



Response- Surface Analysis for Evaluation of Competition in Different Densities of Sesame (*Sesamum indicum*) and Bean (*Phaseolus vulgaris*) Intercropping

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Abstract

Response surface models predict crop yield based on crop density and this is an important tool for evaluation competition at different density and hence selection of optimum density based on yield. In order to study intra and inter specific competition in intercropping bean (*Phaseolus vulgaris*) and sesame (*Sesamum indicum*), an experiment was conducted at the Agricultural Research Station, Ferdowsi University of Mashhad during the growing season of 2010. For this purpose a complete randomized block design with 3 replications and 16 treatments based on different densities of sesame and bean intercropping was used. The model predicted the maximum yield of an isolated plant of bean and sesame approximately 33 and 17g per plant respectively. The area associated with the maximum yield per plant in bean and sesame were 0.6 and 0.1 m², respectively. Bean was the dominant competitor with respect to both grain and biomass, and competition coefficient was 0.35 and 0.3 for bean grain yield and bean biomass respectively. Intra-specific competition was more important than inter-specific competition for bean. Competition coefficient was 2.6 and 2.9 for sesame grain yield and biomass respectively. Intra-specific competition was much less important than Interspecific competition in sesame. The highest grain yield in bean (300 g m⁻²) was obtained of sole crop with density of 20 plants, and the highest sesame grain yield (195 g m⁻²) was obtained of sole crop with density of 40 plants, the highest land equivalent ratio (1.14) was obtained in intercropping of 20 plants of bean and 10 plants of sesame.

Keywords: Competition, Density, Intercropping, Land equivalent ratio, Response surface model

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Investigation of Changes in Grain Yield and Some Morphophysiological Characteristics of Wheat (*Triticum aestivum* L.), Maize (*Zea mays* L.) and Rice (*Oryza sativa* L.) in Recent Decades in Iran

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Abstract

Twentieth century had faced considerable increase in crops yields. Nonetheless, it is postulated that world population will reach 10.4 billion until 2050 which means the demand for agricultural crops production should be increased between 60 and 110 percent. In the present study, improvements in grain yields of wheat, maize and rice during the recent decades in Iran were studied through analyzing morphological and agronomic data relevant to these three crops between 1957 and 2012. Linear regression was used to analyze the trends of improvements in different traits. Results indicated that wheat and maize grain yields in the target period have significantly increased, while little increase in rice yield was observed. Results showed that breeding programs could significantly shorten plant height in wheat and maize, especially in spring wheat compared to winter wheat, but this was not the case in rice. Regarding one thousand-grain weight, little change was observed in wheat although the amount of increase in this trait was more in spring rather than winter wheat. The study showed that newer maize cultivars were more tolerant to higher plant density compared to older cultivars. In rice, it was revealed that crop growing period has considerably decreased during the studied period. Overall, it could be concluded that breeding could effectively increase spring and winter wheat and maize grain yields in Iran. However, regarding rice it seems that breeding was not successful toward grain yield improvement.

Keywords: Crop growing period, Grain yield improvement, Plant density, Plant height, Thousand-grain weight

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The Effects of Nitroxin and Nitrogen Fertilizer on Yield and Yield Components of Winter Wheat (*Triticum aestivum* L.)

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Abstract

In order to evaluate the effects of Nitroxin biofertilizer and different levels of nitrogen fertilizer, on yield and yield components of winter wheat (*Triticum aestivum*), a field experiment was conducted in Research Station, College of Agriculture, Ferdowsi University of Mashhad in 2009-2010. The experiment was conducted as a factorial arrangement based on completely randomized block design with three replications. The experimental treatments were all combination of nitroxin biofertilizer in two levels (inoculated with nitroxin and non inoculated), and nitrogen fertilizer in six levels (0, 10, 20, 40, 80, 160 and 320 Kg ha⁻¹ urea). Result showed that combination of biofertilizer with different levels of N fertilizer, had significant effect ($p < 0.01$) on yield and yield components such as number of tiller per plant, biological yield, and harvest index. The highest and the lowest biological yield were obtained in combination of 160 Kg ha⁻¹ Urea + Nitroxin and control treatments, respectively. It seems that, increased seed yield with combination treatments have been caused by the combined effects of biofertilizer and N fertilizer. Therefore, nitrogen fertilizer combined with biofertilizer could be used as a suitable replacement of chemical fertilizers.

Keywords: Azotobacter, Inoculation, Plant growth promoting bacteria, Urea

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Effects of Intercropping on Biological Yield, Percentage of Nitrogen and Morphological Characteristics of Coriander and Fenugreek

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Abstract

In order to study the intercropping arrangements of coriander (*Coriandrum sativum* L.) and fenugreek (*Trigonella foenum-graecum* L.), a field experiment was conducted during growing season of 2010 at Agriculture Research Station, College of Agriculture, Ferdowsi University of Mashhad, Iran. A randomized complete block design with three replications was used. Treatments included: mono-crop of fenugreek (A), %25 of optimum density of coriander + %175 of optimum density of fenugreek (B), %50 of optimum density of coriander + %150 of optimum density of fenugreek (C), %75 of optimum density of coriander + %125 of optimum density of fenugreek (D), %100 of optimum density of coriander + %100 of optimum density of fenugreek (E), mono-crop of coriander (F), %125 of optimum density of coriander + %75 of optimum density of fenugreek (G), %150 of optimum density of coriander + %50 of optimum density of fenugreek (H), %175 of optimum density of coriander + %25 of optimum density of fenugreek (I). Biological yield harvested in coriander at %5 flowering stage and in fenugreek at %20 flowering stage. The result showed that B treatment had highest plant height and biological yield of fenugreek, highest total land equivalent ratio and also B treatment had lowest essential oil contents of leaf, essential oil yield and biological yield of coriander. I treatment had lowest biological yield of fenugreek and it had highest essential oil contents of leaf, essential oil yield and plant height in coriander. Also A and E treatments had highest percent of nitrogen of biomass in fenugreek and coriander, respectively.

Keywords: Essential oil, Land equivalent ratio, Biological yield

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Evaluation of Yield and Yield Components of 43 Sesame (*Sesamum indicum* L.) Lines and Ecotypes under Irrigated with Saline Water

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Abstract

Salinity of water and soil in arid and semi arid regions restricts the growth and yield of crops such as sesame. In order to evaluate yield and yield components of 43 lines and ecotypes of sesame (*Sesamum indicum* L.) under saline condition (EC of irrigation water, 5.2 dS m⁻¹) an experiment was carried out in randomized complete block design with three replications at salinity Research Station of Center of Special Crops, Agricultural College, Ferdowsi University of Mashhad in 2010. Results showed that 25 sesame accessions were capable to emerge and growth until maturity and others died in different growth stages. There were significant differences between sesame accessions for yield and yield components (number of capsule per plant, number of seed per capsule and 1000 seed weight). The maximum biomass was obtained from MSC3 (73.2 g/plant), and in 24 percent of accessions was further than 30 g plant⁻¹ and the maximum grain yield was observed in MSC3 (24.7 g m⁻²). There was considerable variation between accessions in number of capsule per plant, so that the range was from 2 to 57 capsules per plant. Results of correlation coefficients showed that there were significant and positive correlation between seed yield and number of capsules per plant ($r=0.46^{**}$) and biological yield ($r=0.94^{**}$). It seems that for selection of salt tolerant sesame accessions, screening of seed yield in field conditions is a reliable index. However, further study on growth and physiological processes is necessary for determination of salt tolerance in sesame.

Keywords: Capsule per plant, Grain per plant, Harvest index, 1000-grain weight

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Evaluation of a Model to Simulate Wheat Growth and Development under Drought Stress Conditions

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Abstract

Modeling is one of the best tools for quantitative analyzing of biological systems that is helpful for understanding physiological basis of crops growth and development especially under limited water. In this study, a model was developed based on FAO Penman-Monteith model to simulate soil water balance (SWB) components and linked with wheat growth and development model, which was developed based on basic models SUCROS and LINTUL. A field experiment was conducted in order to presented model validation in 2010-2011 at the Ferdowsi University of Mashhad Research Field. Experimental design was split plots with 5 irrigation treatments (main plot), 2 cultivars (sub plot), and 3 replications. Irrigation treatments included irrigation based on full water requirement (FI), without irrigation during spring (NI), irrigation at the rate of 75% of water requirement (75% FI), irrigation at the rate of 50% of water requirement (50% FI) and irrigation at the rate of 25% of water requirement (25% FI) and subplots also included Pishgam (drought-resistant) and Gascogne (drought-susceptible) wheat cultivars. Then simulated results was validated with two methods: fitted linear regression between observed and simulated data and compare with 1:1 line and Root Mean Square Error in percent (RMSE %). The result of LAI-trend simulation was excellent for susceptible cultivar in non-stress condition (FI treatment) and medium for drastic stress condition (NI and 25%FI treatments). The simulation accuracy was good for other treatments. The LAI-trend simulation for resistant variety was good in all treatments. The model accuracy in maximum Leaf Area Index (LAI_{max}) simulations and its day ripening was excellent for both varieties. Dry matter production of susceptible cultivar was simulated excellent only in FI treatment and good for other treatments. But the model accuracy was gained excellent for resistant variety in all treatments. The model accuracy in yield simulations also was excellent for both varieties. The simulated yield for NI, 25%FI, 50%FI, 75%FI and FI treatments was 1285, 3031, 4697, 6137 and 7649 kg.ha⁻¹, respectively. The actual yield of Gascogne variety for the mentioned treatments was 1615, 2954, 4483, 5952 and 8132 kg.ha⁻¹, and for Pishgam variety was 1758, 3652, 5071, 6064 and 7548 kg.ha⁻¹, respectively. Overall, the results suggesting the effectiveness of presented model to predict wheat growth and development variation under different water supplies but should be revalidated with various experiments to reach better results.

Keywords: Evapotranspiration, FAO Penman-Monteith model, LINTUL, Modelling, SUCROS

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Statistical Analysis of Long-Term Trend of Performance, Production and Cultivated Area of 17 Field Crops Khorasan Razavi Province

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Abstract

Any planning for the future requires estimates of future conditions. It is possible to study changes over time series. In this study, changes of production and cultivated area of 17 field crops of Khorasan Razavi province in a 25-year period were determined with Mann - Kendall test, Sen's Estimator Slope and linear regression. Analysis of the three tests showed that performance of 76.5% from yield, 88.2% from area under cultivation and 55.8% from agricultural production were significant at the 0.01 and 0.05 level. On the other hand, trend of yields 58.8% was increase, 17.7% was reduced and 23.5% was no significant trend. Similarly, trend of 23.5% from area under cultivation was acreage, 64.7% was reduction, and 11.8% was no significant trend. For production variable, 29.4% was significantly increased and 29.4% was significant reduction. More detailed analysis showed that performance, production and area under cultivation of three crops of cotton, grain and tomatoes increased significantly. Results of all three methods showed the highest trend of negatively performance and area under cultivation variation is related to pea and melon respectively. Furthermore, most of the positive trend in production of tomatoes and grain, performance in onions, potatoes and tomatoes and area under cultivation in tomato observed. The results showed that linear trend and the nonparametric tests of important products of province: wheat, barley, sugar beet, cotton, melons, watermelons and tomatoes in 0.01 were significant. This result shows the importance of these yields in gross state province product.

Keywords: Mann - Kendall, Sen's Estimator, Linear regression, Field crops

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Effect of Water Stress on Root Distribution and Extension of Different Triticale Genotypes

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Abstract

Root depth and distribution have an important role in drought resistance and optimization of moisture content of soil. This research was carried out in order to consider of root response of triticale genotypes to water stress and recognition of root trait that can effective in resistance of water stress. This experiment was in a factorial experiment based on completely random design on the year 2009. The genotypes of triticale was included (i) ET-82-15 (ii) ET-82-8 (iii) ET-82-17 and commercial triticale genotype Juanillo-92. Two irrigation regimes included 100 and 50 % of field capacity, respectively. The result showed that water stress result in increased 9% of root depth in each plant. Differences between minimum root depth was observed in ET-82-15 rather than maximum root depth in Juanillo-92 was approximately 8.2 centimeters. Late irrigation caused to diminish 25% of root length. Differences between maximum root length in ET-82-15 and minimum root length in ET-82-17 was not significant ($p < 0.01$). Water deficit caused to decrease length, area, diameter and dry weight of root on 0-20, 20-40 and 40-60 cm layer of soil surface. Correlation coefficient between traits in water stress condition showed that all traits except length and diameter was the significant and positive correlation ($p < 0.01$). It seems that root length and area were the effective factors of these genotypes of triticale in water stress condition.

Keywords: Root depth, Root length, Root surface area, Grain yield

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Effect of Salicylic Acid on Yield, Component Yield and Essential Oil of Black Cumin (*Nigella sativa* L.) under Water Deficit Stress

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Abstract

Since the production of medicinal plants can be influenced by environmental factors such as water limitation. In other hand salicylic acid as a plant regulator can enhance drought resistance in plants. In order to investigate the effect of different irrigation intervals on yield, yield components and essential oil of black cumin (*Nigella sativa* L.), a field experiment was conducted a farm located in West Azerbaijan province- city Nagadeh, West-Azerbaijan, during growing season of 2011- 2012. The experiment was arranged as split plot based on a randomized complete block design with three replications. Irrigation intervals (6, 12 and 18 days) and three levels of salicylic acid concentration (0, 0.5 and 1 mM) considered as in main plots and sub-plots, respectively. Results showed that irrigation had significant effects on all characteristics such as Plant height, number of follicule per plant, number of seed per follicule, biological yield, grain yield, essential oil content and essential oil yield with the exception of 1000- seed weight. With increasing irrigation intervals from 6 to 18 days, plant height, number of follicule per plant, number of seed per follicule, biological yield, grain yield, essential oil percentage and essential oil yield were decreased up to 49, 52, 40, 35, 43, 20 and 55 %, respectively. In contrast, yield components and yield were enhanced up to treatments 0.5 mM of salicylic acid. Grain yield and essential oil yield with application of 0.5 mM salicylic acid increased up to 13 and 11 % compared to control, respectively. It seems that due to the limited sources of water in the region irrigation after 12 days and 0.5 mM salicylic acid concentration are suitable for black cumin grain production.

Keywords: Antioxidant, Grain yield, Irrigation intervals, Medicinal plant, Stress moderator factors

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Predicting Wheat Grain Number by Photothermal Quotient in Anthesis Stage

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Abstract

This study was conducted to examine effects photothermal Quotient on grain number of four wheat cultivars under four planting dates and four replications. The experiment conducted at the Sabzevar Agricultural Sciences Research during 2007-2008 and 2008-2009. Various responses functions were evaluated to quantify the response of grain number to influencing parameters (environmental and non- environmental- based factors). The best relationship was found between grain number and grain yield, thus we evaluated and modeled other influence parameters (photothermal Quotient and temperature) on grain number. Result indicated that the grain number per area with mean temperature ($r=0.88$) at stem elongation to anthesis stage the highest correlation coefficient and grain number reduced with increasing temperature, in first and second years, 12150.3 and 1118.9 grain number /°C respectively. In 27 and 30 ° C mean temperature grain was not formed. Quadratic equation was obtained between grain number per unit area and photothermal Quotient at stem elongation to anthesis stage and the highest grain number of wheat were observed in 0.55 photothermal Quotient.

Keywords: Wheat, Grain number, Photothermal Quotient and temperature

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Effect of Ca, K, and Mn Foliar Spray on Vegetative Traits of Safflower (*Carthamus tinctorius* L.) under Salt Stress

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Abstract

In order to study the effect of Ca, K, and Mn foliar spray on vegetative traits of safflower (Padideh cultivar) under salt stress, a factorial experiment was conducted based on randomized complete blocks design with three replications in Vali-asr university greenhouse. Factors included salinity with four levels representing 0, 500, 1000, and 1500 mg NaCl kg⁻¹, and foliar spray with four level representing 10 mM spray of distilled water, CaNo₃, K₂HPO₄ and MnSo₄, 1 mM spray, respectively, sprayed two weeks after emergence, one application per 2 weeks. Results showed that increasing salinity level, reduced plant dry weight, leaf area, height, while salinity and foliar spray treatments has no effect on number of leaves. Highest leaf area was obtained after K₂HPO₄ and CaNo₃ foliar spray, and lowest leaf area was obtained from MnSo₄, K₂HPO₄ and CaNo₃ foliar spray prevented somewhat early plant growth rate reduction treated with 500 and 1000 mg NaCl. Applying 1500 mg NaCl reduced SPAD value, and leaf chlorophyll fluorescence. MnSo₄, K₂HPO₄ and CaNo₃ foliar spray nutrients, also reduced SPAD value.

Keywords: Plant Growth Rate, Leaf Area, Safflower, Dry Weight

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Effect of *Trichoderma harzianum* on Wheat (*Triticum aestivum* L.) Grain Yield under Different Levels of Cadmium Nitrate

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Abstract

A pot experiment was designed to evaluate the effect of *Trichoderma* spp. on yield and yield components of wheat (cv. N₈₁) under different levels of cadmium nitrate. Experiment was arranged in factorial based on completely randomized design with three replicates. *Trichoderma harzianum* at two levels (with and without inoculation) and four levels of cadmium nitrate (0, 50, 100, 150 mg l⁻¹) were the treatment. Results of ANOVA and mean comparisons showed that inoculation of *Trichoderma* increased biological yield (46%) and straw yield (30%) as compared to control. Cadmium pollution has led to significant decrease in harvest index, grain number per spike and partitioning coefficient up to 5, 20, 24 and 38 percent compared to control, respectively. Furthermore, cadmium and fungus interaction were significant in terms of spike number, grain weight per spike, grain yield and tolerance index. Maximum grain yield and tolerance index were recorded in *Trichoderma* inoculation under cadmium-free plots which nearly increased 65 and 53 percent, respectively. In conclusion, using *Trichoderma* under cadmium pollution could improve wheat growth, yield and tolerance index.

Keywords: Bioremediation, Harvest index, Yield

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Comparison Between Direct-seeding and Transplanting of Rice in Mazandaran Province: Weed Competition, Yield and Yield Components

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Abstract

In order to investigate rice competition ability against weeds in direct-seeding and transplanting systems a field experiment was conducted at Mahmud Abad region of Mazandaran province on 2011 growing season. Experimental treatments were studied in a split plot factorial design based on randomized complete blocks with three replicates. Direct-seeding and transplanting of rice in wet seedbed were the main plots and three rice cultivars under two weed management systems (weed free and weed infested) were arranged in sub plots. Results showed there was no significant yield difference in both system of rice planting under weed free condition, but yield loss due to weed interference in direct-seeding and transplanting of rice were 66% and 14% respectively. Line 843 which showed high competition ability in transplanting of rice, encountered with low ability due to weed pressure derived weed early vigor but our traditional cultivar (Tarom Deilamani) has acceptable competition ability and better yield sustainability than improved cultivar (Khazar) and line 843 in direct seeding system. Cultivars competitiveness could be attributed to more height, higher growth rate in early season, panicle number and higher dry weight of rice. Also in direct seeding related traits to the early vigor was more important than others. Results revealed that direct seeding integrated with weed control could be a good strategy for reducing costs of rice production. In such a system seedling early growth has important role in weed suppression.

Keywords: Competition ability, Early growth rate, Rice, Weed, Yield loss

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The Control of Broomrape (*Orobanche aegyptiaca*) in Tomato (*Lycopersicum esculentum* Mill) Farms

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Abstract

Broomrape would have irreversible effects on tomatoes in all growth stages and the damage would be unrecoverable. In order to chemically control *Orobanche* spp with consumption of bio-fertilizer in tomato cultivation, an experiment as factorial based on complete randomized blocks design in three replications and 12 plots was carried out at a farm which is located in Mahabad city (Iran). In this experiment, the experimental factors were including: A- sulfosulfuron 35 g/ha in three levels (application, at 40 days after transplanting of seedlings, application at 60 days and after sample transplanting without any chemical spraying), B and C: bio-fertilizers, Barvar -2 and Nitrajin in two levels (application and non-application of bio-fertilizer), were taken place. The results showed that Sulfosulfuron treatment at the rate of 35 gr/ha, with- twice application of 40 and 60 days after transplanting of seedlings decreased the biomass of *Orobanche aegyptiaca* in surface level and also it was possible to decrease the biomass per tomato bush and *Orobanche aegyptiaca* biomass to amount of 75%, 57% and 60% respectively compare to the main treatment without applying any kind of spray application. The applied bio-fertilizer-2 decreased the amount of fruit and economical function of tomato. The applying phosphate biofertilizer-2 resulted in a decrease in economical function of *Lycopersicum esculentum* and number of ripen fruits. However none of the applied treatment was influential on diameter and weight of ripen fruits.

Keywords: Chemically control, *Orobanche aegyptiaca*, Bio-fertilizer, Nitrajin biofertilizer, Sulfosulfuron herbicide

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Growth Analysis of Two Cultivars of Lentil Using Regression Modeling

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Abstract

Growth analysis is a valuable method in the study of quantitative of growth, development and crop production. In order to study the physiological growth indices of lentil plant under dry- farming conditions, an experiment was carried out as a randomized complete block design with three replications at the Agricultural Research Station of Lorestan University during 2010. In this experiment two cultivars were used including Gachsaran and Philip, that are appropriate and commonly in the area cultivating. In order to have more accurate study, Growing Degree Day (GDD) index was used for fitting growth curves, and then appropriate model was selected for each growth index using non-linear regression models. The results of the growth indices showed that Gachsaran cultivar has higher priority than Philip cultivar in leaf area index, but Philip cultivar had higher priority than Gachsaran cultivar in crop growth rate, net assimilation rate and dry matter production. Relative growth rate was similar in both cultivars. In total, growth characteristics of Gachsaran cultivar leading to higher seed yield and growth characteristics of Philip variety leading to produce more biological yield.

Keywords: Dry Farming, Lentil, Non-Linear Regression, Physiologic Growth Index

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Evaluating the Competitive Ability of Different Common Bean Genotypes Against The Weeds

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Abstract

In order to investigate the effects of weeds interference on yield and yield components of different genotypes of common bean, an experiment was conducted as split plot based on randomized complete block design with three replications at Agricultural Research Station of Tabriz University, in 2011. The main plots were eight genotypes of different types of common bean including red bean, (cv. Gholi, Sayad, Derakhshan and Akhtar); pinto bean, (cv. Khomein and Sadri) and white bean (cv. Shokufa and Pak) and the sub-plots were two levels of weed including weed-free and weed-infested. Results indicated that the effect of bean genotype was significant on yield and yield components. The effect of weed treatment was significant on all traits of common bean, except 100-seeds weight. The pod number per plant of all common bean genotypes reduced significantly under weed-infested treatment. The interaction effect of weed treatment× genotype was significant on bean seed number per pod, grain and biological yield. Among the genotype, the cv. Gholi had the highest pod number per plant and the cultivars Gholi and Shokufa had the highest seed number per pod. The cultivars of Gholi and Khomein produced the highest and lowest seed yield, respectively in both weed-free and weed-infested treatment. The common bean genotype showed different competitive ability as the genotypes Gholi and Pak had the higher competitive ability against the weeds than other genotypes. Therefore by cultivating the bean genotypes with high competitive ability against the weeds, the yield loss of common bean could be reduced as well as the growth of weed species will be suppressed.

Keywords: Competitive index (CI), Cultivar, Seed yield, Weed-infested

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Effect of Deficit Irrigation on Yield and Yield Components of Two Different Species of Balangu (*Lallemantia royleana* & *iberica*) from Mashhad and Urmia

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Abstract

To evaluate the effect of drought stress on yield, yield components and some physiological characteristics of *Lallemantia* sp, an experiment was conducted as split plot in randomized complete block design with three replications. The first factor was irrigation system in two levels 40 % and 60% depletion of available soil water, the second factor was *L. iberica* and *L. royleana* and the third factor was the origin of ecotypes, at two levels, Urmia and Mashhad. The results showed that drought stress had significant effect on Leaf Area Index (LAI) though with increment of water depletion, the LAI decreased 24.2%. The highest LAI was in *L. iberica*, with 2.99. *L. royleana* with 0.0088 mg.g⁻¹, had the highest chlorophyll a content in compared to *L. iberica* with 0.008 mg.g⁻¹ chlorophyll a content. The maximum number of capsules was related to 40% depletion of available soil water, *L. iberica* and Mashhad ecotype. The highest grain yield with an average of 208.4 kg per hectare obtained at 40% depletion of available soil water and related to *L. iberica* with an average of 189.4 kg.h⁻¹. The yield of 60% depletion of available water in the soil was 107.3 kg.h⁻¹ declined by 43.84% in compared to 40% depletion of available soil water. Significant difference was seen between ecotypes of *L. iberica* in terms of grain yield. Mashhad ecotype showed the highest grain yield. There was a significant positive correlation in grain yield, LAI, chlorophyll a content and thousand seed weight.

Keywords: Ecotype, Grain yield, Irrigation, Leaf area index, Photosynthetic pigments

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Study of Sowing Date and Seed Priming Effect on Seed Yield, Its Components and Some of Agronomic and Qualitative Properties of Two Spring Canola Cultivars in Hamedan

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Abstract

To determine the effect of planting date, cultivar and seed priming on yield, yield components, oil and protein content of seeds of two spring canola cultivars a field experiment was conducted in Bu-Ali Sina University in 2012. The experiment was factorial in a randomized complete block design with three replications. Factors consisted of sowing dates (14 and 24th March and 3rd April), seed priming treatments (no-primed, primed with water and zinc sulfate solution) and two canola cultivars (Hayola401 and RGS003). The evaluated traits were number of pod per plant, number of seed per pod, 1000 seeds weight, plant height, oil and protein percentage, yields of seed, oil and biologic and harvest index. The results showed that delay in sowing, except of seed protein percentage, decreased all traits. Seed priming could increase traits of plant height, 1000 seed weight, number of seed per pod, oil percentage and yield and protein percentage in all sowing dates. Seed priming with zinc sulfate solution and water increased the number of pod per plant 16.1 and 10.5 percent, respectively compared to no-primed treatment. The highest seed number per pod was achieved through the priming with water and zinc sulfate solution with an average of 14.3, in the first sowing date for Hayola401 cultivar. Priming with water, especially in the third sowing date increased oil yield by 56 percent in RGS003 cultivar in comparison with its no-primed treatment. Also priming with zinc sulfate and water, increased the harvest index 5.04 and 3.7% respectively compared to no-primed treatment. In general in the case of delay in sowing date in spring rapeseed cultivars especially for RGS003, primed seed preferably with zinc sulfate improves the quantitative and qualitative characteristics of the production.

Keywords: Harvest index, Oil, Protein, Water, Zinc sulfate

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Evaluation of Sowing Date, Plant Density and Harvest Method on Growth, Yield and Yield Components of Baby Corn (*Zea mays* L. var. SC403su)

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Abstract

Considering importance of baby corn, the study was consisted of sowing date (14th June, 3th July and 24th July) as main Plots and plant densities (6.5, 8.5 and 10.5. plant m⁻²) as sub Plots and two harvest methods (baby corn, as first harvest sweet corn and next ear as baby corn) on Growth parameter and yield of baby corn (*Zea mays* L. Var SC403su) in agricultural Research Center and Natural Resources of Khorasan Razavi Province, Mashhad on 2009. The experiment was carried out in a factorial split plot design based on randomized completely block design with 4 replications. The results showed the highest plant height on sowing date 3th July with average 168.6 cm. Also the highest standard ear percentage that one of the important factors for food manufactory had on sowing date 24th July with plant density 10.5 plants plant m⁻², by harvesting method baby corn with 63.9 percentages. Also The results showed the highest substandard ear percentage of baby corn was belonged to sowing date 24th July with 8.5 plant m⁻², by harvesting method (baby corn sweet corn) with 74.6%. The highest harvest ear index was belonged to sowing date 14th June, by harvesting method (baby corn sweet corn) with 35.29 percentages. Therefore, sowing date 3th July for forage production with average 4 kg m⁻² by harvesting method baby corn are recommended for lateral produce production. Considering to Mashhad weather conditions, producing the highest and best standard ear percentage, density, 10.5 plants per square meter and 24th July planting is recommended.

Keywords: Corn, Harvest method, Plant density, Sowing date

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