mm, the reductions in drainage observed under lucerne show promise in reducing the regional impact of dryland salinity
Descriptors:clovers. duplex-soils. grasslands. internal-drainage. lucerne. plant-water-relations. rooting. soil-salinity. soil-types. soil-water-balance. sown-grasslands. water-uptake. water-use
Geographic Locator:Western-Australia
Organism Descriptors:Medicago. Medicago-sativa. Trifolium-subterraneum
Supplemental Descriptors:Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Trifolium. Australia. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:FF007. FF062. JJ200. JJ300
Supplementary Info:24 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Lucerne in crop rotations on the Riverine Plains. 1. The soil water balance
View Article: Australian Journal of Agricultural Research. 2001. 52 (2). 263-277
CD Volume:338
Print Article: Pages: 263-277
Author(s):Ridley A M Christy B Dunin F X Haines P J Wilson K F Ellington A
Author Affiliation:Agriculture Victoria, Department of Natural Resources and Environment, RMB 1145, Rutherglen Vic. 3685, Australia
Language:English
Abstract:Dryland salinity, caused largely by insufficient water use of annual crops and pastures, is increasing in southern Australia. A field experiment in north-eastern Victoria (average annual rainfall 600 mm) assessed the potential for lucerne (Medicago sativa) grown in rotation with crops to reduce the losses of deep drainage compared with annual crops and pasture. Soil under lucerne could store 228 mm of water to 1.8 m depth. This compared with 84 mm under a continuous crop (to 1.8 m depth), except in 1997-98 where the crop dried soil by 162 mm. Between 1.8 and 3.25 m depth lucerne was able to create a soil water deficit of 78 mm. The extra water storage capacity was due to both the increased rooting depth and increased drying ability of lucerne within the root-zone of the annual species. Large drainage losses occurred under annuals in 1996 and small losses were calculated in 1997 and 1999, with no loss in 1998. Averaged over 1996-99, drainage under annual crops was 49 mm/year (maximum 143 mm) and under annual pastures 35 mm/year (maximum 108 mm). When the extra soil water storage under lucerne was accounted for, no drainage was measured under this treatment in any year. Following 2 years of lucerne, drainage under subsequent crops could occur in the second crop. However, with 3 or 4 years of lucerne, 3-4 crops were grown before drainage loss was likely. Our calculations suggest that in this environment drainage losses are likely to occur under annual species in 55% of years compared with 6% of years under lucerne. In wet years, water use of lucerne was higher than for crops due to lucerne's ability to use summer rainfall and dry soil over the summer-autumn period. During the autumn-winter period crop water use was generally higher than under lucerne. The major period of increased soil water extraction under lucerne was from late spring to midsummer, with additional drying from deeper layers until autumn. Under both lucerne and crops, soil dried progressively from upper to lower soil layers. Short rotations of crops and lucerne currently

offer the most practical promise for farmers in cropping areas in southern Australia to restore the water balance to a level which reduces the risk of secondary salinity
Descriptors:climatic-seasons. grasslands. internal-drainage. lucerne. plant-water-relations. rooting-depth. rotations. soil-salinity. soil-water-balance. sown-grasslands. water-use
Geographic Locator:Australia. Victoria
Organism Descriptors:Medicago. Medicago-sativa
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:FF007. FF062. FF150. JJ200. JJ300
Supplementary Info:25 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:LIGULE: an evaluation of indigenous perennial grasses for dryland salinity management in south-eastern Australia. 1. A base germplasm collection
View Article: Australian Journal of Agricultural Research. 2001. 52 (3). 343-350
CD Volume:338
Print Article: Pages: 343-350
Author(s):Johnston W H Mitchell M L Koen T B Mulham W E Waterhouse D B
Author Affiliation:NSW Department of Land and Water Conservation, Centre for Natural Resources, Wagga Wagga Research Centre, PO Box 5336, Wagga Wagga, NSW 2650, Australia
Language:English
Abstract:This paper reports on the collection phase of a research programme, LIGULE (Low input grasses useful in limiting environments), which aimed to identify Australian native grasses that may be useful for pastoral purposes and for controlling land degradation on hill-lands in the high (>500 mm) rainfall zone of south-eastern Australia. Live plants of 37 target species were collected along a number of transects, and at specific locations, in New South Wales and Victoria. The collection sites were generally along public roads, and were chosen for their vegetation diversity. Each collection site was marked on a 1:250 000 topographic map, and detailed notes were taken of the native vegetation, geology, soil types, land use, and other features. Surface (0-10 cm) soil samples were collected at most sites and analysed for phosphorus, pHCaCl2, electrical conductivity, and particle size distribution. A total of 807 accessions were collected from 210 locations. At most collection sites, soils were acidic (median pH 5.6); soil phosphorus (Olsen) was in the low range (<8.5 mg/kg); and the target genera occurred with a low frequency (half of the sites yielded 3 accessions or less). Although genera collected in the study could be ranked on the basis of the mean pH of their collection sites, they all tolerated a considerable soil pH range (of about 2-5 pH units). Allowing root and shoot growth to recommence by growing collected plants for a short period in coarse sand considerably improved establishment success
Descriptors:collecting-missions. electrical-conductivity. germplasm. grasslands. particle-size-distribution. phosphorus. plant-genetic-resources. soil-pH. soil-properties. soil-salinity
Geographic Locator:Australia. New-South-Wales. Victoria
Organism Descriptors:grasses. Poaceae

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:JJ200. PP350. PP720. JJ300
Supplementary Info:28 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:LIGULE: an evaluation of indigenous perennial grasses for dryland salinity management in south-eastern Australia. 2. Field performance and the selection of promising ecotypes
View Article: Australian Journal of Agricultural Research. 2001. 52 (3). 351-365
CD Volume:338
Print Article: Pages: 351-365
Author(s):Mitchell M L Koen T B Johnston W H Waterhouse D B
Author Affiliation:Department of Natural Resources and Environment, Agriculture Victoria-Rutherglen, RMB 1145, Rutherglen, Vic. 3685, Australia
Language:English
Abstract:This paper reports the results of an initial evaluation of a large collection of Australian perennial native grasses. The overall aim of the research was to identify accessions that may be useful for pastoral purposes and for controlling land degradation on hill-lands in the high (>500 mm) rainfall zone of south-eastern Australia. Accessions (807) representing 37 target species were established in spaced plant nurseries at Rutherglen, Victoria and Wagga Wagga, New South Wales. Some accessions were planted out in October and November 1989, but mortality was high. Accessions collected from December 1989 to April 1990, mainly from lower rainfall Victoria and New South Wales, were planted out in autumn 1990; another smaller group of 79 accessions was also planted at Wagga Wagga in March 1991. Dactylis glomerata cv. Porto and Eragrotis curvula cv. Consol were established as comparator (control) species. A range of attributes was observed over a 2-year period (1990-92), including persistence, vigour, productivity, palatability, morphology and characteristics related to seed production. Accessions were initially culled on the basis of their persistence. Data for a range of attributes were separately analysed using pattern analysis to provide a broad overview of the performance and characteristics of the remaining accessions. A number of selection criteria were applied which resulted in selection of a promising group of 20 accessions (12 species from 8 genera): two accessions of Chloris truncata and 1 of C. ventricosa, and 1 each of 3 species of Austrodanthonia [Danthonia] and 2 species of Digitaria were nominated as promising, together with two accessions of Elymus scaber, Enteropogon acicularis and Microlaena stipoides, and 3 accessions of Bothrichloa macra and Themeda australis [Themeda triandra]. The promising group of accessions will be evaluated further at field sites typical of hilly landscapes in the 500-600 mm rainfall zone of south-eastern Australia
Descriptors:ecotypes. evaluation. germplasm. grasslands. palatability. persistence. plant-genetic-resources. plant-morphology. productivity. seed-production. selection. soil-salinity. sown-grasslands. vigour
Geographic Locator:Australia. New-South-Wales. Victoria
Identifiers:Chloris ventricosa. Elymus scaber. Enteropogon acicularis
Organism Descriptors:Bothriochloa-macra. Chloris-truncata. Danthonia. Digitaria. Elymus. Enteropogon. grasses. Microlaena-stipoides. Poaceae. Themeda-triandra

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Bothriochloa. Chloris. Microlaena. Themeda. Australia
Subject Codes:FF020. PP350. PP720
Supplementary Info:25 ref
ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Changes in protein composition during grain development in wheat
View Article: Australian Journal of Agricultural Research. 2001. 52 (4). 485-493
CD Volume:338
Print Article: Pages: 485-493
Author(s):Panozzo J F Eagles H A Wootton M
Author Affiliation:Agriculture Victoria-Horsham, Victorian Institute for Dryland Agriculture, PB 260, Horsham, Vic 3401, Australia
Language:English
Abstract:Changes in glutenin, gliadin, glutenin subunit composition, and polymer size distribution were monitored for 4 cultivars of wheat (Triticum aestivum cultivars Hartog, Halberd, Eradu and Rosella) throughout grain filling in an irrigated and non-irrigated environment over 2 seasons (1991 and 1992) in Victoria, Australia. The synthesis of glutenin and gliadin was modelled using a logistic function to determine the rate and duration of synthesis in response to environmental conditions. The maximum rate of synthesis of glutenin occurred approximately 6-8 days after the maximum rate of gliadins, with the duration extended by a similar period. High molecular weight glutenin subunits (HMWGS) were detected earlier than low molecular weight glutenin subunits (LMWGS). After the initial synthesis of HMWGS, there was a period at approximately mid grain filling when the rate of synthesis was reduced, followed by a period of more rapid synthesis in the latter stages of grain filling. In contrast, once detected, LMWGS increased at a faster rate than, and were in excess with respect to, HMWGS. Cultivar and environmental differences were observed, but in all cases the average molecular weight of polymeric glutenin increased throughout grain filling. Large polymers (>400 kD) increased continuously during grain filling, whereas polymers in the range 150-400 kD remained relatively constant and smaller polymers <150 kD decreased. As grain filling approached physiological maturity, there was a rapid increase in the synthesis of large polymers. The gliadin to glutenin ratio was almost the same in grain from adjacent irrigated and non-irrigated environments subjected to high temperatures at mid grain filling, but the proportion of highly polymeric glutenin was greater from the non-irrigated environment
Descriptors:chemical-composition. crop-growth-stage. cultivars. environmental-factors. gliadin. glutenins. irrigation. models. plant-composition. plant-development. plant-proteins. polymers. protein-content. protein-synthesis. temperature. wheat
Geographic Locator:Australia. Victoria
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:FF005. FF020. FF060. JJ800. PP500
Supplementary Info:35 ref

ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:Effects of sowing time and nitrogen fertiliser on canola and wheat, and nitrogen fertiliser on Indian mustard. I. Dry matter production, grain yield, and yield components
View Article: Australian Journal of Agricultural Research. 2001. 52 (6). 623-634
CD Volume:338
Print Article: Pages: 623-634
Author(s):Hocking P J Stapper M
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia
Language:English
Abstract:Canola, Indian mustard, and wheat were grown under dryland conditions at Ariah Park and Cowra (canola only) in the cropping belt of New South Wales, Australia, in 1990 to determine the effects of sowing time (canola and wheat) and nitrogen (N) fertilizer on the growth, grain yield, and yield components of the crops. Compared with an April sowing, the grain yield of canola at Ariah Park was reduced by 35% for a May sowing and by 67% for a July sowing. Canola yield at Cowra was reduced by 45% between early and late May sowings. Wheat yield declined by 35% between the May and July sowings at Ariah Park. Grain yields of canola and wheat at Ariah Park responded to N fertilizer in the April and May sowings, but not in the July sowing. Indian mustard had a higher yield than the comparable sowing of canola. Canola yields at Cowra were more responsive to N fertilizer than at Ariah Park, and increased from 0.5 to 2.9 t/ha with 100 kg N/ha. For each day that sowing canola was delayed at both sites after April-early May, anthesis was delayed on average by 0.52 days. For Dollarbird wheat, the delay in anthesis was 0.39 days per day sowing was delayed. Dry matter accumulation by the oilseeds was greatest during flowering, but before anthesis for wheat. Late sowing had little effect on the proportions of dry matter accumulated in a particular growth period. Irrespective of sowing time, grain yields and dry-matter harvest indices of the oilseeds were similar to values for wheat when differences in the biosynthetic costs of grain and straw production were taken into account. Late sowing usually resulted in a greater reduction in canola oil concentration than high N fertilizer rates. Canola oil concentration was reduced by 1.7 percentage points per 1 deg C increase in mean temperature during grain filling as a result of sowing late. It was concluded that N fertilizer could not compensate for the yield reduction in canola and wheat due to sowing late. Early sowing was essential to achieve high oil levels in canola
Descriptors:crop-yield. dry-matter-accumulation. flowering. growth. growth-period. harvest-index. Indian-mustard. nitrogen-fertilizers. production-costs. rape. rapeseed-oil. sowing-date. wheat. wheat-straw. yield-components
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Brassica-juncea. Brassica-napus-var.-oleifera. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Brassica-napus. Australia. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:FF005. FF040. FF100. JJ700
Supplementary Info:36 ref

ISSN:0004-9409
Year:2001
Journal Title:Australian Journal of Agricultural Research

Title:A comparison of the adaptation of yellow lupin (Lupinus luteus L.) and narrow-leafed lupin (L. angustifolius L.) to acid sandplain soils in low rainfall agricultural areas of Western Australia
View Article: Australian Journal of Agricultural Research. 2001. 52 (10). 945-954
CD Volume:338
Print Article: Pages: 945-954
Author(s):French R J Sweetingham M W Shea G G
Author Affiliation:Agriculture Western Australia, Dryland Research Institute, PO Box 432, Merredin, WA 6415, Australia
Language:English
Abstract:Almost the entire lupin industry of Western Australia is based on the single species Lupinus angustifolius (narrow-leafed lupin), which is very well adapted to coarse-textured, mildly acid soils. However, L. angustifolius is not well suited to the strongly acid sand plain soils along the low rainfall fringe of Western Australia's agricultural areas, and alternative grain legume species may be preferable. These soils, known locally as wodjil soils, have very low nutrient contents, often high levels of extractable Al in the subsoil, and are common in areas where severe brown spot and root rot disease is caused by Pleiochaeta setosa. Yellow lupin, L. luteus, may be a better species on these soils. This paper describes a series of trials comparing the grain yields of narrow-leafed lupin and yellow lupin on a range of soils in the agricultural areas of Western Australia. Sowing was conducted on a range of dates and in a range of rotational backgrounds between 1995 and 1998. With current cultivars, narrow-leafed lupin clearly has higher yield potential than yellow lupin when soil-extractable Al at a depth of 15-25 cm (measured in a 1:5 extract of soil in 0.01 M CaCl2) is <10 mg/kg. When extractable Al at this depth is greater, yellow lupin can produce greater yields than narrow-leafed lupin depending on other environmental characteristics, especially when extractable Al exceeds 28 mg/kg; its yield advantage, however, is often small. Yellow lupin is less sensitive to delayed sowing than narrow-leafed lupin, and more tolerant of brown spot, but narrow-leafed lupin is more responsive to good seasonal conditions and less sensitive to frost. We conclude that yellow lupin has a place in Western Australian farming systems on soils with >10 mg/kg extractable Al where these soils are in close lupin rotations, in areas where brown spot is severe or in low rainfall areas where narrow-leafed lupin yield potential does not often exceed 1 t/ha on these soils
Descriptors:aluminium. crop-yield. cultivars. fungal-diseases. genotype-environment-interaction. plant-diseases. plant-pathogenic-fungi. plant-pathogens. rotations. soil-chemical-properties. sowing-date
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Lupinus-angustifolius. Lupinus-luteus. Pleiochaeta-setosa
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Lupinus. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Pleiochaeta. Deuteromycotina. Eumycota. fungi. Australia
Subject Codes:FF007. FF020. FF100. FF150. FF610. JJ200. FF005
Supplementary Info:25 ref
ISSN:0004-9409
Year:2001

Journal Title:Australian Journal of Agricultural Research

Title:Co-occurrence of Proteaceae, laterite and related oligotrophic soils: coincidental associations or causative inter-relationships?
View Article: Australian Journal of Botany. 2001. 49 (5). 529-560
CD Volume:338
Print Article: Pages: 529-560
Author(s):Pate J S Verboom W H Galloway P D
Author Affiliation:Botany Department, Co-operative Research Centre for Plant-based Management of Dryland Salinity, University of Western Australia, WA 6009, Australia
Language:English
Abstract:This paper presents the hypothesis that certain Australian lateritic and related oligotrophic soils may have been partly derived biotically from soluble iron-rich complexes generated following secretion of low-molecular weight organic acids by phosphate-absorbing specialized proteoid (cluster) roots of proteaceous plants. Subsequent precipitation of the iron is then pictured as occurring onto the oxide rinds of developing laterite after consumption of the organic components of the complexes by soil bacteria. The hypothesis is first examined in relation to current theories of origins of laterites and the extent of the coincidences worldwide in past and present times between Proteaceae and oligotrophic soil types of lateritic character. The paper then provides more definitive lines of evidence supporting the hypothesis, based largely on recent studies by the authors in southwestern Western Australia. This relates to (a) cases of definitive association in habitats rich in Proteaceae between zones of root proliferation and ferricrete layers in lateritic soils, (b) proximity in soil profiles between ferric deposits and current and ancestral root channels, (c) the recovery of citrate-consuming bacteria from soil profiles and specifically from ferricrete rinds and horizons accumulating sesquioxide organic matter and (d) distribution of iron and phosphorus within plant and soil profile components consistent with ferricrete rinds being generated by rhizosphere-mediated interactions of plants and microbes under conditions of severely limited availability of phosphorus. The mode of functioning of proteoid root clusters is then discussed, especially in relation to exudation of organic acid anions, uptake of phosphorus and the subsequent fate of organic anions and their metal ion complexes in the system. An empirically based scheme is presented indicating flow profiles for phosphorus and iron between soil, ferricrete rinds and bacterial and plant components. Possible carbon costs to proteaceous plant partners when accessing phosphorus under the nutrient-impoverished conditions typical of heathlands and open woodlands of Mediterranean-type ecosystems of Western Australia were also discussed. The paper concludes with a critical overview of the hypothesis, particularly its implications regarding possible higher plant: microbial influences shaping soil and landscape evolution in the regions involved
Descriptors:citrates. dry-matter-accumulation. heathlands. iron. lateritic-soils. organic-acids. phosphorus. Podzols. rooting. roots. soil-bacteria. soil-profiles. soil-types. weathering
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Banksia. Proteaceae
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Proteaceae. Proteales. dicotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:JJ100. JJ200. JJ400. KK100
Supplementary Info:many ref
ISSN:0067-1924

Year:2001
Journal Title:Australian Journal of Botany

Title:Grazing management to increase utilisation of phalaris-based pasture in dryland dairy systems
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (1). 29-36
CD Volume:339
Print Article: Pages: 29-36
Author(s):Watson D J Avery A Mitchell G J Chinner S R
Author Affiliation:Agriculture Victoria, Institute for Intergrated Agricultural Development, RMB 1145, Rutherglen, Vic. 3685, Australia
Language:English
Abstract:Phalaris (Phalaris aquatica cv. Sirosa)-based pastures at Sandy Creek (northeastern Victoria) and Flaxley (South Australia) were subjected to grazing strategies based on different pre- and post-grazing pasture dry matter levels for 3 years, 1994-96. At Sandy Creek, 3 treatments consisted of commencing grazing when either 1600 (1), 2200 (2) or 2800 (3) kg dry matter per hectare (DM/ha) of pasture had accumulated, with treatments being grazed to a pasture residual of 1200 kg DM/ha. Grazing strategies were imposed over autumn-winter. At Flaxley, there were 5 treatments. Grazing commenced when either 1800 (1) or 2000 (2) kg DM/ha of pasture had accumulated, and was grazed to a pasture residual of 1200 kg DM/ha. Also when either 2200 (3) or 2600 (4) kg DM/ha of pasture had accumulated and these treatments were grazed to a pasture residual of 1800 kg DM/ha. A further treatment was when phalaris had reached a 4-leaf stage (5) (4 fully expanded leaves per tiller) and this was grazed to a residual of 1200 kg DM/ha. The grazing strategies were imposed over the autumn, winter and spring. Pasture consumption at Sandy Creek was higher in treatments 2 and 3. Pasture metabolizable energy (ME) levels and crude protein contents were not affected by treatment. Pasture consumption at Flaxley was greater in treatments 2 and 4. The strategy of grazing at the phalaris 4-leaf stage (5) showed potential for large spring growth. The ME of pasture was unaffected by treatments. The optimum grazing strategy to increase pasture growth for phalaris cv. Sirosa-based pastures in winter-dominant rainfall zones of temperate Australia, receiving about 700 mm average annual rainfall appears to be: allowing 2200 or 2600 kg DM/ha of pasture to accumulate before grazing back to a pasture residual of 1200 or 1800 kg DM/ha, respectively
Descriptors:crude-protein. dry-matter. grazing-systems. metabolizable-energy. seasonal-variation
Geographic Locator:Australia. South-Australia. Victoria
Organism Descriptors:Phalaris-aquatica
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Phalaris. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:FF007. LL500. PP350
Supplementary Info:29 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:The yield, quality and irrigation response of summer forage crops suitable for a dairy pasture renovation program in north-western Tasmania

View Article: Australian Journal of Experimental Agriculture. 2001. 41 (1). 37-44
CD Volume:339
Print Article: Pages: 37-44
Author(s):Eckard R J Salardini A A Hannah M Franks D R
Author Affiliation:North West Centre, Tasmanian Institute of Agricultural Research, University of Tasmania, PO Box 447, Burnie, Tas. 7320, Australia
Language:English
Abstract:The yield and quality of perennial ryegrass [Lolium multiflorum], short-rotation ryegrass-perennial ryegrass mix, oats, millet (Echinochloa utilis), maize, rape, kale, B. campestris x B. napus (cv. Pasja) and turnips were determined over a 13-week summer period during 1995-96 and 1996-97. The experiment was conducted at the Elliott Research Station in northwestern Tasmania, Australia (145 deg E, 41 deg S) and consisted of 2 irrigated and 2 dryland main plots. Within each main plot was a randomized complete block design with 9 forage crop subplots. Where forage is required through the summer, there is little advantage in establishing millet or oats over a spring-sown ryegrass pasture, mainly as the former still require replacement with permanent pasture in the autumn. However, if additional forage is required from late January then turnips are clearly superior to the other forages evaluated in all respects, apart from a low bulb crude protein (CP) content. Turnips responded significantly to irrigation, producing between 15 and 22 kg DM per ha per mm irrigation applied, with yields ranging between 7.9 and 10.6 t DM/ha dryland and between 13.5 and 14.4 t DM/ha under irrigation. The metabolizable energy (ME) and CP contents of turnips were 12.5 MJ/kg DM and 12.4% in the shoots and 13.4 MJ/kg DM and 7.0% in the bulbs, respectively. In comparison, the other fodder crops tested yielded between 4 and 6 t DM/ha under dryland conditions and between 5 and 7 t DM/ha under irrigated conditions. Turnips were most economic, costing on average $A120/t DM irrigated and $A160/t DM dryland, while spring renovation to perennial ryegrass cost $A385/t DM irrigated and $A344/t DM dryland; clearly more expensive than purchased feeds for this period. These findings confirm the choice of many farmers that, of the species examined, turnips are the most suitable as a summer fodder crop, both irrigated or dryland, and integrate well with a pasture renovation rotation
Descriptors:crop-quality. crop-yield. crude-protein. dry-matter. economic-evaluation. grassland-management. grasslands. irrigation. kale. maize. metabolizable-energy. oats. rape. turnips
Geographic Locator:Australia. Tasmania
Organism Descriptors:Avena-sativa. Brassica-campestris-var.-rapa. Brassica-napus-var.-oleifera. Brassica-oleracea-var.-viridis. Echinochloa-utilis. Lolium-multiflorum. Zea-mays
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Avena. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Brassica-campestris. Brassica. Brassicaceae. Capparidales. dicotyledons. Brassica-napus. Brassica-oleracea. Echinochloa. Lolium. Australia. Zea
Subject Codes:EE110. FF005. FF007. FF100. JJ800. PP350
Supplementary Info:21 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:Relationship between yield of grain sorghum (Sorghum bicolor) and soil salinity under field conditions

View Article: Australian Journal of Experimental Agriculture. 2001. 41 (2). 211-217
CD Volume:339
Print Article: Pages: 211-217
Author(s):Daniells I G Holland J F Young R R Alston C L Bernardi A L
Author Affiliation:NSW Agriculture, RMB 944, Tamworth, NSW 2340, Australia
Language:English
Abstract:Three field experiments using grain sorghum (S. bicolor), an important dryland summer crop on the Liverpool Plains in northern New South Wales, Australia were conducted: (i) to determine the effect of dryland salinity on the yield of commercial crops at 2 sites; (ii) to see if ridging the soil would ameliorate the problem; and (iii) to compare 16 commercial cultivars for tolerance to dryland salinity. Grain sorghum was more severely affected by dryland salinity than most literature would suggest. Over 3 seasons and 2 sites, sorghum yield was reduced by 50% at soil electrical conductivity (saturation extract, ECe) levels as low as 2.8 dS/m whereas advisory literature indicated a salinity threshold (no yield reduction) for sorghum of 6.8 dS/m, and 50% yield reduction at 9.9 dS/m. Current advisory literature is based on research where salinity was artificially imposed after plants were established in non-saline soil. The measurements described in this paper were on sorghum sown into saline soil. Soil and crop management strategies (ridging the soil or choosing a tolerant variety) showed limited potential for improving yields of grain sorghum on saline soil. At one site, the ECe varied widely across the paddock but little down the soil profile at any sampling point. Hence, analysing the surface soil would indicate the salinity hazard. However, at a second site, where ECe levels in the surface soil were low (<2 dS/m) everywhere, ECe at soil depths of 1 m varied widely (from 2 to 15 dS/m) across the paddock. Soil sampling to assess salinity hazard before crop planting should therefore include the entire root zone
Descriptors:crop-yield. cultivars. ridging. saline-soils. salt-tolerance. soil-salinity. soil-types. stress-response
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Sorghum-bicolor
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia. Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF100. FF900. JJ200
Supplementary Info:18 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:Nitrogen supply and demand in Australian agriculture
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (3). 277-288
CD Volume:339
Print Article: Pages: 277-288
Author(s):Angus J F
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, ACT 2601, Australia
Language:English
Abstract:The supply of and demand for nitrogen by whole industries and individual crops are discussed in relation to changes in farming systems, particularly the relative importance of fertilizer and biologically-fixed nitrogen. The use of fertilizer nitrogen (N) in

Australia has grown at an annual rate of 14% since the early 1990s, after growing at half that rate since the 1950s. The accelerated growth occurred during a period when world demand has been almost constant. Most of the additional demand has been for the dryland cereal and rape industries of southern Australia, where crops previously obtained almost all their N from mineralization of soil organic matter and the residues of legume pastures. The most likely reasons for the belated increase in the use of N fertilizer in Australia are to replace the supply from pasture residues as the area of pasture decreased and to satisfy the increased demand of cereals following break crops and of the break crops themselves, particularly rape. For a dryland cereal, there is a problem of matching soil N supply with an unpredictable N demand. For winter cereals in Australia, crop N demand is poorly synchronized with soil N supply. The time of greatest demand is normally during the stem elongation phase when the crop is growing fastest. For crops targeted for high-protein grain, there is an even greater demand around the flowering phase. The peak N demand for well-managed crops growing with no water limitations exceeds the capacity of the soil to supply N from mineralization at the time, so additional N is required to meet the shortfall, either from fertilizer or mineral N retained in the soil from earlier mineralization. Predicting the optimum supply of fertilizer N at sowing is difficult in cases where N demand is influenced by variable rainfall. Top dressing and banding fertilizer offer prospects for more closely matching N supply and demand for dryland crops. The future role of legumes in supplying residual N is discussed in relation to the trend towards continuous cropping
Descriptors:band-placement. cereals. crop-growth-stage. crops. demand. farming-systems. industry. legumes. mineralization. nitrogen-fertilizers. nitrogen-fixation. rape. supply. top-dressings
Geographic Locator:Australia
Organism Descriptors:Brassica-napus-var.-oleifera. Fabaceae
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica-napus. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Fabales
Subject Codes:EE140. FF005. JJ700
Supplementary Info:52 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:The fate of biologically fixed nitrogen in legume-based dryland farming systems: a review
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (3). 361-381
CD Volume:339
Print Article: Pages: 361-381
Author(s):Fillery I R P
Author Affiliation:CSIRO Plant Industry, PO Private Bag 5, Wembley, WA 6913, Australia
Language:English
Abstract:The progress achieved in delineating the fate of legume N in dryland systems is reviewed. Findings on the cycling of N in intensively managed temperates, perennial legume-based pastures in New Zealand and Western Europe are also discussed to enable an assessment of the potential for N loss from legume-based pastures in the higher rainfall zones of Australia. Options for improving the utilization of legume-fixed N are discussed at the end of this review

Descriptors:cycling. dry-farming. farming-systems. grazing. legumes. losses-from-soil. nitrogen. nitrogen-balance. nitrogen-cycle. nitrogen-fixation. pasture-legumes. pastures. reviews. soil-types
Geographic Locator:Australia. New-Zealand. Western-Europe
Organism Descriptors:Fabaceae
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Europe. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF150. JJ100. FF007. JJ200
Supplementary Info:140 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:Nitrogen special issue: summing up of papers and recommendations for future research
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (3). 459-463
CD Volume:339
Print Article: Pages: 459-463
Author(s):Wolfe E C
Author Affiliation:School of Agriculture, Charles Sturt University, Locked Bag 588, Wagga Wagga, NSW 2678, Australia
Language:English
Abstract:The 12th Australian Nitrogen Fixation Conference was the third in a series of national workshops that began in 1991 and dealt with aspects of the nitrogen dynamics of Australian pastures and crop-lands. The conference and the papers published in the special issue addressed, at least in part, the slow progress that is evident in improving the rate of biological nitrogen fixation by enhacing inoculating techniques and Rhizobium strains. In this paper, some key issues in science and farming that are relevant to N fixation, evaluation of some of the highlights from the papers presented at and written after the conference, and the assessment of the value of the contributions in the light of the future challenges are summarized. An important output from the conference was the analysis of nitrogen supply and demand in Australian dryland crops, indicating less reliance on biological nitrogen fixation due to higher wheat yields, the increased use of canola [rape] in crop rotations and problems with pulses. The further development and use of models is a way of predicting outcomes for various combinations of management and crop rotations. The present trend towards fewer years of legumes in phase farming in Australia may reverse, resulting in renewed interest in ley pastures and pulse crops
Descriptors:grain-legumes. inoculation. legumes. leys. nitrogen-fixation. pastures. rape. rotations. wheat
Geographic Locator:Australia
Organism Descriptors:Brassica-napus-var.-oleifera. Fabaceae. Rhizobium. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Rhizobiaceae. Gracilicutes. bacteria. prokaryotes. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Brassica-napus. Brassica. Brassicaceae. Capparidales. dicotyledons. Fabales
Subject Codes:FF150. JJ100. FF005. FF007
Supplementary Info:20 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:Nitrogen accumulation and distribution at anthesis and maturity in ten wheats grown at three sites in north-western Victoria
View Article: Australian Journal of Experimental Agriculture. 2001. 41 (4). 533-540
CD Volume:339
Print Article: Pages: 533-540
Author(s):Flood R G Martin P J
Author Affiliation:Victorian Institute for Dryland Agriculture, Agriculture Victoria, Private Bag 260, Horsham, Vic. 3401, Australia
Language:English
Abstract:Plant nitrogen relationships were studied in 10 wheat cultivars sown at 3 sites (Horsham, Boort and Walpeup) in north-western Victoria by determining the nitrogen concentration and nitrogen content of plant components at anthesis and maturity. While the concentration of nitrogen varied in different plant components, whole plants at anthesis had a nitrogen concentration below the value required for maximum growth. The time to anthesis had an influence only on grain yield and grain nitrogen percentage at Horsham. Total assimilation of nitrogen at both anthesis and maturity was more strongly correlated to plant dry matter than plant nitrogen concentration. There was a significant negative correlation between grain nitrogen percentage and both nitrogen harvest index and harvest index. Grain yield was strongly correlated with total nitrogen accumulated at anthesis and more strongly correlated with total nitrogen accumulated at maturity. Grain yield was significantly correlated with nitrogen harvest index and more strongly correlated with harvest index. Grain yield was negatively correlated with grain nitrogen percentage. The negative association between grain nitrogen percentage and harvest index has important implications for the breeding of wheat with higher grain nitrogen percentage while maintaining or increasing grain yield. The results indicated that none of the measured parameters could be used for indirect selection aimed at improving grain nitrogen percentage
Descriptors:assimilation. chemical-composition. crop-yield. dry-matter. flowering. harvest-index. maturity. mineral-content. nitrogen-content. nutrient-content. plant-composition. wheat
Geographic Locator:Australia. Victoria
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:FF005. FF020. FF040. FF100
Supplementary Info:35 ref
ISSN:0816-1089
Year:2001
Journal Title:Australian Journal of Experimental Agriculture

Title:An aeolian component in Pleistocene and Holocene valley aggradation: evidence from Dicks Creek catchment, Yass, New South Wales
View Article: Australian Journal of Soil Research. 2001. 39 (1). 13-38
CD Volume:338
Print Article: Pages: 13-38
Author(s):Melis M I Acworth R I
Author Affiliation:Douglas Partners Pty Ltd., P.O. Box 472, 96 Hermitage Road, West Ryde, NSW 2114, Australia

Conference Title:Aeolian Dust Symposium. Implications for mineral exploration and environmental management, Australian National University, Canberra, 25-26 November 1998
Language:English
Abstract:Four late Quaternary depositional units are identified overlying sub-vertically dipping Ordovician bedrock in the upper reaches of the Dicks Creek catchment, near Yass in the Southern Highlands of New South Wales, Australia. The units are spatially discontinuous and separated from each other by erosional unconformities. They are found only on the lower slopes in the valley floors, often exposed by recent gully erosion. The oldest unit (Unit 4) is a competent consolidated well-sorted fine to medium silt that unconformably overlies bedrock. It often forms the base to erosion gullies. Unit 3 is strongly dispensable and frequently has the characteristics of a debris flow. Unit 3 is particularly prone to sheet erosion and exhibits a high risk of dryland salinity development. Unit 2 is light to dark grey, poorly sorted, and often contains irregularly dispersed charcoal. Unit 2 is unconformably overlain by a predominantly pale yellow and (Unit 1) that shows clear evidence of very recent deposition. Physical and chemical characteristics of Units 2, 3 and 4 suggest an aeolian component. The silt size (4 g on phi scale) fraction of Unit 4 is often >70% of the total mass, with grain sizes consistent with an origin as aeolian dust. Unit 3 is yellow brown in colour and often has the characteristics of a diamict with a major grain size component similar in size to Unit 4. Unit 2 is typically uniform in appearance and contains a predominantly kaolinite and illite clay mineralogy that contrast strongly with a predominance of quartz in the underlying bedrock. A simple sediment budget indicators that the volume of Unit 2 could be accounted for by a combination of sheet and rill erosion within the catchment and additional aeolian deposition in the order of 4-8 t/km2 year. Radiocarbon dates for charcoal recovered from Unit 2 indicate that some deposition was associated with cooler, drier conditions of the late Holocene 'Little Ice Age', approximately 200-600 years ago
Descriptors:aeolian-deposits. age-of-soil. deposition. dust. erodibility. geological-sedimentation. particle-size-distribution. radiocarbon-dating. risk. salinization
Geographic Locator:Australia. New-South-Wales
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:JJ400. PP400
Supplementary Info:43 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research

Title:Salt source for dryland salinity - evidence from an upland catchment on the Southern Tablelands of New South Wales
View Article: Australian Journal of Soil Research. 2001. 39 (1). 39
CD Volume:338
Print Article: Pages: 39
Author(s):Aeworth R I Jankowski J
Author Affiliation:UNSW Groundwater Centre, School of Civil and Environmental Engineering, Water Research Laboratory, King Street, Manly Vale, 2093, Australia
Conference Title:Aeolian Dust Symposium. Implications for mineral exploration and environmental management, Australian National University, Canberra, 25-26 November 1998
Language:English

Abstract:A detailed study involving drilling, geophysics, hydrogeochemistry, and groundwater monitoring over a 10-year period has been carried out at a small catchment south-cast of Yass on the Southern Tablelands of New South Wales, Australia, to investigate the source of salt causing dryland salinity. The catchment is within 2 km of the top of a regional groundwater and surface water divide and remains substantially tree covered. The investigations have found a highly heterogeneous distribution of salt, most of which is associated with swelling clay. Dispersion of this clay causes the surface features commonly associated with dryland salinity. There is no hydrogeochemical evidence to suggest evaporative or transpirative concentration of salt in the groundwater. The short flow path from the top of the catchment cannot provide a significant source of salt from bedrock weathering. An alternative model of salt accumulation is proposed with the salt imported into the catchment with silt during dust storms in the acid and windy conditions during the last glacial. The management implications of this model of salt distribution and the associated dryland salinity development are discussed
Descriptors:aeolian-deposits. dust. geochemistry. groundwater. hydrology. salt. soil-salinity. sources
Geographic Locator:Australia. New-South-Wales
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:JJ200. JJ400. PP200
Supplementary Info:30 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research

Title:Land suitability assessment in the Namoi Valley of Australia, using a continuous model
View Article: Australian Journal of Soil Research. 2001. 39 (2). 273-290
CD Volume:338
Print Article: Pages: 273-290
Author(s):Triantafilis J Ward W T McBratney A B
Author Affiliation:Department of Agricultural Chemistry and Soil Science, Australian Cotton Cooperative Research Centre, Ross Street Building A03, The University of Sydney, NSW 2006, Australia
Language:English
Abstract:In an agricultural context, land evaluation is assessment for a specified kind of land utilization. The final result of agricultural evaluation is a map, which partitions the landscapes into suitable and unsuitable areas for a particular land-use of interest. However, this approach may not represent the continuity of land. Land suitability could be better expressed by a fuzzy approach. In this paper a fuzzy methodology is used to evaluate land suitability in the Edgeroi district, New South Wales, Australia for various crops including barley, dryland cotton, oats, pasture, soyabean, sorghum, sunflower, and wheat. This is achieved using a membership function to derive a land-suitability membership score ranging from non-suitable (i.e. 0) to suitable (i.e. 1). We express this as continuous land suitability maps using punctual kriging. An expression for overall land suitability (i.e. its versatility) and its capacity with respect to suitability to particular rotations is introduced to highlight the most productive units of soil
Descriptors:barley. cotton. fuzzy-logic. land-evaluation. models. oats. pastures. soil-suitability. soyabeans. sunflowers. wheat
Geographic Locator:Australia. New-South-Wales

Organism Descriptors:Avena-sativa. Glycine-(Fabaceae). Gossypium. Helianthus-annuus. Hordeum-vulgare. Sorghum. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Avena. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Fabaceae. Fabales. dicotyledons. Helianthus. Asteraceae. Asterales. Hordeum. Australia. Triticum. Malvaceae. Malvales
Subject Codes:FF005. JJ500. ZZ100. FF007
Supplementary Info:38 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research
Copyright:Copyright CAB International

Title:Explaining groundwater hydrographs: separating atypical rainfall events from time trends
View Article: Australian Journal of Soil Research. 2001. 39 (4). 861-875
CD Volume:338
Print Article: Pages: 861-875
Author(s):Ferdowsian R Pannell D J McCarron C Ryder A Crossing L
Author Affiliation:Agriculture Western Australia, Albany, WA 6330, Australia
Language:English
Abstract:By 1994, an estimated 1.8 million hectares of cleared land in Western Australia was affected by secondary dryland salinity to some extent. The area affected is likely to double in the coming 20 years. The cause of this salinity is excessive recharge under traditional agriculture, leading to rising groundwater levels. Monitoring changes in groundwater levels is helpful in indicating the degree of threat to agricultural land and public assets. Many researchers have studied groundwater level rises and attempted to explain them statistically. We present an approach for statistically estimating trends in groundwater levels. The approach separates the effect of atypical rainfall events from the underlying time trend and the lag between rainfall and its impact on groundwater is explicitly represented. Rainfall is represented as an accumulation of deviations from average rainfall. Application of the approach is demonstrated using data from 49 bores in Jerramungup Shire, Western Australia. The approach provides high explanatory power, particularly for deeper bores
Descriptors:groundwater. groundwater-level. monitoring. rain. salinity
Geographic Locator:Australia. Western-Australia
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:PP200. PP500. ZZ100
Supplementary Info:15 ref
ISSN:0004-9573
Year:2001
Journal Title:Australian Journal of Soil Research
Copyright:Copyright CAB International

Title:Registration of 'Shaw' alfalfa
View Article: Crop Science. 2001. 41 (1). 264-265
CD Volume:359
Print Article: Pages: 264-265
Author(s):Ditterline R L Dunn R L Cash S D Wichman D M Welty L E Bergman J L Eckhoff J L A Majerus M E Scheetz J G Holzworth L K Blunt K R Strang L S Vavrovsky J

Author Affiliation:Dep. of Plant Science, Montana State Univ., Bozeman, MT 59717, USA
Language:English
Abstract:'Shaw', developed for increased forage yield under dryland conditions by the Montana Agricultural Experiment Station and released jointly by MAES and USDA/NRCS Plant Materials Center in 2000, is a synthetic lucerne cultivar with 115 parent plants selected from MAES breeding populations. 'Shaw' has high resistance to Aphanomyces root rot (Aphanomyces euteiches) and northern root-knot nematode (Meloidogyne hapla), resistance to Phytophthora root rot (Phytophthora medicaginis), pea aphid (Acyrthosiphon pisum), spotted aphid (Therioaphis maculata [Therioaphis trifolii form maculata]) and moderate resistance to Verticillium wilt (Verticillium albo-atrum), anthracnose (Colletotrichum trifolii) and stem nematode (Ditylenchus dipsaci). In trials conducted at Farmington, Montana, USA the forage yield of 'Wichita' was equal to the control cultivars under irrigated conditions and was higher than the standard 'Ladak 65' under dryland conditions
Descriptors:characteristics. disease-resistance. insect-pests. lucerne. pest-resistance. plant-diseases. plant-parasitic-nematodes. plant-pathogenic-fungi. plant-pathogens. plant-pests
Geographic Locator:Montana. USA
Identifiers:Peronosporomycetes. Phytophthora medicaginis. Pythiaceae
Organism Descriptors:Acyrthosiphon-pisum. Aphanomyces-euteiches. Colletotrichum-trifolii. Ditylenchus-dipsaci. insects. Medicago. Medicago-sativa. Meloidogyne-hapla. Nematoda. Phytophthora. Therioaphis-trifolii-form-maculata. Verticillium-albo-atrum
Supplemental Descriptors:Acyrthosiphon. Aphididae. Aphidoidea. Sternorrhyncha. Homoptera. Hemiptera. insects. arthropods. invertebrates. animals. Aphanomyces. Saprolegniales. Mastigomycotina. Eumycota. fungi. Colletotrichum. Deuteromycotina. Ditylenchus. Anguinidae. Nematoda. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Meloidogyne. Meloidogynidae. Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Peronosporales. Phytophthora. Therioaphis-trifolii. Therioaphis. Verticillium
Subject Codes:FF007. FF020. FF610. FF620. HH600
Supplementary Info:3 ref
ISSN:0011-183X
Year:2001
Journal Title:Crop Science

Title:Economic evaluation of dry farming technologies - a study in Southern Districts of Tamil Nadu
View Article: Indian Journal of Agricultural Economics. 2001. 56 (2). 220-229
CD Volume:379
Print Article: Pages: 220-229
Author(s):Rajesh R
Author Affiliation:Department of Agricultural Economics, Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai - 625 104, India
Language:English
Abstract:The study attempts to evaluate the gains from the dry farming technology in Tamil Nadu, India, in terms of income, employment of labour and profits of farms of different size and to suggest specific measures to maximize returns to new dryland farm technologies. A three-stage stratified random sampling procedure was

adopted and a total of 300 farmers formed the basis of sample. Technology Adoption Index was used to classify the farms into 3 groups. A whole farm production function and decomposition analysis were used to study the contribution to technology in the farms. The study found that the average level of adoption of technology was 51.29% and the largest number of 102 farms (one-third of total number of farms) was seen in the class intervals of 51-60% of adoption. The functional analysis in terms of resource use efficiency revealed that the farms can increase the yield in cotton by applying more of farmyard manure, nitrogen fertilizer and using more of human labour and machine power. The study emphasizes that encouraging collective farming may solve the problems confronted by the farmers
Descriptors:dry-farming. economic-evaluation. efficiency. employment. farm-income. labour. production-functions. profits. resource-utilization. returns. technology. yields
Geographic Locator:India. Tamil-Nadu
Supplemental Descriptors:South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. India
Subject Codes:EE110. EE145. EE900. EE950. FF150
Supplementary Info:4 ref
ISSN:0019-5014
Year:2001
Journal Title:Indian Journal of Agricultural Economics

Title:Heat production and body temperature of Arabian babblers (Turdoides squamiceps): A bird from hot desert habitats
View Article: Journal of Arid Environments. 48 (1). May, 2001. 59-67
CD Volume:357
Print Article: Pages: 59-67
Author(s):Anava Avner Kam Michael Shkolnik Amiram Degen A Allan
Author Affiliation:Desert Animal Adaptations and Husbandry, Wyler Department for Dryland Agriculture, Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev, Beer-Sheva, 84105: degen@bgumail.bgu.ac.il
Language:English
Language of Summary:English (EN)
Abstract:The Arabian babbler (Turdoides squamiceps; adult body mass = 65-75 g) lives in groups all year round and inhabits extreme deserts. We measured body temperature (Tb) and resting metabolic rate (as O2 consumption) and calculated thermal conductance of Arabian babblers at air temperatures (Ta) ranging between 11 and 44degreeC. Tb increased from 40degreeC to 42.9degreeC. The thermoneutral zone (TNZ) was found to occur at high air temperatures and was wide (31.6degreeC-40degreeC). The metabolic rate of 1.34 ml O2 g-1 h-1 is half of that predicted for a passerine of its body mass. Allometric comparison with passerine species of up to 125 g body mass indicates that the resting metabolic rate (RMR) of babblers is about 71% of the basal metabolic rate (BMR) expected for a passerine of its body mass. When the RMR of the babblers was compared with the phylogenetically-adjusted equation for BMR of birds, RMR was only 73% of the value predicted from this equation. Its thermal conductance at a lower critical temperature of 31.6degreeC was 0.307 mW cm-2degreeC-1, which is 14.9% higher than that predicted for a bird of its body mass. The low heat production, the ability to tolerate high Tb, the wide TNZ at high Ta and high thermal conductance are physiological adaptations of Arabian babblers to extreme deserts
Descriptors:allometric comparison; basal metabolic rate; body mass; body temperature; desert habitat; heat production; resting metabolic rate; thermal conductance. Chemical Coordination and Homeostasis

Organism Descriptors:Turdoides squamiceps [Arabian babbler] (Passeriformes)
Supplemental Descriptors:Passeriformes: Aves, Vertebrata, Chordata, Animalia. Animals; Birds; Chordates; Nonhuman Vertebrates; Vertebrates
Subject Codes:Chemical Coordination and Homeostasis
ISSN:0140-1963
Year:2001
Journal Title:Journal of Arid Environments

Title:Monitoring land-cover changes in semi-arid regions: Remote sensing data and field observations in the Ferlo, Senegal
View Article: Journal of Arid Environments. 48 (2). June, 2001. 129-148
CD Volume:357
Print Article: Pages: 129-148
Author(s):Diouf A Lambin E F
Author Affiliation:Department of Geography, University of Louvain, Place Louis Pasteur, 3, B-1348, Louvain-la-Neuve: lambin@geog.ucl.ac.be
Language:English
Language of Summary:English (EN)
Abstract:Dryland degradation rarely translates into linear, declining trends in vegetation cover due to interannual climatic variability. Appropriate indicators of land-cover modifications need to be defined for semi-arid regions. Our hypothesis is that degradation can be measured by: (1) a decrease in the resilience of vegetation to droughts; (2) a decrease in rain-use efficiency; and (3) a modification of floristic composition. The objective of this paper is to test the relationships between a remotely sensed indicator of vegetation, rainfall data and field measurements of biomass and floristic composition. The study was based on field measurements of vegetation conditions covering a period of 10 years, in the semi-arid region of the Ferlo in Senegal. Our results indicate that land-cover modifications in the Ferlo are best measured by changes in rain-use efficiency. No consistent trend in the relative abundance of grass species was visible at the scale of the decade, even on the two sites affected by degradation. Just after a drought, a given increase in rainfall results in less biomass production than is the case for normal years
Descriptors:biomass; desertification; dryland: degradation; floristic composition modification; interannual climatic variability; land-cover changes: appropriate indicators, monitoring, semi-arid regions; rain-use efficiency increase; rainfall; vegetation drought resilence.
Terrestrial Ecology (Ecology, Environmental Sciences); Methods and Techniques
Geographic Locator:Ferlo (Senegal, Africa, Ethiopian region); Sahel (Ethiopian region)
Subject Codes:Terrestrial Ecology (Ecology, Environmental Sciences); Methods and Techniques
ISSN:0140-1963
Year:2001
Journal Title:Journal of Arid Environments

Title:Simulating endosulfan transport in runoff from cotton fields in Australia with the GLEAMS model
View Article: Journal of Environmental Quality. 2001. 30 (3). 702-713
CD Volume:362
Print Article: Pages: 702-713

Author(s):Connolly R D Kennedy I R Silburn D M Simpson B W Freebairn D M
Author Affiliation:Queensland Dep. of Natural Resources, P.O. Box 318, Toowoomba, QLD 4350, Australia
Language:English
Abstract:Endosulfan (6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-6,9-methano-2,4,3-benzodi ox athiepin 3-oxide), a pesticide that is highly toxic to aquatic organisms, is widely used in the cotton (Gossypium hirsutum) industry in Australia and is a risk to the downstream riverine environment. We used the GLEAMS model to evaluate the effectiveness of a range of management scenarios aimed at minimizing endosulfan transport in runoff at the field scale in Queensland and New South Wales, Australia. The field management scenarios simulated were (i) Conventional, bare soil at the beginning of the cotton season and seven irrigations per season; (ii) Improved Irrigation, irrigation amounts reduced and frequency increased to reduce runoff from excess irrigation; (iii) Dryland, no irrigation; (iv) Stubble Retained, increased soil cover created by retaining residue from the previous crop or a specially planted winter cover crop; and (v) Reduced Sprays, a fewer number of sprays. Stubble Retained was the most effective scenario for minimizing endosulfan transport because infiltration was increased and erosion reduced, and the stubble intercepted and neutralized a proportion of the applied endosulfan. Reducing excess irrigation reduced annual export rates by 80 to 90%, but transport in larger storm events was still high. Reducing the number of pesticide applications only reduced transport when three or fewer sprays were applied. We conclude that endosulfan transport from cotton farms can be minimized with a combination of field management practices that reduce excess irrigation and concentration of pesticide on the soil at any point in time; however, discharges, probably with endosulfan concentrations exceeding guideline values, will still occur in storm events
Descriptors:aquatic-organisms. endosulfan. insecticide-residues. irrigation. pesticide-residues. runoff. simulation-models. transport-processes
Geographic Locator:Australia. New-South-Wales. Queensland
Organism Descriptors:Gossypium-hirsutum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Gossypium. Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:FF005. HH430. JJ200. JJ800. MM300. PP600
Supplementary Info:23 ref
ISSN:0047-2425
Year:2001
Journal Title:Journal of Environmental Quality

Title:Maximizing precipitation utilization in dryland agriculture in South Africa - a review
View Article: Journal of Hydrology (Amsterdam) 2001. 241 (1/2). 124-139
CD Volume:360
Print Article: Pages: 124-139
Author(s):Bennie A T P Hensley M
Author Affiliation:Department of Soil Science, University of the Orange Free State, P.O. Box 339, Bloemfontein 9300, South Africa
Language:English
Abstract:Agricultural systems in South Africa have been developed under primarily arid and semi-arid climatic conditions where droughts are common. Adoption of agricultural practices by farmers maximizes

precipitation utilization, ensure production, economic and social sustainability. Precipitation use efficiency (PUE, kg produce ha-1 mm-1 rainfall plus the change in soil water content of the root zone) proved to be a valuable parameter for comparing the level of precipitation utilization of different production or management practices for dryland crop production or rangeland utilization. Increasing the length of the fallow period before planting increased the amount of pre-plant stored water in the soil thereby reducing the risk of drought damage to crops that resulted also in better yields. Deep drainage occurred only on sandy soils during wet seasons and values as high as 20% of the annual precipitation were measured during years of above average precipitation. In the experiments reported, soil cultivation generally increased runoff. The retention of large amounts (>6 t ha-1) crop residue on the soil surface is required to decrease runoff from cultivated fields. Between 50 and 75% of the annual precipitation is lost through evaporation from the soil surface thus resulting in relatively low PUE-values
Descriptors:crop-production. crop-yield. dry-farming. evapotranspiration. infiltration. precipitation. runoff. soil-water. utilization. internal-drainage. reviews. use-efficiency. evaporation. tillage. crop-residues. rangelands
Geographic Locator:South-Africa
Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. Threshold-Countries. Anglophone-Africa. Commonwealth-of-Nations
Subject Codes:FF100. PP500. JJ300. PP350
Supplementary Info:44 ref
ISSN:0022-1694
Year:2001
Journal Title:Journal of Hydrology

Title:A short note: lack of effect of post-AI hCG or GnRH treatment on embryonic mortality in dairy cattle
View Article: Livestock Production Science. 2001. 71 (2/3). 277-281
CD Volume:375
Print Article: Pages: 277-281
Author(s):Tefera M Chaffaux S Thibier M Humblot P
Author Affiliation:Department of Animal Science, Faculty of Dryland Agriculture, Mekelle University, P.O. Box 231, Mekelle, Ethiopia
Language:English
Abstract:The aim of the present trial was to test the effects of two treatments in dairy cows, in an attempt to sustain the circulating progesterone levels and hence possibly reduce the embryonic mortality rates. Treatment 1 consisted of a 3000 IU hCG i.m. injection at day 4 (D4) after artificial insemination (AI) and treatment 2 of a GnRH i.m. injection (Buserelin, 10 micro g) on day 12 after AI (D12). A set of 156 Holstein females from the same herd were assigned to one of the four treatments; hCG D4 (n=52), placebo D4 (n=25), GnRH D12 (n=52), placebo D12 (n=27). They were served for the first, second or third time or more and monitored regularly via a herd fertility survey. Pregnancy status was assessed by rectal palpation at day 45 after AI. The overall mean pregnancy rate (PR) was 42% and there was no significant difference between treatment groups or between ranks of AI (P>0.05). These data show that stimulation of luteal function following ovulation and AI did not result in any reduction of the embryonic mortality rates
Descriptors:artificial-insemination. dairy-cattle. embryo-mortality. embryonic-development. GnRH. ovulation. placebos. pregnancy. progesterone. rectal-palpation
Organism Descriptors:cattle

Supplemental Descriptors:Bos. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates
Subject Codes:LL240. LL250
Supplementary Info:24 ref
ISSN:0301-6226
Year:2001
Journal Title:Livestock Production Science

Title:Factors regulating the contributions of fixed nitrogen by pasture and crop legumes to different farming systems of eastern Australia
View Article: Plant and Soil. 2001. 228 (1). 29-41
CD Volume:372
Print Article: Pages: 29-41
Author(s):Peoples M B Bowman A M Gault R R Herridge D F McCallum M H McCormick K M Norton R M Rochester I J Scammell G J Schwenke G D
Author Affiliation:CSIRO Plant Industry, GPO Box 1600 Canberra, ACT 2601, Australia
Document Editor:Jensen-E-S. Recous-S
Conference Title:The 10th International Nitrogen Workshop, Copenhagen, Denmark, 23-26 August 1999
Language:English
Abstract:On-farm and experimental measures of the proportion (%Ndfa) and amounts of N2 fixed were undertaken for 158 pastures either based on annual legume species (annual medics-Medicago spp.,, clovers-Trifolium subterraneum, T. banansae, T. alexandrinum, T. resupinatum or vetch-Vicia spp.), or lucerne (alfalfa, Medicago sativa), and 170 winter pulse crops (chickpea-Cicer arietinum, faba bean-Vicia faba, field pea-Pisum sativum, lentil-Lens culinaris, lupin-Lupinus angustifolius) over a 1200 km north-south transect of eastern Australia. The average annual amounts of N2 fixed ranged from 30 to 160 kg shoot N fixed /ha per year for annual pasture species, 37-128 kg N/ ha per year for lucerne, and 14 to 160 kg N/ ha per year by pulses. These data have provided new insights into differences in factors controlling N2 fixation in the main agricultural systems. Mean levels of %Ndfa were uniformly high (65-94%) for legumes growing at different locations under dryland (rainfed) conditions in the winter-dominant rainfall areas of the cereal-livestock belt of Victoria and southern New South Wales, and under irrigation in the main cotton-growing areas of northern New South Wales. Consequently, N2 fixation was primarily regulated by biomass production in these areas and both pasture and crop legumes fixed between 20 and 25 kg shoot N for every tonne of shoot dry matter (DM) produced. Nitrogen fixation by legumes in the dryland systems of the summer-dominant rainfall regions of central and northern New South Wales on the other hand was greatly influenced by large variations in %Ndfa (0-81%) caused by yearly fluctuations in growing season (April-October) rainfall and common farmer practice which resulted in a build up of soil mineral-N prior to sowing. The net result was a lower average reliance of legumes upon N2 fixation for growth (19-74%) and more variable relationships between N2 fixation and DM accumulation (9-16 kg shoot N fixed/t legume DM). Although pulses often fixed more N than pastures, legume-dominant pastures provided greater net inputs of fixed N, since a much larger fraction of the total plant N was removed when pulses were harvested for grain than was estimated to be removed or lost from grazed pastures. Conclusions about the relative size of the contributions of fixed N to the N-economies of the different farming systems depended upon the inclusion or omission of an estimate of fixed N associated with the nodulated roots. The net amounts of fixed N remaining after each year of either legume-based

pasture or pulse crop were calculated to be sufficient to balance the N removed by at least one subsequent non-legume crop only when below-ground N components were included. This has important implications for the interpretation of the results of previous N2 fixation studies undertaken in Australia and elsewhere in the world, which have either ignored or underestimated the N present in the nodulated root when evaluating the contributions of fixed N to rotations
Descriptors:chickpeas. clovers. dry-matter-accumulation. faba-beans. farming-systems. grain-legumes. legumes. lentils. lucerne. lupins. nitrogen. nitrogen-fixation. pasture-legumes. pastures. peas. root-nodules. vetch
Geographic Locator:Australia. New-South-Wales. Victoria
Identifiers:Trifolium banansae
Organism Descriptors:Cicer-arietinum. Fabaceae. Lens-culinaris. Lupinus. Lupinus-angustifolius. Medicago. Pisum-sativum. Trifolium-alexandrinum. Trifolium-resupinatum. Trifolium-subterraneum. Vicia. Vicia-faba
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Cicer. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lens. Australia. Pisum. Vicia. Trifolium. Lupinus
Subject Codes:FF003. FF150. JJ100. JJ200. FF007. FF005
Supplementary Info:42 ref
ISSN:0032-079X
Year:2001
Journal Title:Plant and Soil

Title:Minimum and delayed conservation tillage for wheat-fallow farming
View Article: Soil Science Society of America Journal. 2001. 65 (4). 1203-1209
CD Volume:377
Print Article: Pages: 1203-1209
Author(s):Schillinger W F
Author Affiliation:Dep. of Crop and Soil Sciences, Washington State Univ., P.O. Box B, Lind, WA 99341, USA
Language:English
Abstract:Maintaining crop residue, clods, and roughness on the soil surface during summer fallow is critical for wind erosion control in the low-precipitation (<300 mm annual) dryland wheat (Triticum aestivum) production region of the inland Pacific Northwest, USA. Conventional farming practices are intensive, involving eight or more tillage operations during the fallow cycle. My objective was to evaluate fallow conservation tillage management systems for soil water storage, residue retention, surface and subsurface soil cloddiness, surface roughness, wheat stand establishment, and grain yield during 6 years at Lind, Washington, USA. The soil is a Shano silt loam (coarse-silty, mixed, superactive, mesic Xeric Haplocambids). Treatments were (i) conventional (tillage), (ii) minimum (herbicides and tillage), and (iii) delayed minimum (herbicides and delayed tillage). Averaged over years, precipitation storage efficiency in the soil was 51, 54, and 57% over winter, and 24, 26, and 26% at the end of the fallow cycle, for conventional tillage (CT), minimum tillage (MT), and delayed minimum tillage (DMT), respectively. Surface residue and surface clod mass were consistently reduced by 45% or more in CT compared with MT and DMT. There were no differences among treatments in seed-zone water content at time of sowing in September nor in grain yield in any year or when averaged across years. Results show that the long-term practice of minimum and delayed minimum tillage during fallow significantly

increased surface residue and clod retention for erosion control with no adverse agronomic affects compared with conventional tillage
Descriptors:clods. conservation-tillage. crop-residues. crop-yield. erosion-control. fallow-systems. herbicides. minimum-tillage. roughness. silt-loam-soils. soil-conservation. soil-management. soil-types. soil-water. wheat. wind-erosion
Geographic Locator:USA. Washington
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. North-America. America. Developed-Countries. OECD-Countries. Pacific-Northwest-States-of-USA. Pacific-States-of-USA. Western-States-of-USA. USA
Subject Codes:FF005. FF100. JJ900. PP400
Supplementary Info:15 ref
ISSN:0361-5995
Year:2001
Journal Title:Soil Science Society of America Journal

Title:Measured and modeled unsaturated hydraulic conductivity of a Walla Walla silt loam
View Article: Soil Science Society of America Journal. 2001. 65 (5). 1385-1391
CD Volume:377
Print Article: Pages: 1385-1391
Author(s):Chen C Payne W A
Author Affiliation:Oregon State Univ., Columbia Basin Agricultural Research Center, P.O. Box 370, Pendleton, OR 97801, USA
Language:English
Abstract:There are numerous methods of estimating unsaturated soil hydraulic conductivity (K(theta)), ranging from direct measurement in the laboratory or field, to models that use only basic soil data, e.g., texture or water release curves (WRC). We evaluated K(theta) for a Walla Walla silt loam (coarse-silty, mixed, superactive, mesic Typic Haploxeroll), in Oregon, USA, using two field methods and the Mualem-van Genuchten model (MVG). Field methods were the internal drainage method and the Klaij and Vachaud method (MKV), which was modified to include hydraulic head (H), and used 20 years of data from a dryland field experiment. Four approaches to estimate WRC were compared for the MKV, and two approaches to estimate parameters of the MVG. For water contents >0.20 m3 m-3, the MKV gave K values that were two orders of magnitude less than those obtained from internal drainage experiments conducted under wetter conditions. When MVG parameters were predicted by the Rosetta model, which used pedotransfer functions, K values approached those of the MVK. However, when model parameters were estimated from internal drainage and saturated hydraulic conductivity (Ksat) data, K(theta) values were closer to those of the internal drainage experiments. The study reaffirms the difficulty of reconciling K(theta) determined by different methodologies, and of extrapolating to values of theta outside those measured. It also demonstrates the sensitivity of the MVG and pedotransfer functions to different sources of input values. Advantages and disadvantages of the different approaches to determining K(theta) are discussed
Descriptors:internal-drainage. methodology. models. saturated-hydraulic-conductivity. silt-loam-soils. soil-texture. soil-types. soil-water-content. unsaturated-hydraulic-conductivity
Subject Codes:JJ300. ZZ100
Supplementary Info:46 ref
ISSN:0361-5995
Year:2001

Journal Title:Soil Science Society of America Journal

Title:Rate and timing of nitrogen fertilizer applications on wheat grown under dryland and supplementary irrigation
View Article: South African Journal of Plant and Soil. 2001. 18 (1). 15-20
CD Volume:340
Print Article: Pages: 15-20
Author(s):Adjetey J A Searle P G E Campbell L C
Author Affiliation:School of Crop Sciences, University of Sydney, Sydney, NSW, 2006, Australia
Language:English
Abstract:Field experiments were carried out at the University of Sydney Farm to examine nitrogen fertilizer application strategies for increasing N uptake and productivity of wheat (Triticum aestivum) grown on a red-brown earth (Natrixeralf) in Australia, under dryland and supplementary irrigation. Increasing N rate increased shoot dry matter and N uptake consistently but grain yield response was greatly dependent on soil moisture or rainfall in the post-heading period. Water availability at this time determined kernel weight and hence grain yield, even when sufficient grain number had been established. Split application of N increased N uptake most, when the second dose was applied at tillering. On the other hand, delayed applications to the time of heading or anthesis resulted in a relatively lower uptake of N even with supplementary irrigation. The effect of a single pre-sowing application was similar to that applied at sowing or early tillering. We conclude that a split application of N is important for increasing N uptake when the second dose is applied during tillering rather than at heading or anthesis
Descriptors:application-rates. crop-growth-stage. crop-yield. dry-matter. flowering. kernels. mineral-uptake. nitrogen. nitrogen-fertilizers. nutrient-uptake. plant-nutrition. rain. shoots. soil-water. split-dressings. tillering. water-availability. wheat
Geographic Locator:Australia
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF061. FF100. JJ700
Supplementary Info:24 ref
ISSN:0257-1862
Year:2001
Journal Title:South African Journal of Plant and Soil

Title:The effect of water stress during grain filling on the yield and processing quality of sunflower seed
View Article: South African Journal of Plant and Soil. 2001. 18 (3). 114-117
CD Volume:340
Print Article: Pages: 114-117
Author(s):Nel A A Loubser H L Hammes P S
Author Affiliation:ARC, Grain Crops Institute, Private Bag X1251, Potchefstroom, 2520, South Africa
Language:English
Abstract:The oil and protein contents of sunflower seed are affected by water stress. Hullability is a seed quality trait which affects the efficiency of oil extrusion and the quality of the oil cake produced from the seed. Apart from cultivars, hullability is also affected by environmental conditions during seed filling. The effect

of water stress, the major environmental factor for yield, on hullability is, however, unclear. The influence of an irrigated and a dryland treatment during the grain filling stage on seed composition, some physical seed properties including hullability, the potential oil and oil cake yield and the protein content of the oil cake of cultivars HV3037, PAN7392 and SNK37 was compared in a field trial in South Africa during 20 November 1997. The relative water content of the leaves showed that the dryland treatment induced a mild to moderate stress compared to the irrigated treatment, which persisted for 25 days from the opening of the inflorescences. Seed yield was reduced by 23%, hullability by 14% and kernel oil content by 2.3% owing to this water stress. Seed yield did not differ amongst cultivars but all physical seed properties differed. The potential oil yield, oil cake yield and composition of the oil cake, however, were not affected by the water stress. Owing to the difference in seed composition and hullability, the potential oil yield, oil cake yield and protein content of the oil cake differed between cultivars
Descriptors:chemical-composition. crop-yield. cultivars. plant-composition. protein-content. seed-quality. seeds. sunflowers. water-stress
Organism Descriptors:Helianthus-annuus
Supplemental Descriptors:Helianthus. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:FF005. FF060. FF062. FF100. FF900
Supplementary Info:16 ref
ISSN:0257-1862
Year:2001
Journal Title:South African Journal of Plant and Soil

Title:Quantitative trait loci for yield and yield components in an Oryza sativa x Oryza rufipogon BC2F2 population evaluated in an upland environment
View Article: Theoretical and Applied Genetics. 2001. 102 (1). 41-52
CD Volume:373
Print Article: Pages: 41-52
Author(s):Moncada P Martinez C P Borrero J Chatel M Gauch H Jr Guimaraes E Tohme J McCouch S R
Author Affiliation:Department of Plant Breeding, 252 Emerson Hall, Cornell University, Ithaca, NY 14853-1901, USA
Language:English
Abstract:An advanced backcross breeding strategy was used to identify quantitative trait loci (QTLs) associated with eight agronomic traits in a BC2F2 population derived from an interspecific cross between Caiapo, an upland Oryza sativa subsp. japonica rice variety from Brazil, and an accession of Oryza rufipogon from Malaysia. Caiapo is one of the most-widely grown dryland cultivars in Latin America and may be planted as a monoculture or in a multicropping system with pastures. The objectives of this study were: (1) to determine whether trait-enhancing QTLs from O. rufipogon would be detected in 274 BC2F2 families grown under the drought-prone, acid soil conditions to which Caiapo was adapted, (2) to compare the performance with and without pasture competition, and (3) to compare putative QTL-containing regions identified in this study with those previously reported for populations adapted to irrigated, low-land conditions. Based on analyses of 125 simple single-length polymorphisms (SSLP) and RFLP markers distributed throughout the genome and using single-point, interval, and composite interval mapping, two putative O. rufipogon derived QTLs were detected for yield, 13 for yield components, four for maturity and six for plant height. We conclude that advanced backcross QTL analysis offers a useful germplasm enhancement strategy

for the genetic improvement of cultivars adapted to stress-prone environments. Although the phenotypic performance of the wild germplasm would not suggest its value as a breeding parent, it is noteworthy that 56% of the trait-enhancing QTLs identified in this study were derived from O. rufipogon. This figure is similar to the 51% of favourable QTLs derived from the same parent in crosses with a high-yielding hybrid rice cultivar evaluated under irrigated conditions in a previous study. In conclusion, parallel studies in rice using AB-QTL analysis provide increasing evidence that certain regions of the rice genome are likely to harbour genes of interest for plant improvement in multiple environments
Descriptors:backcrossing. gene-mapping. genetic-markers. interspecific-hybridization. plant-genetic-resources. plant-height. quantitative-trait-loci. quantitative-traits. restriction-fragment-length-polymorphism. rice. wild-relatives. yield-components
Geographic Locator:Brazil. Malaysia
Organism Descriptors:Oryza. Oryza-rufipogon. Oryza-sativa
Supplemental Descriptors:Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-America. America. Developing-Countries. Threshold-Countries. Latin-America. South-East-Asia. Asia. ASEAN-Countries. Commonwealth-of-Nations
Subject Codes:FF020. FF005. PP720. WW000
Supplementary Info:48 ref
ISSN:0040-5752
Year:2001
Journal Title:Theoretical and Applied Genetics

Title:Molecular-genetic characterisation of a new nematode resistance gene in wheat
View Article: Theoretical and Applied Genetics. 2001. 102 (4). 623-629
CD Volume:373
Print Article: Pages: 623-629
Author(s):Ogbonnaya F C Seah S Delibes A Jahier J Lopez Brana I Eastwood R F Lagudah E S
Author Affiliation:Victorian Institute for Dryland Agriculture, Natimuk Road, PB 260, Horsham, Victoria 3400, Australia
Language:English
Abstract:Bread wheat lines introgressed with Aegilops ventricosa chromosomes were evaluated for their resistance to the Australian cereal cyst nematode (CCN, Heterodera avenae) pathotype Ha13. Higher levels of resistance relative to the phenotype of the Cre1 CCN resistance gene in wheat were found in the donor A. ventricosa parental lines and chromosome 5Nv substitution or addition lines. The newly identified resistance to pathotype Ha13 on chromosome 5Nv, designated, Cre6, was shown to be independent of the A. ventricosa-derived Cre2 gene, effective against several European pathotypes. Another A. ventricosa derived gene, Cre5, showed partial resistance to pathotype Ha13. Inhibition of Ha13 female nematode reproduction was ranked in the order Cre6 >Cre1 >CreF more than or equal to Cre5. Cre6 was inherited as a single dominant locus. Gene sequences encoding nucleotide-binding sites and leucine-rich repeats (NBS-LRR) from the Cre3 CCN pathotype Ha13 resistance locus were used as probes to isolate related sequences from one of the donor A. ventricosa parents. Related sequences from A. ventricosa (71-73% similarity at the amino acid level to the Cre3-derived sequences) of chromosome 5Nv origin were identified and served as diagnostic molecular markers for the presence of 5Nv. CCN susceptible plants, found as variants in some of the purported chromosome 5Nv lines, were also found to be missing the diagnostic 5Nv RFLP markers assayed by the NBS-LRR probe.

An alloplasmic chromosome 5Nv addition line with A. ventricosa cytoplasm in the wheat cultivar, Moisson, background was particularly variable, with 43% CCN-susceptible plants and a corresponding loss of the diagnostic chromosome 5 molecular markers
Descriptors:addition-lines. chromosomes. genes. nucleotide-sequences. pest-resistance. plant-parasitic-nematodes. substitution-lines
Organism Descriptors:Aegilops-ventricosa. Heterodera-avenae. Nematoda
Supplemental Descriptors:Aegilops. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Heterodera. Heteroderidae. Nematoda. invertebrates. animals
Subject Codes:FF005. FF020. WW000. FF620
Supplementary Info:24 ref
ISSN:0040-5752
Year:2001
Journal Title:Theoretical and Applied Genetics

Title:A study on the productivity and diseases of camels in eastern Ethiopia
View Article: Tropical Animal Health and Production. 2001. 33 (4). 265-274
CD Volume:372
Print Article: Pages: 265-274
Author(s):Tefera M Gebreah F
Author Affiliation:Department of Animal and Range Science, Faculty of Dryland Agriculture, Mekelle University, PO Box 231, Mekelle, Ethiopia
Language:English
Language of Summary:spanish. french
Abstract:A study of performance traits of the Ethiopian camel indicated that, in the camel herds examined, there was one active bull camel for 25 females. The bull camel was 5 years old at puberty; it reached rutting vigour at the age of 9 years, the number of mountings per day was 8 during the breeding season, and the reproduction span was 10 years. The female camel reached puberty at 4 years of age; the age at first calving was 5 years, and the lactation period was one year; the calving interval was 2 years, the calving rate was 50%, and the reproduction span was 10-15 years. The survival rate of the newborn calves was 50%. The average milk yield was 2.5 litres per day; the price of camel's milk was higher than that of cow's milk at US$0.5. Adult camels weighed around 500 kg; the dressing-out percentage was 52%. Mutton was preferred to camel meat, which came second in popularity, costing US$2/kg. Owing to their poor reproductive performance, camels are not efficient for producing meat. The camels worked for 16 h per day, covering 60 km. Animal health problems encountered were trypanosomosis, camel pox, camel pustular dermatitis, camel cephalopsis, dermatomycosis, mange mite, tick infestation and balantidiosis, most of which mainly affected the young animals
Descriptors:agricultural-prices. animal-diseases. body-weight. calving-interval. calving-rate. dermatitis. dermatomycoses. dressing-percentage. mange. milk-yield. sexual-maturity. reproduction. reproductive-performance. survival. tick-infestations. trypanosomiasis. protozoal-infections
Geographic Locator:Ethiopia
Identifiers:camels
Organism Descriptors:dromedaries. Trypanosoma. Balantidium
Supplemental Descriptors:Camelus. Camelidae. Tylopoda. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates. East-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Balantidiidae.

Vestibuliferida. Ciliophora. Protozoa. invertebrates. Trypanosomatidae. Kinetoplastida. Sarcomastigophora
Subject Codes:EE110. LL060. LL120. LL250. LL821. LL822. QQ010. QQ030
Supplementary Info:24 ref
ISSN:0049-4747
Year:2001
Journal Title:Tropical Animal Health and Production

Title:Implementing and conducting on-farm weed research with the use of GPS
View Article: Weed Science. 2001. 49 (4). 536-542
CD Volume:374
Print Article: Pages: 536-542
Author(s):Luschei E C Wychen L R van Maxwell B D Bussan A J Buschena D Goodman D
Author Variant:van-Wychen-L-R
Author Affiliation:Department of Land Resources and Environmental Sciences, Montana State University, Bozeman, MT 59717, USA
Language:English
Abstract:The adoption of precision technologies that spatially register measurements using global positioning systems (GPS) greatly facilities conducting large-scale on-farm research by farmers. On-farm experiments that utilize producer equipment include variations in agronomic practices that occur in situations where we want to predict the effect of inputs on yield. The domain of inference for such on-farm studies therefore more closely matches that desired by researchers. To investigate the feasibility of on-farm research using GPS, a study was conducted in 1999 to evaluate the potential benefit of site-specific weed management. The study utilized producer-maintained field-scale equipment on four Montana farms in dryland spring wheat production. Paired site-specific and whole-field herbicide (fenoxaprop, imazamethabenz, tralkoxydim) treatment areas were established in 0.9 to 1.9-ha blocks using consultant weed maps and a geographic information system. Yield was unaffected by herbicide treatment strategy (site-specific or broadcast). Minimal detectable yield differences were evaluated for the experimental design (0.2 t ha-1). Net returns increased when the percentage of field infested by wild oat (Avena fatua) decreased. Visual ratings of wild oat density taken at harvest indicated no difference in wild oat control between treatments in two of four site-years. This research suggests that producer-owned equipment can be used to compare treatments, but the accuracy and subsequent power of such comparisons are likely to be low
Descriptors:agricultural-research. application-methods. broadcasting. crop-yield. experimental-design. feasibility-studies. fenoxaprop. field-experimentation. geographical-information-systems. global-positioning-systems. herbicides. imazamethabenz. nontarget-effects. precision-agriculture. returns. tralkoxydim. wheat
Geographic Locator:Montana. USA
Organism Descriptors:Avena-fatua. Triticum. Triticum-aestivum
Supplemental Descriptors:Avena. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum
Subject Codes:AA500. EE145. FF005. FF100. FF500. HH405. WW000
Supplementary Info:28 ref
ISSN:0043-1745
Year:2001
Journal Title:Weed Science

Title:Potential benefits from alternative areas of agricultural research for dryland farming in northern Syria
View Article: Agricultural Systems. 2002. 72 (2). 93-108
CD Volume:388
Author(s):Petersen E H Pannell D J Nordblom T L Shomo F
Author Affiliation:National Centre for Development Studies, Australian National University, Canberra ACT 0200, Australia
Other Title:Potential benefits from alternative areas of agricultural research for dryland farming in northern Syria
Language:English
Abstract:This study is intended to contribute to the setting of priorities for agricultural research in two regions of northern Syria. A whole-farm economic model based on production data from 8-year field trials, and market and farmer surveys for the same years, is used for each region. The models are run with 10% increases in approximately 30 parameters of the farming system, and the parameters are ranked according to their effect on whole-farm profit. Results indicate that improvements in wheat grain yields have the greatest effect on income, with improvements in lentil grain yields ranking second. Other parameters rate considerably below these two. The lower-ranked parameters include the energy content of barley grain, the lambing percentage, the energy content of lentil straw, and milk production. Extensive sensitivity analysis with plausible economic and environmental changes found that this ranking is robust under all changes for both regions studied
Descriptors:agricultural-research. animal-production. crop-production. dry-farming. farming-systems. productivity. profitability
Geographic Locator:Syria
Supplemental Descriptors:West-Asia. Asia. Mediterranean-Region. Middle-East. Developing-Countries. Threshold-Countries
Subject Codes:aa500. ee110. ff100. ll180
Supplementary Info:21 ref
ISSN:0308-521X
Year:2002
Journal Title:Agricultural Systems

Title:An ecology of a DSS: reflections on managing wheat crops in the northeastern Australian grains region with WHEATMAN
View Article: Agricultural Systems. 2002. 74 (1). 57-77
CD Volume:388
Author(s):Hayman P T Easdown W J
Author Affiliation:NSW Agriculture, RMB 944, Calala Lane, Tamworth, 2340, Australia
Other Title:An ecology of a DSS: reflections on managing wheat crops in the northeastern Australian grains region with WHEATMAN
Language:English
Abstract:An ecological framework is used to study the reinforcing and limiting processes on a computerized decision support system (DSS) designed for winter cropping decisions in the northeastern Australian Grains-belt (WHEATMAN). We found that WHEATMAN has had a significant impact on how many advisers structure their thinking and much of their advice on winter cropping in the region, but the number of routine users of WHEATMAN remains relatively low. Computer hardware was the most obvious limiting factor to widespread use during the early stages of the 15 year history of the project. However, despite a dramatic increase in the availability of computers on grain farms (from 5 to 75%), a maximum of 250 out of an estimated 4500 grain farmers in the region with computers directly use WHEATMAN. Another common limiting factor for adoption of DSS is a failure to engage with end users; yet from early days the WHEATMAN project had a high

degree of extension agronomist and farmer input. We suggest that just as the debate on the adoption of DSS was dominated by discussions of computerization in the late 1980s, notions of user involvement have dominated current debate. Experiences with WHEATMAN suggest that well designed software and a focused development team approach, good access to hardware and representative end user involvement are necessary requirements to help explain the comparative longevity of the project. On their own these are not sufficient requirements for widespread adoption or impact. We argue that the perception of farmers of the nature of dryland farm management in general, and the specific decisions addressed by WHEATMAN are the primary limitations to the routine use of a computerised DSS for tactical decision making
Descriptors:computer-hardware. computer-software. wheat. winter
Geographic Locator:Australia
Identifiers:decision support system
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:cc300. ff005
Supplementary Info:many ref
ISSN:0308-521X
Year:2002
Journal Title:Agricultural Systems

Title:Sheep animal welfare in a low rainfall Mediterranean environment: a profitable investment?
View Article: Agricultural Systems. 2002. 74 (2). 221-240
CD Volume:388
Author(s):Kingwell R
Author Affiliation:Faculty of Agriculture, Agricultural and Resource Economics Group, University of Western Australia, Nedlands, Perth, WA 6907, Australia
Other Title:Sheep animal welfare in a low rainfall Mediterranean environment: a profitable investment?
Language:English
Abstract:Public concern over the welfare of animals used for agricultural production has grown over the last 20 years. This paper examines sheep animal welfare in a dryland farming system in a Mediterranean environment. The farming system examined is an integrated livestock-crop system in the Merredin region of Western Australia, Australia. A model of the farming system is used to examine the impact on farm profits of pursuing various management strategies that impact on sheep animal welfare. Results suggest that maintaining the animal welfare of sheep is the most profitable strategy. By contrast, neglect of animal welfare results in less farm profit. Hence, aside from ethical considerations, there are strong profit motives to maintain animal welfare in the dryland farming system reported here
Descriptors:animal-welfare. dry-farming. farming-systems. investment. models. profitability. profits. sheep-farming
Geographic Locator:Australia. Western-Australia
Organism Descriptors:sheep
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Ovis. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates. Australia
Subject Codes:ee110. ee800. ll145. ll180. ll810
Supplementary Info:32 ref
ISSN:0308-521X

Year:2002
Journal Title:Agricultural Systems

Title:A model for regional optimal allocation of irrigation water resources under deficit irrigation and its applications
View Article: Agricultural Water Management. 2002. 52 (2). 139-154
CD Volume:388
Author(s):Shangguan ZhouPing Shao MingAn Horton R Lei TingWu Qin Lin Ma JianQing
Author Variant:Z. P. S.-M. A. L.-T. W. Q.-L. M.-J. Q. Shangguan
Author Affiliation:Institute of Soil and Water Conservation, National Laboratory of Soil Erosion and Dryland Agriculture on the Loess Plateau, Chinese Academy of Sciences and Ministry of Water Resources, Yangling 712100, Shannxi Province, China
Other Title:A model for regional optimal allocation of irrigation water resources under deficit irrigation and its applications
Language:English
Abstract:It is important to promote efficient use of water through better management of water resources, for social and economical sustainability in arid and semiarid areas, under the conditions of severe water shortage. Based on the developments in deficit irrigation research, a recurrence control model for regional optimal allocation of irrigation water resources, aiming at overall maximum efficiency, is presented, with decomposition-harmonization principles of large systems. The model consists of three levels. The first level involves dynamic programming for optimization of crop irrigation scheduling. The second level deals with optimal allocation of water resources among various crops. The last level concerns optimal allocation of water resources among different sub-regions. As a test, this model was applied to the combined optimal allocation of multiple water resources (surface, ground and in-take from the Weihe river) of Yangling, a semiarid region on the Loess Plateau, China. Exemplary computation showed that not only are the results rational, but the method can also effectively overcome possible dimensional obstacles in dynamic programming of multiple dimensions. Furthermore, each sub-model is relatively independent by using various optimization methods. The model represents a new approach for improving irrigation efficiency, implementing water-saving irrigation, and solving the problem of water shortage in the region studied. The model can be extended in arid and semiarid areas for better water management
Descriptors:groundwater. irrigation. irrigation-scheduling. irrigation-water. mathematical-models. optimization. semiarid-zones. surface-water. water-allocation. water-conservation. water-deficit. water-distribution. water-management. water-resources
Geographic Locator:China
Supplemental Descriptors:East-Asia. Asia. Developing-Countries
Subject Codes:jj800. pp200. pp400. zz100
Supplementary Info:11 ref
ISSN:0378-3774
Year:2002
Journal Title:Agricultural Water Management

Title:Economics of deep-rooted perennials in western Australia
View Article: Agricultural Water Management. 2002. 53 (1/3). 117-132
CD Volume:388
Author(s):Bathgate A Pannell D J
Author Affiliation:Agriculture Western Australia, Locked Bag No. 4, Bentley, WA 6983, Australia
Document Editor:Turner-N-C. Ward-P-R

Other Title:Economics of deep-rooted perennials in western Australia
Conference Title:Special Issue: The role of agroforestry and perennial pasture in mitigating waterlogging and secondary salinity. Selected papers from a symposium held at Albany, Western Australia, 13-14 June 2000.
Language:English
Abstract:Much of the hoped-for success of deep-rooted perennials in reducing the eventual extent of dryland salinity in Australia will depend on the farm-level economic performance of the available perennial-based farming systems. A diverse range of factors contributes to this economic performance, including short-term production-related issues, dynamic factors, sustainability factors, risk factors and whole-farm factors. Although some examples of profitable perennial-based farming systems can be identified, they are limited to particular niches in particular regions, which tend to be higher rainfall regions. For the great majority of land that is at risk of salinisation, no profitable perennial plant options are currently available. The benefits of perennials for on-farm salinity prevention are likely to be of secondary importance in determining their economic attractiveness to farmers. A case study is presented for lucerne (Medicago sativa L.) in the southern region of Western Australia. Lucerne appears likely to be profitable in suitable environments, even without considering salinity-related benefits. However, further improvements to its economic performance are needed if it is to be adopted voluntarily on a scale that would address the bigger, catchment-level problems such as river salinity and flooding risk. Policy implications of these findings are discussed
Descriptors:agricultural-economics. lucerne. perennials. profitability. salinity
Geographic Locator:Australia
Organism Descriptors:Medicago-sativa
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ee110
Supplementary Info:33 ref
ISSN:0378-3774
Year:2002
Journal Title:Agricultural Water Management

Title:An index for quantifying the trade-off between drainage and productivity in tree-crop mixtures
View Article: Agricultural Water Management. 2002. 53 (1/3). 187-199
CD Volume:388
Author(s):Stirzaker R J Lefroy E C Ellis T W
Author Affiliation:CSIRO Land and Water, P.O. Box 1666, Canberra 2601, ACT, Australia
Document Editor:Turner-N-C. Ward-P-R
Other Title:An index for quantifying the trade-off between drainage and productivity in tree-crop mixtures
Conference Title:Special Issue: The role of agroforestry and perennial pasture in mitigating waterlogging and secondary salinity. Selected papers from a symposium held at Albany, Western Australia, 13-14 June 2000
Language:English
Abstract:The introduction of deep-rooted perennial species into catchments dominated by annual crops and pastures forms part of the strategy for managing dryland salinity in South Australia, Australia. This paper provides a methodology for determining whether it is better to mix trees and crops (agroforestry), or segregate them into

plantations and monocrops, when attempting to achieve specified drainage and productivity targets. We introduce an index that quantifies the complementarity or competition for resources between the trees and crops. Data required to calculate this index include crop yield with distance from the tree belt and leaf area of the tree belt compared to the leaf area of a native stand. The method allows for a simple assessment of the most promising tree/crop mixtures. Such an assessment is needed because of the wide range of possible tree-crop-soil-climate combinations and the hydrological complexity of the tree/crop interface. Examples are given which make cases for either separating or mixing trees and crops. We predict that the success of a tree/crop mixture becomes less likely with declining crop season rainfall and increasing seasonal variability and more likely when the tree products have a direct economic benefit
Descriptors:agroforestry-systems. agrosilvicultural-systems. continuous-cropping. crop-yield. cropping-systems. farming-systems. internal-drainage. mixed-cropping. mixtures. plant-competition. plantations. seasonal-variation. soil-salinity
Geographic Locator:Australia. South-Australia
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:ff005. ff100. ff150. jj200. jj300. kk600
Supplementary Info:19 ref
ISSN:0378-3774
Year:2002
Journal Title:Agricultural Water Management

Title:Sustainable cropping systems for high rainfall areas of southwestern Australia
View Article: Agricultural Water Management. 2002. 53 (1/3). 201-211
CD Volume:388
Author(s):Poole M L Turner N C Young J M
Author Affiliation:CSIRO Plant Industry, Centre for Mediterranean Agricultural Research, Private Bag No. 5, Wembley, Perth, WA 6913, Australia
Document Editor:Turner-N-C. Ward-P-R
Other Title:Sustainable cropping systems for high rainfall areas of southwestern Australia
Conference Title:Special Issue: The role of agroforestry and perennial pasture in mitigating waterlogging and secondary salinity. Selected papers from a symposium held at Albany, Western Australia, 13-14 June 2000
Language:English
Abstract:Crop production has increased in the high rainfall (400-700 mm annual rainfall) areas of southwestern Australia in response to prolonged poor prices for wool relative to improvements in grain production technology and a desire by farmers to diversify their enterprise mix. This paper defines the higher rainfall region and suggests that approximately 70% of the area is potentially arable. Economic analysis indicates that for a range of grain and wool prices, profitability is maximized if 20-40% of the farm is cropped. So, cropping is likely to remain an important part of the farming system in this region. In southwestern Australia, water draining below the root zone causes saline groundwater to rise and leads to the development of dryland salinity. It is, therefore, important to develop cropping systems that minimize leakage of water past the root zone. It is suggested that 30% of the farm needs to be in perennial pasture such as lucerne to minimize deep drainage. A rotation of 3 years of lucerne and 3 years of crop over 60% of the farm would meet this target and allow up to 30% of the farm to be cropped. The

strategic introduction of trees in cropped areas increases the potential arable area that can be in crop without a rise of salinity. It is concluded that with careful arrangement of annual crops with perennial vegetation, sustainable crop production is achievable in the high rainfall areas of southwestern Australia
Descriptors:arable-land. crop-production. crop-yield. cropping-systems. economic-analysis. farming-systems. groundwater. internal-drainage. lucerne. rain. rhizosphere. rotations. saline-water. soil-salinity. sustainability. wool
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Medicago. Medicago-sativa
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:ee110. ff007. ff100. ff150. jj200. jj300. ss100
Supplementary Info:29 ref
ISSN:0378-3774
Year:2002
Journal Title:Agricultural Water Management

Title:Impacts of shifting agriculture on a floodplain woodland regeneration in dryland, Kenya
View Article: Agriculture, Ecosystems & Environment. 2002. 90 (2). 211-216
CD Volume:387
Author(s):Oba G Stenseth N C Weladji R B
Author Affiliation:Noragric, Centre for International Environment and Development Studies, The Agricultural University of Norway, P.O. Box 5001, N-1432 As, Norway
Other Title:Impacts of shifting agriculture on a floodplain woodland regeneration in dryland, Kenya
Language:English
Abstract:Perceptions on the role played by shifting agriculture on ecosystems integrity at the landscape scale are divided between those proposing loss of biodiversity and habitat fragmentation and those suggesting improvement of ecosystem diversity. This study investigated the impacts of sorghum (Sorghum bicolor) cultivation in farming landscapes divided between active and fallow farms in the 120 km2 floodplain of the lower Turkwel River, northwestern Kenya. Farming landscapes were grouped into: recently farmed (<15 years), middle (15-20 years), old (20-30 years) and very old (<50 years), distributed across a wide range of micro-topography such as abandoned channels, levees, terraces and sand bars. The impacts were assessed in terms of total woody species richness, cut species richness, coppicing cut tree stumps, percentage mortality of cut tree stumps and seedling and sapling (hereafter called regeneration). The cut tree species richness did not vary between farming landscapes, while the fallow farms had greater woody species richness than the active cultivated farms. More coppices of cut tree stumps were found in farming landscapes of old ages and less in the recent ones. Density of coppicing cut tree stumps was significantly different among farming landscapes of different ages but not between fallow and active farms. Coppices of cut tree stumps were positively correlated with tree regeneration ($r=0.522$, $P<0.0001$). The majority of the woody species had the capacity of coppicing. Among the cut woody species, doum (Hyphaene compressa) coppiced more (562 stems ha-1) than Acacia tortilis (70 stems ha-1). Moreover, regeneration was greater in the active cultivation than in the fallow farms. H. compressa had greater regeneration potential (612 plants ha-1) compared to A. tortilis (49

plants ha-1) and A. albida [Faidherbia albida] (17 plants ha-1). Overall, land clearance resulted in mortality of <5% of cut tree stumps. The sorghum farming cycles through woodland regeneration was closely associated with forest landscapes that were used for livestock browsing. The study shows the positive role played by shifting agriculture in forest regeneration, implying that farming promoted ecosystem diversity
Descriptors:biodiversity. coppice. coppicing. diameter. ecosystems. environmental-impact. fallow. floodplains. natural-regeneration. seedlings. shifting-cultivation. silvicultural-systems. silviculture. species-diversity. species-richness. stumps. woodlands
Geographic Locator:Kenya
Identifiers:Hyphaene compressa. saplings
Organism Descriptors:Acacia-tortilis. Faidherbia-albida. Hyphaene. Sorghum-bicolor
Supplemental Descriptors:Acacia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Faidherbia. Arecaceae. Arecales. monocotyledons. East-Africa. Africa-South-of-Sahara. Africa. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. Anglophone-Africa. Sorghum. Poaceae. Cyperales
Subject Codes:kk100. kk110. pp320. pp720. zz331
Supplementary Info:24 ref
ISSN:0167-8809
Year:2002
Journal Title:Agriculture, Ecosystems & Environment

Title:Root architecture of provenances, seedlings and cuttings of Melia volkensii: Implications for crop yield in dryland agroforestry
View Article: Agroforestry Systems. 2002. 56 (1). 65-72
CD Volume:384
Author(s):Mulatya J M Wilson J Ong C K Deans J D Sprent J I
Author Affiliation:International Centre for Research in Agroforestry, United Nations Avenue, P.O. Box 30677, Nairobi, Kenya; E-Mail: c.ong@cgnet.com, Kenya
Other Title:Root architecture of provenances, seedlings and cuttings of Melia volkensii: Implications for crop yield in dryland agroforestry
Language:English
Abstract:Melia volkensii (Gurke) is being increasingly promoted as an on-farm tree in Kenya. Researchers' and farmers' views on its competitiveness with crops differ; research station studies have found it to be highly competitive whereas farmers do not consider it to be so. Because of difficulties in seed germination, it is probable that dissemination programmes will rely upon plants produced from root and stem cuttings, rather than on seedlings. This study evaluates differences in root system architecture of plants raised from seed (of four provenances), stem or root cuttings and the relationships between the competitivity index (CI) and crop yield. Cuttings were more shallowly rooting than seedlings, and had higher competitivity indices, and there was a negative relationship between CI and crop yield. No differences in root architecture between provenances were found. Therefore, to reduce tree-crop competition, the use of seedlings rather than cuttings should be recommended when promoting the use of this species on dryland farms. If cuttings are used to circumvent the problems of seed germination, alternative methods of controlling competition, such as root pruning, need to be considered
Descriptors:Agronomy- (Agriculture-); Forestry- competitivity-index; dissemination-programs; dryland-agroforestry; index-of-shallow-rootedness; tree-crop-competition

Geographic Locator:Kenya- (Africa-, Ethiopian-region)
Identifiers:root-architecture-assessment: applied-and-field-techniques
Organism Descriptors:Melia-volkensii (Meliaceae-): multipurpose-dryland-tree-species, provenances-, root-cuttings, seed-, seedling-, stem-cuttings; maize- (Gramineae-): grain-crop, yield- root-: architecture-; seed-: germination-; stem-
Supplemental Descriptors:Gramineae-: Monocotyledones-, Angiospermae-, Spermatophyta-, Plantae-; Meliaceae-: Dicotyledones-, Angiospermae-, Spermatophyta-, Plantae- Angiosperms-; Dicots-; Monocots-; Plants-; Spermatophytes-; Vascular-Plants
ISSN:0167-4366
Year:2002
Journal Title:Agroforestry Systems

Title:Agroforestry tree selection in central Chile: Biological nitrogen fixation and early plant growth in six dryland species
View Article: Agroforestry Systems. 2002. 56 (2). 155-166
CD Volume:384
Author(s):Aronson James Ovalle C Avendano J Longeri L del Pozo A
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Other Title:Agroforestry tree selection in central Chile: Biological nitrogen fixation and early plant growth in six dryland species
Language:English
Abstract:Growth rate, resource partitioning, and several biological traits related to biological N2 fixation for six native or non-native tree species were compared using 15N isotope dilution techniques. The trees were field grown for six years in a semiarid mediterranean-climate region with five to six months a year of absolute drought. Trees were tested as candidates for new agroforestry systems being developed in central Chile to improve soil fertility and land 'health', while also increasing productivity and profitability for landowners and animal breeders. Four nitrogen-fixing legume trees (NFTs) were tested: Acacia caven (Mol.) Mol. Prosopis alba Griseb., P. chilensis (Mol.) Steuntz. emend. Burk., and Tagasaste (Chamaecytisus proliferus L.f. subsp. palmensis (Christ.) Kunkel). Additional, non-nitrogen-fixing trees were the slow-growing native Huingan (Schinus polygamus (Cav.) Caberera and the fast-growing European Ash (Fraxinus excelsior L.). Among the NFTs, highly contrasting patterns in biological nitrogen fixation (BNF) were detected, for Ndfa (proportion of N derived from atmosphere), nodule efficiency (NE = gN fixed g-1 nodules), and N content in leaves, stems and roots. Tagasaste produced 2.5-25 times more biomass and fixed 4.5 to 30 times more atmospheric nitrogen than the South American Acacia and Prosopis species. Ndfa reached 250 g plant-1 in Tagastaste, in the sixth year, with NE = maximum 2.68 in the 4th year, and 1.12 in the 6th year. In contrast, Acacia caven had by far the highest NE of the four NFTs - 12.13 in the 4th year and 6.6 in the 6th year. Whereas BNF in Tagasaste peaked in the fourth year, and declined thereafter, BNF in Acacia caven increased steadily over six years. Fraxinus excelsior and Schinus polygamus had growth rates and biomass accumulation intermediate between that of Tagasaste and the South American NFTs. Results are discussed in relation to agroforestry, restoration of soil fertility, and ecological and economic rehabilitation of damaged ecosystems and landscapes
Descriptors:Forestry-; Terrestrial-Ecology (Ecology-, Environmental-Sciences) nitrogen-: fixation- absolute-drought; agroforestry-; agroforestry-tree-selection; animal-breeder-productivity; animal-

breeder-profitability; biological-nitrogen-fixation; damaged-ecosystems: ecological-rehabilitation, economic-rehabilitation; early-growth; land-health-improvement; landowner-productivity; landowner-profitability; new-agroforestry-systems; nodule-efficiency; semiarid-mediterranean-climate-region; soil-fertility-improvement; soil-fertility-restoration
Geographic Locator:central-Chile (Chile-, South-America, Neotropical-region)
Identifiers:nitrogen-15-isotope-dilution-method: applied-and-field-techniques
Organism Descriptors:Acacia-caven (Leguminosae-): South-American-native, growth-rate, nitrogen-fixing-associated-biological-traits, nitrogen-fixing-legume-trees, resource-partitioning; Chamaecytisus-proliferus-subsp.-palmensis [tagasaste-] (Leguminosae-): growth-rate, nitrogen-fixing-associated-biological-traits, nitrogen-fixing-legume-trees, resource-partitioning; Fraxinus-excelsior [European-ash] (Oleaceae-): fast-growing, non-nitrogen-fixing-tree; Prosopis-alba (Leguminosae-): South-American-native, growth-rate, nitrogen-fixing-associated-biological-traits, nitrogen-fixing-legume-trees, resource-partitioning; Prosopis-chilensis (Leguminosae-): South-American-native, growth-rate, nitrogen-fixing-associated-biological-traits, nitrogen-fixing-legume-trees, resource-partitioning; Schinus-polygamus [huingan-] (Anacardiaceae-): non-nitrogen-fixing-tree, resource-partitioning, slow-growing-native leaves-: nitrogen-content; nodule-; roots-: nitrogen-content; stems-: nitrogen-content
Supplemental Descriptors:Anacardiaceae-: Dicotyledones-, Angiospermae-, Spermatophyta-, Plantae-; Leguminosae-: Dicotyledones-, Angiospermae-, Spermatophyta-, Plantae-; Oleaceae-: Dicotyledones-, Angiospermae-, Spermatophyta-, Plantae- Angiosperms-; Dicots-; Plants-; Spermatophytes-; Vascular-Plants
ISSN:0167-4366
Year:2002
Journal Title:Agroforestry Systems

Title:Planting date, cultivar, and tillage system effects on dryland soybean production
View Article: Agronomy Journal. 2002. 94 (1). 81-88
CD Volume:391
Print Article: Pages: 81-88
Author(s):Popp M P Keisling T C McNew R W Oliver L R Dillon C R Wallace D M
Author Affiliation:Dep. of Agric. Econ. and Agribusiness, Univ. of Arkansas, Fayetteville, AR 72701, USA
Other Title:Planting date, cultivar, and tillage system effects on dryland soybean production
Language:English
Abstract:Soyabean (Glycine max) yields from non-irrigated fields in the mid-southern USA have consistently lagged behind those from irrigated fields. Nonetheless, non-irrigated fields still attract a larger share of soyabean acreage in this region. This is likely due to various irrigation constraints, which include land leasing arrangements, water shortage, lack of management time and low levels of operating capital. The objective of this study was to identify production system components consisting of tillage, cultivar selection and planting date strategies for a soil series that are most suitable for enhancing economic returns to dryland soyabean. Data from field experiments in three locations in Arkansas, USA during 1995 and 1996 were used for the study. Leading production systems were identified on the basis of their net returns. Results of the study showed that the performance of the production systems in

terms of crop yields and net returns is influenced by the location and production year. While the evidence on pure planting date effects was confounded with physical field location, cultivar yields from early soyabean plantings in April and May were generally higher than those from later plantings. Furthermore, conventional and fallow production systems had higher net returns than no-till systems, largely due to higher herbicide costs associated with no-till systems. Sensitivity analysis showed that planting date and seedbed preparations are robust to changes in herbicide, fuel and soyabean prices. Further, careful attention to cultivar selection is deemed appropriate because cost differences of cultivar seeds are minor relative to net return differences that are yield driven
Descriptors:crop-yield. cultivars. fallow. no-tillage. planting-date. returns. soyabeans. tillage
Organism Descriptors:Glycine-(Fabaceae). Glycine-max
Supplemental Descriptors:Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ee110. ff005. ff020. ff100. jj900
Supplementary Info:22 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Transition to dryland agriculture: limited irrigated vs. dryland corn
View Article: Agronomy Journal. 2002. 94 (2). 310-320
CD Volume:391
Print Article: Pages: 310-320
Author(s):Norwood C A Dumler T J
Author Affiliation:Southwest Res. Ext. Cent., 4500 E. Mary, Garden City, KS 67846, USA
Other Title:Transition to dryland agriculture: limited irrigated vs. dryland corn
Language:English
Abstract:Maize (Zea mays) is grown on more irrigated hectares than any crop in the Great Plains. Much of this area is irrigated from the Ogallala aquifer, which is being depleted. Research was conducted at Garden City, Kansas, USA from 1998 through 2000 to compare grain yield and water use of short- and long-season maize hybrids to determine if limited irrigation is a viable alternative to dryland in an area of declining ground water. Maize hybrids having maturities of 104 d (H1) and 116 d (H2) were grown at populations averaging 44 000 (P1) and 69 000 (P2) plants ha-1. Treatments were dryland and 150 (one irrigation) and 300 mm (two irrigations) of water. When irrigated, H2 yielded most in the two wettest years, but H1 yielded most in the driest year. Average grain yields from dryland, one irrigation and two irrigations of H1 were 6.38, 8.23 and 8.79 Mg ha-1, respectively. For H2, yields were 5.75, 9.04 and 9.75 Mg ha-1, respectively. Grain yield responses from two irrigations did not occur for either hybrid in 1999 or for H1 in 1998. At current pumping costs of approximately $0.20 mm-1, it is probably not economically feasible to irrigate more than once unless the maize price exceeds $0.099 kg-1. Irrigating long-season maize once, given a price of $0.099 kg-1, will increase profits by $71 ha-1 more than dryland production and $44 ha-1 more than with a short-season hybrid. Lower maize prices and/or higher pumping costs will force the conversion of irrigated hectares to dryland
Descriptors:cost-benefit-analysis. crop-yield. hybrids. irrigation. maize. plant-water-relations. prices. profits
Geographic Locator:Kansas. USA

Organism Descriptors:Zea-mays
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ee110. ff005. ff062. ff100. jj800
Supplementary Info:19 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Establishment of wheat seedlings after early sowing and germination in an arid Mediterranean environment
View Article: Agronomy Journal. 2002. 94 (3). 585-593
CD Volume:391
Print Article: Pages: 585-593
Author(s):Klein J D Mufradi I Cohen S Hebbe Y Asido S Dolgin B Bonfil D J
Author Affiliation:Agric. Res. Organ., Dep. of Field Crops and Nat. Resour., Volcani Cent., POB 6, Bet Dagan 50250, Israel
Other Title:Establishment of wheat seedlings after early sowing and germination in an arid Mediterranean environment
Language:English
Abstract:Seedling establishment of dryland crops in semiarid and arid zones is limited by precipitation. Spring wheat (Triticum aestivum) generally is sown in dry soil in the dryland regions of Israel before the rainy season starts. We compared the effects of no-tillage, conventional tillage, and plant growth regulators on wheat cv. Nirit seedling growth to identify the optimum crop management system for seedling establishment in dryland farming. Experiments were conducted during 1998 and 1999 at the Gilat Experimental Station located in southern Israel (annual precipitation of 222 and 72 mm for 1998 and 1999, respectively; soil type is sandy loam loess - Torrifluvents). Neither inhibitors of gibberellin synthesis (chlorocoline chloride, paclobutrazol, and trinexapac-ethyl) nor monopotassium phosphate (KH_2PO_4) enhanced seedling survival under drought stress when sprayed on seedlings at the two-leaf stage. No-tillage led to increases in water content in the upper (0-30 cm) soil layer and in seedling water content and seedling biomass. No-tillage management also maintained seedling viability compared with the control, with seedlings surviving as long as 35 days without precipitation. No-tillage management allows successful seedling establishment and growth after a dry period that follows germination
Descriptors:crop-establishment. drought. germination. gibberellins. growth. no-tillage. plant-growth-regulators. seedling-growth. sowing-date. tillage. water-stress. wheat
Geographic Locator:Israel
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:West-Asia. Asia. Mediterranean-Region. Middle-East. Developed-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff100. ff900. ff005. ff060. ff062
Supplementary Info:14 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Water depletion depth of grain sorghum and sunflower in the central High Plains
View Article: Agronomy Journal. 2002. 94 (4). 936-943
CD Volume:391
Print Article: Pages: 936-943
Author(s):Stone L R Goodrum D E Schlegel A J Mahmad Nor Jaafar Khan A H
Author Affiliation:Dep. of Agron., Throckmorton PSC, Kansas State Univ., Manhattan, KS 66506-5501, USA
Other Title:Water depletion depth of grain sorghum and sunflower in the central High Plains
Language:English
Abstract:In dryland agriculture of the central High Plains, water is often the primary factor influencing selection of crops and cropping systems. For improved water management, a greater percentage of precipitation during fallow must be stored and used in crop production. More efficient water use can be promoted via agronomic management such as extending the root zone by use of deep-rooted crops. While sunflower (Helianthus annuus) has a reputation for deep rooting, grain sorghum (Sorghum bicolor) is the dominant dryland row crop in western Kansas (USA). Our objective was to contrast the depth of soil water depletion and end-of-season rooting depth of sorghum and sunflower. Rooting depth at end of season was measured by the core-break method during a 3-year (1985-87) study near Tribune, Kansas, on a Ulysses silt loam soil (fine-silty, mixed, superactive, mesic Aridic Haplustoll). Water content was measured to the 3.2-m soil depth by neutron thermalization. The water depletion front advanced downward at greater rates and to deeper depths with sunflower (3.1 m) than with sorghum (2.5 m). Water depletion in the 2.2- to 3.3-m soil depth zone was significantly more for sunflower (48 mm) than for sorghum (14 mm). End-of-season rooting depth was significantly greater for sunflower (3.03 m) than for sorghum (2.54 m). The faster advance of the water depletion front and greater depth of rooting of sunflower compared with sorghum are factors contributing to drought avoidance in sunflower and its ability to deplete water from deeper soil depths
Descriptors:drought. drought-resistance. rooting. roots. soil-depth. sunflowers. water-stress. water-use
Geographic Locator:Kansas. USA
Organism Descriptors:Helianthus-annuus. Sorghum-bicolor
Supplemental Descriptors:Helianthus. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Sorghum. Poaceae. Cyperales. monocotyledons
Subject Codes:ff005. ff062. ff900
Supplementary Info:34 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Residue accumulation and changes in soil organic matter as affected by cropping intensity in no-till dryland agroecosystems
View Article: Agronomy Journal. 2002. 94 (4). 944-954
CD Volume:391
Print Article: Pages: 944-954
Author(s):Ortega R A Peterson G A Westfall D G
Author Affiliation:Pontificia Universidad Catolica de Chile, Santiago, Chile

Other Title:Residue accumulation and changes in soil organic matter as affected by cropping intensity in no-till dryland agroecosystems
Language:English
Abstract:Crop residue is a valuable resource in Great Plains of eastern Colorado (USA) dryland agroecosystems because it aids in water conservation and soil erosion control. The objectives of our research were to (i) determine the effect of cropping intensity, climate gradient, and soil depth on levels and changes in soil C, soil N, and residue parameters after 8 years of no-till management in dryland cropping systems and (ii) relate soil and residue parameters to soil C and N levels. Surface soil properties and residue parameters were compared in two cropping systems, wheat (Triticum aestivum)-fallow (WF) and wheat-maize (Zea mays) or sorghum (Sorghum bicolor)-proso millet (Panicum miliaceum)-fallow (WCMF). The effects were examined on the summit position of a catenary sequence of soils across three environments representing an evapotranspiration (ET) gradient. Soils at the low- and medium-ET sites are classified as Argiustolls, and the soil at the high-ET site is an Ustochrept. There was 3.0 t ha-1 of residue in the surface 10 cm of soil compared with 2.7 t ha-1 of residue on the soil surface averaged over ET gradient and cropping systems. Approximately 90% of the residue in the soil was found within the 2.5-cm soil depth. The highest soil organic C (SOC) and soil organic N (SON) were observed in the surface 0- to 2.5-cm depth. There was a trend (Pless than or equal to 0.16) for the more intense WCMF cropping system to have higher SOC and SON contents than the traditional WF system (C=6.6 g kg-1 for WF compared with 7.5 g kg-1 for WCMF and N=0.70 g kg-1 for WF compared with 0.74 g kg-1 for WCMF). From 1985 to 1993, gains in SOC (967 kg ha-1) and SON (74 kg ha-1) occurred in the surface 0- to 2.5- and 2.5- to 5-cm depths while losses were observed in the 5- to 10-cm depth (SOC=-694 kg ha-1; SON=-44 kg ha-1). Climate strongly modified these effects but did not reflect a clear ET gradient effect. The results suggest that higher levels of surface SOC and SON can be attained by increasing cropping intensity under no-till management
Descriptors:carbon-nitrogen-ratio. cellulose. chemical-composition. climate. crop-residues. cropping-systems. dry-farming. erosion. erosion-control. evapotranspiration. fallow. fibre-content. Inceptisols. lignin. maize. Mollisols. no-tillage. organic-carbon. organic-nitrogen. soil-conservation. soil-depth. soil-organic-matter. soil-types. water-conservation. wheat
Geographic Locator:Colorado. USA
Organism Descriptors:Panicum-miliaceum. Sorghum-bicolor. Triticum. Triticum-aestivum. Zea-mays
Supplemental Descriptors:Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Panicum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Sorghum. Triticum. Zea
Subject Codes:ff005. ff062. ff100. ff150. jj200. jj900. pp400. xx200
Supplementary Info:36 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Cropping system influence on planting water content and yield of winter wheat
View Article: Agronomy Journal. 2002. 94 (5). 962-967
CD Volume:391
Print Article: Pages: 962-967

Author(s):Nielsen D C Vigil M F Anderson R L Bowman R A Benjamin J G Halvorson A D
Author Affiliation:Central Great Plains Res. Stn., USDA-ARS, 40335 County Road GG, Akron, CO 80720, USA
Other Title:Cropping system influence on planting water content and yield of winter wheat
Language:English
Abstract:Many dryland producers in the central Great Plains of the USA express concern regarding the effect that fallow elimination has on soil water content, winter wheat planting, and subsequent yields. Our objectives were to quantify cropping system effects (fallow weed control method and crop sequence), including maize (C) and proso millet (M), on soil water at winter wheat planting and subsequent grain yield, and to determine the frequency of environmental conditions which would cause wheat yield to drop below 2500 kg ha-1 for various cropping systems. Crop rotations evaluated from 1993 to 2001 at Akron, Colorado, USA, were W-F, W-C-F, W-M-F, and W-C-M (all no-till), and W-F (conventional till). Yields were correlated with soil water at planting: kg ha-1=373.3+141.2 x cm (average and wet years); kg ha-1=897.9+39.7 x cm (dry years). Increasing cropping intensity to two crops in 3 years had little effect on water content at wheat planting and subsequent grain yield, while continuous cropping and elimination of fallow reduced soil water at planting by 11.8 cm and yields by 450 to 1650 kg ha-1, depending on growing season precipitation. No-till systems, which included a 12- to 15-month fallow period before wheat planting nearly always produced at least 2500 kg ha-1 of yield under normal to wet conditions, but no cropping system produced 2500 kg ha-1 under extremely dry conditions
Descriptors:crop-yield. cropping-systems. fallow. maize. sequential-cropping. soil-water. soil-water-content. tillage. wheat. winter-wheat
Organism Descriptors:Panicum-miliaceum. Triticum-aestivum. Zea-mays
Supplemental Descriptors:Panicum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Triticum. Zea
Subject Codes:ff005. ff100. ff150. jj300
Supplementary Info:27 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Yield responses to narrow rows depend on increased radiation interception
View Article: Agronomy Journal. 2002. 94 (5). 975-980
CD Volume:391
Print Article: Pages: 975-980
Author(s):Andrade F H Calvino P Cirilo A Barbieri P
Author Affiliation:Unidad Integrada INTA Balcarce, Facultad de Ciencias Agrarias UNMP
Other Title:Yield responses to narrow rows depend on increased radiation interception
Language:English
Abstract:The response of grain yield to narrow rows can be analysed in terms of the effect on the amount of radiation intercepted by the crops. The objective of this work was to study the effect of row spacing (2-row distances of 0.52 and 0.70 m, 0.35 and 0.70 m, 0.50 and 0.70 m, 0.19 and 0.57 m, and 0.30 and 0.60 m) on grain yield and radiation interception (RI) during the critical period for grain set in three crop species. Ten experiments were conducted with maize (cultivars DK 688, P37P73, C7301, C280, M4, C Titanium, C 343, DK757, Ax924, and Ax884), sunflower (Rancul 20, Zenit, and Paraiso), or

soyabean (SRF 350, Ax 3127, Williams, Ax4268, SRF450, Crawford, Pioneer 9396, Don Mario 2800, and Mitchel), under irrigation or under dryland conditions in Balcarce, Tandil, and Pergamino, Argentina, without severe drought during flowering and grain filling. The treatments consisted of two row distances combined with other factors such as plant density, cultivar, defoliation, etc. Grain yield responses to decrease distance between rows were inversely proportional to RI achieved with the wide-row control treatment during the critical period for grain number determination (r2=0.62, 0.54, and 0.86 for maize, soyabean, and sunflower, respectively). Moreover, when row spacing was reduced, grain yield increases and RI increases during the critical periods for grain set were significantly and directly correlated in the three crop species (r2=0.71, 0.64, and 0.94 for maize, soyabean, and sunflower, respectively). For the conditions of these experiments, grain yield increase in response to narrow rows was closely related to the improvement in light interception during the critical period for grain set
Descriptors:crop-growth-stage. crop-yield. cultivars. environmental-factors. interception. leaf-fall. light. maize. plant-density. row-spacing. soyabeans. sunflowers
Geographic Locator:Argentina
Organism Descriptors:Glycine-(Fabaceae). Glycine-max. Helianthus-annuus. Zea-mays
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Helianthus. Asteraceae. Asterales. Zea. Poaceae. Cyperales. monocotyledons
Subject Codes:ff005. ff100
Supplementary Info:many ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Profile water balance model under irrigated and rainfed systems
View Article: Agronomy Journal. 2002. 94 (5). 1204-1211
CD Volume:391
Print Article: Pages: 1204-1211
Author(s):Mandal U K Sarma K S S Victor U S Rao N H
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Other Title:Profile water balance model under irrigated and rainfed systems
Language:English
Abstract:A profile moisture model has been developed to evaluate the seasonal soil moisture fluctuation with respect to soil characteristics and land use pattern under irrigated and rainfed conditions in an area of agricultural fields. Daily rainfall and irrigation were used as model inputs. Instantaneous uniform redistribution of soil moisture in the effective root zone and negligible contribution of soil water through upward flux were assumed. An empirical model was used to determine the root depth. Runoff was estimated from rainfall data using the curve number technique of the Soil Conservation Service adapted for conditions in India and combined with a soil moisture-accounting procedure. The modified Penman method was used to calculate the reference evapotranspiration. To calculate the crop coefficient (Kc), regression equations were developed taking Kc as the dependent

variable on normalized difference vegetation index. This model was very easy to parameterize and required a minimum soil data set of field capacity and permanent wilting point. To evaluate model performance, observed values of soil water were taken for wheat (Triticum aestivum) in the Mehrauli (sandy loam to loam texture) and Daryapur (loamy texture) soil series under irrigated conditions and for gram (Cicer arietinum) in the Jagat (clay loam texture) and Holambi (loam texture) soil series under rainfed conditions in New Delhi. The r2 and D index between observed and predicted soil water values varied between 0.67 and 0.77 and 0.83 and 0.93, respectively
Descriptors:chickpeas. clay-loam-soils. evapotranspiration. field-capacity. infiltration. irrigated-conditions. irrigation. loam-soils. percolation. rain. rooting-depth. runoff. sandy-loam-soils. soil-texture. soil-types. soil-water-balance. temporal-variation. wheat
Geographic Locator:Delhi. India
Organism Descriptors:Cicer-arietinum. Triticum. Triticum-aestivum
Supplemental Descriptors:Cicer. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. South-Asia. Asia. Developing-Countries. Commonwealth-of-Nations. Triticum. Poaceae. Cyperales. monocotyledons. India
Subject Codes:ff005. ff062. jj300. jj800. pp500
Supplementary Info:35 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Simulating soybean water stress effects with RZWQM and CROPGRO models
View Article: Agronomy Journal. 2002. 94 (6). 1234-1243
CD Volume:391
Print Article: Pages: 1234-1243
Author(s):Nielsen D C Ma L W Ahuja L R Hoogenboom G
Author Affiliation:USDA-ARS, Cent. Great Plains Res. Stn., 40335 County Rd. GG, Akron
Other Title:Simulating soybean water stress effects with RZWQM and CROPGRO models
Language:English
Abstract:The Root Zone Water Quality Model (RZWQM) and CROPGRO-Soyabean simulate soyabean (Glycine max) growth, development and yield. The models require calibration for soyabean grown in the specific environmental conditions of the central Great Plains before any long-term assessments can be made of dryland soyabean yield potential under the highly variable precipitation patterns of this area. The objective of this study was to calibrate and test RZWQM and CROPGRO-Soyabean for soyabean growth, yield and water use under a range of water stress conditions normally encountered by dryland production systems in the central Great Plains. Data from five experiments conducted during 1985-86 on Colorado, USA, each with four levels of water availability (20 data sets), were used to evaluate leaf area, plant height, aboveground biomass, evapotranspiration (ET), soil water extraction and yield of soyabean. Data from one water level of one experiment was used to calibrate the models, and the other 19 data sets were used as evaluation data sets. Both models correctly predicted the time course of volumetric water content, leaf area development, and plant and height biomass increase although RZWQM more accurately simulated water extraction in the lower soil profile. The decline in ET that is a result of decreased water availability was generally predicted well by both models. The models generally estimated the yield to within 10 to 15% of measured values. The models should be useful tools in evaluating the potential for

soyabean as an alternative crop in dryland rotations in the central Great Plains
Descriptors:biomass. crop-yield. evapotranspiration. growth. leaf-area. models. plant-development. plant-height. simulation-models. soyabeans. water-stress
Geographic Locator:Colorado. USA
Organism Descriptors:Glycine-(Fabaceae). Glycine-max
Supplemental Descriptors:Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Glycine-(Fabaceae). Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff060. ff100. zz100
Supplementary Info:50 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal

Title:Tillage system and crop rotation effects on dryland crop yields and soil carbon in the central Great Plains
View Article: Agronomy Journal. 2002. 94 (6). 1429-1436
CD Volume:391
Print Article: Pages: 1429-1436
Author(s):Halvorson A D Peterson G A Reule C A
Author Affiliation:USDA-ARS, 301 South Howes, Rm 407, Fort Collins, CO 805522, USA
Other Title:Tillage system and crop rotation effects on dryland crop yields and soil carbon in the central Great Plains
Language:English
Abstract:Winter wheat (Triticum aestivum)-fallow (WF) using conventional stubble mulch tillage (CT) is the predominant production practice in the central Great Plains and has resulted in high erosion potential and decreased soil organic C (SOC) contents. This study, conducted from 1990 through 1994 on a Weld silt loam (Aridic Argiustoll) near Akron, Colorado, USA, evaluated the effect of WF tillage system with varying degrees of soil disturbance (no-till (NT), reduced till (RT), CT and bare fallow (BF)) and crop rotation (WF, NT wheat-corn (Zea mays)-fallow (WCF), and NT continuous corn (CC)) on winter wheat and maize yields, aboveground residue additions to the soil at harvest, surface residue amounts at planting and SOC. Neither tillage nor crop rotation affected winter wheat yields, which averaged 2930 kg/ha. Maize grain yields for the CC (NT) and WCF (NT) rotations averaged 1980 and 3520 kg/ha, respectively. The WCF (NT) rotation returned 8870 kg/ha residue to the soil in each 3-year cycle, which is 2960 kg/ha on an annual basis. Annual residue return in WF averaged 2520 kg/ha, which was 15% less than WCF (NT). Annual maize residue returned to the soil was 3190 kg/ha for the CC (NT) rotation. At wheat planting, surface crop residues varied with year, tillage and rotation, averaging WCF (NT) (5120 kg/ha) > WF (NT) (3380 kg/ha) > WF (RT) (2140 kg/ha) > WF (CT) (1420 kg/ha) > WF (BF) (50 kg/ha). Soil erosion potential was lessened with WCF (NT), CC (NT) and WF (NT) systems because of the large amounts of residue cover. Levels of SOC in descending order in 1994 were CC (NT) more than or equal to WCF (NT) more than or equal to WF (NT)=WF/(RT)=WF (CT) > WF (BF). Although not statistically significant, the CC (NT) treatment appeared to be accumulating more SOC than any of the rotations that included a fallow period, even more rapidly than WCF (NT), which had a similar amount of annualized C addition. Reduced tillage and intensified cropping increased SOC and reduced soil erosion potential

Descriptors:carbon. crop-yield. cropping-systems. maize. no-tillage. rotations. soil-fertility. stubble-mulching. tillage. wheat
Geographic Locator:Colorado. USA
Organism Descriptors:Triticum. Triticum-aestivum. Zea-mays
Supplemental Descriptors:Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Zea
Subject Codes:ff005. ff100. ff150. jj600
Supplementary Info:30 ref
ISSN:0002-1962
Year:2002
Journal Title:Agronomy Journal
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Title:Performance evaluation of basin lister cum-seeder attachment to tractor-drawn cultivator
View Article: AMA, Agricultural Mechanization in Asia, Africa and Latin America. 2002. 33 (1). 15-19
CD Volume:390
Print Article: Pages: 15-19
Author(s):Selvan M M Kathirvel K Manian R
Author Affiliation:College of Agricultural Engineering, Tamil Nadu Agricultural University, Coimbatore - 641 003, India
Other Title:Performance evaluation of basin lister cum-seeder attachment to tractor-drawn cultivator
Language:English
Abstract:In dryland farming it is important to have even a relatively small amount of water stored in the soil prior to sowing of crops. This can be achieved effectively by creating a multitude of small basins. A basin lister cum-seeder as an attachment to tractor drawn cultivator was developed for cotton to perform tilling, basin forming and sowing simultaneously. Keeping in consideration of day-by-day increase in tractor population, the unit was developed as a rear mounted attachment to four-wheel tractor of 35-45 hp range and consists of common cultivator attached with a three bottom basin lister and mounted with a cup feed type seeder as attachments. The unit was evaluated for its performance in dryland for cotton crop cultivation. The amount of soil moisture observed was greater in the basin lister cum seeder treatment in all important stages and at all depths studied. The basin lister cum-seeder registered the highest seed cotton yield of 796 kg/ha which is 41.64% higher than control treatment. There was a positive relationship between the moisture content at various stages and depths with yield. The basin lister cum-seeder offered 31.41, 96.30 and 17.73% savings in cost, time and energy, respectively
Descriptors:cotton. crop-yield. dry-farming. equipment-performance. mathematical-models. seeder-cultivators. soil-water. tillage. tractors
Organism Descriptors:Gossypium
Supplemental Descriptors:Malvaceae. Malvales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff100. jj300. jj900. nn400. zz100
Supplementary Info:7 ref
ISSN:0084-5841
Year:2002
Journal Title:AMA, Agricultural Mechanization in Asia, Africa and Latin America
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Title:The nutritional value of Lathyrus cicera and Lupinus angustifolius grain for sheep
View Article: Animal Feed Science and Technology. 2002. 99 (1/4). 45-64
CD Volume:388
Author(s):White C L Hanbury C D Young P Phillips N Wiese S C Milton J B Davidson R H Siddique K H M Harris D
Author Affiliation:CSIRO Livestock Industries, Private Bag 5, Wembley, WA 6014, Australia
Other Title:The nutritional value of Lathyrus cicera and Lupinus angustifolius grain for sheep
Language:English
Abstract:Certain Lathyrus species have recently been found suitable as multipurpose legume crops in the southern Australian dryland regions, with a potential growing area of 100 000-300 000 ha. However, their use is limited by the presence, mainly in seeds, of 3-(-N-oxalyl)-L-2,3-diamino propionic acid (ODAP), an agent which causes lathyrism. Researchers at the Centre for Legumes in Mediterranean Agriculture (CLIMA) have selected a high yielding variety of Lathyrus cicera (cv. Chalus) which contains consistently low levels of ODAP. The aim of the present study was to assess the nutritional value and animal health aspects of Lathyrus cicera cv. Chalus grain as a feed for sheep. Comparisons were made against lupin grain (Lupinus angustifolius). Eighty individually penned Merino wethers (35 plus or minus 0.3 kg) were allocated to four treatment groups of 20 sheep. Following a 4-week adjustment period, sheep were fed ad libitum the following treatment diets for up to 13 weeks: 35% lathyrus, 35% lupin, 70% lathyrus and 70% lupin. The remainder of the diet was oaten hay and minerals. After 10 weeks on treatments, 14 sheep per group were killed for carcass assessment. The remaining six sheep were fed to maintenance ME requirements for 1 week followed by a 10-day faecal and urinary collection period. Analysis of the grains showed that lathyrus contained less protein (28 vs. 36%), fat (0.7 vs. 4.1%) and fibre (25 vs. 36% NDF) but more starch (42 vs. 1%) and antinutritional compounds (ODAP, tannins and trypsin inhibitor) than lupin. Essential amino acid composition was similar for the two grains, as were in sacco degradabilities of dry matter (DM) (84 vs. 81%) and protein (92 vs. 94%). The feeding experiment showed that lathyrus had a higher nutritional value than lupin in terms of voluntary feed intake, liveweight gain ($P<0.01$), carcass weights ($P<0.05$) and feed efficiency ($P=0.05$). Wool growth reflected ME intake and there was no independent effect of grain type ($P>0.05$). Results from the balance study showed that ME concentration was the same for both grains (14 MJ/kg DM). Microbial crude protein (CP) synthesis, estimated from urinary purine derivatives, was significantly lower for lathyrus than lupin and was lower at 70% grain inclusion than at 35% ($P<0.05$). There were no visible or biochemical signs of ill health (inappetence, lethargy, shaking or instability) in any sheep fed lathyrus. Several sheep fed the 70% lupin diet had mild diarrhoea and two were eventually removed from the experiment due to anorexia. Meat from sheep fed lupin tended to be yellower than that from those fed lathyrus ($P=0.05$). Apart from this, there were no differences in meat quality due to grain type (e.g. redness, pH, taste or tenderness). In conclusion, compared with lupin grain, low ODAP Lathyrus cicera grain appears to be of high nutritional value for sheep, with no evidence of adverse effects on sheep health
Descriptors:amino-acids. antinutritional-factors. carcass-weight. chemical-composition. crude-protein. cultivars. diets. dry-matter. energy-intake. fat. feed-conversion-efficiency. feed-grains. feed-intake. fibre. liveweight-gain. meat-quality. metabolizable-energy.

nutritive-value. plant-composition. propionic-acid. protein-content. protein-digestibility. rumen-digestion. sheep-feeding. sheepmeat. starch. tannins. trypsin-inhibitors. wethers. wool-production
Organism Descriptors:Lathyrus-cicera. Lupinus-angustifolius. sheep
Supplemental Descriptors:Lathyrus. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lupinus. Ovis. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates
Subject Codes:ff007. ff040. ll500. ll520. qq030. qq500. rr300. ss100
Supplementary Info:many ref
ISSN:0377-8401
Year:2002
Journal Title:Animal Feed Science and Technology

Title:Eucalypt dieback in Eastern Australia: a simple model
View Article: Australian Forestry. 2002. 65 (2). 87-98
CD Volume:391
Print Article: Pages: 87-98
Author(s):Jurskis V Turner J
Author Affiliation:State Forests of NSW, PO Box 273, Eden, NSW 2551, Australia
Other Title:Eucalypt dieback in Eastern Australia: a simple model
Language:English
Abstract:Eucalypt dieback is widespread throughout Australia and affects an increasing range of species. In addition to salt, a 1993 study listed 13 types of insects, five types of fungi, five kinds of vertebrate animals, four climatic perturbations and a parasitic plant that had been implicated as major agents of dieback in southeastern Australia. Repeated defoliation by insects has usually been identified as a major factor in rural and forest diebacks, while mesic understorey development is often an important feature of forest diebacks. Different mechanisms of initiation and reinforcement have been proposed to account for many different forms of dieback. High rates of folivory leading to both rural and forest diebacks, have been related either to high resource availability and tree vigour or to low resource availability and tree stress. A simple model of eucalypt dieback is proposed to account for both rural and forest dieback, including an increasing range of 'susceptible' species and sites. It associates eucalypt dieback with increased soil moisture and nitrogen status that stresses the roots of established eucalypt trees. These changes affect the physiology of the trees and encourage high rates of folivory and/or fungal pathogenicity. This model can encompass dieback from dryland salinity, 'high-altitude' dieback in Tasmania, 'bellbird' dieback, 'koala' dieback in Victoria and South Australia, phasmatid outbreaks in New South Wales and Victoria, and potentially extends to 'regrowth' dieback in Tasmania. Reduced application of low-intensity fire is a common agent of changed soil conditions. Additional factors that may apply are fertilizer application and modifications to runoff and soil drainage
Descriptors:dieback. models. nitrogen-content. plant-disorders. soil-water. susceptibility
Geographic Locator:Australia
Organism Descriptors:Eucalyptus
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Myrtaceae. Myrtales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff610. kk100. kk600. zz100
Supplementary Info:many ref
ISSN:0004-9158
Year:2002

Journal Title:Australian Forestry

Title:Soil factors influencing growth and yield of narrow-leafed lupin and field pea in Western Australia
View Article: Australian Journal of Agricultural Research. 2002. 53 (2). 217-225
CD Volume:382
Author(s):French R J
Author Affiliation:Western Australian Department of Agriculture, Dryland Research Institute, PO Box 432, Merredin, WA 6415, Australia
Other Title:Soil factors influencing growth and yield of narrow-leafed lupin and field pea in Western Australia
Language:English
Abstract:Crop growth and grain yield of narrow-leafed lupin (Lupinus angustifolius) and field pea were compared in 40 field trials in the Western Australian wheatbelt in 1988-90. Trials were arranged in clusters of 2 or 3 in close proximity, but on contrasting soil types. This enabled seasonal effects on growth and yield to be separated from soil type effects. Soil pH ranged from 4.1 to 5.8 at the surface and from 3.7 to 8.4 at 50 cm, A horizon depth from 9 cm to >70 cm, and clay content at 50 cm from 0 to 54%. Other soil properties also varied across wide ranges. Some soil properties were closely correlated with one another; pH, electrical conductivity (EC), gravimetric water content (theta g) at field capacity and at wilting point, and depth of the A horizon were all correlated. Narrow-leafed lupin grain yield was 2.6 times as variable between trials within locations as field pea yield, which, on average, was 32% greater than narrow-leafed lupin yield. The pH, EC, theta g at field capacity, and theta g at wilting point each explained a large proportion of lupin yield variability on their own, but because they were closely correlated with one another, it was not possible to determine which had the primary effect on grain yield. On the basis of other work, pH is an important factor in its own right. A horizon depth explained 9% of the lupin x trial variance but this was largely due to its correlation with pH and other related soil properties. When the effects of these were removed, depth still reduced the between-trial variance within locations but did not affect species differentially. Bulk density also reduced between-trial variance within locations without affecting species differentially. Altogether, soil properties explained 42% of the lupin x site variance but none of the pea x site variance. The pH and correlated soil properties also explained much of the species x site variance in dry matter production at maturity, but not in harvest index. Bulk density and A horizon depth had small, but significant, effects on harvest index. Therefore, soil type affects grain yield in these species largely through its effect on dry matter production. It is concluded that field pea is equally well-adapted to the full range of soils in this study. Narrow-leafed lupin does not yield as well on soils with subsoil pH greater than 6.5 as on more acid soils. The depth of the A horizon is only useful as a criterion for judging the suitability of a soil for growing narrow-leafed lupin as long as it is correlated with pH
Descriptors:A-horizons. bulk-density. crop-yield. electrical-conductivity. growth. lupins. peas. soil. soil-pH. soil-water-content
Geographic Locator:Australia
Organism Descriptors:Lupinus. Lupinus-angustifolius. Pisum-sativum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lupinus. Papilionoideae. Pisum
Subject Codes:ff005. ff060. ff100. jj200. jj300

Supplementary Info:30 ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Identification of research to improve the efficiency of breeding strategies for white clover in Australia - a review
View Article: Australian Journal of Agricultural Research. 2002. 53 (3). 239-257
CD Volume:382
Author(s):Jahufer M Z Z Cooper M Ayres J F Bray R A
Author Affiliation:Agriculture Victoria, Pastoral and Veterinary Institute, Private Bag 105, Hamilton, Vic. 3300, Australia
Other Title:Identification of research to improve the efficiency of breeding strategies for white clover in Australia - a review
Language:English
Abstract:A major challenge faced by today's white clover (Trifolium repens) breeder is how to manage resources within a breeding programme. It is essential to utilize these resources with sufficient flexibility to build on past progress from conventional breeding strategies, and also take advantage of emerging opportunities from molecular breeding tools such as molecular markers and transformation. It is timely to review white clover breeding strategies. This background can be used as a foundation for considering how to continue conventional plant improvement activities and complement them with molecular breeding opportunities. In this review, conventional white clover breeding strategies relevant to the Australian dryland target population environments are considered. Attention is given to: (i) availability of genetic variation, (ii) characterization of germplasm collections, (iii) quantitative models for estimation of heritability, (iv) the role of multi-environment trials to accommodate genotype-by-environment interactions, (v) interdisciplinary research to understand adaptation to dryland environments, (vi) breeding and selection strategies, and (vii) cultivar structure. Current achievements in biotechnology with specific reference to white clover breeding in Australia are considered, and computer modelling of breeding programmes is discussed as a useful integrative tool for the joint evaluation of conventional and molecular breeding strategies and optimization of resource use in breeding programmes. Four areas are identified as future research priorities: (i) capturing the potential genetic diversity among introduced accessions and ecotypes that are adapted to key constraints such as summer moisture stress and the use of molecular markers to assess the genetic diversity, (ii) understanding the underlying physiological/morphological root and shoot mechanisms involved in water use efficiency of white clover to identify appropriate selection criteria, (iii) estimation of quantitative genetic parameters of important morphological/physiological attributes to enable prediction of response to selection in target environments, and (iv) modelling white clover breeding strategies to evaluate the opportunities for integration of molecular breeding strategies with conventional breeding programmes
Descriptors:adaptation. biotechnology. breeding-methods. breeding-programmes. cultivars. genetic-diversity. genetic-markers. genetic-parameters. genetic-transformation. genetic-variation. genotype-environment-interaction. germplasm. heritability. models. molecular-genetics. plant-morphology. plant-water-relations. reviews. selection. water-stress. water-use-efficiency
Geographic Locator:Australia
Organism Descriptors:Trifolium-repens

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff007. ff020. ff030. ff062. ww100. zz100. zz360
Supplementary Info:many ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Estimation and utilisation of glutenin gene effects from the analysis of unbalanced data from wheat breeding programs
View Article: Australian Journal of Agricultural Research. 2002. 53 (4). 367-377
CD Volume:382
Author(s):Eagles H A Hollamby G J Gororo N N Eastwood R F
Author Affiliation:Natural Resources and Environment-Horsham, Victorian Institute for Dryland Agriculture, PB 260, Horsham, Vic 3401, Australia
Other Title:Estimation and utilisation of glutenin gene effects from the analysis of unbalanced data from wheat breeding programs
Language:English
Abstract:Glutenins are a major determinant of dough characteristics in wheat. These proteins are determined by genes at 6 loci (Glu genes), with multiple alleles present in most breeding programs. This study was conducted to determine whether estimates of allele effects for the important dough rheological characters, maximum dough resistance (Rmax) and dough extensibility, could be determined from aggregated data from southern Australian wheat breeding programs using statistical techniques appropriate for unbalanced data. From a 2-stage analysis of 3226 samples of 1926 cultivars and breeding lines, estimates of Rmax and extensibility effects were obtained, first for the lines, and then for 31 glutenin alleles. Glutenin genes did not determine flour protein concentration, and this character was used as a covariate. Rankings of the estimates of Rmax for the alleles were similar to the relative scores for dough strength reported from previous studies, providing strong evidence that the analysis of a large, unbalanced data set from applied wheat breeding programs can provide reliable estimates. All 2-way interactions between loci were present for 18 of the alleles. Analyses including interactions showed that epistasis was important for both Rmax and extensibility, especially between the Glu-B1 locus coding for high molecular weight glutenins and the Glu-A3 and Glu-B3 loci coding for low molecular weight glutenins. Because of the complexity of these interactions, similar values of Rmax and extensibility were predicted for diverse combinations of alleles. This implied that the practical application of glutenin genes in applied wheat breeding would be greatly enhanced by computer software which can predict dough rheology characteristics from glutenin allele classifications
Descriptors:alleles. breeding-programmes. cultivars. epistasis. estimation. genes. genetic-effects. glutenins. lines. loci. rheological-properties. wheat
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff020. qq050. qq500
Supplementary Info:many ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Simulation of growth and development of diverse legume species in APSIM
View Article: Australian Journal of Agricultural Research. 2002. 53 (4). 429-446
CD Volume:382
Author(s):Robertson M J Carberry P S Huth N I Turpin J E Probert M E Poulton P L Bell M Wright G C Yeates S J Brinsmead R B
Author Affiliation:CSIRO Sustainable Ecosystems/Agricultural Production Systems Research Unit, Indooroopilly, Qld 4068, Australia
Other Title:Simulation of growth and development of diverse legume species in APSIM
Language:English
Abstract:This paper describes the physiological basis and validation of a generic legume model as it applies to 4 species: chickpea (Cicer arietinum L.), mungbean (Vigna radiata (L.) Wilczek), peanut (Arachis hypogaea L.), and lucerne (Medicago sativa L.). For each species, the key physiological parameters were derived from the literature and our own experimentation. The model was tested on an independent set of experiments, predominantly from the tropics and subtropics of Australia, varying in cultivar, sowing date, water regime (irrigated or dryland), row spacing, and plant population density. The model is an attempt to simulate crop growth and development with satisfactory comprehensiveness, without the necessity of defining a large number of parameters. A generic approach was adopted in recognition of the common underlying physiology and simulation approaches for many legume species. Simulation of grain yield explained 77, 81, and 70% of the variance (RMSD=31, 98, and 46 g/m2) for mungbean (n=40, observed mean=123 g/m2), peanut (n=30, 421 g/m2), and chickpea (n=31, 196 g/m2), respectively. Biomass at maturity was simulated less accurately, explaining 64, 76, and 71% of the variance (RMSD =134,236, and 125 g/m2) for mungbean, peanut, and chickpea, respectively. RMSD for biomass in lucerne (n=24) was 85 g/m2 with an R2 of 0.55. Simulation accuracy is similar to that achieved by single-crop models and suggests that the generic approach offers promise for simulating diverse legume species without loss of accuracy or physiological rigour
Descriptors:biomass. chickpeas. crop-yield. groundnuts. growth. lucerne. mung-beans. plant-development. simulation-models
Geographic Locator:Australia
Organism Descriptors:Arachis-hypogaea. Cicer-arietinum. Medicago. Medicago-sativa. Vigna-radiata
Supplemental Descriptors:Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Cicer. Medicago. Vigna
Subject Codes:ff005. ff060. zz100
Supplementary Info:many ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Use of tree and shrub belts to control leakage in three dryland cropping environments
View Article: Australian Journal of Agricultural Research. 2002. 53 (5). 571-586
CD Volume:382
Author(s):Knight A Blott K Portelli M Hignett C
Author Affiliation:Anangu Pitjantjatjara Land Management, PMB 227 Umuwa via Alice Springs, NT 0872, Australia

Other Title:Use of tree and shrub belts to control leakage in three dryland cropping environments
Language:English
Abstract:The water extraction of deep-rooted perennial trees and shrub belts integrated with annual cropping/grazing systems was studied at 3 sites typical of sandy soils in the 300-450 mm rainfall zone of the Murray-Darling Basin of south-eastern Australia. The belts have a row of Acacia saligna flanked by two rows of Atriplex nummularia. Within 4 years of planting alley farming systems on cropland, the soil directly below and near the belts had dried the deep profile. Between 82 and 261 mm of extra soil water storage capacity was created in the 2.5 to 5.5-6 m profile. At Palamana (the only site monitored to greater depth), living roots were found 16 m below the surface. The cumulative water content of the soil to 12 m under the belts was 600 mm less than of soil cores extracted from nearby cropland. This water storage difference created under the belts is greater than the largest episodic event likely in this region and it is therefore unlikely that leakage will occur directly under or within a few metres of the belts. The early growth of the belts was rapid and the leaf area of the belts far exceeded that of remnant mallee eucalypt vegetation (Eucalyptus incrassata, E. socialis and E. leptophylla). The belts used water that had accumulated deep in the profile below the annual cropping systems they replaced. However, the belts only used water from below or within a few metres from the edge with the adjacent cropland. As suggested by RJ Harper et al. (2000), a much greater amount of potential recharge could be controlled if deep-rooted perennials were planted more closely across the landscape (compared with widely spaced belts). However, although the belts may be beneficial for the catchment water balance, they would be commercially unacceptable to farmers. In practice, farmers put the belts usually no less than 50-70 m apart so that less cropland is displaced and there is less belt/crop competition. In such cases alley farming only controls a small percentage of the total leakage, similar to the amount of crop yield lost by displacement and competition. It would be better to use a full coverage of perennials on soils where annual systems are the leakiest, rather than belts across all of the landscape, some of which may not be very leaky and could be highly profitable for annual cropping. Leakage could be controlled under cropland in a few years by growing easy to establish perennial species to retrieve moisture deep in the profile. At Pallamana, the belts utilized 600 mm of accumulated leakage from deep in the profile in less than 4 years. Based on the average annual recharge rates under annual cropping (11-35 mm) the land could be cropped again for between 17 and 55 years before that leakage accumulated again
Descriptors:agroforestry-systems. alley-cropping. drainage. farm-forestry. leakage. plant-water-relations. salinity. sandy-soils. soil-types. soil-water. water-use
Geographic Locator:Australia
Identifiers:Eucalyptus incrassata. Eucalyptus leptophylla. Eucalyptus socialis
Organism Descriptors:Acacia-saligna. Atriplex-nummularia. Eucalyptus
Supplemental Descriptors:Acacia. Mimosoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Atriplex. Chenopodiaceae. Caryophyllales. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Myrtaceae. Myrtales. Eucalyptus
Subject Codes:ff062. ff150. jj300. kk600
Supplementary Info:42 ref
ISSN:0004-9409
Year:2002

Journal Title:Australian Journal of Agricultural Research

Title:Improving soil physical fertility and crop yield on a clay soil in Western Australia
View Article: Australian Journal of Agricultural Research. 2002. 53 (5). 615-620
CD Volume:382
Author(s):Hamza M A Anderson W K
Author Affiliation:Dryland Research Institute, Western Australian Department of Agriculture, Merredin, WA 6415, Australia
Other Title:Improving soil physical fertility and crop yield on a clay soil in Western Australia
Language:English
Abstract:In the low rainfall area of Western Australia, clay soils with massive soil structure form a major part of the area sown to wheat. Yield increases on such soils have been poor in the last decade compared with those on other soil types. An experiment was conducted over 4 years (1997-2000) using a factorial combination of soil ripping to 0.4 m, application of commercial grade gypsum at 2.5 tonnes/ha, and addition of complete nutrients based on soil test each year. All crop residues were retained after harvest and returned to the soil. The experiment was conducted in a wheat-field pea [Pisum sativum] rotation at Merredin, Western Australia. Soil water infiltration rate, soil strength, bulk density, water-stable aggregates, cation exchange capacity, and wheat yields were measured. Grain yields of wheat and field peas were increased by deep ripping, the addition of gypsum, or the addition of complete nutrients in some years. The main treatment effects on yield were additive, as significant interactions between the treatments on yield were seldom found. However, all the main treatments also significantly improved many of the soil physical properties related to crop growth. In 2000, 4 years after the treatments were applied, soil water infiltration rate was increased by more than 200%, strength of the topsoil decreased by around 1600 kPa, and soil bulk density decreased by 20%. Gypsum application increased water-stable aggregates, but soil mixing caused by deep ripping reduced them. The combination of soil ripping and gypsum application in the presence of complete nutrients and annual return of crop residues to the soil is suggested to improve crop grain yield and soil physical fertility on a range of Western Australian soils
Descriptors:aggregates. bulk-density. cation-exchange-capacity. clay-soils. crop-yield. gypsum. infiltration. nonclay-minerals. nutrients. peas. ripping. soil-strength. soil-types. soil-water. wheat
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Pisum-sativum. Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Pisum. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Triticum. Poaceae. Cyperales. monocotyledons. Australia
Subject Codes:ff003. ff005. ff100. jj200. jj300. jj700. jj900
Supplementary Info:29 ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research
Copyright:Copyright CAB International

Title:Current and emerging environmental challenges in Australian agriculture - the role of plant breeding
View Article: Australian Journal of Agricultural Research. 2002. 53 (8). 881-892

CD Volume:382
Author(s):Richards R A
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra 2601, Australia
Other Title:Current and emerging environmental challenges in Australian agriculture - the role of plant breeding
Language:English
Abstract:Dryland farming systems are evolving due to sustainability issues and market pressures that impact growers. Levels of atmospheric CO2 and temperatures, both of which can dramatically impact on crop growth, are increasing at unprecedented levels. Subsoil constraints and water stress remain. In this paper, I assess the emerging and current environmental challenges to farmers and identify challenges and opportunities for plant breeders. Questions are raised which require debate. For example, crops will soon be growing at atmospheric CO2 levels more than triple those in which they evolved. Should plant breeders be responding to the anticipated effects of elevated CO2 and temperature? In other instances, issues are discussed which require immediate research by the plant breeding community. Examples of the latter are breeding crops that maximize water and nutrient use, either by increasing the rooting zone and/or improving the ability to grow roots into inhospitable subsoils, and breeding crops specifically to overcome constraints imposed by farming systems. Immediate attention to these issues is required to sustain our landscape and agricultural systems as well as enhancing our ability to grow crops for an internationally competitive market place
Descriptors:adaptation. climatic-change. crop-production. global-warming. heat-resistance. plant-breeding. reviews
Geographic Locator:Australia
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:ff020. ff100. ff900. pp500
Supplementary Info:many ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Genetic and environmental variation for grain quality traits routinely evaluated in southern Australian wheat breeding programs
View Article: Australian Journal of Agricultural Research. 2002. 53 (9). 1047-1057
CD Volume:382
Author(s):Eagles H A Hollamby G J Eastwood R F
Author Affiliation:Natural Resources and Environment-Horsham, Victorian Institute for Dryland Agriculture, PB 260, Horsham, Vic. 3401, Australia
Other Title:Genetic and environmental variation for grain quality traits routinely evaluated in southern Australian wheat breeding programs
Language:English
Abstract:Milling yield, maximum dough resistance (Rmax), dough extensibility, flour protein concentration (flour protein), particle size index (PSI), water absorption, and dough development time are important determinants of grain quality and are routinely evaluated in Australian wheat breeding programs. Information on allelic variation at the 6 loci determining glutenin proteins is also regularly obtained and used to predict Rmax and extensibility. For each character, except dough development time, 4029 observations on 2377 lines and 94 environments were analysed to estimate genotypic

and environmental variances, heritabilities, genotypic and environmental correlations, and the effects of glutenin genes. A subset was analysed for dough development time. Milling yield, Rmax, extensibility, PSI, water absorption, and dough development time had intra-class correlation coefficients, or broad-sense heritabilities, between 0.66 and 0.76, and extensibility had a value of 0.52, with flour protein at 0.36. Genotypic and environmental correlations between extensibility and flour protein were high at +0.78 and +0.85, respectively. Rmax had a genotypic correlation with dough development time of +0.67, which was substantially due to pleiotropic effects of glutenin genes. Rmax, extensibility, PSI, and dough development time were influenced by glutenin genes. For Rmax about 50% of the genotypic variance could be explained by glutenin genes. For extensibility about 50% could be explained by flour protein, with 50% of the remainder by the inclusion of glutenin genes. For dough development time about 15% could be explained by flour protein, with a further 30% by glutenin genes. For PSI, about 40% of the genotypic variation could be accounted for by glutenin genes after the removal of the effects of flour protein and milling yield. We concluded that dough development time could be added to Rmax and extensibility as a trait that can be usefully predicted by the glutenin genes, but more work is required for PSI
Descriptors:breeding-programmes. crop-quality. genes. genetic-correlation. genetic-variance. genetic-variation. glutenins. heritability. pleiotropy. protein-content. rheology. water-uptake. wheat. wheat-flour
Geographic Locator:Australia
Identifiers:doughs. milling and baking quality
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff020. qq050. qq500
Supplementary Info:40 ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Within-field variation in wheat quality: implications for precision agricultural management
View Article: Australian Journal of Agricultural Research. 2002. 53 (11). 1229-1242
CD Volume:382
Author(s):Skerritt J H Adams M L Cook S E Naglis G
Author Affiliation:Quality Wheat Cooperative Research Centre and CSIRO Plant Industry, Canberra, ACT 2601, Australia
Other Title:Within-field variation in wheat quality: implications for precision agricultural management
Language:English
Abstract:In this study, 9 Western Australian fields sown with several cultivars (Cadoux, Trident, Blade, Perenjori, Spear and Machete) of dryland wheat were monitored using precision agricultural techniques in 1997-98, in order to understand implications for processing quality of the grain. Four fields received variable inputs of N fertiliser, and 6 received variable seed rates. In most cases, there was a very large variation within-field in grain yield, protein content, and protein quality, and such variation was related to variation in soil acidity, soil nitrate, and soil organic carbon, and specific weed and pest problems in some fields, as well as variation in the inputs. Grain protein content was positively correlated with

soil nitrate levels in 6 of the 7 fields for which soil analyses were carried out. For several of the larger fields, separate harvesting of zones within the fields having differences in grain protein content would have enabled a greater proportion of the grain to be in a higher return quality grade. In 7 of the 9 fields, variation in protein quality (sodium dodecyl sulfate-sedimentation volume, SDS-SV) was greater than variation in protein content. The different measures of protein quality (SDS-SV, polymeric protein (glutenin) content, and glutenin molecular weight distribution) sometimes followed similar spatial trends, but in many cases did not. Therefore, total protein estimates are probably suitable measures for predicting within-field variation in protein quality. In none of the 9 fields was there overall a negative relationship between grain yield and protein content, although limited moisture availability can affect such relationships. The results suggest that the use of precision agricultural methods to manipulate inputs such as fertiliser, lime, or seed rates to increase yield does not have a negative effect on protein content. Farmers, therefore, can use precision agricultural methods along with other approaches to maximize wheat yield and grain protein content/quality at the same time
Descriptors:crop-quality. genetic-variation. nitrogen-fertilizers. protein-content. protein-quality. sowing-rates. wheat
Geographic Locator:Australia
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff020. ff061. ff100. jj700
Supplementary Info:41 ref
ISSN:0004-9409
Year:2002
Journal Title:Australian Journal of Agricultural Research

Title:Factors affecting nitrogen fixation by dryland lucerne in central-western New South Wales
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (4). 439-451
CD Volume:382
Author(s):Bowman A M Peoples M B Smith W Brockwell J
Author Affiliation:Agricultural Research Centre, NSW Agriculture, PMB No. 19, Trangie, NSW 2823, Australia
Other Title:Factors affecting nitrogen fixation by dryland lucerne in central-western New South Wales
Language:English
Abstract:Eight stands of dryland lucerne (Medicago sativa) cv. Trifecta were grown on a red-brown earth at Trangie, New South Wales, Australia. The stands were of varying age and plant density. Their biomass production and capacity to fix atmospheric nitrogen were measured on 15 occasions over a 5-year period (1995-99). Biomass production (shoot dry matter) ranged from 0.22 to 4.87 tonnes/ha/year and nitrogen fixed from 1.8 to 78.6 kg/ha/year. Whereas biomass production was highest in summer periods, most nitrogen fixation took place in winter and autumn. Irrespective of stand age, greatest productivity occurred in the early years of the experiment and declined thereafter. Plant density varied from 6 to 21 plants/m2 at the commencement of the study and decreased over time. We conclude that the productive life of dryland lucerne stands in this environment is probably limited by frequent periods of moisture stress and high soil temperatures in summer. Stands with a lucerne density of 8 plants/m2 or better produced twice as much shoot biomass

and fixed nearly double the amount of shoot N as did stands with densities of 7 plants/m2 or less. There was no relationship between the age of lucerne stands per se and biomass production or nitrogen fixation. The practical implication of this work for farmers in the dryland cropping zone of central-western New South Wales who wish to maximize nitrogen fixation from the lucerne phase of their cropping rotations is to establish and maintain dryland lucerne at 8 plants/m2 or better
Descriptors:biomass-production. dry-farming. lucerne. nitrogen-fixation. plant-density. plant-water-relations. soil-temperature. water-stress
Geographic Locator:Australia. New-South-Wales
Organism Descriptors:Medicago. Medicago-sativa
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australia
Subject Codes:ff100. jj300. ff007. ff062
Supplementary Info:47 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Reaction of a range of Brassica species under Australian conditions to the fungus, Leptosphaeria maculans, the causal agent of blackleg
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (5). 587-594
CD Volume:382
Author(s):Marcroft S J Purwantara A Salisbury P A Potter T D Wratten N Khangura R Barbetti M J Howlett B J
Author Affiliation:Victorian Institute for Dryland Agriculture, Agriculture Victoria, Private Bag 260, Horsham, Vic. 3401, Australia
Other Title:Reaction of a range of Brassica species under Australian conditions to the fungus, Leptosphaeria maculans, the causal agent of blackleg
Language:English
Abstract:A range of Brassica species was screened for resistance to L. maculans, the causal agent of blackleg. The lines were assessed in 8 disease nurseries in 4 rape growing regions of Australia and in a glasshouse trial, with a view to identifying alternative sources of resistance to L. maculans for Australian breeding programmes. Lines were screened for degree of internal and external blackleg symptoms during both the seedling and adult plant growth stages. Correlation for resistance with ranking between disease nurseries was very strong (0.41-0.98). Brassica carinata and B. nigra were the most resistant species in the disease nurseries, being even more resistant than B. juncea. The 7 European winter B. napus lines tested were significantly more resistant than the 7 Australian spring B. napus lines, with another crucifer, Sinapis alba, being intermediate in resistance between the European and Australian B. napus lines. The same ranking of lines from most to least resistant was also seen when cotyledons and stems were inoculated in the glasshouse with 2 well-characterized Australian isolates. With the exception of the B. napus susceptible control Westar, all lines had similar frequencies of seedling survival in the nurseries. However, mature plants of these lines varied significantly in their degree of resistance. This indicates that screening for seedling survival is not useful in selecting L. maculans resistant lines in Australia. The Brassica lines with the B genome, especially B. carinata, and the winter B.

napus types are now being used as sources of resistance in Australian breeding programmes
Descriptors:breeding-programmes. cotyledons. crop-growth-stage. disease-resistance. fungal-diseases. lines. plant-breeding. plant-diseases. plant-pathogenic-fungi. plant-pathogens. rape. screening. seedlings. stems. survival
Geographic Locator:Australia
Identifiers:white mustard
Organism Descriptors:Brassica. Brassica-carinata. Brassica-napus-var.-oleifera. Brassica-nigra. Leptosphaeria-maculans. Sinapis-alba
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Brassica. Brassica-napus. Leptosphaeria. Dothideales. Ascomycotina. Eumycota. fungi. Sinapis
Subject Codes:ff003. ff005. ff020. ff610. hh600
Supplementary Info:28 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Management practices to minimise pre-harvest aflatoxin contamination in Australian groundnuts
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (5). 595-605
CD Volume:382
Author(s):Rachaputi N R Wright G C Krosch S
Author Affiliation:Farming Systems Institute, Agency for Food and Fibre Sciences, Queensland Department of Primary Industries, Kingaroy, Qld 4610, Australia
Other Title:Management practices to minimise pre-harvest aflatoxin contamination in Australian groundnuts
Language:English
Abstract:Aflatoxin contamination caused by Aspergillus flavus and A. parasiticus in groundnut kernels is a serious food safety issue throughout the world. Stringent implementation of the international regulatory limits for aflatoxin contamination has become a major factor affecting the economic viability of dryland groundnut growers in regional Queensland, Australia. In this study, the effect of time of harvesting (digging) and threshing on kernel yield, seed grades, aflatoxin contamination and gross returns were examined with groundnut (cv. Streeton), grown in large-scale on-farm trials in the Burnett District of Queensland, during the 1997-98 and 1999-2000 seasons. Aflatoxin contamination was widespread during the 1997-98 season because of a severe and prolonged end-of-season drought and associated elevated soil temperatures. During the 1999-2000 season, aflatoxin risk was low at 2 sites because of well-distributed rainfall and lower soil temperatures, in contrast to the other 2 sites where the risk was higher. In both seasons, early harvest and threshing under high aflatoxin risk conditions resulted in consistently lower aflatoxin concentrations and higher gross returns (up to 27%) than in delayed harvesting treatments. However, under low aflatoxin risk conditions crops could be left longer to realize higher potential yield and better seed grades. Indeed, early harvest under low aflatoxin risk resulted in lower gross returns because of lower yields and poorer seed grades. The current study highlighted the importance of assessing aflatoxin risk on a site-by-site basis to make appropriate decisions on timing of harvest so as to minimize aflatoxin contamination and maximize gross returns from dryland groundnuts

Descriptors:aflatoxins. carcinogens. climatic-factors. crop-management. crop-yield. cultural-control. digging. drought. food-contamination. groundnuts. harvesting-date. kernels. microbial-contamination. plant-pathogenic-fungi. plant-pathogens. rain. returns. seeds. soil-temperature. threshing
Geographic Locator:Australia. Queensland
Organism Descriptors:Arachis-hypogaea. Aspergillus-flavus. Aspergillus-parasiticus
Supplemental Descriptors:Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Aspergillus. Deuteromycotina. Eumycota. fungi. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:ee110. ff005. ff150. ff610. hh200. qq050
Supplementary Info:30 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Characterisation of a windbreak system on the south coast of Western Australia. 2. Crop growth
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (6). 717-727
CD Volume:382
Author(s):Sudmeyer R A Scott P R
Author Affiliation:Western Australian Department of Agriculture, PMB 50, Esperance, WA 6450, Australia
Other Title:Characterisation of a windbreak system on the south coast of Western Australia. 2. Crop growth
Language:English
Abstract:This paper, which is the second in a series of three, describes dryland crop (Lupinus angustifolius, Brassica napus [B. napus var. oleifera], Hordeum vulgare) growth and yields in a windbreak bay in southwestern Australia and relates changes to microclimate modification by the windbreaks. Over the 4 years of this trial (1994-97), aboveground biomass and the development rate of crops 3-20 times the tree height from the windbreak (H) were similar to crops growing in unsheltered conditions (more than 20 H from the windbreaks). Grain yield was 16-30% higher between 3 H and 20 H than at more than 20 H in 1994, the driest year on record for the district, while in other years, yield was largely unchanged. In contrast, aboveground biomass growth was consistently less within 3 H than further from the windbreaks and grain yield within 3 H was 19-27% less than unsheltered yield. Water use by the trees is the most likely cause of reduced yield within 3 H. Over the 4 years, mean grain yield between 0.5 and 20 H was 3.8% greater than yield at more than 20 H. This increase was largely due to the yield increase in 1994. As 5.4% of the paddock was directly occupied by, or uncropped next to, the windbreaks, there was a net yield decrease of 2.8% over 4 years compared to estimated production from a similar area with no windbreaks. The principle benefits of the windbreaks were reducing evaporative demand in extremely dry years and protection against extreme wind events. These benefits must be weighed against the costs of establishing and maintaining windbreak systems
Descriptors:barley. biomass. crop-yield. evaporation. growth. height. lupins. microclimate. paddocks. plant-development. rape. shelter. wind-effects. windbreaks
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Brassica-napus-var.-oleifera. Hordeum-vulgare. Lupinus. Lupinus-angustifolius

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica-napus. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Hordeum. Poaceae. Cyperales. monocotyledons. Fabaceae. Fabales. Lupinus. Papilionoideae. Australia
Subject Codes:ff005. ff100. kk600. pp500
Supplementary Info:38 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Broadacre crop yield in the lee of windbreaks in the medium and low rainfall areas of south-western Australia
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (6). 739-750
CD Volume:382
Author(s):Sudmeyer R A Adams M A Eastham J Scott P R Hawkins W Rowland I C
Author Affiliation:Western Australian Department of Agriculture, PMB 50, Esperance, WA 6450, Australia
Other Title:Broadacre crop yield in the lee of windbreaks in the medium and low rainfall areas of south-western Australia
Language:English
Abstract:In Western Australia, the paucity of documented information detailing crop yield in the lee of windbreaks is a constraint to the adoption of tree windbreaks in dryland farming systems. This paper presents grain yield data for crops (barley, rape, wheat, lupins and faba bean) growing in the lee of windbreaks in the medium to low rainfall areas of the south-west of Western Australia for 64 field years between 1994 and 1997. Two distinct areas were identified in the lee of windbreaks: a zone of reduced crop yield extending 3-5 times the windbreak height (H) from the trees (competition zone), and a zone of unchanged or improved yield extending 15-20 H (sheltered zone). Yield between 1 and 20 H was less than unsheltered yield in years with average rainfall, similar to unsheltered yield in years, or areas, with low rainfall and higher than unsheltered yield if the unsheltered crop was subjected to sandblasting. Changes in microclimate in shelter appeared to be of benefit in increasing crop yields in drier years or areas. Lupin yield was generally increased in the sheltered zone while cereal yield was generally unchanged. The rate of canopy development may be critical to crop response. In dry years, reduced wind speed in shelter reduced evaporation of soil moisture, increasing the amount of soil water available to establishing crops and reducing sandblasting damage. The principle benefit of windbreaks was their ability to reduce wind erosion and subsequent crop damage. As such, windbreaks are best regarded as a form of insurance
Descriptors:barley. crop-yield. faba-beans. lupins. rain. rape. soil-water-content. wheat. wind-damage. wind-effects. wind-erosion. wind-speed. windbreaks
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Brassica-napus-var.-oleifera. Hordeum-vulgare. Lupinus. Triticum. Triticum-aestivum. Vicia-faba
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica-napus. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Hordeum. Poaceae. Cyperales. monocotyledons. Fabaceae. Fabales. Papilionoideae. Triticum. Vicia. Australia
Subject Codes:ff005. ff100. jj300. kk600. pp400. pp500
Supplementary Info:49 ref

ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Effect of artificial wind shelters on the growth and yield of rainfed crops
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (6). 841-858
CD Volume:382
Author(s):Sudmeyer R A Crawford M C Meinke H Poulton P L Robertson M J
Author Affiliation:Agriculture WA, PMB 50, Esperance, WA 6450, Australia
Other Title:Effect of artificial wind shelters on the growth and yield of rainfed crops
Language:English
Abstract:There is great interest in quantifying and understanding how shelter modifies crop growth and development under Australian conditions. Small constructed enclosures (shelters) can consistently reduce wind speed, allowing experiments to be run with replicated sheltered and unsheltered treatments in close proximity. The aim of this study was to quantify the effect on microclimate of consistently reducing wind speed by 70% and explain the consequences for dryland wheat (Triticum aestivum), lupin (Lupinus angustifolius) and mungbean (Vigna radiata) growth and development, at sites in Queensland, Victoria and Western Australia. Crops were grown inside and outside of artificial shelters, 10 by 10 m and extending 1 m above the crop canopy throughout the growing season. Mean daily air and soil temperatures and atmospheric vapour pressure inside the shelters were largely similar to unsheltered conditions. However, clear diurnal trends were evident; daily maximum temperature and vapour pressure deficit (VPD) were increased in shelter when crops were establishing or senescing. When leaf area index (LAI) was reduced in the shelters, soil temperature was greater than in the open, however when LAI was increased in the shelters, soil temperature was less than in the open. Grain yield in shelters ranged between 78 and 120% of unsheltered yield, depending on seasonal conditions and crop species; the mean yield for all sites, crops and years was 99% of unsheltered yield. In the absence of waterlogging, sheltered crops tended to develop more leaf area than unsheltered crops, with an increase in the ratio of leaf area to above-ground biomass. This greater leaf area did not increase soil water use. While LAI was increased by shelter, only 2 of the 6 sheltered crops that were not waterlogged yielded significantly more grain than the unsheltered crops. This may be because the sheltered crops experienced greater maximum temperatures and VPD during anthesis and grain filling than unsheltered crops. Also, net photosynthesis may not have increased in the shelters after canopy closure (LAI>3-4). Lupins, which developed more leaf area inside shelters, may have experienced strong competition for assimilates between developing branches, flowers and fruit. When rainfall was above average and the soil became waterlogged for part of the growing season, grain yield was reduced inside the shelters. Reduced evaporation inside the shelters may have extended the duration and severity of waterlogging and increased stresses on sheltered plants when potential yield was being set. The reductions in wind speed achieved inside the artificial shelters were greater than those likely in conventional tree windbreak systems. Analysis of crop growth illustrated that microclimate modification at this high level of shelter can be both beneficial and harmful,

depending on the crop species and climatic conditions during the growing season
Descriptors:air-temperature. atmospheric-pressure. climatic-factors. crop-yield. growth. leaf-area. leaf-area-index. leaves. microclimate. rain. soil-temperature. waterlogging. wheat. wind-effects. wind-speed. windbreaks
Geographic Locator:Australia. Queensland. Victoria. Western-Australia
Organism Descriptors:Lupinus-angustifolius. Triticum. Triticum-aestivum. Vigna-radiata
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Lupinus. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Australia. Triticum. Poaceae. Cyperales. monocotyledons. Vigna
Subject Codes:ff005. ff100. jj300. pp500. nn400. ff150
Supplementary Info:45 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Crop growth, yield and water use in long fallow and continuous cropping sequences in the Victorian mallee
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (7). 971-983
CD Volume:382
Author(s):O'Connell M G Connor D J O'Leary G J
Author Affiliation:Department of Natural Resources and Environment, Victorian Institute for Dryland Agriculture, Mallee Research Station, Private Bag 1, Walpeup, Vic. 3507, Australia
Other Title:Crop growth, yield and water use in long fallow and continuous cropping sequences in the Victorian mallee
Language:English
Abstract:The agronomic implications of substituting Indian mustard (Brassica juncea) for long (winter) fallows were investigated in a 6-year field experiment by comparing 2 cropping sequences (fallow-wheat-pea vs. Indian mustard-wheat-pea) in the semiarid Victorian mallee, Australia. Production and water use of wheat, pea and Indian mustard were measured. Grain yields ranged from 0.1 to 2.4 t/ha for wheat (mean 1.72 t/ha after fallow and 1.22 t/ha after Indian mustard); from 0 to 0.6 t/ha (mean 0.22 t/ha) for Indian mustard and from 0 to 1.4 t/ha (mean 0.8 t/ha) for field pea, strongly reflecting variable seasonal conditions (in-crop rainfall range from 84 to 231 mm). Indian mustard was shown to be a potential replacement for long fallow producing additional yield benefit (Indian mustard + wheat) in one year. However, under drought conditions, it introduces severe penalties to wheat growth and yield compared with the traditional fallow cropping system. Further, Indian mustard did not affect water use, growth, or yield of the second crop after wheat (in our case field pea). This study highlights a conflict between developing farming systems that are productive, environmentally and socially acceptable under variable weather conditions and yet uphold the regional need to reduce dependence on fallowing. Further analyses of weather patterns and other crop choice strategies are needed to help develop better management strategies for the mallee region of Australia
Descriptors:continuous-cropping. crop-yield. fallow. growth. Indian-mustard. peas. water-use. water-use-efficiency. wheat
Geographic Locator:Australia. Victoria
Organism Descriptors:Brassica-juncea. Pisum-sativum. Triticum. Triticum-aestivum

Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Brassica. Brassicaceae. Capparidales. dicotyledons. angiosperms. Spermatophyta. plants. Pisum. Papilionoideae. Fabaceae. Fabales. Triticum. Poaceae. Cyperales. monocotyledons. Australia
Subject Codes:ff005. ff062. ff100. ff150
Supplementary Info:40 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Grasslands NuSiral white clover (Trifolium repens L.)
View Article: Australian Journal of Experimental Agriculture. 2002. 42 (7). 1023-1025
CD Volume:382
Author(s):Ayres J F Lane L A Caradus J R Clifford P T P
Author Affiliation:Agricultural Research and Advisory Station, NSW Agriculture, Glen Innes, NSW 2370, Australia
Other Title:Grasslands NuSiral white clover (Trifolium repens L.)
Language:English
Abstract:Grasslands NuSiral is a medium-large-leaf white clover (T. repens) cultivar with intermediate growth habit (midway between open and erect and dense and prostrate), early flowering maturity and high growing point density. It is a synthetic cultivar developed by phenotypic selection from 3 cycles of single plant selection from a random population of 500 plants sampled from breeder seed of cultivar Siral. Grasslands NuSiral possesses the plant-type attributes known to be desirable for broad adaptation to dryland pasture conditions in Australia and has been developed for cattle and sheep pastures in both summer rainfall and winter rainfall areas where average annual rainfall exceeds 750 mm. Grasslands NuSiral is expected to provide enhanced stolon survival and autumn recovery in environments where summer moisture stress is present but not intense, and winter growth comparable to cultivar Haifa where mild winter conditions allow the expression of the winter activity of Grasslands NuSiral
Descriptors:adaptation. characteristics. drought-resistance. habit. maturity. phenotypic-selection. stolons. survival. winter-hardiness
Identifiers:new cultivars
Organism Descriptors:Trifolium-repens
Supplemental Descriptors:Trifolium. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff007. ff020. ff900
Supplementary Info:8 ref
ISSN:0816-1089
Year:2002
Journal Title:Australian Journal of Experimental Agriculture

Title:Dryland salinity in south-western Australia: its origins, remedies, and future research directions
View Article: Australian Journal of Soil Research. 2002. 40 (1). 93-113
CD Volume:382
Author(s):Clarke C J George R J Bell R W Hatton T J
Author Affiliation:School of Environmental Science, Murdoch University, Murdoch WA, 6150, Australia
Other Title:Dryland salinity in south-western Australia: its origins, remedies, and future research directions
Language:English

Abstract:Replacement of deep-rooted, perennial native vegetation with shallow-rooted, annual agricultural plants has resulted in increased recharge causing shallow saline water tables leading to dryland salinity and loss of agricultural production. Restoring the vegetation by regeneration or replanting lowers water levels locally but field evidence and computer modelling suggests this needs to be widespread for regional effects, which conflicts with the future of conventional agriculture. Alley farming allows agriculture to be continued in the bays between the rows, but needs as much perennial, preferably deep-rooted, vegetation as possible in the bays to achieve the required recharge reductions. Where the asset to be preserved is valuable and a means of safe saline effluent disposal exists, pumps and drains will be part of any salinity management system, but where these conditions are not met they will be of limited use on an economic basis. To limit the spread of dryland salinity substantial change in farming systems is required and farmers need assurance that the recommended strategies will have the desired effect. Computer modelling is the only timely way to do this. An operationally simple 1-dimensional model already exists, and a 2-dimensional one is under development and testing. Three-dimensional modelling is also probably required to support strategic, intensive interventions
Descriptors:alley-cropping. farming-systems. geology. groundwater-recharge. models. revegetation. salts-in-soil. soil-salinity. weathering
Geographic Locator:Australia
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:ff150. jj200. kk600. zz100. zz800
Supplementary Info:many ref
ISSN:0004-9573
Year:2002
Journal Title:Australian Journal of Soil Research

Title:Mineralisation of nitrogen contained in mature subterranean clover, capeweed and annual ryegrass, and subsequent nitrogen use by wheat in dryland farming systems in southern Australia
View Article: Australian Journal of Soil Research. 2002. 40 (2). 299-315
CD Volume:382
Author(s):Thompson R B Fillery I R P
Author Affiliation:Depto. Produccion Vegetal, Universidad de Almeria, 04120 Almeria, Spain
Other Title:Mineralisation of nitrogen contained in mature subterranean clover, capeweed and annual ryegrass, and subsequent nitrogen use by wheat in dryland farming systems in southern Australia
Language:English
Abstract:Net nitrogen (N) mineralization in soil and N uptake by wheat from mature shoots and roots of subterranean clover (Trifolium subterraneum), capeweed (Arctotheca calendula), and annual ryegrass (Lolium rigidum), and from clover burrs were assessed with 15N-labelled plant material in 2 field studies in Western Australia, Australia, using confined micro-plots. Soil used in the study was a deep yellow loamy sand (Typic Psamment). In the first study, shoot residues of the 3 species (150 g DM/m2) were placed on the soil surface, and roots of the 3 species (75 g DM/m2) were mixed into 0-10 cm soil. The treatments were applied in March 1991. The shoot residues were incorporated into soil in early June 1991. Net 15N mineralization from the clover, capeweed, and ryegrass shoots during the 8-month experimental period was estimated to be, respectively,

15, 12, and 12%, and for the corresponding roots was 10, 7, and 6%. Negligible net mineralization of 15N occurred during the 2.5 months that the shoot residues were on the soil surface. Crop 15N recoveries in wheat, at maturity, in November 1991 were 9, 7, and 7%, respectively, of that applied in the clover, capeweed, and ryegrass shoot residues. The respective crop recoveries from the root residues were 6, 5, and 3%. Less than 5% of N taken up by wheat was obtained from shoot or root residues. In a second similar study, 15N-labelled subterranean clover shoots (200 g dry matter (DM)/m2) and burrs (75 g DM/m2) were applied in December 1992; 3% of 15N in the clover shoots was net mineralized during the 5 months they were on the soil surface. Crop recoveries of 15N in October 1993, at the time of wheat anthesis, from the clover shoots and burrs were 14 and 17%, respectively, of applied 15N. The results of these field studies suggest that mature shoot residues and the associated intact roots (recoverable by wet-sieving), and clover burrs, make only a small direct contribution to the N response of cereals immediately following ley pasture in southern Australia. They also indicate that, under Mediterranean climatic conditions, generally very little net N mineralization occurs from mature shoot residues until the shoots are incorporated into soil
Descriptors:burrs. dry-farming. Entisols. farming-systems. litter-(plant). mineralization. nitrogen. nutrient-uptake. plant-nutrition. roots. sandy-soils. shoots. soil-types. wheat
Geographic Locator:Australia. Western-Australia
Organism Descriptors:Arctotheca-calendula. Lolium-rigidum. Trifolium-subterraneum. Triticum. Triticum-aestivum
Supplemental Descriptors:Arctotheca. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Lolium. Poaceae. Cyperales. monocotyledons. Trifolium. Papilionoideae. Fabaceae. Fabales. Triticum. Australia
Subject Codes:ff005. ff007. ff061. ff150. jj100
Supplementary Info:35 ref
ISSN:0004-9573
Year:2002
Journal Title:Australian Journal of Soil Research

Title:Interpretation of morphological features in a salt-affected duplex soil toposequence with an altered soil water regime in western Victoria
View Article: Australian Journal of Soil Research. 2002. 40 (6). 903-926
CD Volume:382
Author(s):Brouwer J Fitzpatrick R W
Author Affiliation:Brouwer Envir. & Agric. Consultancy, Wildekamp 32, 6721 JD Bennekom, Netherlands
Other Title:Interpretation of morphological features in a salt-affected duplex soil toposequence with an altered soil water regime in western Victoria
Language:English
Abstract:This paper is the first of two describing how soil macromorphological and chemical data can be combined with a minimum of hydrological data to distinguish between, and to quantify, past and present hydrological processes. These processes are relevant to both waterlogging and dryland salinity. The purpose of this first paper is to establish a methodological framework. It also describes the initial interpretation of the macromorphological features of the toposequence studied at Gatum on the Dundas Tablelands in western Victoria, Australia. A modified version of the soil feature-system-

domain grouping method was used. The toposequence in the study area can be described as consisting of Typic Plinthoxeralfs (upslope), with Aquic Natrixeralfs occurring part-way along the slope, and Typic Natraqualfs at the bottom of the slope. The soil feature-system-domain grouping method makes it possible to distinguish between the effects of past and present hydrological processes on soil macromorphology at Gatum. Waterlogging of the surface horizons at Gatum is often caused by perching of soil water within the B-horizon (as opposed to on top of the B-horizon). Changes in soil structure and in colour of cutans and mottles can be an indicator of this first restricting layer. It is likely that interpedal cracks and old tree root holes act as preferred paths for water to flow through this first restricting layer. A second fresh perched water table can occur on top of the pallid zone. Where the pallid zone reaches close to the surface the two perched water tables may merge and cause a local increase in waterlogging, as indicated by local soil morphology. When this occurs, hillside seeps can occur quite high up on the slopes, even when there is no apparent irregularity in surface topography. The permanent saline water table occurs on top of the bedrock and causes salting problems where it comes too close to the soil surface. Salting problems at the bottom of a slope are more severe where fresh perched water tables increase waterlogging. On the basis of these findings, the suitability of various management options to reduce waterlogging and salinization is discussed
Descriptors:Alfisols. duplex-soils. salinization. soil-morphology. soil-salinity. soil-types. soil-water-content. soil-water-regimes. toposequences. waterlogging
Geographic Locator:Australia. Victoria
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:jj300. jj400
Supplementary Info:40 ref
ISSN:0004-9573
Year:2002
Journal Title:Australian Journal of Soil Research

Title:Restricting layers, flow paths, and correlation between duration of soil saturation and soil morphological features along a hillslope with an altered soil water regime in western Victoria
View Article: Australian Journal of Soil Research. 2002. 40 (6). 927-946
CD Volume:382
Author(s):Brouwer J Fitzpatrick R W
Author Affiliation:Brouwer Environmental and Agricultural Consultancy, Wildekamp 32, 6721 JD Bennekom, Netherlands
Other Title:Restricting layers, flow paths, and correlation between duration of soil saturation and soil morphological features along a hillslope with an altered soil water regime in western Victoria
Language:English
Abstract:This paper is the second of two describing how soil macromorphological and chemical data can be combined with soil hydrological data to distinguish between, and to quantify, past and present hydrological processes relevant to waterlogging and dryland salinity. The first paper provides a methodological framework for the study, and describes the initial interpretation of the macromorphological features of the toposequence studied, using the soil feature-system-domain grouping method. This second paper deals with the added value of extensive piezometric and other hydrological observations relative to soil macromorphological studies, and with quantitative relationships between soil colour and duration of

waterlogging. As with the first paper, this paper focuses on a soil toposequence at Gatum on the eastern Dundas Tableland in western Victoria, Australia. For the broad crest with yellow gradational soils or Dermosols (Plinthoxeralfs), the hydrological data confirmed the conclusion from macromorphological observations that: (1) There are three levels at which downward flow of water is restricted: at the top of the largely unaltered mottled zone, that is at 0.8-1.0 m depth, well below the top of the yellow Btl-horizon (fresh water); at the top of the pallid zone, at approx equal to 3-3.5 m depth (fresh water); and on top of the unweathered ignimbrite (saline water). (2) Below approx equal to 30 mm depth, down at least as far as 2.0 m and sometimes even more, the major pathways for downward movement of water are indeed root channels, with or without live roots, and not interpedal cracks. The 3-dimensional spacing of the roottholes above and through the less-permeable mottled zone, and the (horizontal) conductivity, storage capacity, and thickness of overlying horizons determine the extent of ponding, runoff, and deep infiltration taking place. In addition, the hydrological observations showed that: (3) If rainfall is regular, well-spaced, and not excessive, ponding is unlikely to take place even where there is a rainfall surplus and there are layers restricting downward flow of water. Furthermore, along the toposequence with yellow duplex soils or Dermosols, Chromosols, and Hydrosols, (4) There were generally good correlations between duration of saturation at the bottom of the E-horizon and colour aspects of the E-horizon (value and chroma of the matrix) and of the B2-horizon (hue, value, and chroma of the matrix). Based on these findings additional suggestions are made for improving identification and management of water logging and salinization processes
Descriptors:Alfisols. duplex-soils. ponding. salinization. saturation. soil-colour. soil-morphology. soil-salinity. soil-types. soil-water-content. soil-water-movement. soil-water-regimes. water-flow. waterlogging
Geographic Locator:Australia. Victoria
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:jj300. jj400
Supplementary Info:many ref
ISSN:0004-9573
Year:2002
Journal Title:Australian Journal of Soil Research

Title:The role of ants, especially the fire ant, Solenopsis geminata (Hymenoptera: Formicidae), in the biological control of tropical upland rice pests
View Article: Bulletin of Entomological Research. 2002. 92 (5). 431-437
CD Volume:393
Print Article: Pages: 431-437
Author(s):Way M J Javier G Heong K L
Author Affiliation:Department of Biology, Imperial College of Science, Technology and Medicine, Silwood Park, Ascot, Berks, SL5 7PY, UK
Other Title:The role of ants, especially the fire ant, Solenopsis geminata (Hymenoptera: Formicidae), in the biological control of tropical upland rice pests
Language:English
Abstract:Predatory ants are omnipresent year-round in upland (dryland) rice fields in the Philippines. At least 14 species were identified of which the very aggressive S. geminata and Tapinoma sp.

nr indicum usually predominated. Some highly aggressive species, notably Pheidolegeton spp. and Bothriomyrmex dalyi were localized. S. geminata flourished within many fields, not only during the crop season but also throughout dry season fallows where they remained aggressively predatory. Rice plants infested with brown planthopper (Nilaparvata lugens) were usually found within a few hours and S. geminata workers were quickly recruited to N. lugens aggregates. Predation was usually incomplete and workers began to solicit the few remaining late instar or adult N. lugens survivors. These oviposited but no second generation nymphs appeared. There was a surge of recruited ants at the time of N. lugens egg hatch, when surviving adults were also killed. Initially, S. geminata alone killed N. lugens aggregates less quickly than with the whole predator complex but ultimately its sole effect was as great as that of the complex. Scattered N. lugens adults, corresponding to numbers that initially colonize rice plants, were eliminated as quickly by S. geminata alone as by the predator complex. Tapinoma indicum occurring separately or with S. geminata on the same plant contributed to predation of N. lugens especially on young nymphs. S. geminata attacked other insects on rice notably leaffolders of which 97% mortality was recorded when they were exposed throughout egg and larval stages. The role of S. geminata as a predator of upland rice pests is discussed in the context of known biological control of pests of non-rice dryland crops in the tropics and subtropics by S. geminata and other Solenopsis spp
Descriptors:biological-control. biological-control-agents. insect-pests. natural-enemies. plant-pests. predation. predators. predatory-insects. rice
Geographic Locator:Philippines
Identifiers:Bothriomyrmex dalyi. Pheidolegeton. Tapinoma indicum
Organism Descriptors:Formicidae. insects. Nilaparvata-lugens. Oryza. Oryza-sativa. Solenopsis-geminata
Supplemental Descriptors:Hymenoptera. insects. arthropods. invertebrates. animals. Nilaparvata. Delphacidae. Fulgoroidea. Auchenorrhyncha. Homoptera. Hemiptera. Oryza. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. South-East-Asia. Asia. Developing-Countries. ASEAN-Countries. Solenopsis. Formicidae. Tapinoma
Subject Codes:ff005. ff620. hh100
Supplementary Info:14 ref
ISSN:0007-4853
Year:2002
Journal Title:Bulletin of Entomological Research

Title:Improving intrinsic water-use efficiency and crop yield
View Article: Crop Science. 2002. 42 (1). 122-131
CD Volume:396
Print Article: Pages: 122-131
Author(s):Condon A G Richards R A Rebetzke G J Farquhar G D
Author Affiliation:CSIRO Plant Industry, GPO Box 1600, Canberra, ACT, 2601, Australia
Other Title:Improving intrinsic water-use efficiency and crop yield
Language:English
Abstract:Greater yield per unit rainfall is one of the most important challenges in dryland agriculture. Improving intrinsic water-use efficiency (WT), the ratio of CO2 assimilation rate to transpiration rate at the stomata, may be one means of achieving this goal. Carbon isotope discrimination (DELTA 13C) is recognized as a reliable surrogate for WT and there have now been numerous studies which have examined the relationship between crop yield and WT (measured as

DELTA 13C). These studies have shown the relationship between yield and WT to be highly variable. The impact on crop yield of genotypic variation in WT will depend on three factors: (i) the impact of variation in WT on crop growth rate, (ii) the impact of variation in WT on the rate of crop water use, and (iii) how growth and water use interact over the crop's duration to produce grain yield. The relative importance of these three factors will differ depending on the crop species being grown and the nature of the cropping environment. Here, we consider these interactions using (i) the results of field trials with bread wheat (Triticum aestivum), durum wheat (T. turgidum), and barley (Hordeum vulgare) that have examined the association between yield and DELTA 13C and (ii) computer simulations with the SIMTAG wheat crop growth model. We present details of progress in breeding to improve WT and yield of wheat for Australian environments where crop growth is strongly dependent on subsoil moisture stored from out-of-season rains and assess other opportunities to improve crop yield using WT
Descriptors:barley. computer-simulation. crop-yield. genetic-variation. growth-models. growth-rate. plant-water-relations. simulation-models. transpiration. water-use-efficiency. wheat
Geographic Locator:Australia
Organism Descriptors:Hordeum-vulgare. Triticum. Triticum-aestivum. Triticum-durum. Triticum-turgidum
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Hordeum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Triticum
Subject Codes:ff005. ff020. ff062. ff100
Supplementary Info:43 ref
ISSN:0011-183X
Year:2002
Journal Title:Crop Science

Title:Use of spectral radiance to estimate in-season biomass and grain yield in nitrogen- and water-stressed corn
View Article: Crop Science. 2002. 42 (1). 165-171
CD Volume:396
Print Article: Pages: 165-171
Author(s):Osborne S L Schepers J S Francis D D Schlemmer M R
Author Affiliation:USDA-ARS, Northern Grain Insects Research Laboratory, 2923 Medary Ave., Brookings, SD 57006, USA
Other Title:Use of spectral radiance to estimate in-season biomass and grain yield in nitrogen- and water-stressed corn
Language:English
Abstract:Current technologies for measuring plant water status are limited, while recently remote sensing techniques for estimating N status have increased with limited research on the interaction between the two stresses. Because plant water status methods are time-consuming and require numerous observations to characterize a field, managers could benefit from remote sensing techniques to assist in irrigation and N management decisions. A 2-year (1997 and 1998) experiment was initiated in Nebraska, USA, to determine specific wavelengths and/or combinations of wavelengths indicative of water stress and N deficiencies, and to evaluate these wavelengths for estimating in-season biomass and maize (Zea mays) grain yield. The treatment structure had five N rates (0, 45, 90, 134, and 269 kg N/ha) and three water treatments (dryland, 0.5 evapotranspiration (ET), and full ET). Canopy spectral radiance measurements (350-2500 nm) were taken at various growth stages (V6-V7, V13-V16, and V14-R1). Specific wavelengths for estimating crop biomass, N concentration, grain yield, and chlorophyll metre readings changed with growth stage

and sampling date. Changes in total N and biomass in the presence of a water stress were estimated using near-infrared (NIR) reflectance and the water absorption bands. Reflectance in the green and NIR regions were used to estimate total N and biomass without water stress. Reflectance at 510, 705, and 1135 nm were found for estimating chlorophyll meter readings regardless of year or sampling date
Descriptors:biomass-production. chlorophyll. crop-growth-stage. crop-yield. infrared-radiation. maize. nitrogen-content. reflectance. water-stress. water-uptake
Geographic Locator:Nebraska. USA
Organism Descriptors:Zea-mays
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Zea. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff060. ff100
Supplementary Info:25 ref
ISSN:0011-183X
Year:2002
Journal Title:Crop Science

Title:Hand-plucked forage yield and quality and seed production from annual and short-lived perennial warm-season legumes fertilized with composted manure
View Article: Crop Science. 2002. 42 (3). 897-904
CD Volume:396
Print Article: Pages: 897-904
Author(s):Muir J P
Author Affiliation:Texas A&M Univ. Agric. Exp. Stn., 1229 North U.S. Hwy. 281, Stephenville, TX 76401, USA
Other Title:Hand-plucked forage yield and quality and seed production from annual and short-lived perennial warm-season legumes fertilized with composted manure
Language:English
Abstract:Productive warm-season forage legume species adapted to drier regions of the southeastern USA have yet to be identified. This trial evaluated adaptability, forage quality, hand-plucked forage yield, and seed production of legumes in north-central Texas as affected by dairy manure compost and harvest deferment. For 2 years, eight warm-season annual or short-lived perennial legume species, with or without 20 Mg dairy manure compost ha-1 year-1 added to the soil, were either hand-plucked monthly throughout the season or once-only in the autumn. Compost increased ($P<0.05$) forage P and crude protein (CP) concentrations and plant-available soil P by the end of the trial. Phasey bean (Macroptilium lathyroides), groundnut (Arachis hypogaea) and 'iron-clay' cowpea (Vigna unguiculata) harvested throughout the season yielded over 2.5 Mg of high quality forage ha-1 year-1 during the higher rainfall year. Autumn-only harvests produced lower yields but 'Tecomate' lablab (Lablab purpureus) and groundnut responded to autumn rainfall in the higher rainfall year with yields over 1.7 Mg ha-1 year-1. Forage yields were less than 1.0 Mg ha-1 year-1 during the second year when plots received only 358 mm of moisture from January through September. Both partridge pea (Chamaecrista fasciculata) and phasey bean produced over 5000 seed ha-1 year-1 the higher rainfall year under autumn-only harvest and over 1200 seed ha-1 year-1 under all-season harvest. Quality of the herbage changed with precipitation, species, and harvest. Although

not highly productive under dryland conditions, these legumes can contribute both forage and seeds for livestock and wildlife
Descriptors:application-rates. cattle-manure. cowpeas. crop-quality. crop-yield. crude-protein. dairy-cattle. fodder-crops. forage. groundnuts. herbage. seed-production
Geographic Locator:Southeastern-States-of-USA. Texas. USA
Identifiers:Chamaecrista. Chamaecrista fasciculata
Organism Descriptors:Arachis-hypogaea. cattle. Lablab-purpureus. Macroptilium-lathyroides. Vigna-unguiculata
Supplemental Descriptors:Arachis. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants. Lablab. Macroptilium. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Great-Plains-States-of-USA. Gulf-States-of-USA. Vigna. Bos. Bovidae. ruminants. Artiodactyla. mammals. vertebrates. Chordata. animals. ungulates
Subject Codes:ff007. ff060. ff100. jj700. xx100
Supplementary Info:35 ref
ISSN:0011-183X
Year:2002
Journal Title:Crop Science
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Title:Registration of 'Golden Spike' wheat
View Article: Crop Science. 2002. 42 (4). 1376-1377
CD Volume:396
Print Article: Pages: 1376-1377
Author(s):Hole D J Clawson S M Young S A Roche D
Author Affiliation:Dep. of Plants, Soils, and Biometeorology, Utah State Univ., Logan
Other Title:Registration of 'Golden Spike' wheat
Language:English
Abstract:Golden Spike is a new wheat cultivar derived from Arbon/Hansel//Hansel/ID0281. It is released for its adaptability to dryland conditions and high yield. It has intermediate resistance to snow mould caused by Typhula spp
Descriptors:adaptability. characteristics. crop-yield. disease-resistance. fungal-diseases. plant-diseases. plant-pathogenic-fungi. plant-pathogens. wheat
Identifiers:new cultivars
Organism Descriptors:Triticum. Triticum-aestivum. Typhula
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Aphyllophorales. Basidiomycotina. Eumycota. fungi
Subject Codes:ff005. ff020. ff610. ff900. hh600
Supplementary Info:8 ref
ISSN:0011-183X
Year:2002
Journal Title:Crop Science
Copyright:Copyright CAB International

Title:Simulated effects of dryland cropping intensification on soil organic matter and greenhouse gas exchanges using the DAYCENT ecosystem model
View Article: Environmental Pollution. 2002. 116 (Suppl. 1). S75-S83
CD Volume:388
Author(s):Grosso S del Ojima D Parton W Mosier A Peterson G Schimel D
Author Variant:S. del Grosso
Author Affiliation:Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO 80523, USA

Other Title:Simulated effects of dryland cropping intensification on soil organic matter and greenhouse gas exchanges using the DAYCENT ecosystem model
Language:English
Abstract:We present evidence to show that DAYCENT can reliably simulate soil C levels, crop yields, and annual trace gas fluxes for various soils. DAYCENT was applied to compare the net greenhouse gas fluxes for soils under different land uses. To calculate net greenhouse gas flux we accounted for changes in soil organic C, the C equivalents of N2O emissions and CH4 uptake, and the CO2 costs of N fertilizer production. Model results and data show that dryland soils that are depleted of C due to conventional till winter wheat/fallow cropping can store C upon conversion to no-till, by reducing the fallow period, or by reversion to native vegetation. However, model results suggest that dryland agricultural soils will still be net sources of greenhouse gases although the magnitude of the source can be significantly reduced and yields can be increased upon conversion to no till annual cropping
Descriptors:agricultural-soils. carbon. carbon-dioxide. carbon-sequestration. crop-yield. dry-farming. ecosystems. emission. fallow. gas-exchange. greenhouse-gases. land-use. methane. nitrous-oxide. simulation-models. soil-management. soil-organic-matter. soil-types. tillage
Subject Codes:ff150. jj200. jj900. zz100
Supplementary Info:38 ref
ISSN:0269-7491
Year:2002
Journal Title:Environmental Pollution

Title:Sensitivity of carbon sequestration costs to soil carbon rates
View Article: Environmental Pollution. 2002. 116 (3). 413-422
CD Volume:388
Author(s):Antle J Capalbo S Mooney S Elliott E T Paustian K H
Author Affiliation:Department of Agricultural Economics and Economics, PO Box 172920, Montana State University, Bozeman, MT 59717-2920, USA
Document Editor:Mickler-R-A. McNulty-S-G
Other Title:Sensitivity of carbon sequestration costs to soil carbon rates
Conference Title:Special issue: Terrestrial carbon (Part I), presented at the Advances in Terrestrial Ecosystems Carbon Inventory, Measurements, and Monitoring Conference, Raleigh, North Carolina, USA, 3-5 October 2000
Language:English
Abstract:Modifying current agricultural management practices as a means of sequestering carbon has been shown to be a relatively low cost way to offset greenhouse gas emissions. In this paper, we examine the sensitivity of the estimates of the amount of soil carbon sequestered and the implied costs of sequestering a tonne of carbon to changes in the rates of soil carbon sequestered for alternative production practices. An application is made to the dryland grain production systems of the US Northern Plains where the marginal costs of soil C range from $20 to $100 per MT [metric tonne]. We show that the resulting changes in the marginal costs quantities of C sequestered are not a monotonic transformation of the changes in the soil carbon rates. These results underscore the importance of using a linked economic and biophysical simulation model to assess the economic potential for sequestering carbon in agricultural soils

Descriptors:agricultural-soils. carbon. carbon-sequestration. dry-farming. emission. estimated-costs. greenhouse-gases. simulation-models. soil-management. soil-types
Geographic Locator:Northern-Plains-States-of-USA. USA
Supplemental Descriptors:North-America. America. Developed-Countries. OECD-Countries. West-North-Central-States-of-USA. North-Central-States-of-USA. USA
Subject Codes:jj200. jj900. pp600. ee115
Supplementary Info:19 ref
ISSN:0269-7491
Year:2002
Journal Title:Environmental Pollution

Title:Genetic analysis of feed quality and seed weight of sorghum inbred lines and hybrids using analytical methods and NIRS
View Article: Euphytica. 2002. 127 (1). 31-40
CD Volume:384
Author(s):Hicks C Tuinstra M R Pedersen J F Dowell F E Kofoid K D
Author Affiliation:Dep. of Agronomy, Kansas State Univ., Manhattan, KS 66506, USA
Other Title:Genetic analysis of feed quality and seed weight of sorghum inbred lines and hybrids using analytical methods and NIRS
Language:English
Abstract:Eight lines of grain sorghum and their F1 hybrids were evaluated for contents of crude protein (CP), fat (FAT) and starch (STA); protein digestibility (PD); and in vitro dry matter disappearance (IVDMD). The effect of seed weight (SW) on these traits and the potential use of near infrared reflectance spectroscopy (NIRS) to predict them also were investigated. The male lines included three normal-seeded lines (TX2737, TX435 and P954063) and two large-seeded lines (PL-1 and Eastin1). The female lines included common U.S. seed parent lines (Wheatland, Redlan and SA3042). The lines and their hybrids were grown under dryland conditions at Kansas State University experiment fields in Ashland and Belleville, Kansas, USA, in 1999. The experiments were conducted using a randomized complete block design with four replications at each location. The effect of genotype was significant for all measured traits. The male parent lines were highly variable and expressed high levels of genetic variation in combining ability for CP, PD, STA and SW. The female parents were genetically more uniform; however, significant general combining ability effects were noted for PD and SW. Significant negative correlations were noted between CP and STA and between SW and STA. Significant positive correlations were found between CP and SW and between FAT and IVDMD. Crude protein content was predicted accurately by NIRS. Fat content and IVDMD could not be predicted by NIRS. The NIRS equations based on ground samples were more accurate than those based on whole-seed samples
Descriptors:analytical-methods. chemical-composition. combining-ability. crop-quality. crude-protein. dry-matter. fat. genetic-correlation. genetic-effects. genetic-variation. hybrids. inbred-lines. protein-content. protein-digestibility. seed-weight. starch
Geographic Locator:Kansas. USA
Organism Descriptors:Sorghum-bicolor
Supplemental Descriptors:Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff007. ff020. rr300. zz900
Supplementary Info:35 ref

ISSN:0014-2336
Year:2002
Journal Title:Euphytica
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Title:Magat, a wetland semidwarf hybrid rice for high-yielding production on irrigated dryland
View Article: International Rice Research Notes. 2002. 27 (1). 26-28
CD Volume:389
Print Article: Pages: 26-28
Author(s):George T Magbanua R Laza M Atlin G Virmani SS
Author Affiliation:IRRI, DAPO Box 7777, Metro Manila, Philippines
Other Title:Magat, a wetland semidwarf hybrid rice for high-yielding production on irrigated dryland
Language:English
Abstract:Magat was evaluated in trial 1 (along with Apo, Lubang Red, and IR72 in 1998), 2 (along with Apo in 2001), 3 (along with Apo, Maravilha, KMP 34, and B6 144 in 2001), and 4 (along with IR73868H, IR75207H, IR75217H, IR73871H, IR75585H, IR73855H, IR73870H, IR73860H, IR75201H, B6 144, and UPLRi-5 in 2001) for yield and yield components under fully fertilized and irrigated upland conditions in Laguna, Philippines. Magat had the highest grain yield in all trials, except in trial 2 when Magat had a yield (5.7 t/ha) which was on a par with that of Apo (6.2 t/ha). Magat outyielded Apo by 1 t/ha in 3 trials and outyielded nine other lowland hybrids in trial 4. The high yield of Magat on aerobic soil was mainly attributed to its profuse tillering, reduced plant height, decreased rot dry matter accumulation, high number of small panicles, and increased partitioning of dry matter to grains
Descriptors:crop-yield; cultivars-; dry-matter; dry-matter-distribution; hybrids-; panicles-; plant-height; rice-; roots-; tillering-; tillers-; upland-rice; varietal-reactions; yield-components Oryza; Poaceae; Cyperales; monocotyledons; angiosperms; Spermatophyta; plants; South-East-Asia; Asia; Developing-Countries; ASEAN-Countries Field-Crops; Plant-Breeding-and-Genetics; Plant-Production; Plant-Morphology-and-Structure
Geographic Locator:Philippines-
Organism Descriptors:Oryza-; Oryza-sativa
Supplemental Descriptors:20030113
Subject Codes:ff005; ff020; ff100; ff030
Supplementary Info:1 ref
ISSN:0117-4185
Year:2002
Journal Title:International Rice Research Notes
Copyright:Copyright CAB International

Title:Jojoba seed meal proteins associated with proteolytic and protease inhibitory activities
View Article: Journal of Agricultural and Food Chemistry. 2002. 50 (20). 5670-5675
CD Volume:397
Print Article: Pages: 5670-5675
Author(s):Shrestha Madan K Peri Irena Smirnoff Patricia Birk Yehudith Golan Goldhirsh Avi
Author Affiliation:Desert Plant Biotechnology Laboratory, Albert Katz Department of Dryland Biotechnologies, Jacob Blaustein Institute for Desert Research, Ben-Gurion University of the Negev, Sede Boker Campus, 84990, Beer-Sheva; E-Mail: avigolan@bgumail.bgu.ac.il, Israel
Other Title:Jojoba seed meal proteins associated with proteolytic and protease inhibitory activities
Language:English

Abstract:The jojoba, Simmondsia chinensis, is a characteristic desert plant native to the Sonoran desert. The jojoba meal after oil extraction is rich in protein. The major jojoba proteins were albumins (79%) and globulins (21%), which have similar amino acid compositions and also showed a labile thrombin-inhibitory activity. SDS-PAGE showed two major proteins at 50 kDa and 25 kDa both in the albumins and in the globulins. The 25 kDa protein has trypsin- and chymotrypsin-inhibitory activities. In vitro digestibility of the globulins and albumins resembled that of casein and soybean protein concentrates and was increased after heat treatment. The increased digestibility achieved by boiling may be attributed to inactivation of the protease inhibitors and denaturation of proteins
Descriptors:Biochemistry-and-Molecular-Biophysics; Foods- amino-acids: analysis-; chymotrypsin-: activities-, inhibition-; enzymes-: activities-, inhibition-; jojoba-seed-meal-proteins: analysis-, biological/biochemical-effects, isolation-; proteases-: activities-, inhibition-; proteins-: analysis-, denaturation-; trypsin-: activities-, inhibition- food-chemistry; food-processing; jojoba-seed-meal: animal-feed, chemical-analysis, food-supplement, preparation-; proteolysis-
Geographic Locator:Sonoran-desert (North-America, Nearctic-region)
Identifiers:SDS-polyacrylamide-gel-electrophoresis: analytical-method
Organism Descriptors:Simmondsia-chinensis [jojoba-] (Buxaceae-)
Supplemental Descriptors:Buxaceae-: Dicotyledones-, Angiospermae-, Spermatophyta-, Plantae- Angiosperms-; Dicots-; Plants-; Spermatophytes-; Vascular-Plants
ISSN:0021-8561
Year:2002
Journal Title:Journal of Agricultural and Food Chemistry

Title:Regional classification for dryland agriculture in southern Iran
View Article: Journal of Arid Environments. 2002. 50 (2). 333-341
CD Volume:387
Author(s):Sadeghi A R Kamgar Haghighi A A Sepaskhah A R Khalili D Zand Parsa S
Author Affiliation:Department of Irrigation, College of Agriculture, Shiraz University, Shiraz, Iran
Other Title:Regional classification for dryland agriculture in southern Iran
Language:English
Abstract:The average annual and the autumn season ratios of rainfall (P) to reference crop evapotranspiration (ET0) were used as agroclimatological indices, to develop a suitability atlas of dryland agriculture for southern Iran (Fars province). The results were plotted as ISO-(P/ET0) lines. The autumn season atlas can be used to study the P/ET0 status of seed germination stage. The annual atlas, information on regional yields and UNESCO recommendations are used for land selection. Areas with ISO-(P/ET0) lines of at least 0.58 and of 0.63 should have a yield 1000 kg ha-1 for wheat and barley, respectively. Areas with ISO-(P/ET0) lines of 0.2-0.6 can have a yield of less than 1000 kg ha-1. Areas with ISO-(P/ET0) lines of less than 0.2 are not suitable for dryland agriculture. A probabilistic atlas (90% rainfall and 10% ET0) was developed as an extreme condition for land selection. Areas of the annual probabilistic atlas with ISO-(P/ET0) lines of at least 0.2 are the most suitable for dryland agriculture. The probabilistic autumn season atlas shows the effect of autumn season rainfall
Descriptors:barley. classification. crop-yield. evapotranspiration. seed-germination. wheat

Geographic Locator:Iran
Organism Descriptors:Hordeum-vulgare. Triticum. Triticum-aestivum
Supplemental Descriptors:Hordeum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. West-Asia. Asia. Middle-East. Developing-Countries. Threshold-Countries. Triticum
Subject Codes:ff005. ff062. ff100. pp500
Supplementary Info:19 ref
ISSN:0140-1963
Year:2002
Journal Title:Journal of Arid Environments
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Title:Nebkha dunes in the Molopo Basin, South Africa and Botswana: formation controls and their validity as indicators of soil degradation
View Article: Journal of Arid Environments. 2002. 50 (3). 413-428
CD Volume:387
Author(s):Dougill A J Thomas A D
Author Affiliation:School of the Environment, University of Leeds, Leeds, UK
Other Title:Nebkha dunes in the Molopo Basin, South Africa and Botswana: formation controls and their validity as indicators of soil degradation
Language:English
Abstract:Nebkha dunes have been proposed as a reliable rapid indicator of aeolian erosion and dryland degradation. This paper tests the applicability of these links for the Molopo Basin, southern Africa, where it is shown that nebkha sediments are largely locally derived from interdune areas and are significantly enriched in available inorganic nutrients. Feedbacks with the bush canopy are the most likely cause of the enrichment, such that this can occur without associated declines in nutrient availability in surrounding source areas. Thus, although the nebkhas indicate aeolian transport of sediment, the immediate association with soil degradation is over-simplistic
Descriptors:aeolian-sands. dunes. indicators. nutrient-availability. particle-size. particle-size-distribution. sediment. soil-degradation. soil-fertility. soil-organic-matter. wind-erosion
Geographic Locator:Botswana. South-Africa
Supplemental Descriptors:Southern-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Commonwealth-of-Nations. SADC-Countries. Anglophone-Africa. Threshold-Countries
Subject Codes:jj200. jj300. jj600. pp400. pp600
Supplementary Info:39 ref
ISSN:0140-1963
Year:2002
Journal Title:Journal of Arid Environments
Copyright:Copyright CAB International

Title:Tiller recruitment and mortality in the dryland bunchgrass Eragrostis curvula as affected by defoliation intensity
View Article: Journal of Arid Environments. 2002. 51 (4). 577-585
CD Volume:387
Author(s):Wan C G Sosebee R E
Author Affiliation:Department of Range, Wildlife, and Fisheries Management, Texas Tech University, Lubbock, TX 79409, USA
Other Title:Tiller recruitment and mortality in the dryland bunchgrass Eragrostis curvula as affected by defoliation intensity
Language:English

Abstract:A greenhouse experiment was conducted to investigate the effects of moderate (14 cm) vs. severe (7 cm) defoliation on tiller recruitment and mortality within the interior and on the perimeter of weeping lovegrass (Eragrostis curvula) tussocks. Tiller number per marked shoot within the interior was significantly greater in plants defoliated at 14-cm stubble height than at 7-cm stubble height (2.37 vs. 0.43, $p<0.05$) 28 weeks after defoliation; likewise, tiller number per marked shoot was also greater on the perimeter of tussocks in the higher stubble than the lower stubble defoliation treatment (5.10 vs. 2.03, $p<0.05$). Tiller natality increased significantly 4 weeks after defoliation except for tillers cut to 7-cm stubble height within the interior of tussocks where tiller natality reached a peak at 4.5 weeks after defoliation. During the later stages of canopy development, tiller numbers per marked shoot gradually declined as tiller mortality increased. Tillers began senescing 13 weeks after defoliation, and the senescence rate was 52% greater in the 7-cm stubble height treatment than in the 14-cm stubble height treatment (2.33 vs. 1.53, $p<0.0001$). Within the interior of tussocks, number of the marked tillers more than doubled under the 14-cm stubble height treatment, whereas the plants lost 57% of the monitored tillers under the 7-cm stubble height treatment. We concluded that the central dieback process in weeping lovegrass is accelerated by severe defoliation
Descriptors:defoliation. dieback. grassland-management. grasslands. grazing. height. mortality. recruitment. sown-grasslands. stubble. tillers
Organism Descriptors:Eragrostis-curvula
Supplemental Descriptors:Eragrostis. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff007. ff060. ff100
Supplementary Info:28 ref
ISSN:0140-1963
Year:2002
Journal Title:Journal of Arid Environments

Title:The effects of large-scale afforestation and climate change on water allocation in the Macquarie River catchment, NSW, Australia
View Article: Journal of Environmental Management. 2002. 65 (4). 369-381
CD Volume:387
Author(s):Herron N Davis R Jones R
Author Affiliation:NSW Department of Land and Water Conservation, Suite U101, Level 1, 131-139 Monaro St, PO Box 189, Queanbeyan NSW 2620, Australia
Other Title:The effects of large-scale afforestation and climate change on water allocation in the Macquarie River catchment, NSW, Australia
Language:English
Abstract:Widespread afforestation has been proposed as one means of addressing the increasing dryland and stream salinity problem in Australia. However, modelling results presented here suggest that large-scale tree planting will substantially reduce river flows and impose costs on downstream water users if planted in areas of high runoff yield. Stream flow reductions in the Macquarie River, New South Wales, Australia are estimated for a number of tree planting scenarios and global warming forecasts. The modelling framework includes the Sacramento rainfall-runoff model and IQQM, a stream flow routing tool, as well as various global climate model outputs from which daily rainfall and potential evaporation data files have been generated in OzClim, a climate scenario generator. For a 10% increase

in tree cover in the headwaters of the Macquarie, we estimate a 17% reduction in inflows to Burrendong Dam. The drying trend for a mid-range scenario of regional rainfall and potential evaporation caused by a global warming of 0.5 deg C may cause an additional 5% reduction in 2030. These flow reductions will decrease the frequency of bird-breeding events in Macquarie Marshes (a RAMSAR protected wetland) and reduce the security of supply to irrigation areas downstream. Inter-decadal climate variability is predicted to have a very significant influence on catchment hydrologic behaviour. A further 20% reduction in flows from the long-term historical mean is possible, should we move into an extended period of below average rainfall years, such as occurred in eastern Australia between 1890 and 1948. Because current consumptive water use is largely adapted to the wetter conditions of post 1949, a return to prolonged dry periods would cause significant environmental stress given the agricultural and domestic water developments that have been instituted
Descriptors:afforestation. catchment-hydrology. climatic-change. conservation-areas. global-warming. salinity. stream-flow. water-availability. water-distribution. wetlands
Geographic Locator:Australia. New-South-Wales
Supplemental Descriptors:Australasia. Oceania. Developed-Countries. Commonwealth-of-Nations. OECD-Countries. Australia
Subject Codes:kk100. pp200. pp320. pp500
Supplementary Info:40 ref
ISSN:0301-4797
Year:2002
Journal Title:Journal of Environmental Management

Title:Copper and zinc speciation in the solution of a soil-sludge mixture
View Article: Journal of Environmental Quality. 2002. 31 (1). 193-203
CD Volume:392
Print Article: Pages: 193-203
Author(s):Vulkan R Mingelgrin U Ben Asher J Frenkel H
Author Affiliation:The Wyler Department of Dryland Agriculture, The Jacob Blaustein Institute for Desert Research, Ben-Gurion University, Sede Boqer Campus 84990, Israel
Other Title:Copper and zinc speciation in the solution of a soil-sludge mixture
Language:English
Abstract:Only a small fraction of the transition metals content in sludge-amended soils is soluble, and yet this fraction is a major contributor to the mobility and bioavailability of the metals. The chemical species of zinc (Zn) and copper (Cu) in the soluble fractions of soil (Typic Torripsamment)-sludge mixtures were characterized with respect to their charge, molecular weight, and stoichiometry using ion exchange resin and gel chromatography procedures. The change in the metals' species with time after sludge application was followed for 100 days. Copper in the water extracts of the sludge-sand mixtures was found almost exclusively in low molecular weight (below 1000 Da) complexes. Higher molecular weight (approx equal to 2500 Da) dissolved organic carbon (DOC) was present in the extracts as well, but this DOC fraction exhibited little complexation. Copper was present in the extracts mainly as negatively charged species throughout the incubation period, and zinc tended to form zwitter ions. As incubation progressed, the relative content of positively charged Zn in solution increased. Complexation capacity of DOC in sludge water extract, extrapolated to infinite dilution, was 8.75 mM Cu g-1 DOC. When the complexation capacity of the extract is near saturation, a mean Cu-DOC complex can be defined. It consists of

1.9 Cu atoms attached to DOC species containing 5.6 C atoms. Thus, the organic Cu complexes consist primarily of approximately two Cu ions attached to DOC species containing only five or six C atoms. Amino acids and small peptides or polycarboxylic acids, such as citric acid, thus may be important complexing agents of the metal
Descriptors:application-to-land. charges. chemical-speciation. copper. Entisols. heavy-metals. ion-exchange-resins. molecular-weight. polluted-soils. sewage-sludge. soil-amendments. soil-organic-matter. soil-pollution. soil-types. zinc
Identifiers:dissolved organic carbon
Subject Codes:jj200. jj700. pp600. xx300
Supplementary Info:43 ref
ISSN:0047-2425
Year:2002
Journal Title:Journal of Environmental Quality

Title:Hydrological properties of a clay loam soil after long-term cattle manure application
View Article: Journal of Environmental Quality. 2002. 31 (3). 989-996
CD Volume:392
Print Article: Pages: 989-996
Author(s):Miller J J Sweetland N J Chang C
Author Affiliation:Agriculture and Agri-Food Canada, P.O. Box 3000, Lethbridge, AB T1J 4B1, Canada
Other Title:Hydrological properties of a clay loam soil after long-term cattle manure application
Language:English
Abstract:Limited information exists on the effect of long term application of beef cattle (Bos taurus) manure on soil hydrological properties in the Great Plains region of North America. A site on a clay loam soil (Typic Haploboroll) in Alberta, Canada, was used to examine the effect of manure addition on selected soil hydrological properties in 1997 and 1998. The manure was annually applied in the fall for 24 years at one, two, and three times the recommended rates (in 1973) under dryland (0, 30, 60, and 90 t ha-1 wet basis) and irrigation (0, 60, 120, and 180 t ha-1). Manure significantly (Pless than or equal to 0.05) increased soil water retention (0-5 and 10-15 cm) by 5 to 48% compared with the control at most potentials between 0 and -1500 kPa. Field soil water content (0-5 and 10-15 cm) was increased by 10 to 22% in the summers of 1997 and 1998. Manure increased ponded infiltration by more than 200% at 90 t ha-1 under dryland (1998) and at rates more than or equal to 120 t ha-1 under irrigation (1997). Field-saturated hydraulic conductivity (Kfs) of surface soil (1-cm depth) was significantly increased by 76 to 128% under dryland (1998) and irrigation (1997), as were number of pores >1120 micro m in diameter (37-128% increase). In contrast, manure rate had little or no effect on unsaturated hydraulic conductivity [K(psi)] values (-0.3, -0.5, -0.7, and -1.0 kPa) in 1997 and 1998. Overall, soil hydrological parameters generally had a neutral or positive response to 24 years of annual manure addition
Descriptors:application-rates. cattle-manure. clay-loam-soils. infiltration. Mollisols. saturated-hydraulic-conductivity. soil-amendments. soil-physical-properties. soil-types. soil-water-content. soil-water-potential. soil-water-retention. unsaturated-hydraulic-conductivity. waste-disposal. waste-management. waste-utilization
Geographic Locator:Alberta. Canada
Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:jj300. jj700. xx100
Supplementary Info:48 ref

ISSN:0047-2425
Year:2002
Journal Title:Journal of Environmental Quality

Title:Solution chemistry influence on metal mobility in biosolids-amended soils
View Article: Journal of Environmental Quality. 2002. 31 (4). 1157-1165
CD Volume:392
Print Article: Pages: 1157-1165
Author(s):Al Wabel M A Heil D M Westfall D G Barbarick K A
Author Affiliation:Department of Soil and Crop Sciences, Colorado State Univ., Fort Collins, CO 80523-1170, USA
Other Title:Solution chemistry influence on metal mobility in biosolids-amended soils
Language:English
Abstract:Many studies have implicated dissolved organic carbon (DOC) as an important contributor to the elevated mobility of trace metals in soils amended with biosolids. Few of these studies, however, have quantified both DOC and metal concentrations. We completed laboratory leaching column studies on a dryland Platner loam (fine, smectitic, mesic Aridic Paleustoll) and an irrigated Osgood sand (loamy, mixed, mesic Arenic Ustollic Haplargid) collected from Colorado (USA), both with a history of biosolids application. The soils were neutral to slightly alkaline in pH prior to amendment. We performed an additional application of biosolids to one set of columns in the laboratory at a rate of 28 t ha-1 to investigate the effect of time following application on metal mobility. The effect of electrolyte concentration was studied by using both distilled water and simulated irrigation water. Biosolids application increased both DOC and Cu in the column effluents resulting in a positive correlation between Cu and DOC across application treatments for both soils. Both Cu and Pb were mobilized under conditions of low electrical conductivity (EC). This may be the result of the release of a strong metal-binding component of DOC under these conditions. Conversely, Zn mobility was positively correlated with EC, suggesting that either cation exchange or the formation of inorganic complexes influences Zn mobility. Anodic stripping voltammetry measurements indicated that only a small percentage of the total dissolved metals existed as free ions or inorganic complexes; the remainder appears to be complexed to DOC
Descriptors:alkaline-soils. cation-exchange. chemical-composition. copper. electrical-conductivity. irrigated-soils. irrigation-water. leachates. leaching. lead. loam-soils. Mollisols. sandy-soils. sewage-sludge. soil-amendments. soil-pH. soil-types. solutions. transport-processes. zinc
Geographic Locator:Colorado. USA
Identifiers:Ardisols. dissolved organic carbon
Supplemental Descriptors:Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA
Subject Codes:jj200. jj300. jj700. jj800. xx300
Supplementary Info:33 ref
ISSN:0047-2425
Year:2002
Journal Title:Journal of Environmental Quality

Title:Root distribution pattern of some grass species in black clay soil in relation to their capability for controlling erosion

View Article: Journal of the Indian Society of Soil Science. 2002. 50 (3). 280-282
CD Volume:389
Print Article: Pages: 280-282
Author(s):Ranade DH Mishra VK Gupta RK Verma SK
Author Affiliation:AICRP on Dryland Agriculture, JNKVV Campus, College of Agriculture, Indore, Madhya Pradesh 452 001, India
Other Title:Root distribution pattern of some grass species in black clay soil in relation to their capability for controlling erosion
Language:English
Abstract:In a study conducted at AICRP on Dryland Agriculture, Madhya Pradesh, India based on the root parameter of four grass species namely Vetiveria zizanioides, Cymbopogon martinii, Panicum maximum and Dichanthium annulatum suitable for growing as vegetative barriers for soil conservation the root dynamic model has been developed. It was observed that the root development model of these grass species in time and space could be described by logistic growth function. Since a close agreement was observed in the computed and observed root biomass density values, these equations can be considered valid for the region
Descriptors:biomass-; clay-soils; distribution-; erosion-; erosion-control; mathematical-models; roots-; soil-conservation; soil-types
Cymbopogon; Poaceae; Cyperales; monocotyledons; angiosperms; Spermatophyta; plants; Dichanthium; South-Asia; Asia; Developing-Countries; Commonwealth-of-Nations; India; Panicum; Vetiveria
Grasslands-and-Rangelands; Erosion:-Soil-and-Water-Conservation; Mathematics-and-Statistics
Geographic Locator:India-; Madhya-Pradesh
Organism Descriptors:Cymbopogon-martinii; Dichanthium-annulatum; Panicum-maximum; Vetiveria-zizanioides
Supplemental Descriptors:20030408
Subject Codes:pp350; pp400; zz100
Supplementary Info:5 ref
ISSN:0019-638X
Year:2002
Journal Title:Journal of the Indian Society of Soil Science

Title:The fate of carbon and fertiliser nitrogen when dryland wheat is grown in monoliths of duplex soil
View Article: Plant and Soil. 2002. 241 (2). 259-269
CD Volume:384
Author(s):Atwell B J Fillery I R P McInnes K J Smucker A J M
Author Affiliation:Department of Biological Sciences, Macquarie University, Sydney, N.S.W. 2109, Australia
Other Title:The fate of carbon and fertiliser nitrogen when dryland wheat is grown in monoliths of duplex soil
Language:English
Abstract:Triticum aestivum (cv. Gutha), a short-season wheat, was grown to maturity in large monoliths of duplex soil (sand over sandy-clay) in a daylight phytotron mimicking field conditions. Either 15N-labelled ammonium sulfate ((NH4)2SO4) or urea was banded into the soil at a rate of 30 kg N ha-1: even though roots were approximately 20% heavier when grown in the presence of (NH4)2SO4 for 86 days ($P<0.05$), above ground mass was not affected by the source of nitrogen. At four times through crop development up to grain-filling (50, 56, 70 and 86 days after sowing) shoots were labelled heavily with 14CO2 with two purposes. First, to trace 'instantaneous' assimilate movement over 24 hours, revealing relative sink strengths throughout plants. This, in turn, allowed precise measurements of live root mass and the proportion of recent photoassimilates

deposited in the rhizosphere. Although root systems were sparse, even in surface soil layers, they were strong sinks for photoassimilates early in development (0-50 days), supporting the conversion of inorganic applied nitrogen (N) to soil organic forms. In the presence of roots, up to 28% of 15N was immobilized, whereas only 12% of labelled ammonium sulfate was immobilized in unplanted plots in spite of a favourable moisture status in both treatments. The effect of plants on rates of 15N transformation is ascribed to recently imported photoassimilates sustaining rhizosphere metabolism. Not more than 15% of recently fixed carbon imported by roots was recovered from the rhizoplane, suggesting that a highly localized microbial biomass supported vigorous immobilisation of soil N. Thus, more than twice as much applied N was destined for soil organic fractions as for root material. By these processes, root- and soil-immobilized N become substantial stores of applied N and together with shoot N accounted for all the applied N under dryland conditions
Descriptors:ammonium-sulfate. biomass. carbon. carbon-dioxide. duplex-soils. immobilization. nitrogen. root-systems. soil-types. urea. wheat
Identifiers:microbial biomass
Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. jj100. jj700
Supplementary Info:35 ref
ISSN:0032-079X
Year:2002
Journal Title:Plant and Soil

Title:Screening rough-seeded lupins (Lupinus pilosus Murr. and Lupinus atlanticus Glads.) for tolerance to calcareous soils
View Article: Plant and Soil. 2002. 245 (2). 261-275
CD Volume:384
Author(s):Brand J D Tang C Rathjen A J
Author Affiliation:Department of Natural Resources and Environment, Victorian Institute for Dryland Agriculture, Private Bag 260, Horsham, VIC, 3401, Australia; E-Mail: jason.brand@nre.vic.gov.au, Australia
Other Title:Screening rough-seeded lupins (Lupinus pilosus Murr. and Lupinus atlanticus Glads.) for tolerance to calcareous soils
Language:English
Abstract:Soil- and solution-based screening methods were used to identify interspecific and intraspecific variation in lupins for tolerance to calcareous soils. Plants were grown for 21 days in a calcareous soil (pH 8.2; 50% $CaCO_3$; moisture content 90% of field capacity) for soil-based screening and in nutrient solution containing 15 mM $KHCO_3$ for solution-based screening. Chlorosis as an indicator of tolerance was recorded. Lupinus pilosus Murr. had the most tolerant genotypes and had the greatest range of intraspecific variation. Most genotypes of Lupinus atlanticus Glads. and Lupinus angustifolius L. were moderately intolerant, although two genotypes of L. atlanticus appeared to be tolerant. Lupinus albus L. had moderately tolerant to moderately intolerant genotypes, whilst the single genotypes of Lupinus cosentinii Guss. and Lupinus digitatus Forsk appeared tolerant. In a field study six genotypes of L. pilosus identified in the soil-based screening as differing in their tolerance to the calcareous soil were grown on comparable calcareous (pH apprx8.3; topsoil 3% $CaCO_3$, subsoil 13% $CaCO_3$) and non-calcareous (pH apprx7.3) soils within a paddock. Chlorosis and nutrient concentrations in the youngest leaves were measured 53 days after

sowing, whilst grain yield was estimated at harvest. Despite the soil containing a much lower CaCO3 content than used in the screening method, the field study confirmed that moderately intolerant to intolerant genotypes had lower relative grain yields than more tolerant genotypes. Chlorosis rankings of the genotypes were correlated between field and the screening studies. It is suggested that the incorporation of genes conferring tolerance to calcareous soils into high yielding, agronomically suitable genotypes of L. pilosus should be an important objective in a lupin breeding program for calcareous soils
Descriptors:Agronomy- (Agriculture-); Soil-Science bicarbonate-; calcium-carbonate; potassium-bicarbonate chlorosis-: nutritional-disease calcareous-soil; genetic-variation; paddock-; soil-moisture-content
Identifiers:soil-based-screening: laboratory-techniques; solution-based-screening: laboratory-techniques
Organism Descriptors:Lupinus-atlanticus (Leguminosae-): calcareous-soil-tolerance, crop-, rough-seeded-lupin; Lupinus-cosentinii (Leguminosae-): crop-; Lupinus-digitatus (Leguminosae-): crop-; Lupinus-pilosus (Leguminosae-): calcareous-soil-tolerance, crop-, genotypes-, rough-seeded-lupin grain-: yield-; leaf-: nutrient-concentrations
Supplemental Descriptors:Leguminosae-: Dicotyledones-, Angiospermae-, Spermatophyta-, Plantae- Angiosperms-; Dicots-; Plants-; Spermatophytes-; Vascular-Plants
ISSN:0032-079X
Year:2002
Journal Title:Plant and Soil

Title:Ecotypic differentiation in Medicago polymorpha L. along an environmental gradient in central Chile. I. Phenology, biomass production and reproductive patterns
View Article: Plant Ecology. 2002. 159 (2). 119-130
CD Volume:384
Author(s):Pozo A del Ovalle C Aronson J Avendano J
Author Variant:A. del Pozo
Author Affiliation:Departamento de Produccion Vegetal, Facultad de Agronomia, Universidad de Concepcion, Casilla 537, Chillan, Chile
Other Title:Ecotypic differentiation in Medicago polymorpha L. along an environmental gradient in central Chile. I. Phenology, biomass production and reproductive patterns
Language:English
Abstract:Burr Medic (Medicago polymorpha) is a widespread, polymorphic annual legume of Mediterranean origin, and as a self-reseeding, highly effective nitrogen fixer it has important value in various dryland farming systems. In central Chile, it is naturalized along a 1000 km long environmental gradient, from an arid zone (29 deg -31 deg S) to a perhumid one (37 deg -38 deg 24'S). Comparative and experimental studies of its ecotypic differentiation patterns along this gradient should be useful in elucidating the evolutionary forces at work along environmental gradients, and also for efforts to select annual legumes for pastures and fallow field improvement in mediterranean climate areas. In this first paper of a two-part series, we present results of two common-environment experiments conducted at a subhumid site in central Chile to compare vegetative and reproductive traits in 69 populations of Burr Medic collected in 1988 and 1994. Multivariate analyses based on 11 phenological and agronomic characters, including phenology and biomass accumulation, winter vigour and degree of hardseededness, showed that three principal components (PCs) explained nearly 70% of total variability,

in both collections. For the larger collection (1988), the diagram of dispersion for the first two PCs - phenology, winter vigour and above ground biomass - provided good discrimination between accessions from arid-semiarid and humid-perhumid mediterranean zones. Onset of flowering was positively correlated with both latitude and longitude, as well as mean annual precipitation/potential evapotranspiration (PP/ETP) of collecting site; days from first flower to pod ripening was negatively correlated with PP/ETP. In contrast to reports from Syria and Sardinia, no clear trends in Burr Medic seed or pod-related traits was found along the Chilean gradient, apart from the concentration of spiny pod accessions in the southern, more mesic end of the gradient. Winter vigour (according to a semi-quantitative analysis of growth) was greater in accessions from the warmer, arid and semiarid zones than in those from cooler, subhumid to humid ones. Both winter vigour and harvest index were negatively correlated with days to first flower. Applied and evolutionary aspects of the results are briefly discussed
Descriptors:biomass-production. ecotypes. flowering. hard-seeds. Mediterranean-climate. phenology. precipitation. seed-morphology. variation. winter-hardiness
Geographic Locator:Chile
Organism Descriptors:Medicago-polymorpha
Supplemental Descriptors:South-America. America. Developing-Countries. Threshold-Countries. Latin-America. Medicago. Papilionoideae. Fabaceae. Fabales. dicotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff007. ff060. ff900. ss200. pp500
Supplementary Info:many ref
ISSN:1385-0237
Year:2002
Journal Title:Plant Ecology

Title:Residue management and paratillage effects on some soil properties and rain infiltration
View Article: Soil & Tillage Research. 2002. 65 (1). 19-27
CD Volume:387
Author(s):Baumhardt R L Jones O R
Author Affiliation:Conservation and Production Research Laboratory, USDA-Agricultural Research Service, P.O. Drawer 10, Bushland, TX 79012, USA
Other Title:Residue management and paratillage effects on some soil properties and rain infiltration
Language:English
Abstract:Dryland winter wheat (Triticum aestivum) and grain sorghum (Sorghum bicolor) are often grown on the semiarid North American Great Plains using the wheat-sorghum-fallow (WSF) crop rotation. When used with WSF, no-tillage (NT) and stubblemulch tillage (SM) residue management reduce evaporation and increase yield, but more runoff occurs with NT compared to SM. Our objectives were to determine the effects of NT and SM residue management with paratill (PT) and sweep (ST) tillage on soil properties and rain infiltration into a Pullman clay loam (US soil taxonomy: fine, mixed, superactive, thermic Torrertic Paleustoll). Six contour-farmed level-terraced watersheds in Texas, USA, were dryland cropped using a WSF rotation with each phase of the WSF appearing all years as main plots. Residue management by tillage subplots of: (i) NT with PT; (ii) NT with no PT (NOPT); (iii) NT with ST; (iv) SM with PT; and (v) SM with NOPT were installed within these main plots after sorghum harvest. Approximately 9 months later during the wheat phase (before planting), we measured selected soil characteristics and the

infiltration rate and amount using a rotating disc rain simulator that applied cistern stored rainwater at 48 mm h-1 on the five tillage - residue management treatments. Cumulative infiltration at 1 h was similar among tillage treatments within residue management practices, i.e., infiltration into SM plots averaged 32.4 plus or minus 3.9 mm compared to 21.9 plus or minus 2.5 mm for NT plots. Regardless of residue management, PT and ST tillage caused no significant (P<0.05) increase in infiltration compared to NOPT. Measured cone-penetrometer resistance, bulk density, and initial soil water content decreased with ST and PT for NT residue management but not
Descriptors:bulk-density. clay-loam-soils. crop-residues. fallow. infiltration. Mollisols. no-tillage. rain. resistance-to-penetration. rotations. soil-density. soil-types. soil-water-content. stubble. stubble-mulching. tillage. wheat
Geographic Locator:Texas. USA
Organism Descriptors:Sorghum-bicolor. Triticum. Triticum-aestivum
Supplemental Descriptors:Sorghum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants. Southern-Plains-States-of-USA. West-South-Central-States-of-USA. Southern-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Gulf-States-of-USA. Triticum
Subject Codes:ff005. ff150. jj300. jj900. pp500. xx200
Supplementary Info:19 ref
ISSN:0167-1987
Year:2002
Journal Title:Soil & Tillage Research

Title:Soil management alters seedling emergence and subsequent autumn growth and yield in dryland winter wheat-fallow systems in the Central Great Plains on a clay loam soil
View Article: Soil & Tillage Research. 2002. 65 (2). 193-206
CD Volume:387
Author(s):McMaster G S Palic D B Dunn G H
Author Affiliation:USDA-ARS, Great Plains Systems Research, P.O. Box E, Fort Collins
Other Title:Soil management alters seedling emergence and subsequent autumn growth and yield in dryland winter wheat-fallow systems in the Central Great Plains on a clay loam soil
Language:English
Abstract:Stand establishment and subsequent autumn development and growth are important determinants of winter wheat (Triticum aestivum L.) yield. Soil management practices change soil properties and conditions, which alter seedling emergence, crop development and growth. Pre-plant soil management practices were studied for 6 years in a wheat-fallow rotation in eastern Colorado, USA, to isolate the impacts of pre-plant tillage (PT) and residue level on winter wheat seedling emergence and autumn development and growth. A split plot design was used with PT, using a moldboard plow that incorporated surface residue, and with no-tillage (NT). The tillage systems represented the main plots and three residue levels within each tillage treatment as subplots: no residue (0R), normal residue (1R) and twice-normal residue (2R). Residue amount had little effect on emergence or autumn growth and development
Descriptors:air-temperature. biomass. clay-loam-soils. crop-yield. fallow. growth. mouldboards. no-tillage. plant-development. plant-residues. ploughs. rotations. seedling-emergence. shoots. soil-management. soil-properties. soil-temperature. soil-types. soil-water. tillage. tillers. wheat
Geographic Locator:Colorado. USA

Organism Descriptors:Triticum. Triticum-aestivum
Supplemental Descriptors:Mountain-States-of-USA. Western-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons. angiosperms. Spermatophyta. plants
Subject Codes:ff005. ff060. ff100. ff150. jj300. jj900
Supplementary Info:33 ref
ISSN:0167-1987
Year:2002
Journal Title:Soil & Tillage Research

Title:Soil tillage and water infiltration in semi-arid Morocco: the role of surface and sub-surface soil conditions
View Article: Soil & Tillage Research. 2002. 66 (1). 13-21
CD Volume:387
Author(s):Dimanche P H Hoogmoed W B
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Other Title:Soil tillage and water infiltration in semi-arid Morocco: the role of surface and sub-surface soil conditions
Language:English
Abstract:Production of cereals in a dryland farming system forms an important part of agricultural production in Morocco. Yield levels on the Sais Plateau between Meknes and Fez in the semi-arid zone, however, remain low possibly because of sub-optimum water use due to inefficient tillage systems. A study was carried out to investigate the effect of soil tillage operations on water infiltration. Two systems of seedbed preparation on a silty clay soil were compared: traditional disc harrow ('cover crop') versus reduced tillage using a spring tined cultivator ('vibrocultor'). Infiltration processes were studied using a rainfall simulator applying rainfall typical for aggressive events in the region. The effect of tillage and rainfall on the structure of the soil was assessed by both quantitative and descriptive methods. It was found that the disc harrow caused excessive pulverisation and seal formation under rainfall. Water infiltration, on the other hand, was not hindered by plough sole formation or subsoil compaction. It is suggested that reduced tillage by the spring tine cultivator is less costly and results in lower losses of water by runoff, thus leaving more water available for the crop
Descriptors:clay-soils. disc-harrows. harrowing. infiltration. rain. rainfall-simulators. reduced-tillage. seedbed-preparation. semiarid-zones. soil-types. tillage. tine-cultivators
Geographic Locator:Morocco
Supplemental Descriptors:Maghreb. North-Africa. Africa. Mediterranean-Region. Developing-Countries. Francophone-Africa
Subject Codes:ff100. jj300. jj900
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Journal Title:Soil & Tillage Research

Title:Stratification of soil aggregation and organic matter under conservation tillage systems in Africa
View Article: Soil & Tillage Research. 2002. 66 (2). 119-128
CD Volume:387
Author(s):Mrabet R
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Document Editor:Franzluebbers-A
Other Title:Stratification of soil aggregation and organic matter under conservation tillage systems in Africa
Conference Title:Conservation tillage and stratification of soil properties. 15th Meeting of the International Soil Tillage Research Organization, Fort Worth, Texas, USA, July 2000
Language:English
Abstract:Soil degradation due to tillage has been reported Africa-wide. Other main causes of soil degradation are overgrazing, extensive cultivation of marginal lands, widespread clearing of vegetation for agriculture, deforestation, exploitation of unsuitable agricultural technologies, mismanagement of arable lands, and frequent drought. Hence, declining soil fertility and increasing population pressure on lands are fragile bases on which to build expectations for improved crop production. This paper recognizes conservation tillage systems as one means for preventing food shortages and natural resources degradation throughout the continent. Conservation tillage has the potential for increasing soil organic matter content and enhancing soil aggregation. Conservation tillage systems can create an aggregated, fertile surface layer that is important from a soil erosion reduction perspective and thus for a sustainable agriculture in Africa. Some indigenous tillage systems in Africa can be adapted to meet objectives of conservation tillage systems. Further, recent technological developments in tillage and seeding machinery will certainly enhance the rate of farmer's acceptance and adoption of conservation tillage
Descriptors:aggregates. carbon-sequestration. conservation-tillage. crop-production. erosion. erosion-control. innovation-adoption. organic-carbon. reduced-tillage. soil-conservation. soil-degradation. soil-fertility. soil-organic-matter. soil-types. sustainability
Geographic Locator:Africa
Identifiers:soil quality
Subject Codes:ff100. jj200. jj300. jj600. jj900. pp400. pp600
Supplementary Info:many ref
ISSN:0167-1987
Year:2002
Journal Title:Soil & Tillage Research

Title:Residue management and tillage effects on soil-water storage and grain yield of dryland wheat and sorghum for a clay loam in Texas
View Article: Soil and Tillage Research. 2002. 68 (2). 71-82
CD Volume:387
Author(s):Baumhardt R L Jones O R
Author Affiliation:Conservation and Production Research Laboratory, Agricultural Research Service, USDA, P.O. Drawer 10, Bushland, TX, 79012, USA; E-Mail: rlbaumhardt@cprl.ars.usda.gov, USA
Other Title:Residue management and tillage effects on soil-water storage and grain yield of dryland wheat and sorghum for a clay loam in Texas
Language:English
Abstract:Dryland wheat (Triticum aestivum L.) and grain sorghum (Sorghum bicolor (L.) Moench) are often grown using a wheat-sorghum-fallow (WSF) crop rotation on the semiarid North American Great Plains. Precipitation stored during fallow as soil water is crucial to the success of the WSF rotation. Stubble mulch-tillage (SM) and no-tillage (NT) residue management practices reduce evaporation, but the sparse residue cover produced by dryland crops, particularly sorghum, is insufficient to reduce soil crusting and runoff. Subsoil tillage practices, e.g., paratill (PT) or sweep (ST), fracture infiltration limiting soil layers and, when used with residue

management practices, may increase soil-water storage and crop growth. Our objectives were to compare the effects of PT to 0.35 m or ST to 0.10 m treatments on soil cone penetration resistance, soil-water storage, and dryland crop yield with NT and SM residue management. Six contour-farmed level-terraced watersheds with a Pullman clay loam (US soil taxonomy: fine, mixed, superactive, thermic Torrertic Paleustoll; FAO: Kastanozems) at the USDA-Agricultural Research Service, Conservation and Production Research Laboratory, Bushland, TX, USA (35degree11'N, 102degree5'W) were cropped as pairs using a WSF rotation so that each phase of the sequence appeared each year. In 1988, residue management plots received PT or ST every 3 years during fallow after sorghum resulting in five treatments: (i) NT-PT, (ii) NT-NOPT, (iii) NT-ST, (iv) SM-PT, and (v) SM-NOPT. Cone penetration resistance was the greatest in NT plots and reduced with PT after 12, 23, and 31 months. Mean 1990-1995 soil-water storage during fallow after wheat was greater with NT than with SM, but unaffected by PT or ST. Dryland wheat and sorghum grain yields, total water use, and water use efficiency (WUE) were not consistently increased with NT, however, and unaffected by PT or ST tillage. We conclude, for a dryland WSF rotation, that: (1) NT increased mean soil-water storage during fallow after wheat compared to SM, and (2) ST and PT "subsoil" tillage of a Pullman did not increase water storage or yield. Therefore, NT residue management was more beneficial for dryland crop production than subsoil tillage
Descriptors:Agronomy- (Agriculture-); Methods-and-Techniques; Soil-Science clay-loam-soil; dryland-crop-yield; grain-yield; soil-cone-penetration-resistance; soil-water-storage
Geographic Locator:Texas- (USA-, North-America, Nearctic-region)
Identifiers:crop-rotation: applied-and-field-techniques; no-tillage-residue-management: applied-and-field-techniques; paratill-tillage: applied-and-field-techniques; stubble-mulch-tillage-residue-management: applied-and-field-techniques; sweep-tillage: applied-and-field-techniques
Organism Descriptors:Sorghum-bicolor [sorghum-] (Gramineae-): forage-crop, grain-crop; Triticum-aestivum [wheat-] (Gramineae-): grain-crop grain-
Supplemental Descriptors:Gramineae-: Monocotyledones-, Angiospermae-, Spermatophyta-, Plantae- Angiosperms-; Monocots-; Plants-; Spermatophytes-; Vascular-Plants
ISSN:0167-1987
Year:2002
Journal Title:Soil & Tillage Research

Title:Tillage, nitrogen, and cropping system effects on soil carbon sequestration
View Article: Soil Science Society of America Journal. 2002. 66 (3). 906-912
CD Volume:390
Print Article: Pages: 906-912
Author(s):Halvorson A D Wienhold B J Black A L
Author Affiliation:USDA-ARS, P.O. Box E, Fort Collins, CO 80522, USA
Other Title:Tillage, nitrogen, and cropping system effects on soil carbon sequestration
Language:English
Abstract:Soil C sequestration can improve soil quality and reduce agriculture's contribution to CO2 emissions. The long-term (12 yr) effects of tillage system and N fertilization on crop residue production and soil organic C (SOC) sequestration in two dryland cropping systems in North Dakota on a loam soil were evaluated. An annual cropping (AC) rotation [spring wheat (SW) (Triticum aestivum

L.)-winter wheat (WW)-sunflower (SF) (Helianthus annuus L.)] and a spring wheat-fallow (SW-F) rotation were studied. Tillage systems included conventional-till (CT), minimum-till (MT), and no-till (NT). Nitrogen rates were 34, 67, and 101 kg N ha-1 for the AC system and 0, 22, and 45 kg N ha-1 for the SW-F system. Total crop residue returned to the soil was greater with
Descriptors:bulk-density. carbon-dioxide. carbon-sequestration. crop-residues. cropping-systems. dry-farming. minimum-tillage. Mollisols. nitrogen. nitrogen-fertilizers. no-tillage. organic-carbon. silt-loam-soils. soil-organic-matter. soil-types. sunflowers. tillage. wheat. winter-wheat
Geographic Locator:North-Dakota. USA
Identifiers:soil quality
Organism Descriptors:Helianthus-annuus. Triticum. Triticum-aestivum
Supplemental Descriptors:Helianthus. Asteraceae. Asterales. dicotyledons. angiosperms. Spermatophyta. plants. Northern-Plains-States-of-USA. West-North-Central-States-of-USA. North-Central-States-of-USA. USA. North-America. America. Developed-Countries. OECD-Countries. Great-Plains-States-of-USA. Triticum. Poaceae. Cyperales. monocotyledons
Subject Codes:jj200. jj700. jj900. xx200. ff005. ff150. jj100
Supplementary Info:44 ref
ISSN:0361-5995
Year:2002
Journal Title:Soil Science Society of America Journal

Title:Surface soil physical properties after twelve years of dryland no-till management
View Article: Soil Science Society of America Journal. 2002. 66 (4). 1296-1303
CD Volume:390
Print Article: Pages: 1296-1303
Author(s):Shaver T M Peterson G A Ahuja L R Westfall D G Sherrod L A Dunn G
Author Affiliation:SHAVER TM,COLORADO STATE UNIV,DEPT SOIL & CROP SCI; FT COLLINS CO 80523, USA. Colorado State Univ, Dept Soil & Crop Sci, Ft Collins, CO 80523 USA. USDA ARS, Great Plains Syst Res Unit, Ft Collins, CO 80522 USA. tshaver@lamar.colostate.edu
Other Title:Surface soil physical properties after twelve years of dryland no-till management
Abstract:Water is the principle limiting factor in dryland cropping systems. Surface soil physical properties influence infiltration and cropping systems under no-till management may affect these properties through residue addition. The objectives of this study were: (i) to determine how cropping intensity and topographic position affect soil bulk density, porosity, sorptivity, and aggregate stability in the surface 2.5 cm of soils at three eastern Colorado sites; and (ii) to relate these properties to crop residue returned to the soil surface. No-till cropping systems had been in place on three slope positions, at three sites, for 12 yr prior to this study. Wheat (Triticum aestivum L.)-corn (Zea mays L.)-fallow (WCF) and continuous cropping (CC) systems were compared with wheat-fallow (WF) on summit and toeslope positions at two sites (Sterling and Stratton), and at the third site (Walsh) wheat-sorghum [Sorghum bicolor (L.) Moench]-fallow (WSF) replaced WCF. Cropping systems (CC and WCF or WSF) that returned more crop residue decreased bulk density and increased total and effective porosities compared with WE Site and slope positions that produced more crop residue also improved these properties. However, sorptivity developed no significant differences as a result of cropping system. Macroaggregates made up a higher percentage of

total aggregates in CC and WCF or WSF compared with WF in proportion to residue added and were also a function of clay content of the soil at different sites and slope positions. These factors enhance the potential for greater infiltration and hence greater water availability for crops
Descriptors:hydraulic conductivity; infiltration; macroporosity; nitrogen; carbon; system
Supplementary Info:ArticleEnglishSOIL SCI SOC AMER J569ET
ISSN:0361-5995
Year:2002
Journal Title:Soil Science Society of America Journal

Title:Macroaggregate characteristics in cultivated soils after 25 annual manure applications
View Article: Soil Science Society of America Journal. 2002. 66 (5). 1637-1647
CD Volume:390
Print Article: Pages: 1637-1647
Author(s):Whalen J K Chang Chi
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Other Title:Macroaggregate characteristics in cultivated soils after 25 annual manure applications
Language:English
Abstract:Agricultural management practices that alter the soil organic matter (SOM) content are expected to cause changes in soil stability and aggregation. Animal manure is a source of organic matter (OM) that has been demonstrated to increase macroaggregate formation and stability. The objectives of this study were to determine how long term cattle manure applications to a calcareous Haploboroll clay loam (Lethbridge, Alberta, Canada) affected aggregate size distribution, the total C, N, and P content of aggregate size fractions, and water-stable aggregates. Beef cattle manure applied at rates >30 t ha-1 year-1 under dryland production and >60 t ha-1 year-1 to soils under irrigation resulted in fewer dry-sieved aggregates >7.1 mm and more dry-sieved aggregates between 0.47 and 1.2 mm in the 0- to 5-cm depth, compared with unamended soils. The dry-sieved aggregate fractions between 0.47 and 1.2 mm include the <0.84-mm fraction that has been associated with increased susceptibility to wind erosion in the Canadian semiarid prairies. There was more total C, N, and P in all dry-sieved aggregate fractions of soils receiving >30 t manure ha-1 year-1 than unamended soils, and dry-sieved aggregates between 0.47 and 2.0 mm tended to have the highest C, N, and P contents. Water aggregate stability was higher in irrigated than dryland soils, but did not improve with increasing manure application rates. Dispersing agents in the cattle manure appear to have destabilized the larger soil macroaggregates
Descriptors:aggregates. application-rates. calcareous-soils. carbon. cattle-manure. clay-loam-soils. dry-farming. grasslands. irrigated-farming. Mollisols. nitrogen. nutrient-content. organic-amendments. particle-size-distribution. phosphorus. prairies. soil-organic-matter. soil-stabilization. soil-types. wind-erosion
Geographic Locator:Alberta. Canada
Supplemental Descriptors:Canada. North-America. America. Developed-Countries. Commonwealth-of-Nations. OECD-Countries
Subject Codes:ff150. jj200. jj300. jj700. pp400. xx100
Supplementary Info:47 ref
ISSN:0361-5995
Year:2002

Journal Title:Soil Science Society of America Journal
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Title:Livestock market dynamics and local vulnerabilities in the Sahel
View Article: World Development (Oxford) 2002. 30 (4). 683-705
CD Volume:388
Author(s):Turner M D Williams T O
Author Affiliation:University of Wisconsin, Wisconsin, USA
Other Title:Livestock market dynamics and local vulnerabilities in the Sahel
Language:English
Abstract:As institutions that facilitate the conversion of livestock to grain and adjust livestock populations to local forage availabilities, livestock markets play important economic and ecological roles in dryland Africa. Using a comprehensive database of 1580 sales of livestock owned by members of 54 households in western Niger over a major drought-and-recovery cycle (1984-94), the effect of real livestock markets on stocking decisions and the economic vulnerability of rural households was investigated. While livestock markets are shown to facilitate destocking of animals from drought areas, price formation is socially-biased (by gender, wealth, residence) reflecting the differential access and powers within local markets
Descriptors:arid-zones. drought. livestock. livestock-numbers. market-prices. marketing. markets
Geographic Locator:Africa. Niger. Sahel
Supplemental Descriptors:West-Africa. Africa-South-of-Sahara. Africa. Least-Developed-Countries. Developing-Countries. ACP-Countries. Francophone-Africa
Subject Codes:ee110. ee130. ee700. l1180
Supplementary Info:many ref
ISSN:0305-750X
Year:2002
Journal Title:World Development
Copyright:Copyright CAB International

Title:Explaining a Miracle: Intensification and the Transition towards Sustainable Small-Scale Agriculture in Dryland Machakos and Kitui Districts, Kenya
View Article: World Development. 30 (7) 2002. 1271-87
CD Volume:388
Author(s):Zaal F Oostendorp R H
Author Affiliation:U Amsterdam. Free U Amsterdam
Other Title:Explaining a Miracle: Intensification and the Transition towards Sustainable Small-Scale Agriculture in Dryland Machakos and Kitui Districts, Kenya
Language:English
Abstract:The transition to sustainable agriculture in tropical small-scale farming has been discussed intensively since Boserup published her theory on the role of population pressure as a leading factor. Bosemp's work challenged the Malthusian approach to rural transformation. Recent evidence supports the Boserup theory as applied to Machakos District, Kenya. This paper aims to establish how much of terracing is directly explained by population density increases as opposed to other district and village-level variables by using a retrospective multivariate analysis in Machakos and Kitui Districts, Kenya. The findings suggest that variables such as the distance to major urban markets and the windfall profits from the coffee boom in the late 1970s are at least as important in explaining the investment in the quality of land in Machakos and Kitui Districts

Descriptors:Economic Development: Agriculture; Natural Resources; Environment; Other Primary Products. Micro Analysis of Farm Firms, Farm Households, and Farm Input Markets
Geographic Locator:Kenya
Subject Codes:ee450. ee110
ISSN:0305-750X
Year:2002
Journal Title:World Development