



Effect of Electromagnetic Field on some of the Growth Characters of *Pleoretus florida*

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Abstract

Undoubtedly presence of magnetic field in human life is undeniable. Magnetic fields are one of the most complex and important energy sources which can influence biological processes. Living organs by having ions and radicals are so affected by these electromagnetic fields. To study the effects of electromagnetic field on growth rate and colony diameter of *Pleoretus florida*, a factorial experiment based on completely randomized design with 3 replicates was carried out and the effect of two factors A: magnetic density (0, 1, 4, 6 mT) and B: exposure time (1, 2, 4 day) was investigated. Results demonstrated that flux density of 4 mT for 2 days and 1mT for 2 days showed the most increase in growth of colony, respectively. Also 6mT treatment for longer time- 2 or 3 days- caused growth inhibition of mushroom colony. It seems that using appropriate density of magnetic fields in convenient time affects on cell membrane through a positive ion flux (usually calcium) that influences normal cell metabolism and causes cell division increase that leads to growth improvement.

Keywords: Magnetic field, Helm holtz, Growth rate, Colony diameter, *Pleoretus florida*

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Effect of Silicon on Growth and some Physiological Characteristics of Persian *Petunia (Petunia hybrida)*

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Abstract

Silicon is a non-essential element with beneficial effects reported for several crops. The main goal of this experiment was to investigate the effects of silicon (Si), on growth and physiological characteristics of Persian *Petunia*. For this, a factorial trial based on completely randomized design was conducted with 4 levels of Si (0, 50, 100 and 150 mg L⁻¹), in two growth stages (4-6 and 8-10 leaf) with 4 replications. The experiment was done in a greenhouse. Si was applied via foliar spray once a two week before the flowering stage. Si increased flower diameter, flower tube length and leaf area by 35, 24 and 52 percent compare to control, respectively. Si at 50 and 100 mg L⁻¹ concentrations also increased Flowering rate by 14 and 9 percent in comparison to control. Photosynthesis and maximum quantum efficiency of PSII (Fv/Fm) ratio were also increased with Si. Flowering rate and leaf area of 8-10 leaf plants were higher than 4-6 leaf plants. Interactions between Si concentrations and growth stages for the measured traits like flower diameter, flowering rate, flower tube length, leaf area, photosynthesis, Fv/Fm ratio, stomatal conductance and chlorophyll index, were not statistically significant. Generally Si improved growth and physiological characteristics of *petunia*.

Keywords: Silicon, *Petunia*, Foliar spray, Photosynthesis

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Determination of Chilling and Heat Requirements of Flower Buds in some Peach (*Prunus persica* L.) Cultivars

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Abstract

This study was carried out to determine the chilling and heat requirements of bud flowers in five peach cultivars (Kosary, Haj Kazemi, Anjiry Asali, Anjiry Zafarany, and Zoud Ras). Determinatal shoots in terms of diameter and length were removed and transported to the laboratory and maintained in a growth chamber weekly. Bud status in the case of phenological stage, dry and fresh weight of buds were measured in all sampling stage. Different models were used for estimating chilling requirement. The heat requirements were calculated as the growing degree hours (GDH) accumulated from breaking of dormancy to the F₅₀ (50% of opened flowers). The results showed that Anjiry Asali had the lowest chilling requirement; while Kosary and HajKazemi had the highest chilling requirement. However, Anjiry Zafarany and Zoud Ras showed moderate chilling requirement. The studied cultivars showed a range of chilling requirements (Utah model), between 746CU and 868CU. There was a significant difference for bud fresh and dry weight before and after forcing among sampling dates. In the case of heat requirement, Anjiry Zafarany (4099GDH) had lowest and Kosary and Haj Kazemi (4543 GDH) were those with the highest heat requirement. Anjiry Asali (4384 GDH) and Zoud Ras (4232GDH) showed moderate heat requirement.

Keywords: Chilling requirement, Heat requirement, Utah model, *Prunus persica* L. Batsch

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Effect of Chemical Treatments and Harvest Stages on Vase Life of Cut Tuberose (*Polianthes tuberosa* L.) Flowers cv. "Pearl".

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Abstract

This experiment was carried out for finding best harvest stage and chemical treatment in order to increase the vase life of cut tuberose (*polianthes tuberosa* L.) flowers cv. 'pearl'. The experimental design was factorial in the base of complete randomized design with ten chemical treatment and 3 replications in two harvest stages of one floret open and three floret open was used. After harvest, cut tuberose flowers pulsed by: Nitric oxide (NO), Thidiazuron (TDZ) and their combinations in three level and distilled water used as control. Cut flowers then transferred in containers with 500 ml of preservative solution including sucrose 2% plus 8-hydroxyquinolinesulfate (8-HQS) 200 ppm. The effects of applied treatments were evaluated according to vase life and some of quantitative and qualitative characteristics. Based on the results of this study, the three floret open stage had the most effect on the vase life and keeping of quantitative and qualitative characteristics of cut tuberose flowers as compared with one floret open. However, the most effective treatment of all was TDZ compared to NO according to vase life and keeping quality. NO was not useful alone but the combination treatments of NO and TDZ had no deleterious effect.

Keywords : Thidiazuron, Vase life, Cut flower tuberose, Nitric oxide, 8- hydroxyquinolinesulfate

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Determination of DRIS Norms and Evaluation of Nutritional Status of Sycamore Trees (*Platanus sp.*) in Mashhad

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Abstract

In order to determine the DRIS norms and evaluate the nutritional status of Sycamore trees (*platanus sp.*) in Mashhad, 270 leaf samples from 15 stations (Repetitions) of green and yellow (early dieback and yellowing) trees, in three times (spring, summer and autumn) were collected from three different layers (low, middle and top) in 2009. By using the mean of nutritional status of green trees and choose the appropriate expression of the form 28 using the t test, DRIS norms for nitrogen, phosphorus, potassium, sodium, iron, zinc, manganese and copper were determined. DRIS norms were employed to calculate the nutrient indices and nutrient balance index of yellow trees. The results showed that mean concentrations of nitrogen, phosphorus, potassium, sodium, iron, zinc, manganese and copper were 1.34, 0.12, 1.11, 0.029%, 243., 28.3 , 96.5 and 9.3 mg.kg⁻¹ respectively in green trees. By using the DRIS indices the most suitable order of nutrient requirement for yellow trees were selected (N> Fe = Zn = Mn> P = K> Cu). The result showed that nitrogen, iron, zinc and manganese deficiency is possible in yellow trees. These results were in agreement with the results of mean comparisons of element concentration in yellow and green tree. So it is expected that sycamore trees (yellow group) show a positive response to nitrogen fertilizers as well as to iron, zinc and manganese. It seems that providing a suitable nutritional condition particularly nitrogen and supplying proper and sufficient water would be necessary for sycamore trees in Mashhad.

Keywords: DRIS Norms, Nutrients Balance, Sycamore Tree

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Effect of Planting Date and Pattern on Fruit Yield and Yield Components of Charjo Melon

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Abstract

In order to study the effect of planting date and planting pattern on Chararjo melon (*Cucumis melo* var *inodorus*) fruit yield and yield components, an experiment was carried out in an RCBD arranged in a split-factorial design with four replications. The study was conducted at the Agriculture Research Station of Gonbad for two years (2006-2007). Main plots consisted of four planting dates (April 9, April 21, May 5 and May 22). Sub-plots were combination of row spaces (180, 230 and 280 cm) and within row distances (50 and 70 cm). Plots were furrow irrigated. To obtain fruit yield, fruit weight, fruit number per plant and per hectare, fruits of two middle rows were hand-picked. Analysis of variance was performed each year and means were compared using F protected LSD. To analyze the data, S.A.S. was used. The results showed that with a delay in planting, fruit yield decreased. The fruit yield decrease with a delay in planting might be attributed to acceleration of growth stages and shortened period of assimilate accumulation and lesser vegetative growth caused by higher temperatures. Row space 180 cm had the highest fruit yield. There was not any significant difference for fruit yield between two in- row distances, i.e. 50 and 70 cm. Based on two year results, and considering fruit yield and fruit weight, the suitable planting date for Charjo melon in the region might be early April. The appropriate planting pattern might be 180 cm by 70 cm.

Keywords: Melon, Plating pattern, Planting date, Fruit yield, Fruit weight

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Influence of Pruning Date and Zinc Sulfate Treatment by Pruning wound on Yield Component and Vegetative Characteristics of Table Grape (*Vitis vinifera* L. cv Askari)

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Abstract

An experiment was conducted in order to study on the effects of pruning date and Zinc Sulfate treatment on vegetative growth and yield components of Table grapes (*Vitis vinifera*) cv. Askari during 2009-2010. Experiment was conducted as a randomized complete blocks design with a two factorial arrangement and four replications. The first factor was seven levels of pruning date (21 Dec, 5 Jan, 20 Jan, 4 Feb, 19 Feb, 6 Mar and 20 Mar) and second factor was 2 levels of ZnSo₄ (0 and 30 percentage). The results showed that pruning date and ZnSo₄ treatment for majority of tested characteristics as % bud -break, yield, % TSS, TSS/TA ratio and Zn content of fruit were significant with delaying pruning date and ZnSo₄ treatments. The % bud -break, yield, % TSS, TSS/TA ratio and Zn content of fruit were increased. Therefore, both ZnSo₄ (30%) as a pruning wound and proper pruning date (19 Feb – 20 Mar) for increasing fruit quality and quantity of Askari Table grape in Dena-Cisakht region is recommended.

Keywords: Askari grape, Date of planting, Zinc Sulfate, Bud break, Yield

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Evaluation of Ascorbic acid, Citric acid and Sodium Metabi-sulfite Effect on Physicochemical and Organoleptical Properties Dried Apricot (*Prunus armeniaca* L. var Jahangiri)

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Abstract

The most Iranian farmers use SO_2 gas for preservation and color stability of dried apricots, but this gas is allergic and carcinogenic. In this research, there was investigated some materials substitute for SO_2 for producing dried apricots. The main objective of this research is use of replacement material instead SO_2 for producing dried apricots. So, in this study Jahangiri variety treated with citric acid, (0.5% and 0.7%), ascorbic acid (0.5 and 0.7%) and sodium meta bisulfite (0.5% and 0.7%) before drying and then were compared with control samples (without any treatment). After drying, characteristics such as Brix, pH, moisture contents, browning index, acidity and organoleptic properties were evaluated. Results showed that treatments affect on evaluated traits, significantly. All of traits also had significant different with control. Diaphanous and bright color is one of most importance qualitative factors in apricot drying. Browning and darkening are count as a negative trait in apricot drying. Sodium meta bisulfite had lowest browning, nevertheless, not only it is unsafe for human life because of allergic effects but also it produced firm drying. There weren't any significant differentiation between citric acid and ascorbic acid however acid citric introduced as a best treatment for apricot drying because of it is more cheap and permanent than ascorbic acid. Also Apricot drying with lighter color, low browning and softer tissue whit low firmness produced in 0.7% of citric acid treatment.

Keywords: Apricot, Sodium Meta bisulfite, Citric acid, Ascorbic acid

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Effect of Levels of Salinity on the Morphological and Physiological Characteristics of Two Grape Cultivars

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Abstract

In this research tolerance of two grape cultivars (Ghizil Uzum and Bidaneh Ghermez) were evaluated at different levels of salinity (0, 50, 100 and 150 μ mol) with factorial experiment based on randomized complete block design with four replications. Salinity stress was performed on one year old grapevines with 4 buds. Three months after stress treatment sampling was performed. According to the results obtained, grape cultivars and levels of salinity were significant on the morphological and physiological parameters. But shoot length was not significant among different levels of salinity. Interaction effect of cultivar \times levels of salinity was significant on shoot length, fresh and dry weight of leaf, dry weight of stem and root, relative water content (RWC), chlorophyll, soluble sugars and leaf temperature. With increasing of salinity, number of leaves per plant, leaf area, fresh and dry weight of leaf, dry weight of stem and root, relative water content and chlorophyll content were significantly decreased. But proline, soluble sugars and leaf temperature were increased. All of evaluated parameters were higher in Ghizil Uzum cultivar. Compared to Ghizil Uzum leaf temperature was lower in Bidaneh Ghermez. Based on obtained results, Ghizil Uzum was mor tolerant to salinity than Bidaneh Ghermez from the point of morphological and physiological characteristics.

Keywords: Grape, Salinity stress, Proline, RWC, Soluble sugars

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Genetic Relatedness among Wild and Cultivated Almond Genotypes Using RAPD Marker

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Abstract

In this experiment, RAPD markers were used to evaluate the genetic relationships among 36 Iranian, European, American and Russian almond cultivars and three wild *Amygdalus* species. Sixty 10-mer primers were used which totally created polymorphism 47 primers, which produced reproducible banding patterns, were used for further analysis. A total of 918 polymorphic RAPD bands were selected among of 968 bands. Regarding the dendrogram and similarity matrix, it was concluded that the genetic similarity value among studied cultivars and genotypes was low and the genetic variation among them was relatively high. Similarity index among the studied cultivars varied between 0.29 and 0.89 with mean of 0.53. The maximum and minimum similarity observed between Monagha and Sefid (0.89), and *A. scoparia* with Sangi28 genotype (0.29), respectively. Cluster analysis was computed based on Jaccard similarity coefficient using UPGMA method and the resulting clusters were represented as dendrogram extracted from the showed dendrogram, 47 polymorphic primers discriminated among all the cultivars and species. The resulting dendrogram divided the cultivars and species into two clusters (at 0.50 similarity values) with American Thompson cultivar, two Sangi genotype and two *Amygdalus* species as the most distant from the group. Cluster analysis of similarity data grouped the cultivars according to their geographic origin and or their pedigree information. Iranian, European and American cultivars were clustered into three separate groups.

Keywords: Almond, Genetic diversity, RAPD

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Effects of Different Substrates and Irrigation on Seedling Growth Indices of Different Cultivars of Tomato (*Lycopersicon esculentum*) in Greenhouse

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Abstract

This study was conducted to investigate the effects of substrate and irrigation on seedling growth indices of some hybrid and standard cultivars of tomato. The experiment was evaluated at research greenhouse of Faculty of Agriculture, Ferdowsi University of Mashhad based on Completely Randomized Design with three replications. Studied factors contained: types of substrate (peat, coco-peat and soil), irrigation regime (48 and 72 hour) and cultivars (hybrid: Zomorod, G.S.12 and R.F.T and standard: Super Majar, Queen and Super C.H). Results showed the highest germination rate (6.04 % day⁻¹), leaf dry weight (0.61 gr), leaf area (172.3) and stem height (6.15 cm) were in peat substrate and the highest amounts of inter bud (11) were cocopeat. Also, the maximum amounts of leaf dry weight (0.60 gr), stem dry weight (0.29 gr), leaf area (149.18 cm²) and stem height (5.60 cm) were obtained in 48 hour regime and the maximum germination percentage (80.8%), germination rate (6.13% day⁻¹) and stem diameter (2.63 mm) were observed in 72 hour regime. The highest germination percentage (98.8%) and number of inter bud (10) were in G.S.12 cultivar and the highest amounts of leaf dry weight (0.61 gr) and stem height (5.33 cm) were obtained in Zomorod cultivar. Results of interaction effects showed that the highest amounts of root weight and leaf area were observed in 48 hour with peat substrate and 48 hour with Zomorod cultivar treatments. However, maximum amount of germination rate were obtained in 72 hour with peat substrate (6.87% day⁻¹). Overall, results of this study showed that seedling growth indices in tomato are improving by applying some soilless culture and also, it depends on kind of cultivars.

Keywords: Tomato, Seedling, Soilless culture, Germination percentage, Germination rate, Seedling growth indices

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Effect of Nitrogen Form and Different Oxygen Levels on Eco-physiological and Chemical Characteristic of Lettuce in Hydroponic System

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Abstract

The effect of nitrogen form and oxygen levels on the some eco-physiological and chemical characteristics of lettuce was investigated. The results showed that the effect of treatments on minimal fluorescence (Fo) was not significant, although, ammonium caused reduction in maximal fluorescence (Fm), variable fluorescence (Fv) and Fv/Fm ratio. Ammonium also increased leaf proline concentration, but the effects of oxygen levels and its interaction with nitrogen form was not significant. Ammonium also increased green color (SPAD value) of leaves compared to nitrate, and SPAD value was higher in low levels of oxygen. Chlorophyll a, b and carotenoids increased in ammonium-fed plants. Low levels of oxygen decreased chlorophyll b content. The results showed that Fe concentration of leaves was higher in the nitrate-grown plants compared to ammonium grown plants. Decrease of Fv/Fm ratio and higher proline could be the sign of ammonium-induced toxicity. Decrease of Fe concentration in the leaves of ammonium-fed plants could have a role in growth reduction.

Keywords: Ammonium, Nitrate, Chlorophyll, Iron, Proline

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Effect of Salicylic Acid on Growth and Some Morphophysiological Characteristics of *Gomphrena* (*Gomphrena globosa* L.) under Salinity Stress

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Abstract

Salicylic Acid (SA) is considered as one of the useful compounds for plants that plays an important role in plant resistance to environmental stresses such as salinity stress. For this purpose and to evaluate the effect of salicylic acid (SA) and salinity on morphophysiological and qualitative characteristics of *Gomphrena* (*Gomphrena globosa*), an experiment with three levels of SA (0, 200, 400 ppm) and three concentrations of sodium chloride (0, 150, 300 mM) was conducted as a factorial experiment based on completely randomized design with 4 replications. At the end of the experiment growth characteristic such as shoot and root dry weight were measured. Also chlorophyll index, relative water content (RWC), electrolyte leakage (EL) were evaluated. Flower number as a qualitative trait were counted at the end of experiment. Results of interaction effect of salinity and SA showed that by increasing salinity stress up to 300 mM, stomatal conductance, flower number, shoot and root dry weight, chlorophyll index and RWC decreased 75, 96, 48, 48, 82 and 38 percentage respectively, and EL increased 99% compared with control. While spraying with SA reduced the rate of electrolyte leakage and improved other measured traits. Foliar spraying of salicylic acid leads to maintain of turgidity and leaf dimension that it is due to increasing the relative humidity content. Also by increasing the photosynthetic pigments and protection of them during stress conditions like salinity stress, it leads to improving the physiological traits of plants and increase the tolerance of plant during stress condition. Based on the results of this experiment the best concentration of salicylic acid for foliar spraying, is 200 ppm that can be effective for improving the tolerance of plants to salinity stress.

Keywords: *Gomphrena*, Salinity stress, Salicylic acid, Stomatal conductance

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The Critical Period of Weed Competition on Yield, Yield Components and Oil Yield of Black Seed (*Nigella sativa* L.)

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Abstract

In order to determine the effect of weed competition periods on yield, yield components and oil yield and critical period of weed control in black seed based on oil yield loss, a field experiment was conducted at the Agricultural Research Station of Ferdowsi University of Mashhad, during 2009-2010 growing season. The experiment was laid out in Randomized Complete Block Design (RCBD) with 12 treatments and 3 replications. Two set of treatments consisted of weed-infested and weed-free periods were used. At the first set of treatments, weeds compete with black seed until 0, 14, 28, 42, 56 and 70 day after emergence (weed-infested periods). At the second set, plots were kept free of weeds until the mentioned stage (weed-free periods). The result showed that weed infestation and weed free periods significantly affected grain, biological and oil yields of black seed. In addition, reduction in grain, biological and oil yields in which caused by the increased length of the weed-infested and the decreased length of weed-free periods, was accompanied by simultaneous reduction in number of lateral branch and follicle per plant, number of seed per follicle, seed weight per follicle, 1000- seed weight and harvest index. According to 2.5, 5 and 10% acceptable oil yield loss, onset of critical period in black seed was recorded 12, 15 and 20 days after emergence (equal to 100.77, 125.02 and 168.49 growing degree days), respectively. In addition, based on above mentioned oil yield loss, the end of critical period of weed control was determined 76, 74 and 70 days after emergence (equal to 1000.50, 955.02 and 877 growing degree days). Significant reducing in grain, biological and oil yields of black seed can be indicating weak competitiveness of this medicinal plant with its relative weed populations.

Keywords: Weed-infested periods, Weed-free periods, Grain yield, Oil yield

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