



Evaluation of Yield and Nitrogen Use Efficiency of Maize and Cotton Intercropping under Different Nitrogen Levels

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Abstract

In order to evaluate the yield and nitrogen use efficiency of corn and cotton intercropping under different levels of nitrogen, an experiment was conducted as a factorial arrangement based on completely randomized block design with three replications. The experimental treatments were nitrogen fertilizers in four levels (0, 50, 100 and 150 kg ha⁻¹) and planting pattern in three levels (maize sole cropping, cotton sole cropping and maize/cotton intercropping). Results showed that fertilizer levels and cropping patterns had significant effect on economical and biological yield, nitrogen uptake and nitrogen use efficiency indices in maize and cotton. During growth season nitrogen concentration decreased in maize and cotton. Nitrogen uptake and concentration and biomass were enhanced with increased levels of nitrogen in both plants. The highest economical and biological yield of maize and cotton were observed on highest fertilizer level and sole cropping. The LER was up to 1 in all nitrogen levels and with a positive effect of intercropping on plant yield was observed. Agronomic nitrogen use efficiency and nitrogen uptake efficiency were significantly reduced with increased nitrogen levels on both plants. Nitrogen efficiency was also higher in maize compared with cotton in all of the treatments. LER evaluation for all nitrogen efficiencies showed that nitrogen use and uptake were more efficient in intercropping compared with sole cropping. Nitrogen competitive ratio showed that nitrogen uptake ratio was higher with 0, 50 and 100 Kg nitrogen ha⁻¹ for maize, while it was higher for cotton with 150 kg ha⁻¹ level.

Keywords: Cropping pattern, LER, NUE, Nitrogen competitive ratio, Uptake

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Evaluation of Maize (*Zea mays* L.) and Bean (*Phaseolus vulgaris* L.) Growth Indices in Strip Intercropping

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Abstract

Intercropping systems are one of the best approaches in development of sustainable agriculture. Based on this purpose, the present study was conducted to evaluate effect of strip intercropping on maize and bean growth analysis and their yield during 2009. The experiment was set up in a completely randomized block with 3 replications and 6 treatments based on replacement design. The treatments were strip width, which included 2 rows bean plus 2 rows maize, 3 rows bean plus 3 rows maize, 4 rows bean plus 4 rows maize, 5 rows bean plus 5 rows maize, maize monoculture, and bean monoculture. Crop growth ratio, relative growth ratio, biological yield, economic yield, harvest index and land equivalent ratio were measured. Our results indicated that all of the measured traits were increased in the strip intercropping treatments compare to the monoculture treatments. Increasing of strip width in the central row of intercropping treatments in comparison with the two rows bean plus two rows maize treatment led to decrease crop growth rate (15.3% and 28.7%), relative growth rate (17.5% and 19.2%), biological yield (30.9% and 14%), economic yield (52.9% and 20.2%), harvest index (31.9% and 7.3%) in maize and bean, respectively. With increasing of strip width, all of the measured traits decreased more in the central rows than the side rows. The highest (1.45) and the lowest (1.22) land equivalent ratio were found in the two rows bean plus two rows maize treatment and five rows bean plus five rows maize treatment, respectively. Partial of maize had more role compare to bean in terms of enhance land equivalent ratio.

Keywords: Crop growth rate, Biological yield, Economic yield, Harvest index, Land equivalent ratio, Relative growth rate

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Effects of Irrigation and Nitrogen Application Rates on Yield and Yield Components of Corn, Sesame and Sugar beet in Mashhad Climatic Condition

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Abstract

In many crops, incorrect management of nitrogen and water is one of the most important factors in the resources productivity such as water and nitrogen. In order to evaluate the effects of different nitrogen levels (zero, 50, 100 and 150 kg ha⁻¹) and irrigation application rates (100, 75 and 50% of water requirement per species) on corn, sesame and sugar beet, three separate experiments was conducted in Agricultural Research Station of Ferdowsi University of Mashhad, Iran, in 2009-2010 growing season. Three separate experiments were arranged by strip plots in randomized complete block design, with three replications. The results showed that effect of irrigation application rates on biological yield and grain number per ear and interaction effects of water × nitrogen on plant height, 100 grain weight and grain yield of corn was significant. With decreasing irrigation over 25 % water requirements, the highest grain yield (4.93 ton ha⁻¹) in corn observed by applying nitrogen equal to 50 kg.ha⁻¹. In addition, the highest maize yield (9.41 ton.ha⁻¹) in mentioned was obtained by supplying 100 % water requirements. Effects of Irrigation levels on plant height and the interaction effects of water × nitrogen on 1000 grain weight in sesame was significant. Under no water stress, the highest grain yield (1.22 ton ha⁻¹) in sesame was obtained with applying 50kg nitrogen per ha. With supplying 75% water requirements plus 50 kg nitrogen per hactar, maximum yield of sesame (820 kg ha⁻¹) was obtained. Results of this study indicated that interaction between studied factors had insignificant effect on economic and biological yield in sugar beet. With supplying 25% water requirements plus 50 kg nitrogen per ha, maximum yield of sugar beet (58.37 ton ha⁻¹) was achieved. It seems that suitable nitrogen management can be considered as approach in optimize the water consuming.

Keywords: Deficit irrigation, Dry mater yield, Economic yield, Water requirement, Water stress

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Effect of Plant Growth Promoting Rhizobacteria (PGPR) on Yield and Yield Components of Sesame (*Sesamum indicum* L.) with Emphasize on Environmental Friendly Operations

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Abstract

In order to evaluate the effects of different plant growth promoting rhizobacteria (PGPR) on yield and yield components of sesame, an experiment was conducted in the form of Randomized Complete Block Design with three replications at Research Station, Faculty of Agriculture, Ferdowsi University of Mashhad in year 2009. Treatments were: 1) Nitragin (containing of *Azotobacter* sp., *Azospirillum* sp. and *Pseudomonas* sp.), 2) Nitroxin (containing of *Azotobacter* sp. and *Azospirillum* sp.), 3) Super nitro plus (containing of *Azospirillum* sp., *Bacillus* sp. and *Pseudomonas* sp.), 4) Phosphate suloblizing bacteria (containing of *Bacillus* sp. and *Pseudomonas* sp.), 5) Bio Phosphate (containing of *Bacillus* sp. and *Pseudomonas* sp.), 6) Nitroxin + Phosphate suloblizing bacteria, 7) Nitroxin + Bio Phosphate and control. The results showed that seed yield affected by PGPR and Nitroxin + Phosphate suloblizing bacteria treatment had superior effect on seed yield compared to other treatments. Superior effect of Nitroxin + Phosphate suloblizing bacteria treatment also was shown on plant seed weight and harvest index. Nitragin, Nitroxin + Bio Phosphate, Nitroxin + Phosphate suloblizing bacteria, Bio Phosphate, Phosphate suloblizing bacteria, Nitroxin treatments increased dry weight of capsules per plant of 62, 53, 51, 36 and 30 percent compared to control, respectively. Although, the effect of PGPR was not significant on sesame seed oil content but Bio Phosphate and Nitragin treatments increased seed oil content by 1 and 1.5 percent, respectively. In general, results showed utilization of PGPR can improve seed yield and seed oil content, which can decrease dependence of sesame seed production to chemical fertilizer, decrease negative environmental impacts and as an ecofriendly inputs can help to produce crops and sustainable agriculture guidelines.

Keywords: Bio Phosphate, Nitragin, Nitroxin, Oil plant, Phosphate suloblizing bacteria, Super nitro plus

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Study Effect of Foliar Application of Iron and Zinc on Yield and Yield Components of Autumn Rapeseed (*Brassica napus* L.) under Limited Irrigation

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Abstract

In order to study effect of foliar application of Iron and zinc on yield and yield components of autumn rapeseed (*Brassica napus* L.) under limited Irrigation an experiment was conducted at Research farm of agricultural faculty of Urmia University in 2009. The experiment was designed in Split plot based on Randomized Complete Block design with 3 replications. Treatments were drought (irrigation at all stages of growth, lack of irrigation at shooting stage, lack of irrigation at flowering stage, lack of irrigation at pod formation stage, lack of irrigation at grain filling stage) in main plots and foliar application (no foliar application, foliar application of iron sulfate (4 g/l), foliar application of zinc sulfate (4 g l⁻¹)) in sub plots. No irrigation and no spraying at flowering stage reduced the number of seeds per pod (16.851). Foliar application of zinc sulfate had positive effect on the number of pods per plant (63.375). The highest grain weight (6.401) was obtained from the treatment combination of irrigation at all stages of growth and foliar application of iron that this showed no significant difference with no irrigation at stem and pod formation stages and foliar application of iron. The lowest grain yield (1.10) was obtained from treatment combination of no irrigation at flowering stage and no foliar application. The highest oil percentage (50.12) was obtained from treatment combination of irrigation at all stage of growing and foliar application of iron and the lowest percentage of oil (43.16) was achieved of non-irrigated plots at grain filling stage with no spraying. The highest protein content (28.800) was achieved from non-irrigated plots at grain filling stage.

Keywords: Drought stress, Oil percentage, Protein percentage, Seed yield

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Evaluation of Sugar beet (*Beta vulgaris* L.) To Freezing Tolerance Under Controlled Conditions

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Abstract

To evaluate the freezing tolerance in sugar beet (*Beta vulgaris* L.), seven cultivars (Suprema, Jolge, Monotunno, Giada, PP8, SBSI1, Palma) were exposed to the 10 temperatures (0, -2, -4, -6, -8, -10, -12, -14, -16 and -18 C). The study carried out as a factorial arrangement of treatments based on randomized completely design with three replications at College of Agriculture, Ferdowsi University of Mashhad in 2009. Plants were kept until 4-5 leaf stage in natural environment at early autumn, then transferred to the thermogradient freezer. No. of leaf, leaf area, leaf dry weight, survival percentage, lethal temperature 50 according to the survival percentage (LT_{50su}) and reduced dry matter temperature 50 ($RDMT_{50}$) were determined after 21 days (end of recovery duration). Results showed that by reduction of temperature No. of leaf, leaf area and its dry weight significantly decreased. Amounts of LT_{50su} between the cultivars were significantly different. Monotunno with LT_{50su} -16.9 C was more cold hardly than others and PP8 and SBSI1 with LT_{50su} -15.2°C were susceptible to the freezing temperatures. Decreasing temperature below -14 C reduced survival percentage in all cultivars. PP8 and SBSI1 cultivars perished completely at -16 C while others like Suprema and Monotunno had high survival percentage, but all of them killed at -18 C. Correlation between $RDMT_{50}$ and LT_{50su} was high but not significant. However there was a strong and significant correlation ($r = 0.99^{**}$) between LT_{50su} and survival percentage.

Keywords: Freezing, LT_{50su} , $RDMT_{50}$, Recovery, Survival percentage

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Effects of Single and Combined Application of Organic and Biological Fertilizers on Quantitative and Qualitative Yield of Anisum (*Pimpinella anisum*)

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Abstract

In order to study the effects of single and combined applications of biofertilizer and organic fertilizers on quantitative and qualitative characteristics of anisum (*Pimpinella anisum*), an experiment was conducted based on a Randomized Complete Block Design with three replications and fifteen treatments at Research Station, Faculty of Agriculture, Ferdowsi University of Mashhad, Iran, in 2011 year. Treatments were: (1) mycorrhiza (*Glomus intraradices*), (2) mycorrhiza + cow manure, (3) mycorrhiza + vermicompost, (4) mycorrhiza+compost, (5) mycorrhiza + chemical fertilizer, (6) biosulfur (*Thiobacillus* sp.) + Bentonite, (7) biosulfur + chemical fertilizer, (8) biosulfur + cow manure, (9) biosulfur + vermicompost, (10) biosulfur+compost, (11) cow manure, (12) vermicompost, (13) chemical fertilizer (NPK), (14)compost and (15) control. The results showed that application of fertilizer treatments had significant effect on most characteristics of anisum. The highest number of seed per umbel (7.24), economic yield (1263.4kg/ha) were obtained from biosulfur treatment. The highest dry matter yield (4504.1 kg/ha) resulted from combined application of biosulfur + chemical fertilizer and the highest harvest index (25.97%) observed in biosulfur+cow manure. The combined application of mycorrhiza affected some qualification traits, as the highest number of umbel per plant (65.7), 1000 seed-weight (3.24 g) and essential oil percentage (5.3%) resulted from combined application of mycorrhiza+chemical fertilizer. In general, it can be concluded that application of organic and biological fertilizer particularly mycorrhiza and biosulfur had a significant effect on improving of quantitative and qualitative characteristics of anisum. Furthermore, the combined application of organic and biological fertilizer had higher positive effects than their single application.

Keywords: Biosulfur, Economic yield, Essential oil percentage, Mycorrhiza, Vermicompost

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Evaluation Physiological Characteristics and Grain Yield Canola Cultivars under end Seasonal Drought Stress in Weather Condition of Ahvaz

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Abstract

To evaluate canola cultivars response to physiological characteristics and grain yield end seasonal drought stress in weather condition of Ahvaz, farm experiments were done at research farm of Khuzestan agriculture and natural resources center. During 2007-2008 and 2008-2009 crop years. Farm test comprised drought stress was done as split plot form with randomize complete block design with four replication, treatments consist of drought stress (main factor) including 50, 60 and 70 percent of water use content, which was applied from early heading stage until physiological maturity, and three spring canola cultivar including Shirali, Hayola 401 and R.G.S. were considered as sub plots. Measurements include biological yield, grain yield, harvesting index, number of pod per plant 1000 grain weight, number of grain in pod, plant height, and stem diameter, oil and protein percentage. Results showed that drought stress reduced significantly grain yield, biological yield, harvest index and the average of reduction of them during 2 years for per unit reduce moisture from 50% to 70% were 2, 1.35, and 0.81 percent, respectively. During two years, 1000 grain weight, number of pods per plant and number of grain per pod reduced 27, 36 and 20 percent, respectively. Terminal Drought stress reduced significantly plant height, stem diameter, stem number per plant and pod length, this reduced were 12, 46, 36 and 14 percent, respectively. Stem diameter, and stem number per plant reduced more than other characteristics. In this study oil grain decreased 12 % and protein grain increased 18.5% but oil and protein yield decreased 44.9% and 27.1% respectively..Finally, in weather condition of Khuzestan, terminal drought stress on February and March in which has simultaneous with early flowering stage and filling seed, significantly, reduced yield and compounded yield and affects on stem growth and qualities oil and protein negatively. Therefore, with irrigation management and selection resistance genotypes to drought stress, canola production could be increased.

Keywords: Oil percent, Plant height, Pod, Protein percent

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Effect of Tillage in Day or Night and Application of Reduced Dosage of Imazethapyr and Trifluralin on Weed Control, Yield and Yield Components of Chickpea

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Abstract

This Experiment was arranged as a strip-plot on the base of a completely randomized block design with three replications to study the effect of tillage (whether in day or night or in day by light-proof cover) and application of reduced dosage of imazethapyr and trifluralin on weed control, yield and yield components of chickpea. Main plots consisted of tillage methods and subplots consisted of trifluralin (at doses of 480, 960 and 1440 g ai /ha) and imazethapyr (at doses of 50, 100 and 150 g ai /ha), plus weed free and weedy checks. Results showed weed biomass in day tillage, night tillage and in light-proof cover tillage were respectively 86, 127 and 148 g m⁻². Therefore tillage at night or by light-proof cover in day time showed not enough efficiency in weed control. Weed biomass increased when application dose of herbicides decreased. Chickpea grain yield showed significant differences when different doses of herbicides applied. The minimum and the maximum seed yield were obtained respectively in weed free (by 208 g m⁻²) and weedy checks (by 123 g m⁻²). Reduced dosage of imazethapyr and trifluralin could control weeds good enough by no significant decrease in chickpea yield. Efficacy of imazethapyr to control weeds grown in chickpea was significantly better than that of trifluralin.

Keywords: Night tillage, Photocontrol, Pursuit, Treflan

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The Study of Phenological and Morphophysiological Traits of New and Old Barely Shoot Cultivars

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Abstract

In order to compare morphophysiological traits between new and old cultivars of barley (*Hordeum vulgare* L.) a greenhouse experiment was conducted in greenhouse condition in Faculty of Agriculture, Ferdowsi University of Mashhad in spring and summer 2011. The type of experiment was a completely randomized design with eight treatments (Nosrat, Yousof, Fagr30, Nick) and four old cultivars include (Reihan, Kavir, Zarjo, Valfajr) and three replications. All seeds were grown in PVC tubes contained washed sands and disruptive sampling was occurred with destroying plastic bags in the end of the four stages including 6th leaf stage, jointing, heading and ripening. Results indicated that new cultivars showed better performances in all shoot growth parameters than the old cultivars. Modern cultivars for most traits, particularly traits that were positively correlated with yield and its components proved more successful than the old cultivars. They had longer reproductive periods and grain filling duration but their vegetative period were shorter than old cultivars. Among shoots characteristics, new cultivars had higher leaf area, stem dry weight and stem length than old cultivars. Result of this study showed that, among all the characteristics of grain yield and yield components, such as grain weight, spike length, spike per plant, grain per spike and number tiller, new figures were better than old figures. In general, new cultivar Nick was introduced as the best cultivar and Zarjo was introduced as the weakest cultivar.

Keywords: Barely, Shoot, Yield, Yield components

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Effects of Seed Priming on Root Characteristics of Two Barley (*Hordeum vulgare* L.) Cultivars in Different Levels of Salinity Stress by using Gel Chamber Technique

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Abstract

The study was conducted to evaluate the effect of seed priming on root growth of two barley cultivars (*Hordeum vulgare* L.) under salinity stress was performed in phytogel. The treatments included two cultivars of barley (Yusuf and Maquie), levels of seed priming (control, hydro-priming and priming with 4.35 g l⁻¹ of urea) and four levels of NaCl salinity stress (0, 0.2, 0.3 M). The experiment was conducted in Factorial experiment based on a completely randomized design (CRD) with three replications. The results indicated that salinity and seed priming were significantly effects on length, volume, density, fresh and dry weight and rate of root development of barley. Also, the effect of cultivar was significantly in volume, fresh weight and density. Salinity stress reduced length, volume, density, fresh and dry weight and rate of root development. However, the most of barely traits which were affected by seed priming were improved in 0, 0.1 and 0.2 salt Molar levels and priming with urea had the most positive impact on root traits. In the highest salinity level, none of seed priming treatments had not significant effect on root traits. The most effective of Hydro-priming was obtained in the absence of stress. In most of salinity treatments Yusuf cv. in compared with Maquie cv, had more fresh weight and volume root was higher fresh and In general, seed priming could be used as a solution to improve root development of barley seedlings until 0.2 Molar NaCl salinity stress.

Keywords: Barley, Hydro-priming, Osmopriming, Phytogel, Sodium chloride, Urea

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Association of Seed Yield, Oil and Related Traits in Safflower Genotypes under Normal and Drought Stress

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Abstract

This research was investigated to study relationship among seed yield, seed yield components and morphological traits and their direct and indirect effects on seed yield of 100 safflower genotypes in two water environments (normal and drought stress) at Research Farm of Isfahan University of Technology during 2012. Seed yield had positive correlation with number of head per plant, seed per head, number of branch, 100-seed weight, oil percent, harvest index and biological yield and negative correlation with branching height in both moisture conditions. Stepwise regression analysis defined the most important components of seed yield and indicated that under normal condition number of head per plant and number of seed per head should be improved respectively but inverse trend was observed for drought stress. Path analysis indicated that number of seed per head had the greatest direct effect on seed yield in both moisture conditions. Factor analysis in non-stress condition showed that five factors (phenological, source, biological and economical factors) contributed around 74% of variation and under drought stress condition three factors (phenological, yield and economical factors) contributed around 63 of total variation. Result can be used for indirect selection in safflower breeding programs.

Keywords: Factor analysis, Path analysis, Regression analysis, Safflower

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Effect of Seeding and Nitrogen Rates on Yield and Yield Components of Wheat Grown in Rapeseed Residues

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Abstract

In order to evaluate the effect of nitrogen (N) and seeding rate and presence of rapeseed residues on yield and yield components of wheat, a field experiment was conducted in cropping year 2011- 12 at College of Agriculture, Shiraz University (Badjgah), Shiraz, Iran as split-split plot arranged in randomized complete blocks design with three replications. Treatment included presence and absence of rapeseed residues as main plot, four N rates (82, 96, 110 and 124 kg ha⁻¹) as sub plots and three seeding rates (220, 245 and 270 kg ha⁻¹) as sub subplots. Results showed that seed yield of no crop residues plots were significantly higher than when residue was present. Rapeseed residues, significantly decreased seed yield by 23.12% compared with no residues. Seed yield significantly increased 24.78% with increased N from 82 to 124 kg ha⁻¹. The highest seed yield was obtained with 124 kg N ha⁻¹, 270 kg seeding rates with no significant difference with 110 kg N ha⁻¹. With increasing per unit of nitrogen and seed per hectare, Seed yield increased 28 and 19.98 respectively. Therefore nitrogen application and plant density, as two agronomic practices, play an important role in increasing wheat yield. The highest wheat grain yield was obtained with 270 kg ha⁻¹ of seed and 124 kg N ha⁻¹ when it is grown in rapeseed residues.

Keywords: Nitrogen, Rapeseed residues, Seeding rate, Seed yield of wheat

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Proline, Total Chlorophyll, Carbohydrate Amount and Nutrients Uptake in Coriander (*Coriandrum Sativum* L.) under Drought Stress and Fertilizers Application

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Abstract

To evaluate the effects of drought stress and organic fertilizers on proline, total chlorophyll, carbohydrate amounts and nutrients uptake in coriander, a study was carried out in the experimental farm plots in the form of split plot in complete block with three replications in 2011. Treatments were consisted of three levels of drought stress (30, 60 and 90% of field capacity) and fertilizer treatments (control, complete fertilizer, manure and vermicompost). The results indicated that drought stress had significant effects on chlorophyll, proline, carbohydrates amounts and on nitrogen, phosphorus, potassium uptakes and on sodium concentrations in plant ($p < 0.01$). Fertilizer application had significant effects at five percent level for proline while on carbohydrate, nitrogen, phosphorus, potassium and sodium concentration it was considerable on the rate of one percent. Fertilizer treatments on chlorophyll content were not significantly effective.

Keywords: Coriander, Drought stress, Fertilizer, Nutrients, Proline

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Evaluation and Comparison of Different Tillage Methods in Improvement of Salt-affected Soils in Wheat Production

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Abstract

One of the main strategy for controlling salt-affected soils is to implement proper tillage method. A field experiments was conducted to determine the effect of different tillage methods on salt distribution and wheat yield in saline-sodic soil. The experiment was laid out according to randomized complete block design with three replications. Treatments were studied in the experiment including conventional tillage (T₁), reduced tillage (T₂), subsoiling+ conventional tillage (T₃), subsoiling+reduced tillage (T₄), subsoiling+power harrow (T₅) and plowing without moldboard (T₆). Electrical conductivity (EC) Ph of the soil sodium adsorption ratio (SAR) and cone index (CI) were measured for all treatments. The results showed that the T₃ and T₄ treatments compared to T₁, caused a significant salinity reduction by 17.8 and 10.3%, respectively. The SAR was influenced by different tillage systems. The maximum SAR was observed for T₁ system and T₂ relative to T₁ system reduced SAR by 4.1%. The results also revealed that SAR in T₃ system was significantly less than T₁ (23.4%) and T₂ (20.1%) systems. Different tillage systems had significant effects on wheat yield.

Keywords: Electrical conductivity, Sodium adsorption ratio, Tillage system, Wheat yield

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Effect of Nitrogen Fertilizer Rates on Morphological Traits, Yield and Yield Components of Three Cultivars of Rice

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Abstract

In order to study the effect of N fertilizer rates on morphological traits, yield and yield components of rice cultivars, a study was carried out in Rice Research Institute of Rasht, Iran during 2009. It was a two-variable factorial experiment based on a randomized complete block design with three replications. The first factor was nitrogen fertilization at four rates of 0, 30, 60 and 90 kg N ha⁻¹ and the second factor was rice cultivar at three levels of Hashemi, Ali-Kazemi and Khazar. The results of analysis of variance showed that N fertilizer rates did not significantly affect on panicle length, grain number per panicle, 1000-grain weight and harvest index but significantly affected plant height, tiller number per m², panicle number per m², grain yield and biological yield. Means comparison showed that as N rate was increased from 0 to 90 kg ha⁻¹, plant height, tiller number per m², panicle number per m², grain yield and biological yield increased by 12.7, 27.6, 32.6, 84.5 and 61.6%, respectively. The cultivar significantly affected morphological traits, panicle number per m², grain number per panicle, 1000-grain weight, grain yield and biological yield. The results indicated that cultivar of Khazar had the highest potential of grain yield (3424.5 kg ha⁻¹). In total, application of 90 kg N ha⁻¹ and cultivar of Khazar treatment was better for having the maximum production under the conditions of the current study.

Keywords: Cultivar, Nitrogen, Rice, Yield and yield components

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Performance of the Forage Crops of a New Brassica Genus and Berseem Clover under the Temperate Climate of Ilam

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Abstract

The performance of new forage *brassica* plants were studied in Ilam, Iran, during 2012-2014 in a field experiment using a randomized complete block design with four replications. The treatments included, different forage crops Perko, Buko, Oilseed radish, Berseem clover, and the combination of three plants Ramtil, Phaselia, and Clover. The Studied traits consisted of plant height, forage yield, total dry weight, protein content, protein yield, the yield of digestible protein, percent organic carbon (before and after planting), the percentage of nitrogen in the soil (before and after planting). According to the combined analysis of variance, the results showed that there were significant difference in terms of plant height, total dry weight, forage yield and percentage of organic carbon of soil after planting, protein content, protein yield, the yield of digestible protein. The higher forage yield belonged to Buko, Perko and Oilseed radish, with 69,938- 65,168 and 63,451 kg ha⁻¹, respectively, and the lowest biological yield was observed for Berseem clover with 31298 kg ha⁻¹. The higher total dry weight was observed for Perko (6371.5 kg ha⁻¹) and the lowest dry matter yield belonged to Berseem clover 4408 kg ha⁻¹. The highest and the lowest plant height of were observed in Buko (54.6 cm) and Clover (33.95 cm), respectively. The highest and the lowest protein percentage were found for Buko (24.46%) and clover (18.72%), respectively. The highest and the lowest digestible amount of protein were achieved in Buko (1203 kg ha⁻¹) and clover (592.3kg ha⁻¹), respectively. The highest and the lowest soil organic carbon percentage after planting of cultivars were observed in Buko (1.71%) and oilseed radish (1.25%), respectively. The least increase in the percentage of organic carbon was observed for clover. Overall, new forage cultivars of the *Brassica* genus, showed significant superiority over Berseem clover.

Keywords: Brassica, Forage yield, Organic Carbon, Protein Content

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Effect of Distance and Weight of Minituber on Yield and Yield Components of Seed Tubers of Potato (*Solanum tuberosum* L.) Savaln cv.

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Abstract

Planting density and weight of minituber are the factors influencing on the yield and yield components on seed tuber production in potato. In order to study the effect of distance and the weight of minituber on quantity and quality traits of seed tubers of potato cv. Savalan, the experiment was designed as a factorial experiment in randomized complete block design with three replications. In this research, minitubers with five different weights (<5, 5-10, 10-15, 15-20 and >20 g) in three intra rows spacing of 15, 20 and 25 cm and 75 cm inter row spacing were studied. The number of tuber in 1 m², weight and number of tuber in each plant, total yield, the percentage of tubers with the size <35, 35-55 and >55 mm and tubers diameter were recorded. Results showed that the effect of distance and minituber weight on the average of number of tuber per m², weight and number of tuber in each plant and the total yield were statistically significant ($p \leq 0.01$). In this study, other traits such as the percentage of tubers with the size <35 and 35-55 mm than the minituber weight and density did not respond. Number of tuber in each plant, total yield and diameter of tubers increased with increasing the minituber weight, so the cultivation of minitubers with >20 g compared to cultivation of minitubers <5 g, increased 20.8 ton ha⁻¹ the total yield. With increasing the distance of minitubers, the average of number of tuber in m² and the total yield increased but the weight and number of tuber in each plant decreased. In this experiment, the maximum of total yield of tubers (71.1 ton ha⁻¹) was obtained from minitubers >20 gram with 15 cm within-rows spacing. In this research, tuber yield showed a positive and significant correlation with weight and number of tuber in each plant and tuber diameter. So that for achievement of the greatest yield indexes of Savalan cultivar in Mashhad climate conditions, cultivation of minitubers >20 g with 15 cm within-rows spacing is recommended.

Keywords: Number of tuber in each plant, Number of tuber per m², Planting density, Tuber diameter, Weight of tuber in each plant

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Response of Wheat Physiological and Agronomic Traits to Water Stress and Zeolite Application

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Abstract

With increasing water deficit in agricultural production, quantity and quality of these products will be affected. In order to evaluate the response of wheat physiological and agronomic characteristics to water stress and zeolite application, this study was carried out in field of Arak Payam Noor University in 2009. A split-plot arrangement of treatments in a randomized complete block design with three replications was used. Water stress (I_0 = Control irrigation, I_1 = Irrigation about 85% plant requirement water, I_2 = Irrigation about 70% of plant requirement water, I_3 = Irrigation about 55% of plant requirement water, were assigned in the main plots and different levels of zeolite application (Z_0 = without zeolite application, Z_1 = 3 ton ha⁻¹, Z_2 = 6 ton ha⁻¹, Z_3 = 9 ton ha⁻¹) in sub plots. Each sub plot consisted of 4 rows, 5 m long with 50 cm between rows space and 5 cm between plants on the rows. Results indicated that un-stress irrigation (control irrigation) with average spike biological yield (36.51 g per 10 plant) and zeolite application (9 ton ha⁻¹) with average (34.02 g per 10 plant) were significantly superior to the other treatments. The maximum and minimum of grain yield obtained of treatments (control irrigation + 9 ton ha⁻¹ of zeolite) and (irrigation about 55% of plant requirement water + 3 ton ha⁻¹ of zeolite), respectively. Zeolite application was positive affected on almost of agronomic and physiologic traits in wheat.

Keywords: Biological yield, Electrical conductivity, Grain yield, Leaf chlorophyll

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Evaluation of Emergence Characteristics and Storage Root Production of *Ferula gummosa* Boiss. Under Its Habitats and Pot Conditions

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Abstract

To assessing the influences of planting dates and depths on storage roots production of endangered medico-industrial *Ferula gummosa* Boiss. some experiments were carried out at natural fields and pot as well. The pot experiments had done as factorial in completely randomized design with ten replications. Treatments contained five levels (2 October, 11 November, 22 December, 30 January, 11 March) of planting date and 2 levels (2 and 4 cm) of planting depth. Results showed that the effect of planting date on emergence percentage, emergence rate, number of storage roots, length of storage root, storage root's dry weight, leaf dry weight and total dry weight were highly significant and depth planting effect on emergence percentage, length of root storage, storage root dry weight, leaf dry weight and total dry weight were significant. The interaction of planting depths and dates had significant effect on root length, root dry weight and total dry weight of storage roots. Based on the results, planting depth of seeds at late autumn, provides the optimum conditions for removal of seed dormancy and increase emergence percentage and emergence rate, so planting at this time have priority on spring planting. The results of field experiments showed a very significant effect of aspects on emergence percentage of *Ferula gummosa* Boiss. The highest emergence rate observed at northern faced aspect, then western and southern faced aspects and eastern faced slop had lowest emergence rate.

Keywords: *Ferula gummosa* Boiss, Emergence rates, Planting date, Planting depth, Total dry weight

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Effect of Nutrient Solution Concentration, Time and Frequency of Foliar Application on Growth of Leaf and Daughter Corms of Saffron (*Crocus sativus* L.)

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Abstract

In order to investigate the effect of different levels of nutrient solution concentration and times and frequencies of foliar applications on dry weight, nitrogen, phosphorus and potassium concentrations of leaf and corm of saffron, a pot experiment was conducted as a completely randomized design with factorial arrangement and three replications under open door conditions in research garden of Ferdowsi University, Faculty of Agriculture. The experimental treatments were included 4 levels of solution concentration (0, 4, 8 and 12 per 1000) and 7 levels of time and frequency of foliar applications (F1: foliar application on 3th February, F2: foliar application on 18th February, F3: foliar application on 5th March, F4: foliar applications on 3th and 18th February, F5: foliar applications on 3th February and 5th March, F6: foliar applications on 18th February and 5th March, F7: foliar applications on 3th and 18th February and 5th March). Results of variance analysis showed that fresh and dry weight of corm and leaf were not influenced by concentration, time and frequency of foliar applications. Also, comparison of nitrogen, phosphorus and potassium concentrations of leaf and corm showed that there was no significant difference between levels of foliar treatments and control. Therefore, it seems that due attention to pattern of leaf and low nutrient demand of saffron, foliar applications in different levels of nutrient solution concentrations and times and frequencies of foliar applications could not increase vegetative growth and consequently, could not improve the growth and nutritional properties of saffron corms.

Keywords: Corm of saffron, Leaf, Nutrient elements, Nutrient solution

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Effects of Hydro Priming and Priming with Different Rates of Selenium along with Foliar Application on Yield and Yield Components of Rain fed Wheat

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Abstract

In order to study the effects different treatments of priming on yield and yield components of rainfed wheat, a field experimental was carried with three replications in the Research Station of Islamic Azad University, Arak Branch, Iran in 2014. The experimental treatments were control, seed priming with distillate water, priming with rates of 1, 2 and 3 mg l⁻¹ Se alone and along with foliar application of distillate water and selenium. The result showed seed priming with 1 and 2 mg l⁻¹ Se along with foliar application of selenium increased seedling emergence percentage by 47.64 and 41.5% as compared with control, respectively. The maximum number of grain per spike) was obtained from seed priming with 2 mg l⁻¹ Se along with foliar application of Se, That was increased number of grain per spike by 18.2% as compared with control. The maximum of 1000 grain weight was record for foliar application with distillate water. Seed priming with 2 mg l⁻¹ Se along with foliar application of Se increased 1000 grain weight by 9.4% as compared with control. Seed priming with 1 and 2 mg l⁻¹ Se along with foliar application of Se and priming with distillate water along with foliar application of selenium increased grain yield by 16.7, 19 and 17.9% as compared with control.

Keywords: Foliar application, Seed priming, Selenium, Seedling emergence percentage, Rainfed wheat

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