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Effects of different polyamines on vase life, ethylene production and some physiological traits of Carnation (*Dianthus caryophyllus* cv. Red Corsa)

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Abstract

In this research, the effect of putrescine, spermine and spermidine on the vase life of cut red carnation (Red Corsa) and some physiological traits was investigated in horticultural laboratory of Azad University branch Rafsanjan in 2015. Therefore, an experiment based on completely randomized design with tree levels of 1, 2 and 3mM of putrescine and 0.5, 1 and 2mM of spermidine and 1, 2 and 3mM of spermine with 3 replications was performed. The recorded traits included vase life and morphological and physiological factors. The results indicated that all of the treatments increased vase life significantly compared to control treatment. On the other hand polyamines decreased ethylene production. Spermidineof 2 mM caused the highest vase life and the lowest ethylene production. All of the treatments especially 2 mM of Spermidine increased flower diameter and solution uptake content significantly compared to control treatment and 2 Mm of spermidine have been the most effective treatment. 1 and 2 mM of spermidine were only treatments that don't reduce dry matter percentage significantly in the flowers. 2 mM of Spermidine caused the maximum amount of physiological traits as protein, chlorophyll and total soluble solids in the leaves of flowers. Therefore, 2 mM of Spermidine is suggested as the best treatment to increase postharvest life in Carnation cv. Red Corsa.

Keywords: cur flower, durability, putrescine, Spermidine, Spermine

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Application of mycorrhizal fungi (*Glomus mosseae*) on reducing of salinity effect in New Guinea impatiens

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Abstract

To evaluate the effect of arbuscular mycorrhiza (*Glomus mosseae*) under salt stress on physiological and some nutrient absorption in New Guinea Impatiens (*Impatiens hawkeri*), an experiment established in complete random design with three replications (three pots for each replication) in greenhouse in Shahrekord University in 2014. Treatments were inoculation of substrate with three levels of arbuscular mycorrhiza (0, 8 and 16 percent, v/v) and sodium chloride (0, 15 and 30 Mm). The substrate medium was included 50 percecnt of peat moss, 40 percent of perlite and 10 percent of rice husk (v/v). The mycorrhizal inoculation done with transplanting and salt stress treatment was applied with irrigation water after stablishment of transplants. Some traits such as nitrogen, phosphorous, potassium, sodium and proline content, dry and fresh root weight and root colonization percentage were evaluated. The results showed that 16 percent of mycorrhiza treatment had significant effect on nitrogen (2.31 percent) and phosphorous (0.339 percent) and it's interaction with 30 Mm of salt stress had significant effect on proline content (0.754 micromol/gfw) and root colonization (35 percent) percentage. Based on this research the difference between mycorrhiza treated plants and other treatments was significant and it seems that the application of mycorrhiza in medium, can increase salt tolerance in New Guinea Impatiens by effect on some physiological traits.

Keywords: Nitrogen, Proline, Phosphorous, Root Fresh Weight, Sodium Chloride

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Study the effect of humic acid and zinc on the quantity and quality of fruit, photosynthetic pigments and mineral concentrations of grapevine cv. 'Asgari'

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Abstract

In order to evaluate the effect of humic acid and Zn on the grape yield and mineral concentration, a factorial experiment was conducted based on a randomized complete block design with three replications. The study was done on 20 years old grapevines in the Farsan region from Chaharmahal and Bakhtiari province in 2013-2014. Each of the factors, humic acid and zinc sulfate, were applied in three levels zero, 0.1 and 0.2 weight percent, in two periods including before of flowering and two weeks after full bloom. Results showed humic acid, zinc sulfate and their interaction effects significantly affected on fruit yield, concentration of nitrogen, iron and zinc and also leaf chlorophyll content. The highest fruit yield (8.31 kg per shrub) and the lowest fruit yield (6.12 kg per shrub) obtained in humic acid 0.2 percent and control treatments, respectively. The highest leaf zinc element (49.1 mg per kg dry leaf) obtained in 0.2 present zinc sulfate. Also the results showed positive correlation between zinc concentration and some index such as fruit yield (r = 0.46), cluster weight (r = 0.45), total leaf chlorophyll (r = 0.53) and fruit TSS (r = 0.49). Based on these results, it seems to enhance the yield and improve the quality of grapes, spraying humic acid and zinc sulphate at a concentration of 0.2 percent each to be useful**.**

Keywords: Amino acids, fruit yield, micronutrients, fruit quality, spraying

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Effect of the usage of vermicompost and mycorrhizal fertilizer on quantity and quality yield of soybean in water deficit stress condition

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Abstract

In order to study the effect of the usage of vermicompost and mycorrhiza fertilizer usage on yield quantity and quality of soybean cultivar L_{17} in water deficit stress condition, an experiment was conducted as plots in a split at randomized complete blocks with four replications in Agricultural Research Center in 2013 in Khoramabad. The experiment treatments including irrigation in three levels (after 60, 120 and 180 mm evaporation from pan class A pan), vermicompost and mycorrhiza in six levels (non-use of vermicompost and mycorhiza fertilizer, inoculated with mycorrhiza fertilizer, consumption of 5 and 10 $t.ha^{-1}$ vermicompost , consumption of 5 and 10 $t.ha^{-1}$ vermicompost with mycorrhiza) were respectively as the main plots and sub. The results of experiment showed that the water deficit stress significantly decreased the number of pods per plant, number of grain per pod, number of grain per plant, 1000 grain weight, biological and grain yield. So that the highest grain yield with the rate of 3216.7 $kg.ha^{-1}$ was obtained from 60 mm evaporation. The use of combined vermicompost and mycorrhiza fertilizer increased the traits except the number of grain per pods. Grain yield in combined treatment of 5 and 10 $t.ha^{-1}$ vermicompost and mycorrhiza, respectively increased 23 and 29 percent compared to control. By increasing irrigation distance grain oil content decreased and grain protein content increased. Finally, in order to water_saving irrigation and the cost of inputs and ensuring optimal performance in drought condition, we can use combination of 5 $t.ha^{-1}$ vermicompost with mycorrhiza.

Keywords: Biological yield, Evaporation pan, Grain yield, Oil grain, Protein grain

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Effect of post-harvest wax treatments and methyl salicylate on some enzymes activity related to chilling injury in two cultivars of orange (‘Moro’ and ‘Thomson’)

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Abstract

Treated with different coating and application of methyl salicylate and salicylic acid are used for reduce chilling injury and maintain the quality of citrus fruit during storage. This experiment was carried out Citrus Research Institute of Ramsar in 91 years in order to study enzyme activity that involved in reducing chilling injury and Maintain the fruit quality based on Split Plot design with three replications. Fruits was treated and then placed in the cool storage at 5°C and 95 percent relative humidity(RH) for 80 days. Each 20 days with sampling investigated fruit enzyme activity was measured. Results showed the highest PAL enzyme activity was in fruits treated with methyl salicylate and the lowest was in fruits coated with the Bretix wax. The highest SOD enzyme activity related to Moro fruits which treated with methyl salicylate is in the first 20 days of storage (23/19 umg/FW). The APX enzyme activity increased in both cultivars Thomson and Moro during storage. Relatively, treatments caused the change in APx, SOD and PAl enzyme activity.

Keywords: Antioxidant, enzyme ascorbate peroxidase, enzyme superoxide dismutase, enzyme phenylalanine ammonia Lyaz, quality

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Effect of planting density on fruit quality and leaf elements concentration of apple on rootstock of M_{26}

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Abstract

High-density planting system is one of the effective methods for improving production and profitability of tree orchards. In this research, the effects of four planting densities (1904, 2666, 3137 and 4800 tree/ha) on annual shoot growth, Physicochemical properties of fruit and leaf mineral contents of apple (*Malus domestica* Borkh cv 'Granny Smith') tree grafted on M_{26} clonal rootstock were studied in randomized complete block design with four treatments and four replications in College of Agriculture and Natural Resources, University of Tehran, during 2009-2010. Based on results, planting density significantly affected some qualitative characteristics such as fruit length, fruit diameter, total soluble solid, fruit dry matter, fruit ash and sun scald, but no significant effect on fruit weight, fruit L/D ratio, TA and tenacity were observed. Planting density significantly affected the leaf N and Fe concentrations. The highest N (1.81 percent) and Cu (39 µg/kg) the lowest Fe of leaves (237 µg/kg) was observed with 1904 tree/ha. Although, planting density had no significant effect on other mineral elements, but with increasing the planting density, leaf P, K, Mg and Mn content increased, but, Ca and Cu decreased. Increasing in N and Fe was associated with a decrease and increase of current seasonal shoot growth, respectively. Likewise, trees with higher crop tend to have more N and less Fe. These results showed that, under Iran climatic condition, with increasing in planting density of apple orchardit can be produced higher fruit crop without decrease in its quality parameters.

Keywords: Apple, Dwarf rootstocks, Fruit quality, Leaf mineral, Planting density

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Effects of Salinity Stress on Dry Weight and Macronutrients Contents of two Olive Varieties

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Abstract

A greenhouse experiment was carried out to evaluate the effects of salinity stress on growth and macroelements contents of two olive varieties in soilless culture medium. In the research, one-year old saplings of two olive varieties, 'Zard' and 'Mission', were subjected to different salinity levels induced by NaCl including 0, 4, 8, 12 and 16 dS/m^{-1} for 5 months. Based on the results, total dry weights of the varieties were decreased at 16 dSm^{-1} compared to control up to 63 and 85% at 'Mission' and 'Zard', respectively. Also, a 25% reduction in total dry weight was observed under salinities of 7 and 3.6 dSm^{-1} for 'Mission' and 'Zard', respectively. Salinity was decreased the concentrations of macronutrients and increased the concentrations of Na and Cl in roots and leveas of the both varieties. Compared to control, Na and Cl concentrations in leaves and roots was increased under salinity of 16 dS/m^{-1} at 1660 and 679% for Na and 1069 and 506% for Cl. In all salinity levels, Na and Cl concentrations in the leaves and roots of 'Zard' variety were more than that of 'Mission'. Thesa data demonstrated that 'Mission' has a more salinity tolerance than 'Zard', and could be used as a salt-tolerant variety for cultivation under salinity condition**s.** The defence mechanisms of 'Mission' are restricting in absorbtion and translocation of Na to aerial parts and accumulate a proper concentration of K in Leaves.

Keywords: Salt Tolerance, Macronutrients, Root, Shoot, Olive.

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The Effect of seed priming on germination, yield and the quality of sesame grains under deficit irrigation

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Abstract

Effect of seed priming on germination and seedling growth of sesame investigated under controlled conditions. The primed seeds with $ZnSO_4$ had the maximum germination percentage whereas the highest germination rate was observed in hydro-primed seeds. The treated seeds with PEG showed the best growth of the seedlings and rootlet. The complementary field experiment was conducted to evaluate the effect of seed priming and irrigation intervals on the growth and the yield of sesame. A split plot experiment was carried out based on the RCBD with four replications in a field in Northwest of Shadegan during 2013-14 growing season. Main plots were irrigation intervals (irrigation after 150 and 250 mm evaporation from class-A evaporation pan) and sub plots were eight seed priming levels (as the laboratory test). The maximum plant height was observed in plants from the treated seeds with $CaCl_2$ (5 percent) and irrigated after 150 mm evaporation from pan and the minimum plant height was observed from the no-primed seeds and irrigated after 250 mm evaporation from the pan. The highest and the lowest of 1000-seed weight achieved in plants from the treated seeds with hydro-priming and irrigated after 150 mm evaporation from the pan, and in plants from the non-primed seeds and irrigated after 250 mm evaporation from the pan, respectively. The maximum amounts of biological yield, seed yield, water use efficiency, oil yield, oil percentage and the minimum protein content were achieved in plants from the treated seeds with hydro-priming. Irrigation after 250 mm evaporation from the pan decreased the yield and yield components.

Keywords: harvest index, oil content, protein content, seed germination, sesame

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Effect of application of Clove and Cinnamon essential oils on maintain quality post-harvest of Pomegranate

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Abstract

Using the essential oils to increase the storage life and quality of horticultural products as a new idea is developed in agriculture. In this context, an experiment was conducted in order to effect of application Essential oils of clove and Cinnamon on maintain quality post-harvest of pomegranate (‘*Punica granatum’* cv. Tarom red skin). A split design in time in a completely randomized design with two factors essential oils of cloves and cinnamon each in four levels (0, 500, 1000, 1500 mg per liter) and time in three levels (one month, two months, three months of storage) at 6°C and relative humidity of 85 percent, with four replications. The results showed that with increasing storage period total soluble solid (TSS), anthocyanin, electrolyte leakage, chilling injury, weight loss percent and severity of decay increased. Essential oils by reducing oxidation processes, such as respiration of consumption organic acids in products reduce. The amount of anthocyanin in the fruit treated with essential oil of clove increased more than pomegranates treated with Essential oil of cinnamon. Essential Oils of clove and Cinnamon have a similar effect of chilling injury and decay. Decay of (42.25 percent) in control to (30.75 percent) in the essential oil of cloves 1500 mg per liter decreased in the second month of storage. General, pomegranates treated with essential oils of clove and essential oil of cinnamon have better quality and storage life .

Keywords: Anthocyanin, Chilling injury, Decay, Electrolyte leakage, Weight loss

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Effects of mixing graminicide herbicides and liquid fertilizer on dry matter production and yield of wheat

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Abstract

Rashe grape cultivar grows in Kurdistan province in rain fed conditions. Microclimate conditions have a great effect on grape berry quality. Information about changes in grape berry composition in the relation to climate changes is limited. In order to measure the effects of slope and altitude on some grape berry chemical composition, a study was conducted on grape cv. 'Rasheh' in University of Kurdistan during 2012 and 2013. A randomized complete block design with four treatments (northern and southern slope, low and high altitude) and three replications was used. In this study, amount of carotenoids, anthocyanin, antioxidant capacity, total soluble carbohydrates, tannin and total phenol in grape berry were analyzed. Results showed that southern slope at high altitude increased amount of anthocyanin, antioxidant capacity, phenol and total soluble carbohydrates. Maximum values in the concentration of carotenoid and tannin in grape berry obtained in the northern slope and lower altitude. Berries from Northern slope and lower altitude were found to have a significantly lower anthocyanin and total soluble carbohydrates compared to other treatments. Based on these results, it can be concluded that the planting in the southern slope and higher altitude will help to grape growers for improve the qualitative characteristics of the grape berries.

Keywords: Anthocyanin, Antioxidant capacity, Carotenoid, Climate conditions, Phenol.

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Investigation of mineral elements concentration in leaf and root grafted and ungrafted melon (Zard-e -Jalali accession from Inodorus group) under deficit irrigation on drip irrigation system

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Abstract

The effects of grafting under conditions of deficit irrigation, on content of minerals leaf and root, evalutate in a field experiment under deficit irrigation was conducted with Split plot in a randomized complete block design with three replications, in the research field of higher education institution Imam Khomeini (RA) under the Ministry of Agriculture in Karaj, during 2014. In this study, a landrace melon from Inodorus group (Zard-e-Jalali) as the scion and commercial varieties of Cucurbita rootstocks cv., 'Shintozwa'and 'Ferro-RZ' was used as the rootstock. Grafted melons upon commercial varieties of Cucurbita with own-rooted and ungrafted at three irrigation levels 60, 80 and 100 percent based on total available water depletion with drip irrigation system were evaluated. Comparison of means showed that maximum (40.76 ton.ha^{-1}) and minimum (31.16 ton.ha^{-1}) total yield, related to 'Shintozwa'rootstock and self grafted respectively. The results showed that the irrigation levels and rootstocks had a significant effect ($P < 0.01$) on Leaf and root mineral concentration. Also, content of minerals of leaves and roots decreased with increasing water stress. There was not significant difference in the level of 5 percent, in relation to total nitrogen of leaf between 'Shintozwa'and 'Ferro-RZ' rootstocks.The comparison of means showed highest (2.97 percent on a dry matter basis) and the lowest leaf total nitrogen (2.23 percent on a dry basis), respectively, in plants that grafted on 'Shintozwa'and own rooted. The percent increase in leaves mineral elements, contain nitrogen, phosphorus, potassium and zinc in Zard-e-Jalali grafted upon 'Shintozwa' rootstock in compared to ungrafted plants was 26.92, 13.15, 17.88 and 15.76 percent, respectively.

Keywords: Cucurbita rootstocks, 'Ferro-RZ', Grafting, leaf nitrogen, 'Shintozwa'

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Response of barley cultivars to chemical treatments of salicylic acid and selenium under drought stress in field condition

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Abstract

Effects of drought stress and chemical treatments was studied on growth and developmental traits of four barley cultivars using a split- split plot design (RCBD) in Agricultural Research Farm, Kerman University in 2013-14. Main plots consisted of irrigation (control and drought stress after flowering), sub-plots consisted of four barley cultivars (‘Nosrat’, ‘Afsal’, ‘Yousof’ and ‘UH12 line’) and sub-sub plot consisted of control, salicylic acid (0.5 mM) as seed soaking, foliar spray at anthesis and seed soaking + foliar spray) and also foliar spray with selenium (40 mg/l using sodium selenate). Drought stress significantly decreased chlorophyll index (10 percent), thousand grain weight (19 percent), grain yield (20 percent), biological yield (11 percent) and harvest index (12 Percent). On the contrary, salicylic acid increased plant height, length of spike and awn, chlorophyll index, thousand grain weight, grain yield, biological yield and harvest index. Foliar spray of plants with sodium selenate increased selenium contents of grains in all cultivars. However, it could be concluded that salicylic acid improved plant performance under normal and drought conditions and selenate application enriched barley grains, and therefore those treatments are commercially recommended.

Keywords: Drought, Foliar spray, Grain yield, Growth and Development, Sodium selenate

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Study on amounts of superabsorbent polymer applying on date palm c.v 'Dairi' under water deficit stress

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Abstract

Increasing the efficiency of water use is one of the main topics of sustainable agriculture in arid and semi-arid. The use of some materials such as superabsorbent polymers increase water storage in the soil and thus reduces the water use. Increase water storage in the soil to reduce the effects of drought and saline soil. In order to evaluate the effect of super absorbent polymer on survival and growth characteristics of palm, an experiment was carried out in split plot based on Randomized Completely Block Design (RCBD) with three replications at date palm and tropical fruit research center in Ahwaz, during 2011-2012. Experiment comprised a following treatment combination irrigation based on 60, 80 and 100 percent class A pan in main plots, superabsorbent in four rates (0, 40, 80 and 120 g for each offshoot) in subplot. The results showed that water stress and superabsorbent did not significant effect on the surviving. The water use 100 percent with 40 grams and 80 percent of water use with 120 grams of superabsorbent produced the highest and lowest number of leaves prospectively. The lowest number of leaves on the provision of treatment was. The most and lowest trunk perimeter produced in the treatment of water use 100 percent without superabsorbent and 80 percent of water use with 120 grams of superabsorbent, respectively. The water use 100 percent with 120 grams and 60 percent of water use without superabsorbent caused the maximum and minimum plant height, respectively.

Keywords: Date palm offshoot, Irrigation, Soil, Surviving, Water use

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Effect of drought stress and spraying of salysilic acid and chitosan on photosynthetic pigments and antioxidant enzymes in safflower

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Abstract

In order to evaluate the effects of drought stress and spraying of salysilic acid and chitosan on photosynthetic pigments and antioxidant enzymes of safflower an experiement was conducted as split plot randomized complete block design at the Zabol University research farm in Zabol, south Iran during 2012. Treatments were drought stress at three levels; irrigation when the soil moisture level dropped to 25, 50 and 75 percent of available water as the main treatments, and four combinations of sprayings including non-spraying, salicylic acid (0.424 $g.l^{-1}$), chitosan (5 $g.l^{-1}$) and combination of salicylic acid and chitosan as sub-treatments that were applied with three replications. The results indicated that drought stress significantly decreased chlrophyl a, b, total and chlrophyl flueorecense. Also drought stress increased anti-oxidant enzymes, but this increasing effect was significant in case of peroxidase enzyme. In addition, drought stress did not influence carotenoid, protein yield, and ascorbate, guaiacol peroxidase and catalase. Spraying treatments increased all traits compared to the control. Combination of salicylic acid and chitosan was more effective than sole application. Interaction of drought stress by spraying was significant on chlorophyll a and protein yield, therefore spraying of salyclic acid and chitosan could be recommend for increase the stability of cell membranes in plants and reduce the damage caused by H_2O_2 of limited irrigation in safflower.

Keywords: Chlorophyll, Oil crops, Partial irrigation, Sistan, Spraying

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Effect of super-absorbent, manure and irrigation frequency on growth and some physiological and biochemical characteristics of Rose Geranium

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Abstract

This research was carried out to evaluate the effect of super-absorbent and manure on growth, yield, physiological and biochemical characteristics of geranium under deficit irrigation at research greenhouse of Faculty of Agriculture, Lorestan University, Iran, in 2014. The experiment was arranged factorially based on a completely randomized design with six replications. Factor A was substrate consisted of control, 1 and 2 percent super-absorbent, or 25 percent manure and factor B was irrigation with 3, 5 or 7 d interval. The results showed that as irrigation frequency decreased, plant growth and oil yield decreased and oil content, malondialdehyde, proline, peroxidase and ascorbate peroxidase increased. Both manure and super-absorbent improved plant growth, physiological and biochemical characteristics under deficit irrigation. However, the effects of manure were more pronounced, so that the values for most characteristics, like, leaf area, plant fresh and dry weight and oil content of plants grown in substrate including manure irrigated with 7d interval were the same as those of control plants irrigated with 3d interval. The highest water use efficiency for oil production was found in plants grown in substrate including manure in all irrigation frequencies as well as plants grown in substrate including two percent super-absorbent irrigated with 7d interval. According to these results and due to abundance, cheapness and environmental sustainability, using 25 percent in volume manure in substrate could be recommended to increase water use efficiency.

Keywords: Deficit irrigation, Essential oil, Geranium, Water use efficiency, Water stress

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The evaluation of drought stress impact as irrigation withholding at reproductive stages on quantitative and qualitative performance of soybean cultivars

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Abstract

In order to assess the performance of two soybean cultivars produced in two regions including Karaj and Moghan to drought stress at reproductive stages and also the impact of drought stress on yield and its components, oil and protein percent, an experiment was conducted as a split factorial based on complete randomized block design in three replications in agriculture faculty of Tarbiat Modares University during 2014. Four treatments of drought stress were exerted as complete withholding irrigation at flowering stage (R1-R3), pod formation (R3-R5), seed filling stage (R5-R7) and control (no withholding of irrigation) which were placed in main plot and other treatments were two soybean cultivars (‘Williams’ and ‘L_{17}’) and two seed production sources (Karaj and Moghan) that were placed in sub plots. The results indicated that the effect of drought stress on pod number, 1000-seeds weight, seed yield and also oil and protein percent was significant. The highest seed yield (262.73 gram per meter square) was observed in control (no stress) and the lowest yield (162.22 gram per meter square) belonged to drought stress at pod formation stage. Also the interactions of drought stress × cultivar and drought stress × seed source were significant on grain yield. The lowest seed oil percent (18.24 percent) and the highest protein percent (37.28 percent) of seeds were obtained at seed filling stage. With considering these results, the irrigation at pod formation stage (R3-R5) is necessary for preventing the reduction of soybean seed’s yield.

Keywords: Oil, Pod, Protein, Reproductive growth, Seed filling stage, 1000-seeds Weight

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Effects of temperature and storage time on different varieties of date pollen

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Abstract

Pollen storage could facilitate the date palm hand pollination through saving time and space. The main concern is maintaining pollen viability, which is greatly cultivar dependent and is influenced by storage condition. In this study, to address this issue, the effects of cultivar, storage temperature, and time on pollen germination were investigated. A factorial experiment was laid out in a completely randomized design with three replicates using four cultivars 'Kazeroon (7013)', 'Lar (7035)', 'Darab (7016)' and 'Qyr-va Karzin (7021)', four storage temperatures (RT (20 ± 5), 4, -20 and -80°C) and six storage periods (60, 120, 150, 180, 210 and 375 days). Anova of data showed significant effects of variety, storage temperature, storage time and their interactions on pollen germination. The pollen germination rate increased with decreasing temperature. When pollens were stored for up to 150 days, the germination rates of all varieties initially increased then decreased. Overall, the optimum temperature for preserving pollen grains of tested cultivars is -80°C and the highest pollen grain longevity is related to 'Qyr-va Karzin (7021)' after one year.

Keywords: Date Palm, Germination, Male Cultivar, Pollination, Storage, Time

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Exploring the possibility of reducing deficit water stress damage on yield of forage sorghum by foliar application of salicylic acid and zinc sulphate

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Abstract

According to the global water shortage problem, the exploring for reducing its harmful effects is very important. This experiment was conducted as split plots method based on randomized complete block design with three replicates in Urmia University research field during growing season of 2013-14. Water deficit stress as main plot consisted of three levels (irrigation when soil moisture reached 90, 70 and 50 percent of soil field capacity) and foliar applications (at 5-6 leaf stage two times with an interval of three days) as sub plot with five levels including: no foliar application (control), foliar application of salicylic acid (0.5 and 1 millimolar) and zinc sulphate (300 and 3000 milligram per liter). The results showed that the interaction effect of foliar application and water deficit significantly influenced photosynthetic pigments (except total chlorophyll content) and relative water content. The main effects of foliar application and water deficit were significant on leaves number, dry weight of leaves and stems, forage yield per square meter, electrolyte leakage and leaf area index. Severe Water deficit significantly decreased dry matter yield by 21.11 percent relative to normal irrigation. The maximum forage dry matter yield with average of 1571.53 gram per square meter were produced by both foliar application of zinc sulphate 3000 milligram per liter and salicylic acid 0.5 millimolar, which not only compensate for spraying costs but also lead to an acceptable increase in farmers' income. Therefore they could be recommended for farmers.

Keywords: Electrolyte leakage, Forage yield, Leaf area index, Photosynthetic pigments, Relative water content

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Evaluation of shiitake production possibility on agricultural wastes and their effect on yield and biological efficiency

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Abstract

Edible shiitake mushroom is a relatively fragrant mushroom and grows on different types of dead hard woods. This mushroom ranks second in the world in total yearly mushroom production. On the hand, thousand tons of agricultural wastes are burned or discarded yearly. Hence, to evaluate the shiitake mushroom production possibility on agricultural wastes, an experiment designed based on completely randomized design with three replications. In this study, barley straw, millet straw and wheat straw used as main substrate with 10 and 20 percentage, respectively. The results showed that the highest biological efficiency were observed on barley straw (88.14 percent) and wheat straw with 20 percent sawdust (83.37 percent), respectively and the lowest biological efficiency were obtained on wheat straw (26.48 percent). In addition to, the highest yield was occurred on barley straw (25.28g/500g wet weight of substrate). However, the lowest yield observed on wheat straw (5.27g/500g wet weight of substrate), respectively. In general, the results showed that yield and biological efficiency of shiitake, on the barley and millet straw had increased as the level of sawdust boosted.

Keywords: Barley straw, Millet straw, Sawdust, Substrate, Wheat straw

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Study of effect of substrate, planting networks and type of covering plant on quantitative and qualitative on sodding lawn in northern Iran

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Abstract

According to high importance of sodding for fast creating green beds in all seasons, this experiment carried out with aimidentifying suitable substrate and covering plant including two lawn genus and *Dichondra* with blend seed. The trial carried out as factorial experiment with three factors based on complete block design in three replications. Experimental factors consisted of planting networks (a_1: plastic mesh, a_2: plastic sack) and planting substrates (b_1: garden soil, b_2: garden soil + carbonized rice husk, b_3: garden soil + perlite, b_4: garden soil + sand (v/v)) and types of covering plant (c_1: *Dichondra repens*, c_2: *Lolium perenne*, c_3: *Poa pratensis*, c_4: blend seed including *Lolium perenne* Numan, *Lolium perenne* common type, *Poa pratnesis* Cronino, *Poa pratensis* Common and *Festuca rubra*). The results showed the effect of experimental factors was significant on traits such as germination rate, the appearance quality of the lawn, height of the lawn, rooting depth, content of chlorophyll a, b and total, fresh and dry weight of shoots and total plant dry matter ($P< 0.01$ or 0.05). Based on the results the most chlorophyll content was observed in garden soil and the highest dry matter and plant growth belonged to garden soil + perlite bed. *Lolium* was the best in the most of traits such as germination rate and plant growth. Chlorophyll content of plants on sack plastic was better than plastic network, but the plastic network was better one in other traits such as dry matter.

Keywords: blend seed, carbonized rice husk, *Dichondra*, Lawn type, planting network, quality

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