



Effects of biofertilizers and different water volume per irrigation on vegetative characteristics and seed yield of sesame (*Sesamum indicum* L.)

S. Khorramdel^{1*}, P. Rezvani Moghaddam², A. Amin Ghafouri³ and J. Shabahang³

Submitted: 03-09-2010

Accepted: 19-03-2011

Abstract

In order to study the effects of biofertilizers and different water volume per irrigation on vegetative characteristics and seed yield of sesame (*Sesamum indicum* L.), an experiment was conducted at the Research Greenhouse of Faculty of Agriculture, Ferdowsi University of Mashhad, during 2009. This experiment was conducted as factorial based on randomized complete block design with three replications. The first and the second factors were biofertilizers (Nitragin, Nitroxin, bio-phosphorus and control) and water volume per irrigation (100, 200 and 300 ml), respectively. The results showed that the simple effects of biofertilizer and irrigation volume were significant ($p \leq 0.05$) on plant height, the first internode length, number and dry weight of leaves, dry weight of stem, chlorophyll content and relative water content (RWC) of sesame. Also, interaction between biofertilizer and water volume per irrigation was significant ($p \leq 0.05$) plant height and RWC. The maximum and the minimum sesame seed yield were observed in Nitragin and control with 204.4 and 100.0 kg.m⁻², respectively. The highest seed yield was observed in 100 ml (202.1 kg.m⁻²) and the lowest was achieved with 300 ml (170.1 kg.m⁻²) per irrigation water. Application of biofertilizers enhanced root development and hence availability of moisture and nutrients, particularly nitrogen and phosphorus. On the other hand, since these fertilizers are promote of growth regulator and hence in basement of growth and photosynthesis of sesame. With increasing irrigation volume from 100 to 300 ml, growth of sesame was decreased. Therefore, sesame application of biofertilizers could improve its vegetative characteristics in dry and semi-dry regions.

Keywords: Irrigation volume, Nutrients, Oil seed crop, Water requirement

1, 2 and 3- Assistant Professor, Professor, and PhD student in Agroecology, College of Agriculture, Ferdowsi University of Mashhad, Iran, respectively.

(* - Corresponding Author Email: khorramdel@um.ac.ir)



The effect of organic and biofertilizers on some quantitative characteristics and essential oil content of summer savory (*Satureja hortensis* L.)

P. Rezvani Moghaddam^{1*}, A. Aminghafari², S. Bakhshaie² and L. Jafari³

Submitted: 05-09-2010

Accepted: 19-03-2011

Abstract

Plant growth promoting bacteria with various mechanisms such as an increase in uptake and availability of nutrients can improve plant growth. In order to evaluate the effects of biofertilizers and Vermicompost on quantitative characteristics and essential oil content of vegetative parts of summer savory, a field experiment was conducted during growing season of 2008- 2009 at Agriculture Research Station, Faculty of Agriculture, Ferdowsi University of Mashhad, Iran. A randomized complete block design with three replications was used. Treatments included: Nitragin, Nitragin+Vermicompost, Nitragin+Nitroxin, Nitragin+Phosphate solublizing bacteria, Nitragin+Phosphate solublizing bacteria+Vermicompost, Nitragin+Phosphate solublizing bacteria+Nitroxin, Nitragin+Nitroxin+Vermicompost and control. Plants were harvested twice at 10% flowering stag. The result showed that biofertilizers and Vermicompost had significant effects ($p \leq 0.01$) on plant height, percentage of leaf and stem, biological yield and essential oil contents of leaves in both harvests. The combination of Nitragin + Nitroxin and Vermicompost and control treatments had the highest and the lowest plant height, percentage of stem and leaf, and biological yield. It seems that seed inoculation with biofertilizers enhanced root development and hence availability of moisture and nutrients, particularly nitrogen and phosphorus. Therefore, summer savory inoculation with biofertilizers could improve some quantitative and essential oil contents.

Keywords: Biological yield, Essential oil, Nitragin, Vermicompost

1, 2 and 3- Professor and PhD student in Agroecology, Center of Excellence for Special Crops, Faculty of Agriculture, Ferdowsi University of Mashhad, and Instructor, Department of Horticulture, University of Hormozgan, respectively.
(*- Corresponding Author Email: rezvani@ferdowsi.um.ac.ir)



Evaluating the water and energy productivity of irrigated agroecosystems in Kermanshah Province, Iran

M. Yousefi^{1*} and A.M. Mahdavi Damghani²

Submitted: 23-05-2011

Accepted: 11-12-2011

Abstract

Efficient use of inputs and energy resources is one of the most important principals of sustainable agriculture. For this purpose, water and energy productivity of irrigated agroecosystems of major crops in Kermanshah province were evaluated. The Data was collected via questionnaire through face to face interview of 180 farmers of this province during summer 2010. Results showed that water productivity in alfalfa, corn and wheat agroecosystems were 2.06, 1.05 and 0.9 kg.m³, respectively. Furthermore, energy use efficiency for these crops were 4.29, 2.08 and 3.78. Accordingly, water- energy productivity was 0.08, 0.06 and 0.13 g.m³ kWh for wheat, maize, and alfalfa agroecosystems, respectively. In conclusion, results indicated that in these agroecosystems, energy management should be considered as an important task in terms of efficient and sustainable use of energy in order to reduce environmental footprint in agroecosystems.

Keywords: Energy resource, Environmental footprint, Sustainable development

1 and 2- MSc graduated and Assistant Professor in Agroecology, Environmental Sciences Research Institute, Shahid Beheshti University, G.C., Tehran, Iran, respectively.

(* - Corresponding Author Email: m.y126@yahoo.com)



Evaluation of the environmental impacts of pesticides used in sugar beet (*Beta vulgaris* L.) production systems in Khorasan provinces

A.B. Bazrgar^{1*}, A. Soltani², A. Koocheki³, E. Zeinali⁴ and A. Ghaemi⁵

Submitted: 31-05-2011

Accepted: 11-11-2011

Abstract

Environmental optimizing of pest management strategies and improving their trends towards minimum environmental risks programs is a matter of considerable concern of food scientists particularly in developing countries. This study evaluates the environmental impacts of pesticides consumption based on Environmental Impact Quotient (EIQ) model in different sugar beet (*Beta vulgaris* L.) production systems in Khorasan provinces as the largest producer of this strategic crop in Iran. For this purpose, information of pesticides used in 26 locations of 11 geographic regions in Khorasan provinces, (North, Razavi and South Khorasan provinces) in three types of production systems was gathered: mechanized, semi-mechanized and traditional. In all three production systems, based on EIQ index which uses three risk components: farm worker, consumer and leaching and environment to estimate the relative potential risk of pesticide, the most negative effect of pesticide consumption was on ecosystem organisms as ecological component. Results showed that there is no relationship between sugar beet yield and increasing both diversity of pesticides types and quantity of active ingredients consumption as well. Moreover, granted that increasing in mechanization in sugar beet production caused more environmental load in farm, considering sugar beet yield, mechanized systems resulted in 33% less environmental damage per 1 ton sugar beet produced. Thus, it is expected that there is a possibility to improve ecological function of Khorasan sugar beet production systems without economic loss by substitution or decreasing the use of pesticides. Also, employing more mechanized and more productive systems may reduce environmental hazards in national scale and decrease environmental load due to transportation of non local production in international scale.

Keywords: Ecotoxicity, Environmental impact quotient (EIQ), Environmental load, Human toxicity

1, 2, 3, 4 and 5- Assistant Professor, Department of Agronomy, Neyshabur Branch, Islamic Azad University, Neyshabur, Professor, Department of Agronomy, Gorgan University of Agricultural Sciences and Natural Resources, Professor, Faculty of Agriculture, Ferdowsi University of Mashhad, Assistant Professor, Agronomy, Department of Agronomy, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Assistant Professor in Agronomy, Sugar beet Research Department, Khorasan Razavi Agricultural and Natural Resources Research Center, Mashhad, Iran, respectively.

(*Corresponding Author Email: abbarzgar@yahoo.com)



The effect of soil physiochemical characteristics and field age on agronomic traits of saffron (*Crocus sativus* L.)

E. Azizi¹, M. Jahani Kondori² and R. Divan³

Submitted: 10-06-2011

Accepted: 11-11-2011

Abstract

In order to investigate some soil characteristics and field age effects on flower and corm yield of saffron, an experiment was conducted as factorial based on complete randomized design with five replications in two regions of Neyshabur during growing season 2009-2010. Treatments were included different field ages (2, 4 and 6 years) and two geographical regions (Eshagh abad and Soltan abad). Different characteristics such as fresh and dry weight of corm, corm number, number of corm sprout and flower and stigma yield of saffron were determined. Soil physical and chemical characteristics such as soil texture, pH and EC were measured. Results showed that effect of field age on all characteristics was statistically significant. Flower and stigma yield were affected by region and field age and region interaction significantly. Positive significant regression was shown between field age and parameters such as fresh and dry weight of corm, number of corm sprout and corm number. With increasing field age to 4 years, saffron yield increased and then decreased. Results showed that changes in stigma and flower yield was significantly related to physical and chemical soil criteria (soil texture, EC, pH) characteristics. Significant negative correlations were observed between clay percentage of soil with corm number, corm dry weight, flower and stigma in.

Keywords: Dry weight, EC, pH, stigma, yield

1, 2 and 3- Assistant Professor, Department of Agronomy, Payam Noor University, Expert in Horticulture and MSc Student in Agronomy of Islamic Azad University, Tehran, Iran, respectively.
(* - Corresponding Author Email: azizi40760@gmail.com)



Evaluation of land use and suitability for rainfed crops in Roin, North Khorasan

F. Maghami Moghim^{1*}, A. Karimi², G. Haghnia³ and A. Dourandish⁴

Submitted: 17-03-2012

Accepted: 21-07-2012

Abstract

Classification and utilization of lands based on their capability are necessary for sustainable land use management. The purpose of this study was to identify and grade the effective qualities on the rainfed farming in the Roin area, North Khorasan province, during the year of 2011. Based on field observations and literature review the land qualities including climate, rooting conditions, moisture availability, field workability and land degradation hazard were distinguished and rated as the most effective factors on the rainfed land suitability. To evaluate the land degradation hazard, the variations of soil organic carbon content in north-, south-, west- and east-facing slopes as a result of land use change was measured. In seven sites, 84 soil samples were taken from 0-15 cm soil depth of Back Slope with aspect of north- south- west- and east-facing slopes of rangeland, wheat dry farming and alfalfa dry farming. In addition, 21 soil samples were taken from nearly flat areas (Toe slopes and back slopes) of studied land uses. The results indicated that all aspects except the south-face slopes the amount of soil organic carbon suitable for semiarid regions. In the study area, the climate and qualities related to soil, have no limitations for dry farming. Only field workability and land degradation hazard qualities which are affected by slope and slope aspect are main limitation factors. Based on results the slopes more than 20% and the southern slopes were identified non-suitable for dry farming but the southern slopes were partly suitable for alfalfa dry farming. Considering the mentioned limitations, the areas under dry farming cultivation will be decreased from 1186 to 942 ha. More investigation for new land utilization types is necessary to compensate the negative economic consequences of cultivation land reduction.

Keywords: Land degradation, Land qualities, Qualitative land suitability, Soil organic carbon

1, 2, 3 and 4- MSc Student, Assistant Professor, Professor in Soil Science Department and Assistant Professor in Agricultural Economics Department, College of Agriculture, Ferdowsi University of Mashhad, Iran, respectively.
(* - Corresponding Author Email: baran_soil84@yahoo.com)



Intercropping of kochia (*Kochia scoparia* L.) with blue panic grass (*Panicum antidotale* Retz.) under irrigation with saline water

M.A. Farajian Mashhadi^{1*}, M. Kafi² and A. Nezami²

Submitted: 12-03-2012

Accepted: 21-07-2012

Abstract

Salinity of soil and irrigation water creates major problems for forage production. This study was aimed to evaluate the quality and quantity of forage production in intercropping of kochia (*Kochia scoparia* L.) with blue panic grass (*Panicum antidotale* Retz.) under irrigation with saline water (4.9 dS.m⁻¹). The study was performed based on randomized complete block design with three replications during growing season 2010-2011 at Salinity Research Field, of Ferdowsi University of Mashhad. Treatments were five different levels including 100, 75, 50, 25 and 0 percentage of relative composition of the two species. Treatment of 50% blue panic grass and 50% kochia with an average of 1408 g.m⁻² produced the highest dry matter yield followed by 25% blue panic grass + 75% kochia and 75% blue panic grass + 25% kochia produced 1317 and 993 g.m⁻², respectively. Due to lower growth rate of blue panic grass in the first year, a large proportion of dry matter in the mixture was associated with kochia and land equivalent ratio was less than one in all intercropping treatments. In the first and the second clippings, there was no significant difference between intercropping treatments in terms of crude protein, ash, NDF and ADF.

Keywords: Acid detergent fiber, Ash, Crude protein, Land equivalent ratio, Neutral detergent fiber, Nutritive value

1 and 2- MSc Graduated, Department of Agronomy and Plant Breeding, Faculty of Agriculture, Ferdowsi University of Mashhad, Center of Excellence of Especial Crops and Professor in the Department of Agronomy and Plant Breeding, Faculty of Agriculture, Ferdowsi University of Mashhad, Iran, respectively.
(*-Corresponding Author Email: m.ali.farajian@gmail.com)



A comparative assessment of Agrobiodiversity indices in farms, gardens and home gardens (Case study: of Jajrood basin)

A. Ghalegolab Behbahani^{1*}, K. Khoshbakht², L. Tabrizi³, A. Davari⁴ and H. Vaisi⁵

Submitted: 18-03-2012

Accepted: 22-07-2011

Abstract

Biodiversity consists of wide range diversity such as genetic diversity, species diversity and ecosystem diversity. Nowadays, agrobiodiversity conservation is one the most important aspects of sustainable agriculture. In this research, agrobiodiversity in farmlands, gardens and home garden systems was assessed and compared. In addition the role of home gardens as an effective strategy in In-situ conservation was evaluated. Needed information was obtained by questionnaire method in eight villages in east of Tehran province (Jajrood basin). The questionnaires were completed by 30 percent of households in the area during 2009 and 2010. The result showed that, richness and Shannon indices which were indicators of species diversity in home gardens were more in farmlands and horticulture ecosystems Results also revealed that in some villages like Siahsang which lots of farmland and garden ecosystems had been disappeared, home gardens were the only conservative systems of species, which indicate the important function of home gardens species conservation. In this study Maranak and Khosroabad villages with 7 and 12 species, respectively in farmland and gardens show had the highest species richness index in agricultural ecosystems.

Keywords: Species diversity, Ecosystem, In-situ conservation, Species richness index, Shannon index

1, 2 and 4- M.Sc. Graduate, Associated Professor and Assistant Professor Department of Agroecology, Environmental sciences research institute (ESRI), Shahid Beheshti University, G.C. Tehran, Iran, respectively.

3- Assistant Professor, Department of Horticulture, College of Agriculture and Environment, Tehran University, Tehran, Iran.

(*-Corresponding Author Email: arash_ghalegolab@gmail.com)



Effects of drought stress and arbuscular mycorrhizal fungi on some morphophysiological traits and yield of savory (*Satureja hortensis* L.)

B. Esmailpour^{1*}, P. Jalilvand² and J. Hadian³

Submitted: 28-10-2012

Accepted: 10-06-2013

Abstract

Water deficit stress permanent or temporary limits the growth and distribution of natural vegetation and performance of plants more than other environmental factors. In order to investigate the effect of drought stress and mycorrhizal-arbuscular fungi inoculation on the growth and yield of savory (*Satureja hortensis* L.) a factorial experiment based on completely randomized design were conducted in Research Greenhouse of Horticulture Department of Mohagheh Ardabili University during 2010. Experimental treatments include two species of mycorrhizal-arbuscular fungi, *Glomus etunicatum* and *G. versiformis* and three level of drought stress (100 percent of field capacity as control, 30 and 60 percent of field capacity humidity). Result revealed that 8 weeks after start of drought stress treatments growth parameters such as plant height, number and surface area of leaves, root length, of root, stem and leaves dry weight significantly reduced with increase in drought stress severity. Leaf relative water content reduced by drought significantly. Also, result showed that with increase drought stress, phosphorus content of leaves decreased and potassium content of leaves were raised. Proline content of leaves increased in responses to increases in drought stress. Mycorrhizal fungi inoculation significantly ($p \leq 0.01$) increased vegetative growth indices, relative water content of plants, phosphorus and potassium content of leaf under water deficit condition in comparison to control, but proline content of leaf was decreased. In general, mycorrhizal fungi application improved resistance to drought stress in savory plants.

Keywords: Available phosphorus, Field capacity, Medicinal plant, Potassium, Proline

1, 2 and 3- Assistant Professor and Graduated MSc student in Horticultural Department of Mohagheh Ardabili University, Assistant Professor in Shahid Behshti University, Iran, respectively.
(*-Corresponding Author Email: behsmail@yahoo.com)



Evaluation the effect of deficit irrigation on growth properties, yield and post harvest quality of two tomato (*Lycopersicon esculentum* Mill.) cultivars under Mindoab conditions

B. Esmaielpour^{1*} and M. Akbari²

Submitted: 10-11-2012

Accepted: 10-06-2013

Abstract

Deficit irrigation is an essential optimization method for water consumption in irrigated lands. In order to investigate the effects of deficit irrigation on growth, yield and quality traits of two tomato (*Lycopersicon esculentum* Mill.) cultivars a factorial layout based on randomized complete block design with three replications was conducted in Agricultural Research Station of Miandoab during growing season 2010-2011. Experimental treatments included two tomato cultivars such as Early urbana 111 and Rio-grand and four deficit irrigation such as 60, 80, 100, 120 mm evaporation from Pan. Results of analysis of variance revealed that the effect of different irrigation levels were significant ($p \leq 0.05$) on plant growth indices such as plant height, number of marketable fruits, fruit weight and length, total yield, soluble solid, chlorophyll, lycopene, Beta carotene and EC of fruits of tomato. The highest value for traits such as plant height (93.7 cm), fruit length (7.65 cm), number of marketable fruit (16.29) fruit weight (174 g) and total yield (8.3 kg) were obtained 60 mm evaporation from pan, while the highest value for postharvest properties such as brix (5.86%) and lycopene (17.10 %) were produced in 120 mm evaporation from pan enhanced post harvest quality of tomato fruits. In general, results of this investigation indicated deficit irrigation led to reduction in vegetative growth parameters and improvement in post harvest quality of assessed tomato cultivars.

Keywords: Beta carotene, Chlorophyll, Evaporation pan, Lycopene

1and 2- MSc student and Assistant Professor in Horticulture Department of Faculty of Agriculture, Mohaghegh Ardabili University of Ardebil, Iran, respectively.

(* - Corresponding Author Email: behsmaiel@yahoo.com)



Effects of planting method on agronomic characteristics, yield and yield components of sweet and super sweet corn (*Zea mays* L.) varieties under saline conditions

F. Faridi^{1*}, M. Ramroudi², M. Galavi³, B.A. Siah sar² and S. Khavari Khorasani⁴

Submitted: 19-04-2011

Accepted: 14-10-2012

Abstract

In order to evaluate the effects of planting pattern on morphological, Phonological, yield and yield components of sweet and super sweet corn (*Zea mays* L.) varieties under saline conditions, a field experiment was conducted as split plots based on a randomized complete block design with four replications. Planting pattern in 3 levels included one row in ridge, two row in ridge and furrow planting, as a main plot and varieties in 4 levels sweet corn with 2 types (KSc 403 su, Merit) and super sweet with two types (Basin, obsession) as sub plots. The results showed that planting pattern had significant differences on plant height, ear height, leaf length, leaf width, number of kernel per row, number of rows per ear and 1000-kernel weight. but had no significant effects on the length of tassel, number of leaf/plant, number of leaf per plant above ear, stem diameter, time of anthesis, time of silking, anthesis silking interval (ASI), grain yield, biological yield and harvest index. Different varieties had significant effects on the total characteristics studied except number of leaf above ear and stem diameter. Most of the conservable grain yield and harvest index was in Obsession variety (10 kg and 39%, respectively) and the least was seen in Basin (4 kg and 20%, respectively). The result showed that use of furrow planting pattern for sweet and super sweet corn in saline conditions can effects result in higher yield.

Keywords: Grain yield, Morphological Traits, Planting pattern

1, 2, 3 and 4- MSc student, Assistant Professor, Associate Professor, Zabol University, Assistant Professor, Center of Agricultural Researches and Natural Resources of Mashhad, Iran, respectively.
(* - Corresponding Author Email: fahimeh_faridi@yahoo.com)