



Effect of Water Stress and Spraying of Potassium Iodide on Agronomic Traits and Grain Yield of Bread Wheat (*Triticum aestivum* L.) Genotypes

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Abstract

In order to study the effect of water stress and chemical desiccation (potassium iodide) on grain yield and agronomic traits of 8 wheat genotypes, a field experiment was conducted using a split split plot design based on a randomized complete block design with three replications in Torogh Agricultural and Natural Resources Research Station (Mashhad, Iran) in 2006-2007 and 2007-2008. Main plots were assigned to two levels of water stress treatments; D₁: optimum irrigation, and D₂: cessation of watering from anthesis to maturity stages. Sub plots were assigned to eight bread wheat genotypes: 9103, 9116, 9203, 9205, 9207, 9212, C-81-10 and Cross Shahi (drought sensitive); and photosynthetic conditions with two levels: P₁: using of current photosynthesis and P₂: inhibition of current photosynthesis were in sub-sub plots. The results showed that the effects of water stress and photosynthetic conditions on number of total florets per spike (NTF/S), seed set percentage (SSP), spike harvest index (SHI), duration of grain filling (DGF) and grain yield (GY) were significant. There was a significant difference between genotypes for spike dry weight at anthesis (SDWA), number of spikletes per spike (NSP/S), NTF/S, SSP, SHI, spike partitioning coefficient (SPC), plant height (PLH), spike length (SL), DGF and GY. 9103 genotype produced the most GY (7870 kg/ha) under D₁P₁ treatment. The least GY (1114 kg/ha) related to Cross Shahi cultivar under D₂P₂ treatment. Considering that C-81-10, 9103 and 9116 genotypes showed the highest grain yield, potential for reserves and remobilizations of assimilates under different irrigation conditions thus, these genotypes could be introduced as promising in breeding programs for arid and semi-arid regions.

Keywords: *Triticum aestivum* L., Cessation of watering, Chemical Desiccation, Spike, Grain yield

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Genetic Variation of the Traits in Isolated Lines From Local Populations of Flax (*Linum usitatissimum* L.)

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Abstract

Genetic variation for the traits in flax breeding programs can be used for selection of desirable genotypes for agronomic traits. This study was conducted at the Research Farm of Isfahan University of Technology in 2006 to investigate genetic variability for different agronomic traits of breeding lines isolated from 6 local populations of flax. In this study, 73 isolated lines by single plant selection along with the local populations and "Flanders" cultivar from Canada (as the control genotypes) were evaluated in a randomized complete block design with two replications. The results showed that there were significant differences among the genotypes for all of the studied traits such as capsules per plant, seeds per capsule, 100-seed weight, seed yield per plant and seed yield per plot. The range of variation for days to maturity, plant height, seed yield per plant and seed yield was 113 to 164 days, 32.8 to 68.4 cm, 0.16 to 1.39g and 375 to 2450 kg/ha, respectively. High phenotypic and genetic coefficients of variation were observed for number of seedlings per m², rate of infected plants by powder mildew, branches per plant, capsules per plant, seeds per capsule, seed yield per plant and seed yield. Also, high broad-sense heritability (74.9 to 96.2%) was observed for all the traits, with the exception of days to 50% emergence that had moderate heritability (40.8%). Seed oil content which was determined for 10 higher yielding lines had high variation (36.9% to 40.4%) and high broad-sense heritability (99%). Cluster analysis classified the genotypes in to 4 groups in which the genotypes of two groups had the highest seeds per capsule, seed yield per plant and seed yield.

Keywords: Flax, Local populations, Genetic variation, Heritability, Agronomic traits

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The Effect of Seed Size on Seed Vigor Indices of Different Wheat Cultivars (*Triticum aestivum* L.)

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Abstract

Germination and beneficial seedling establishment is affected by different seed vigor indices. In order to study the effect of seed size on seed vigor indices of wheat, a factorial experiment with two factors was conducted in a completely randomized design with four replications at the Agricultural Natural Resources Research Center Lab of Khorasan Razavi. The first factor was thirteen genotypes of wheat in three types of growth, containing winter, facultative and spring and the second factor was seed size in four levels including 3, 2.5, 2 and 1.5 millimeter. Germination percentage, germination rate, shoots and root length, seedling growth rate and shoot:root length ratio characteristics were investigated. Analysis of variance showed that the effect of wheat cultivars and seed size on traits was significant ($p \leq 0.01$) but interaction effect of seed size and wheat cultivar was significant ($p \leq 0.01$) only for shoot and root length, seedling growth rate and shoot:root length ratio. The highest and lowest seedling growth rate was (15.85 and 8.23 mg dry weight/germinal seedling) that they were related to 3 and 1.5mm seed size, respectively. According to these observations the most and least percentage and germination rate was related to these seed size treatments. Correlation coefficient of seed size and seedling growth rate was highly significant ($r=0.85$ $p \leq 0.01$). Stepwise regression method indicated that the seed size (x_1) and shoot length (x_2) as independent variables could be described ($r^2=0.84$) seedling growth rate as a dependent variable in $y = -5.000955 + (5.128078x_1) + (0.78494x_2)$ equation.

Keywords: Seedling growth rate, Germination rate, Correlation, Regression

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The Effect of Fertilizer and Manure on Forage and Grain Yield of Millet (*Panicum miliaceum*) and Bean (*Phaseolus vulgaris*) In Intercropping

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Abstract

This experiment was conducted in 2007 in Shirvan Agriculture Research center. The experiment was split plot in randomized complete block design with three replications. Main factors consisted of unfertilized (A₁), 100% fertilizer (A₂), 100% manure (A₃), 50% fertilizer + 50 % manure (A₄) treatments and sub factors consisted of sole crop of millet (B₁), 75% millet + 25% bean (B₂), 50% millet + 50% bean (B₃), 25% millet + 75% bean (B₄), and sole crop of bean (B₅). Dry matter yield, grain yield, 1000 kernel weight, harvest index (HI), land equivalence ratio (LER), photosynthetically active radiation (PAR) and soil moisture content and soil temperature in each crop were calculated. Results indicated that the fertilizer and manure treatments had significant effect on millet and bean grain and dry matter yield ($p < 5\%$). But they hadn't significant effect on 1000 kernel weight them. Intercropping had significant effect on millet and bean grain and dry matter yield. It also had significant effect on harvest index and 1000 kernel weight of species. The LER for most intercropping treatments was greater than one which indicates that intercropping had advantage over sole crop. The highest PAR interception also obtained from intercropping treatments. The lowest of soil temperature and soil moisture content obtained from intercropping treatments. For fertilizer and manure treatments achieved the highest of soil moisture content and lowest of soil temperature from 100% manure treatments.

Keywords: Intercropping, Millet, Bean, Fertilizer, Manure, Yield, LER

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Evaluation of Effect of Different Tillage Methods and Seed Rates on Yield and Yield Components of Rapeseed (*Brassica napus*) in Dry Land Condition

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Abstract

In order to study the effect of different tillage methods and seed rates on grain yield and yield components of rapeseed in dry land conditions, an experiment was performed from 2007-2008 season in Imamzadegafar Agriculture Education Center in Gachsaran. The experiment was set up as strip split plot based on randomized complete block design with 3 replications. Main plot factor was different tillage methods including: 1- no tillage 2- chisel plow + disk harrow 3- disk harrow + disk harrow 4- combinat 5- mold board + disk harrow. Sub plot factor was seed rates 5, 7 and 9 kg/ha. Properties of measurement were grain yield, yield components, number of branches, number of pod in bush, 1000 seed weight, harvest index, oil and protein content. The results showed that effect of combinat treatment on grain yield components was better than other treatments. Also amount 7 and 9 kg seed/ha was significantly different from 5 kg seed/ha. Maximum and minimum grain yield of 2957 and 1300 kg/ha produced by combinat with 7 kg seed/ha and no tillage with 5 kg seed/ha, respectively. Maximum and minimum oil content of %37.93 and %35.68 was obtained in combinat treatment with 5 kg seed/ha and moldboard plow with 9 kg seed/ha, respectively. Between yield components, number of branches and pod in bush showed maximum variability and KTW, HI, oil and protein content had the minimum variation. In general, combinat treatment with 7 kg seed/ha was performed better than other treatments.

Keywords: Rapeseed, Seed rate, Tillage methods

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Effect of Harvesting Date on Quantitative and Qualitative Characteristics of Seedless Barberry (*Berberis vulgaris*) Fruit

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Abstract

Seedless Barberry (*Berberis vulgaris*) is one of the endemic and valuable shrubs that grow as a garden crop only in Iran. In order to study the effect of different harvesting dates (9 September, 1 October, 22 October and 12 November) on quantitative and qualitative characteristics of seedless Barberry, an experiment was carried out based on Complete Randomized Block Design with 3 replications at the Southern Khorasan province in 2008. Results showed that different harvesting dates had a significant effect on fresh fruit yield with branch, fresh fruit yield without branch, branch fresh weight, dry fruit yield, 100 fresh fruit weight, 100 dry fruit weight, pH, brix, acidity and anthocyanin index. The highest and the lowest fresh and dry fruit yield were obtained at final harvesting date (12 November). Moreover, with delaying in harvesting date the brix, pH and anthocyanin index were increased but acidity was decreased. The result of correlation coefficient showed that there was a positive correlation between pH and soluble solids content in extract. But correlation coefficient between pH and acidity was negative. Furthermore, correlation of anthocyanin with brix and pH was positive and its correlation with acidity was negative. Our results showed that the best harvesting date was 12 November that improved qualitative and quantitative indexes of seedless barberry for the studied region.

Keywords: *Berberis vulgaris*, Harvest date, pH, Brix, Acidity, Anthocyanin

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Response of Chickpea (*Cicer arietinum* L.) Genotypes to Freezing Stress under Laboratory Conditions

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Abstract

Although in Mediterranean regions fall planting of chickpea has a good chance for producing better and sustainable yield, but this cropping system is not use in highland regions, because of severity of cold stress and lack of cold tolerant genotypes. In order to evaluate chickpea freezing tolerance under laboratory conditions 26 genotypes (including 23 genotypes from Mashhad Chickpea Collection (MCC), two cold tolerant and one susceptible genotypes from ICARDA) with 5 freezing temperatures -3, -6, -9, -12 and -15 °C as factorial arrangement and acclimation (AC) and nonacclimation (NAC) treatment as main factor were evaluated. Survival percentage, LT₅₀, plant dry weight and plant height were calculated at the end of recovery period (21 days after freezing treatment). There were significant differences ($P < 0.05$) among genotypes for survival, plant dry weight and plant height at the end of recovery period. MCC373 with 75% and MCC283 with 57% survival had the most and the least survival, respectively. Acclimation had significant effect ($P < 0.05$) on plants survival, so AC treatment increased survival percentage about 24%. Plants survival for 20 genotypes was at least 50% in -12°C, but susceptible genotype had only 25% survival at such freezing temperature. In order to identifying the chickpea cold hardy genotypes, using the freezing test under laboratory conditions, maybe useful.

Keywords: Acclimation, LT₅₀, Recovery, Survival percentage

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Remobilization in Winter and Facultative Wheat Genotypes under Optimal and Late Season Water Limited Conditions

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Abstract

In order to study remobilization in wheat genotypes (*Triticum aestivum* L.) under optimal and water limited conditions at the end of growing season a field experiment was conducted using 16 wheat genotypes obtain from countrywide program of cold climate. The selected genotypes with winter and facultative growth habit were compared with two cultivar Shahriar and C-80-4 as control. The experiment was conducted as randomized complete block design with three replications at Torogh Research Station, Khorasan Agricultural Research Center. Dry matter translocated (DMT), contribution of pre anthesis assimilates to grain filling (CPAAG), remobilization efficiency (RE) and spike harvest index (SHI) was compared between genotypes. All traits were correlated with remobilization and the highest percentage of remobilization under water limited conditions was obtained in genotype 14.

Keywords: Wheat, Remobilization, Genotype

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Comparison of Weed Floristic Composition in Fruit Gardens in Khorramabad

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Abstract

Weed floristic Characteristic of apple, walnut, grape, apricot, nectarine, peach and plum gardens was surveyed in Khorramabad with selection of many garden by randomized sampling method in different regions in 2008. From 86 weed species in fruit garden, most Frequency (86.9 percentage) belonged to perennial weed of field bindweed. Percentage of frequency for field bind weed species was higher than other species. In addition of field bind three other species had 50. Abundance of foxtail, crabgrass, and Johnson grass were 56, 52, 4 and 50% respectively. In this case, four species, 4.7% of population, had 50% abundance or more. Three species of predominant weeds were perennial. *Prickly lettuce* and common- lambrsquarther with 36.7 and 33.3% abundance compared to other species had relative preference. Among weed species with more than 10% abundance, poaceae family was predominated. Higher level of density (15.9 plants m²) belonged to crabgrass (a perennial weed). In addition to crab grass, also three species in comparison with others had higher level of density. Average pecies density in foxtail, Johnson grass and field bind weed, were 12.3, 8.1 and 7.8 shrub in m², respectively. Within these four species with a higher level of density, just one species was broad leaf and the other three were grasses. Between six studied fruit gardens, higher level of weed density (137.5 plants m²) belonged to plum garden. Average of weed density in plum garden obviously was more than other gardens. Average weed density in walnut, apricot, apple and grape gardens was 86.4, 84, 76.3 and 75.7 shrub in m², respectively. High population of weed in plum garden in comparison to other gardens, was due to stability of environment. Overall, 22 grass species was observed in gardens. The highest ratio of perennial species to total population, belonged to plum garden. This ratio in plum garden, was obviously more than other gardens. Grass species of weeds belonged to three families: poaceae, cyperaceae and liliaceae. Within mono cotyledons the highest number of species belonged to poaceae family. Number of species in poaceae and liliaceae families was 18, 2 and 1, respectively. Fabaceae family with 8 species, Brassicaceae and Apiaceae with 4 species and Amaranthaceae, Lamiaceae, Malvaceae and Polygonaceae with 3 species were other abundant families.

Keywords: Flora, Weed, Fruit garden

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Effect of Size and Height of Storage of Sugar Beets on Weight and Sugar Loses in Silos

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Abstract

Previous studies have shown that weight and sugar content decrease during sugar beets storage in silos. Different parameter such as size of sugar beets and height of storage, can affect on changes of weight and sugar. These parameters are considered in this study. Therefore, random sampling was done from sugar beets that had been carried to Shirvan sugar beet factory silos. Samples were divided in 4 groups of size (large, medium, small and mixed). These groups were stored in 4 different heights in industrial Shirvan sugar beet factory silos and after 18 days, pol and weight of beets were measured and were compared with data obtained on first day (before storing). The results showed that during storage of sugar beets in silos, maximum weight and sugar loses belonged to small sugar beets with 5.54 to 6.97 and 3.86 to 4.13 percent decrease, respectively. Also minimum weight and sugar loses belonged to samples that were stored in floor of silos with 1.69 to 1.91 percent decrease. Increasing of height of storage resulted to increase of weight lose, so maximum of weight lose belonged to sugar beets that were stored in 5 meter height (silos level) and amount of it was 6.37 to 9.84 percent. Furthermore, results showed that maximum of sugar lose belonged to sugar beets that were stored in the lowest height in this study and amount of it was between 4.80 to 5.20 percent. Increasing the height of storage caused to decreasing of sugar loses, as sugar loses of sugar beets that was stored on the uppermost level were obtained between 1.77 to 2.20 percent.

Keywords: Size of sugar beet, Height of storage, Weight lose, Sugar lose, Storage in silos

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Evaluation of Energy Efficiency of Conventional and Mechanized Farming System on Potato Production in East Azarbyjan Province

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Abstract

The aims of this study were to evaluation and comparison energy consumption of input and output to potato production by systems of conventional and mechanized farming. This research was carried out at arable farmland in East Azarbyjan province in 2006-2007 cropping season. For this purpose, the data were collected from 60 potato farms in East Azarbyjan. Inquiries were conducted in a face-to-face and and grabble statistic, information per Jihad Agriculture Organization of East Azarbyjan province and then used of formula and coefficients special are become equivalent values of used factors and input of this type. The results indicated that total energy inputs in conventional farming system (CFS) were found to be 60783.24 MJha⁻¹ (direct energy 44.43%, in direct energy 55.57%, renewable energy 46.96% and non-renewabl 53.03%) and output (production energy) was estimated to be 148268.12 MJ ha⁻¹ and total energy inputs in mechanized farming system (MFS) was obtained 52635.73 MJ ha⁻¹ (direct energy 54.17%, in direct energy 45.83%, renewable energy 39.01% and non-renewabl energy 60.94%) and output (production energy) was 232992.76 MJ ha⁻¹ respectively. The net energy, energy productivity, specific energy value and the ratio of energy outputs to energy inputs was estimated to be 87484.88 MJha⁻¹, 0.58 KgMJ⁻¹, 1.74 MJkg⁻¹ and 2.44, respectively in CFS, and in the MFS was found to be 180357.03 MJ ha⁻¹, 1.04 KgMJ⁻¹, 0.96 MJkg⁻¹ and 4.43 respectively. The results show that the highest share in energy consumption of CFS were: irrigation 24.12%, nitrogen fertilizer 22.36%, seed potato 19.72% and also MFS had the biggest share within the total energy inputs includes irrigation 23.21%, nitrogen fertilizer 19.32% and farmer machinery 15.27% respectively. Using the most of energy: Irrigation and nitrogen fertilizer both of the sowing methods can be due to climatic, land topography, society and culture condition of the region.

Keywords : Energy efficiency, Input, Output, Conventional and mechanized farming, Potato

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Agroecological Zoning of Wheat in Khorasan Province: Risk Analysis

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Abstract

In crop zonation studies potential yield is usually estimated by simulation models where management inputs are defined as recommended by research stations. However, these recommendations are not necessarily in accord with the local situation. Therefore, the prediction of simulation models is subjected to uncertainty or risk. In this research the risk of wheat yield estimation due to management inputs in Khorasan provinces is analysed by application of Monte Carlo simulation. Potential wheat yield was estimated by WOFOST model which was previously validated against the experimental data. The results of sensitivity analysis indicated that change in planting date in order of ± 50 days relative to a reference sowing date resulted in a drastic variation in estimated wheat yield. However, potential wheat yield was not sensitive to variation in planting density in the range of $\pm 50\%$ of the reference density. Therefore, risk analysis was performed on planting date. 100 random planting dates were generated using a random data generator software and the WOFOST model was run for each generated date during 10 climatic years (1375-1385). Using the simulation results probability distribution of potential wheat yield was calculated for recommended planting date and dates with ± 15 or ± 30 days deviation. The results showed that risk of wheat yield in response to change in planting date was different between provinces. In the Northern Khorasan province earlier planting by 15 days compared to the average recommended date led to risk reduction while wheat yield was more risky when planting date was delayed by 30 days. In Khorasan Razavi province the recommended planting date resulted in lower risk but yield risk was increased by earlier planting. In Southern Khorasan province wheat yield was subjected to minimum risk and higher stability when the recommended planting date was delayed by 30 days. It was concluded that the low potential wheat yield particularly in Southern Khorasan could be due to management practices and higher yield with low risk could be achieved with improvement of the current management operations.

Key words: Risk analysis, Monte Carlo simulation, Wheat, Yield stability, Agroecological zonation

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Effect of Drought Stress in Remobilization of Dry Matter in Five Varieties of Bread Wheat

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Abstract

In a field experiment conducted in Ramin Agriculture and Natural Resources University, remobilization of dry matter (DM) after anthesis of five wheat cultivars evaluated in severe and moderate stresses. The statistical design was split plot in RCB (Randomized Complete Blocks) with four replications. In moderate and severe stresses conditions, Falat cv. produced the highest grain yield. However, Chamran cv. had the highest grain yield in control condition. The stress treatment had significant effect on remobilization of DM from shot to grain ($p < 0.01$). In addition, there was a significant difference between wheat cultivars in term of remobilization of DM. In this case, Falat and Verinak cv. had the highest remobilization of DM, and Shole cv. had the lowest amount of this trait. Based on the results, remobilization is an important way to compensate for drought stress effects, it can be a proper characteristic of semi-dwarf cultivars in comparison with old cultivars.

Keywords: Remobilization, Drought stress, Wheat

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Response of Spring Safflower Cultivars to Irrigation Intervals in Birjand Condition

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Abstract

In order to evaluate the effect of irrigation intervals on yield and yield components of three spring safflower cultivars (*Carthamus tinctorius L.*) in Birjand, an experiment was conducted at research farm of faculty of Agriculture of Birjand University in 2007. Experiment was a split plot on the basis of randomized complete block design with four replications. Three irrigation intervals, including: 7, 14 and 21 days were randomized in main plots and three spring safflower cultivars, including: Kooce, P₁ and IL₁₁₁ were allocated to subplots. The highest yield was obtained from Irrigation with 7 days and cultivars of Kooce with mean seed yield of 2653.2 kg/ha. In this irrigation treatment yield of cultivars P₁ with 16% reduction was not different from Kooce, but cultivar IL₁₁₁ with approximately 30% lower yield showed a significant difference with P₁. In all three cultivars the lowest seed yield was obtained from 21-day irrigation interval. Mean seed yield in this treatment was 1069.46 kg/ha and reduced by 53% compared to yield in 7-day irrigation intervals. The influence of irrigation intervals in this situation on cultivar IL₁₁₁ was considerably more than two other cultivars. The results showed that cultivar Kooce had the best yield with 7-day irrigation intervals in Birjand condition.

Keywords: Irrigation interval, Safflower, Yield

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The Effect of Increased Temperature on Flowering Behaviour of Saffron (*Crocus sativus* L.)

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Abstract

Flowering in saffron requires a period of incubation at high temperatures for flower differentiation followed by a period of low temperatures for flower emergence. Global warming could adversely affect the flowering of saffron because of its high sensitivity to temperature. Flowering behaviour of saffron in response to rising temperature was studied in an experiment conducted in controlled environment. Corms with identical sizes were collected from green or fully withered field grown plants and sown in plastic pots. Pots were incubated in 25, 27 and 30 °C for 70, 90 and 120 days. By the end of each incubation period, pots incubated in 25, 27 and 30 °C were transferred to 17, 19 and 21 °C, respectively. Days to flowering, development rate and growth characteristics of saffron were measured in alternative temperature regimes of 25/17, 27/19 and 30/21 °C in combination with 3 incubation periods and in 3 replications. The results indicated that increasing incubation temperature up to 27 °C had no significant effects on saffron flowering behaviour however, no flower was appeared from corms incubated in 30°C. Increased duration of incubation period had adverse effects on flower emergence and corms incubated for 120 days were only flowered in 27/19 °C temperature regime. The optimal flowering response and the highest number of vegetative buds was obtained when 90 days incubation period at 27 °C was followed by a period for flower emergence at 17°C. Corms lifted from green or withered plants showed similar response to temperature regimes and incubation periods. However, in average duration of sowing to flowering was 5 days longer in corms lifted from green plants. Comparing the results of this research with daily temperature in the main saffron production areas of Khorasan provinces showed that increasing mean daily temperature by 2 °C during summer and autumn results in a considerable delay in flowering of saffron.

Keywords: Saffron, Climate change, Flowering, Development rate, Growth characteristics

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Effect of Tillage, Wheat (*Triticum aestivum* L.) Residue & Nitrogen Management on Corn (*Zea mays*) Yield and Yield Components

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Abstract

Conservation tillage practices integrated with appropriate residue management is an efficient approach in sustainable agriculture to prevent the removal or burning of crop residues. Two years field experiments were conducted to evaluate the effect of wheat residue management on yield, yield component and morphophysiological characteristics of corn. Experimental design was split plot using three factors. Main factor was three tillage systems including moldboard plow, once and two times chisel plow; and sub factors were four wheat residues (0, 25, 50 and 75%) and three nitrogen levels (69, 103.5 and 138 kg/ha). With increase in residue levels and decrease in tillage and nitrogen levels, grain and biological yields and grain number per ear decreased, but thousand grains weight was not significantly different among treatments. Although tillage had no significant effect on leaf area index, increase in residue and decrease in nitrogen levels, decreased corn leaf area index. Since there was no significant difference between two times chisel plow with 25% wheat residue + 103.5 kg N/ha, and moldboard plow with 0% wheat residue + 138 kg N/ha treatments, maintenance of 25% wheat residues, and application of a lower nitrogen rate (103.5 kg N/ha) is recommended in order to achieve sustainability in corn fields.

Keywords: Residue management, Soil conservation, Corn planting, Nitrogen

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Studying the Response of Some White Varieties of Common Bean to Limited Irrigation

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Abstract

In order to study the effects of water stress on different traits of common bean, thirty white lines bean were studied based on randomized complete block design under two water stress and non stress conditions. Analysis of variance for most traits showed significant differences among genotypes. Most traits were affected by the stress. Stepwise regression analysis showed that in white genotypes under water stress conditions, pod weight, harvest index, 100 seed weight and number of seed per plant and under non stress conditions pod weight, harvest index and biological yield have the highest effect on seed yield. Factor analysis was performed for white genotypes both in water stress and non stress conditions and in all conditions three common factor have been extracted, which describe most of traits variations. In order to identify tolerant genotypes, drought resistance attributes were calculated. Mean productivity (MP), Geometric Mean Productivity (GMP) and Stress Tolerance Index (STI) were identified as the best drought resistance indexes. Also by using biplot display for red genotypes separately, white genotypes number 21 and 30 were selected as resistant lines.

Keywords: White common bean, Water stress, Drought resistance indexes, Multivariate methods

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Study of Allelopathic Potential of Soybean (*Glycine max*) on Seed Germination and Seedling Growth of Some Weed Species

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Abstract

An experiment was conducted for evaluation the allelopathic potential of extract soybean shoot on seed germination and seedling growth of four weed species tumble pigweed, smooth pigweed, common lambsquarters and black nightshade. For each species a factorial experiment was used in a completely randomized design with three replications. Plant shoots were gathered in flowering stage and individually dried and then ground. Water extracts with concentrations of 5, 10, 20 and 40 % were prepared and distilled water was used as control. Seeds of weed sat in petri dishes. Then, their germination percentage determined after 11 days. The results showed that root length, germination rate and percentage reduced in weed species when concentration rate was increased. Black nightshade had most germination percentage (88.14), root length (46.4 mm) and germination uniformity (1.5 days). Therefore, it affected with soybean shoot extract less than other weed species. Tumble pigweed had most germination rate (3 days) and its required time to achieved 10, 50 and 90% maximum germination, was about 2, 2.5 and 4 days respectively. Therefore, It was better than other species. Most inhibition effect of extracts on germination percentage belonged to smooth pigweed.

Keywords: Germination percent, Germination rate, Germination uniformity, Radicle length

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Optimization of Factors Influencing *Agrobacterium tumefaciens*-Mediated Transformation of Tomato

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Abstract

Tomato is a plant which has highly important nutrition, economic and scientific aspects. Due to its susceptibility to biotic and abiotic stresses, breeding through genetic engineering of this plant is an effective method for enhancement of its tolerance to stresses. In this experiment, factors influencing the transformation of cultivated tomato, were studied. The high shoot regeneration was observed in Peto earlyCH and Early urbanaY cultivars, respectively and the most transformation rate was obtained in Early urbanaY cultivar. Preculture of explants for 1 day and addition of 100 - 150 μ M acetosyringone into inoculation solution had a positive effect on transformation efficiency. The optimum inoculation and cocultivation time for explants was 15 minutes and 2 days respectively. Putative transgenic plants were confirmed using PCR and specific primers of both genes (*nptII* and *codA* genes). These plants were transferred to the soil for further molecular and bioassay experiments.

Keywords: *Agrobacterium*, Cocultivation, Preculture, Regeneration, Transformation, Tomato

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Effect of Different Levels of Sodium Chloride on Germination Characteristics of 20 Cultivars of Bread and Durum Wheat

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Abstract

Salt stress is a major stress influencing wheat seedling establishment. A laboratory experiment was conducted to evaluate the response of 20 cultivars of wheat to two levels of salinity (8 and 16 dS/m NaCl), at the College of Agriculture, Shiraz University, Shiraz, Iran in 2008. Maximum root length was obtained in Dabira (5.73 mm) at 16dS/m salinity level. In control, durum wheat cultivars including D81-17, Yavaros, D82-16, D79-15 and Taro3 had the maximum root length compared to bread wheat, however, with increasing salinity level to 16dS/m, minimum root length was observed in D82-16 (0.3 mm). In all cultivars, with increasing salinity level, shoot length was decreased and minimum shoot length was observed in D82-16 and D79-15. Under control conditions, Taro 3 cultivar had maximum seedling dry weight (108.6 mm), however, at 8 and 16 dS/m salinity levels, seedling dry weight of this cultivar was decreased to 92.33 and 78.43 mg, respectively. All seeds (100%) were germinated in D82-16, Taro3, Bolani Cross, and Chamran cultivars under 16 dS/m but in Marvdasht cultivar, seed germination percentage under 8 and 16 dS/m reached to 65 and 50%, respectively. Shiraz (10.8 seeds/day), Adl Cross (10 seeds/day), and Bolani Cross (9.1 seeds/day) had maximum germination rate under 16 dS/m salinity level. Differences among wheat cultivars also found in germination stress index (germination rate under stress divided by germination rate under control) and Shiraz, Adl Cross and Bolani Cross had maximum germination stress index, while Yavaros and D82-16 had minimum germination stress index. Furthermore, with increasing salinity level, different responses were observed among wheat cultivars in root and shoot length, germination rate and germination stress index which demonstrated the genetic diversity among wheat cultivars. It appeared that durum wheat cultivars, compared to bread wheat cultivars, had lower germination stress index and germination rate. Among what cultivars, Bolani Cross, Shiraz and Adl Cross appeared to be more tolerant and Marvdasht, Yavaros and Karkheh more sensitive to salt stress at seedling stage which is worthy of attention by farms growing wheat in saline soils. did not suitable cultivars for salt areas.

Keywords: Bread and durum wheat cultivars, Salt tolerance, Germination stress index, Germination rate

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