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Effect of foliar zinc application on yield, seed quality and seed vigor of two soybean cultivars under water deficit

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Abstract

In order to study the effects of water deficit stress and zinc foliar application on yield, seed quality, seed vigor and zinc content of different organs of soybean cultivars, an experiment was conducted in randomized complete block design arrangement as a split factorial with three replications. Main factor was three levels of drought stress (non stress, water stress in vegetative growth stage (S_1) and water stress in flowering stage (S_2)) and subordinate factor was combination of foliar zinc application and cultivar. Foliar zinc application in three levels (non foliar application, water foliar application and zinc sulfate (5000 ppm)) foliar application and two cultivars ('L₁₇' and 'Clark 63') were used in this experiment. Results showed that traits were affected by treatments. Water deficit stress in both vegetative and reproductive stages caused to decrease the yield, zinc content of organs, seed protein and oil percentage and seed vigor, but hard seed percentage were increased to 189 and 472 in S_1 and S_2 , respectively. 'Clark 63' was desirable under water deficit stress. The highest yield reduction was observed for stress treatment at the reproductive growth stage. Zinc sulfate foliar application increased the yield, zinc content of seed, seed protein percentage and seedling vigor 34, 26, five and 38 percent, respectively, but decreased seed oil percentage and hard seed percentage four and 58, respectively. Zinc foliar application was more effective in yield increment of 'L₁₇' than 'Clark 63'.

Keywords: Seed oil, Seed protein percentage, Seedling vigour, Soybean, Water deficit.



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Comparison of agronomical traits of four rice genotypes (*Oryza sativa* L.) in cropping systems at Neka region

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Abstract

To evaluate of rice genotypes in various modified systems, an experiment was carried out as split plot in randomized complete blocks design with four replications at Neka region, Mazandaran province, Iran in 2011-2012. Cropping systems were chosen as main plots including conventional, improved and System of Rice Intensification (SRI) and genotypes as sub plots including: Sang Tarom, Hashemi Tarom, Neda and Shiroodi. The results indicated that the most number of fertile tiller per hill, number of spikelet per square meter (374.8 number) and number of filled spikelet percentage per panicle was produced in SRI that has led to the most paddy yield (6412 kg/ha). The most number of filled spikelet per panicle and filled spikelet percentage per panicle was obtained for cv. Tarom Hashemi. But, number of panicle per square meter (396.8) was the highest in cv. Neda. The maximum paddy yields were 7272 and 7315 kg/ha for cv. Neda and Shiroodi. The highest paddy yield was 7770 kg/ha that produced using SRI and cv. Neda. Paddy yield in SRI was 5.44 and 12.65 percentage more than improved and conventional systems, respectively. Therefore, SRI was a cropping system that with creating optimum management practices had led to increase of paddy yield and yield components of rice.

Keywords: Conventional system, Cultivar, Improved system, Paddy yield, SRI.



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Effect of exogenous application of proline and glycine betaine on biochemical alterations in grapevine under drought stress

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Abstract

Proline and glycine betaine are the most common compatible solutes that prevent plants from destructive effects of osmotic stresses by osmotic adjustment and protection of membranes, proteins and enzymes. It has been reported that exogenous application of these compounds, can increase plant resistance to drought stress. Therefore a factorial experiment based on randomized complete block design with four replications was performed in four grapevine cultivars ('Khushnav', 'Peykani', 'Perlette', and 'Flame Seedless'). Grapevines were irrigated by 70 percent of the vine water requirement, in drought stress treatment. Proline (10 mM) and glycine betaine (15 mM) were sprayed on grapevines at four growth stages (before flowering, flowering, sour cluster and veraison). Results showed that endogenous proline and amount of glycine betaine, peroxidase and ascorbate peroxidase enzyme activity in treated vines were significantly higher than the control, in both proline and glycine betaine treatments. Among of the treated vines, the most and the least amount of proline was measured in 'Flame Seedless' and 'Peykani', respectively. Other measured traits in cultivars did not show significant difference. According to the role of these enzymes in eliminating reactive oxygen species (ROS) and also the role of proline and glycine betaine in antioxidants activating, using of these two osmolytes will be able to increase the vines tolerance to drought stress conditions.

Keywords: Antioxidant, Ascorbate Peroxidase, Osmoregulation, Peroxidase, Water Stress



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Photosynthetic and nonphotosynthetic pigments of two rose cultivars under different light intensities

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Abstract

Biosynthesis of plant pigments is affected by environmental factors especially light intensity. An experiment was conducted to evaluate the effect of different light intensities on photosynthetic and non-photosynthetic pigments of two rose cultivars including 'Red One' and 'Gulmira' under greenhouse conditions. In this experiment, the effects of different light intensities including 240, 520 and 640 $\mu\text{mol}/\text{m}^2/\text{s}$ and control with 1200 $\mu\text{mol}/\text{m}^2/\text{s}$ (without application of plastic nets) on the rose cultivars was evaluated under greenhouse conditions. Plastic nets were used to obtain different levels of light intensities. The results showed that photosynthetic pigments, chlorophyll and carotenoids, significantly increased in the light intensity of 240 $\mu\text{mol}/\text{m}^2/\text{s}$ vs. control. In this light intensity, anthocyanin content was significantly reduced. Reducing light intensity to 240 $\mu\text{mol}/\text{m}^2/\text{s}$ could result in higher chlorophyll as well as carotenoid content without significant changes in flavonoids. Increasing anthocyanin content with increasing light intensity to 1200 $\mu\text{mol}/\text{m}^2/\text{s}$ could be a defense mechanism in plants against toxic levels of light intensities.

Keywords: Anthocyanin, Carotenoid, Chlorophyll, Flavonoid, Light intensity.



Effect of biological and reduced rates of chemical fertilizers on forage yield (quantity and quality) in Persian clover¹

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Abstract

Towards Low Input Sustainable Agriculture (LISA), decreased chemical fertilizers and increased of forage yield (quality and quantity) this study was carried out in the experimental field of Boroujerd Agricultural Research Station (Lorestan province, Iran) in 2011. Two factorial experiments (RCBD) with three replications have been studied. Experimental treatments including four levels of chemical fertilizers: (nitrogen and phosphorus) $F_0 = N_0 + P_0$, $F_1 = N_{25}$ (25k/h Urea 46 percent nitrogen) + P_{50} (50 k/h super phosphate triple 46 percent P_2O_5), $F_2 = N_{50} + P_{100}$ and $F_3 = N_{75} + P_{150}$. The biological fertilizers including: control, PGPR, native rhizobium and co-inoculation. Results showed that the location had significant effect on green yield, height, regrow rate and on CP and ADF. Parameters were higher in location two than that of location 1. The CP, DMD and height were not significant under chemical and biological treatments. The highest green yield (76.16 t/ha) was observed using and native at the highest rate of chemical fertilizers (B_2F_4 and B_3F_4). The efficiency of F_2B in comparison to F_3B_0 treatments increased green yield (0.33 percent), Crud Protein (2.6 percent), chlorophyll content (1.9 percent), regrow rate (4.69 percent), ash (3.97 percent) and decreased CF (-0.15 percent). CP correlated ($r = -0.35$) and negatively correlated ($r = -0.73$) with ADF and CF, respectively. It seems that application of reduced chemical fertilizers integrated with biological fertilizers (especially native rhizobium) can positively affect on yield as well as forage quality and led to decrease of chemical fertilizers.

Keywords: Low Input Sustainable Agriculture, native rhizobium, nitrogen, PGPR, phosphorus, Symbiosis.



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Effect of drought stress on yield, yield components and essential oil in coriander (*Coriandrum sativum* L.) treated with organic and inorganic fertilizers

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Abstract

To study the effect of drought stress during using organic and chemical fertilizers on morphological, agronomic traits and the essential oil of coriander, a field experiment was conducted as split plot based on randomized complete block design in three replications at Agricultural Research Station, College of Agriculture, University of Torbat Heydarieh, Iran during growing season of 2010-2011. Treatments were consisted of three levels of drought stress (30, 60 and 90 percent FC) and fertilizer treatments [control, NPK (60: 60: 40), cow manure (25 ton/ha) and vermicompost (25 ton/ha)]. Different traits such as plant height stem diameter, number of branches, number of leaves per plant, fresh and dry weight, herbage yield and number of umbels per plant, number of seeds per umbel, total number of seeds in plant, fruit yield, 1000 seed weight and essential oil percentage and yield were recorded. Analysis of variance indicated that water stress and application of fertilizer treatment had significant effect on all studied trait. The maximum herbage yield (5371 kg/ha) and seed yield (3905 kg/ha) were achieved in 90 percent FC combined with NPK and mild stress under NPK treatment, respectively. The highest essential oil percentage (0.77 percent) and essential oil yield (18.49 kg/ha) were obtained in mild stress by using chemical fertilizers. According to the fact that application of fertilizers in mild stress conditions leads to increase in essential oils yield, using chemical fertilizers under mild drought stress is recommended for coriander as a medicinal plant.

Keywords: Moderate drought stress, Morphological characteristics, Seed yield, Essential oil yield, Fertilizer.



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Effects of environmental and management factors on the weed species richness of winter crops in Ilam province

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Abstract

This research was conducted to assess the effects of management and environmental factors on the weed species richness of winter crops in Ilam province. In order to recognize the weed species, three counties were selected based on the type of climate in 2011-2012. According to the cultivated areas of winter crops in each county, 48 fields were chosen and demographic information was calculated by counting the weeds in each field. The geographic information such as altitude, longitude and elevation above sea level were recorded by GPS at each location. The results showed that 35 weed species were found in wheat (main winter crop) fields. The main broad leaf weeds in wheat fields were *Malva neglecta*, *Vaccaria peramidata*, *Sinapsis arvensis*, and *Galium tricorntutum*. *Avena ludoviciana* were the most widespread grass weed species in these fields. It was found that *S. arvensis* and *A. ludoviciana* with 61.76 and 55.88 percent, respectively, had the greatest constancy on wheat fields. Only crop type and planting date were effective on weed species richness among crop management variables considered in this research.

Keywords: Abundant Index, Climate, Constancy, Crop, Distribution.



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Effect of storage temperature and putrescine concentrations on pollen germination and pollen tube growth of two genotypes of Iranian damask rose (*Rosa damascena* Mill.)

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Abstract

This research was conducted to determine the optimum bud or flower developing stage for pollen collection and a proper pollen germination medium and to evaluate the effect of storage temperature and different concentrations of putrescine on pollen viability and germination of two genotypes of damask rose ('Azaran' and 'Kashan'). The main experiment was performed based on a factorial design, with 16 treatment and 4 replications. Factors studied included four levels of putrescine (concentrations zero, 0.25, 0.5 and 2.5 mM) and four levels of pollen storage temperatures (25, four, -20 and -80°C). The best stage for collecting pollen grain was semi-open bud stage and the optimum medium containing 300 µg/l CaNO₃, 200 µg/l MgSO₄, 100 µg/l KNO₃, 100 µg/l H₃BO₃, 15 percent sucrose and 1.2 percent agar. In 'Azaran' genotype, maximum and minimum pollen germination rate was obtained in media containing 0.25 and 2.5 mM putrescine, respectively. Storage condition of pollen grains resulted in decreasing the pollen germination rate in 'Kashan' genotype, while storage of pollen grains at -80°C revealed higher germination rate on medium containing 0.25 mM putrescine. As a result, maximum pollen germination percentage was obtained by storage of pollens in low temperature (-80°C) and in media containing low concentrations of putrescine.

Keywords: Flower developing stage, Germination media, Pollen grain, Putrescine.



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Effects of culture media and growth regulators on micropropagation of Gisela 6 rootstock

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Abstract

This study was conducted with the main purpose of investigation the effects of culture medium and the concentration of growth regulators on proliferation rate, rooting and the acclimatization of Gisela 6 rootstock at Khorasan Razavi Agriculture and Natural Resource Research Center during 2011-2012. In this experiment, the proliferation and rooting were performed in six kinds of culture medium (DKW, WPM and MS in two solid and liquid media) supplemented with plant growth regulators included TDZ and BAP in zero, one, two mg/l plus 0.01 mg/l IBA in all treatments of the proliferation and IBA with zero, one, two, three mg/l in rooting step. The results showed that the highest number and length of shoot were 6.48 shoot and 3.14 cm, respectively in solid WPM medium and two mg/l BAP concentration and liquid MS medium with one mg/l concentration of TDZ. The liquid MS medium in two mg/l of IBA caused the highest percentage of rooting and root length, 93.90 percent in 11.76 cm, respectively. Although applying the liquid media resulted in better acclimatization of plantlets, but the highest percent of plantlets survival was obtained in WPM liquid medium with two mg/l concentration of IBA at about 91.80 percent.

Keywords: Acclimatization, Cherry, Proliferation, Rooting, Rootstock.



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Evaluation of agronomical yield and insect diversity at different intercropping patterns of bean (*Phaseolus vulgaris* L.) and dill (*Anethum graveolens* L.)

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Abstract

A field experiment was conducted based on randomized complete block design with three replications at the Agricultural Research Station of Payamenoor University of Nagadeh, Iran during growing season of 2009-2010. Treatments included bean and dill monoculture, row intercropping (one row of dill + one row of bean), strip intercropping (two rows of bean+ four rows of dill and four rows of bean+ two rows of dill) and intra- row intercropping (50% dill+ 50% bean). The results showed that the highest and the lowest grain yield and biological yield of bean were achieved in row intercropping and intra- row intercropping (50% dill+ 50% bean), respectively. The plants were planted as replacement method. The highest grain yield (1630 kg/ha) and biological yield (3593 kg/ha) of bean were obtained at row intercropping and the lowest grain yield (414 kg/ha) and biological yield (870 kg/ha) of bean were achieved in intra- row intercropping, respectively. The results showed that the maximum grain yield (340 kg/ha) and biological yield (1926 kg/ha) of dill were obtained at monoculture and the minimum grain yield (340 kg/ha) and biological yield (1926 kg/ha) of dill were achieved in strip intercropping (four rows of bean+ two rows of dill intercropping), respectively. The highest essential oil percentage and essential oil yield were obtained by row intercropping, compared with other treatments. The highest (1.9) and the lowest LER (0.80) values were obtained from row intercropping and intra- row intercropping patterns, respectively. The maximum population of pest obtained under monoculture, while the minimum population of biological predators was observed under intra- row intercropping, respectively.

Keywords: Essential oil, Land equivalent ratio, Medicinal plants, Shannon index, Sustainable agriculture.



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Effect of row spacing and seed rate on grain yield, protein and agronomical traits on two cultivar of common bean (*Phaseolus vulgaris* L.) in Rasht region

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Abstract

To evaluate the effect of row spacing and seed rate on grain yield and agronomical traits of common bean cultivars, a split factorial experiment based on the complete randomized block design with three replications was conducted at Rice Research Institute of Iran (Rasht) in 2008 and 2009 cropping years. Experimental treatments were row spacing in three levels of 20, 30 and 40 cm as main plot and seed rate in three levels of 70, 90 and 110 kg/ha and common bean cultivars including 'Khaldar ghermez' and 'Kiashahri ghermez' cultivars as sub plots. Maximum grain yield was obtained from the second year, row spacing of 20 cm, 'Khaldar ghermez' cultivar and seed rate of 110 kg/ha with averages of 1478.8 kg/ha, 1396.3 kg/ha, 1398.8 kg/ha and 1414.1 kg/ha, respectively. Seed rate of 110 kg/ha also had maximum protein yield (334.0 kg/ha). Based on the results, the use of narrow row spacing, more seed rate and 'Kkhaldar Ghermez' cultivar is better for planting common bean in the experiment region due to high grain yield and early maturity.

Keywords: Biological yield, Plant density, Protein harvest index, Second crop, Short maturation.



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The effect of zeolite on yield and yield components of rapeseed under drought conditions

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Abstract

This study was conducted to analyze the effect of zeolite application on yield and yield components of rapeseed under drought conditions as a factorial-split on the based of randomized complete block design with four replications in 2011-12 in the research field of Seed and Plant Improvement Institute, Karaj. The effects of zeolite levels Z0 (0) and Z10 (10 t/ha) under three drought stress levels, control (irrigation after 40%), moderate stress (irrigation after 60%) and severe stress (irrigation after 80% soil water depletion) were in main plots and four genotypes of *Brassica napus* ('KR4', 'Eldo' lines and 'GKH305', 'Anatol' cultivars) were in subplots. Based on the results, negative impact of drought on yield components led to a significant fall in grain and oil yield. The most negative impact of drought stress was seen in the grain number per silique. Between genotypes, 'GKH305' in none stress condition and 'Anatol' in both mild and severe stress conditions had the highest yield. According to the results, zeolite can be used in growth period or part time of drought stress.

Keywords: Harvest Index, Number of Silique, Oil, Seed Weight, Yield stability.



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The effect of silicon application on grain yield of millet (*Panicum miliaceum* L.) and water use efficiency under drought stress

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Abstract

The water deficit is the most important limiting non-biological factor to achieve the potential yield of crops. To evaluate the effect of silicon application on yield of millet under drought stress in field an experimental was carried out. Treatments were included three irrigation regimes after 60 (non-stress), 90 (moderate stress) and 120 (severe stress) mm evaporation from evaporation pan, class A and four methods of silicon application including non-spray (control), spray, spray and using with irrigation water and using silicon with irrigation water in 2012 growing season in split plot based on randomized complete block design (RCDB) with three replications in Hamedan. The results showed that the effect of drought stress and silicon on all traits, except water use efficiency under drought stress and number of grains per spike after silicon application were significant. The biological yield and grain yield were decreased by 15 and 22 percent in the moderate stress and 33 and 42 percent in the severe stress, respectively. Interaction between drought and silicon application on 1000 seed weight, grain yield and water use efficiency were significant. The use of integrated silicon as spray and irrigation water had the highest positive effects on grain weight, water use efficiency, harvest index and benefit-cost ratio. Economic analysis of different treatments showed higher benefit-cost ratio of all silicon applications. But maximum benefit-cost ratio was recorded from spray and using irrigation water. Therefore, applications of silicon in combination of both methods are recommended.

Keywords: Biomass, Evapotranspiration, Harvest index, Net Income, Water Stress .



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Effect of potassium and boron nutrition on some quantitative and qualitative characteristics of grape ‘Askari’

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Abstract

Optimal nutrition of grapevine is one of the most important factors that affect the quantity, quality and time of fruit ripening. To increase the quantity and quality of ‘Askari’ cultivar, a factorial experiment in a randomized complete block design with three replications was conducted at Shahrekord in 2010. Treatments consisted of four levels of potassium sulfate fertilizer (zero, 300, 600 and 900 g per vine) and four levels of boric acid fertilizer (zero, 1000, 2000, and 3000 ppm). The results showed that potassium had a significant effect on yield and yield components. Different levels of potassium sulfate and boric acid increased cluster (number, weight, length, width) and fruit soluble solids. With increasing potassium levels, the number of clusters (14, 18 and 25) and content of total soluble solid (0.54, 1.45 and 1.53 percent) were significantly increased in comparison with control, respectively. Also, total soluble solids of berries were increased significantly (0.76, 0.75 and 1.25 percent) with boron treatment compared to control. The highest TSS (18.8) obtained in 900 mg of potassium sulfate per square meter, while it caused the greatest reduction in fruit acidity compared with the control. Fruits pH was decreased by 0.3 units with application of 3000 ppm of boric acid. The results of this experiment showed that nutrient treatments, especially potassium sulfate accelerated fruit ripening and increased fruit yield and sugar content.

Keywords: Acidity, Boric acid, Grape, Potassium sulfate, Total soluble solids.



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Evaluation of the effect of closed and perforated plastic tunnel microclimates on leaf expansion and phenological stages of cucumbers

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Abstract

Cucumbers grown under open air conditions, encounters chilling damages, during cold seasons. Plastic tunnels provide suitable heat environment for growing cucumber. The objective of this research was to evaluate cucumber phenological stages and leaf area expansion within three different plastic tunnel microclimates to moderate air temperature and air humidity. Three microclimates including 1. completely closed plastic tunnel (MC), 2. perforated plastic tunnel (MP10), with 100 holes (10 mm in diameter) per m², and 3. perforated plastic tunnel (MP15), with 100 holes (15 mm in diameter) per m², as experimental treatments, were employed using a complete block design with three replications. By employing SNK post-hoc, the results showed a significant difference for growth degree-days and leaf area expansion between tunnels. Within MC tunnel, phenological stages always occurred ahead of other treatments. Cucumber leaf numbers and secondary side shoot within MC were significantly higher than perforated plastic ones. Late in the season leaf area of MP10 reached MC's. In conclusion, MP10 microclimate with relevant microclimate condition could be a good option for early cucumber production.

Keywords: Early ripening, □Growth degree-days, Leaf numbers, Side shoot, Temperature.



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Effect of application of sugarcane filter muds, chemical and biological fertilizers on canola grain yield and quality and some soil properties

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Abstract

Filter mud is a residual of sugar extraction process produced in huge volume and has high organic matter and essential elements. Regarding to these properties, it seems this material could be a useful fertilizer in crop production. To evaluate effect of sugarcane filter muds and chemical and biological fertilizers application on canola (*Brassica napus* L.) yield and some of soil properties, a factorial experiment was conducted in 2012 in experimental farm of Ramin (Mollasani) Agriculture and Natural Resources University of Khuzestan. A complete block design was used for the experiment in three replications. Different integrated treatments of filter muds and chemical fertilizers including A₁: 100 percent filter muds, A₂: 75 percent filter muds and 25 percent chemical fertilizers, A₃: 50 percent filter muds and 50 percent chemical fertilizers, A₄: 25 percent filter muds and 75 percent chemical fertilizers and A₅: 100 percent chemical fertilizers were investigated as an experimental factor. Other experimental factor was biological fertilizers application (with and without biological fertilizers). The biological fertilizers investigated in this study were included nitroxin and Barvar 2. Application of filter muds had significant effects on canola yield, yield components, grain oil and protein contents. The soil organic matter and salinity also were affected by filter muds significantly. Highest canola grain yield was obtained by integration of filter muds and chemical fertilizers. Increase of filter muds caused to increase of grain oil content and decrease of nitrogen and nitrate content. On the other hand, increase of chemical fertilizers increased nitrate and nitrogen contents and decreased oil content. In addition, increase of filter muds resulted in higher soil organic matter and salinity, simultaneously.

Keywords: Nitrate, Oil, Salinity, Sustainable Agriculture.



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The survey effect of BAP and TDZ on direct shoot regeneration from nodal explant of *Agastache foeniculum*

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Abstract

The first successful and an efficient regeneration system on *in vitro* direct plant regeneration of *Agastache foeniculum* was reported. The experiment were done in factorial design with three replications and explants were cultured in MS media fortified with different concentrations of BAP and TDZ (0, 2.2, 4.4, 8.8 μ M) in combination with 3 levels of IAA (0, 1.1 and 2.2 μ M). ANOVA analysis showed that direct shoot induction and regeneration was significantly influenced by hormones combinations. In BAP and IAA treatments, highest frequency of shoot induction (32.72) and maximum regenerated shoots (7.9 shoots per explants) was observed in MS media containing BAP (8.8 μ M) alone. Although in TDZ and IAA treatments, highest average number of induced shoots (24.6) and (7.13 shoots per explants) were obtained in MS media fortified with 2.2 μ M of TDZ. In second experiments, effect of basal media and different concentrations of IAA and IBA on root induction was analyzed. Profuse rooting was obtained in 74 percent of plantlets on 1/2 MS media containing (1.1 μ M) IBA and highest mean rooting (5.06 roots per seedlings) were obtained in same media. The well rooted plantlets were acclimatized successfully in greenhouse on perlite media and transferred to soil with 100 percent survival.

Keywords: *Agastache foeniculum*, Indole-3-butyric acid, *In vitro*, Methyl chavicol, Shoot induction .



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Effect of salicylic acid pretreatment of barley seed on seedling growth, proline content and antioxidant enzymes activity under drought stress

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Abstract

One of the effects of reducing water content on soil is reduction of growth and development of seedlings and variation of field development of them. It was found that seed priming improves some characteristics of seedling and plant. An experiment was conducted for evaluating the effect of seed priming by salicylic acid on some characteristics of barley seed at early growth stages, antioxidant enzymes activity and proline content under drought stress. The first factor was priming with salicylic acid (zero, 50, 100 and 150 ppm) and the second factor was three levels of drought (zero, -6 and -12 bar). The results showed that SA pretreatment effect on germination percentage, germination rate, dry weight, protein, catalase, ascorbate peroxidase activity and proline content were significant. The interaction effect of stress \times seed treatment on leaf number was not significant but the main factors were significant. The highest germination percentage (98.7), germination rate and seedling dry weight were found at 100 ppm concentrations of salicylic acid. Under drought stress conditions, protein content decreased but salicylic acid pretreatment increased the value. Also, drought stress conditions increased enzyme activity and proline content, but salicylic acid pretreatment decreased them.

Keywords: Barley, Drought stress, Enzyme, Proline, Salicylic acid.



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Evaluation of chemical, organic and biological nitrogen on agronomic traits of different linseed ecotypes (*Linum usitatissimum* L.)

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Abstract

Due to importance of nitrogen on the agronomic traits of linseed oil, a factorial experiment was conducted in randomized complete block design with three replications at the field research station of Faculty of Agriculture at Shahrekord University in 2012. Five different treatments of fertilizer including urea, azomin, nitroxin, supernitroplus and control (without nitrogen) as the first factor and three ecotype of Iranian, French and Canadian linseed as second factor were evaluated. The results showed that, ecotypes and fertilizer treatments had significant effects on the plant height, leaf number, number of lateral branches, number of capsule, shoot dry weight per plant and grain yield per m². The maximum leaf number, number of lateral branches, number of capsule and shoot dry weight per plant were observed in French ecotype, while for the other traits, Iranian ecotype had priority. The traits measured under the chemical nitrogen treatment (urea) was greater than other fertilizer treatment. Although the response of linseed to biological and organic nitrogen was lower than chemical nitrogen but it was significantly higher than control. Thus, application of biological and organic nitrogen, due to less environmental pollution, is reasonable compare to chemical fertilizer.

Keywords: Biological fertilizer, Chemical fertilizer, Ecotype, Linseed, Organic fertilizer.



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Effect of auxin concentration and cutting type on rooting of Nemaguard, St Julien A, Tetra and GF677 rootstocks cuttings

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Abstract

For vegetative propagation of Nemaguard, St Julien A, Tetra and GF677 rootstocks via cutting, two separate experiments were carried out in a factorial based on completely randomized design. Semi hardwood cuttings were taken in late August and then treated with concentrations of zero, 1500, 2000, 2500 and 3000 mg/l IBA. Cuttings were cultured in perlite medium and in a greenhouse with mist system. In December, hardwood cuttings were taken and treated with concentrations of zero, 2500, 3000, 3500 and 4000 mg/l IBA. Cuttings were cultured in greenhouse that equipped with bottom heat. After two months, the percentage of rooting, root number and root length were recorded. The results showed that semi hardwood cuttings of GF677 and then Nemaguard and Tetra had the highest root number and the most rooting percentage. Root length of these three rootstocks was not significantly different from each other. St Julien A showed the lowest rooting. Most appropriate concentrations for semi hard wood cutting was 2000, 2500 and 3000 mg/l IBA. Hardwood cuttings of GF677 in 4000 mg/l IBA treatments produced the most number of roots and the highest rooting percentage. Hardwood cuttings of Tetra did not produce any roots. Rooting percentage of semi-hardwood cuttings was higher than hardwood cuttings. In general, application of semi-hard wood cutting of these rootstocks and treatment of those with concentrations of 2000 and 2500 mg/l IBA is advisable.

Keywords: Clonal rootstocks, Indolebutyric acid, Semi hardwood cutting, Stone fruit trees, Wood cutting .