



## General and Specific Combining Ability and Heterosis Estimation of some Cucumber Lines for Qualitative Traits in Partial Diallel Design

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Received: 25-1-2011

Accepted: 13-10-2012

### Abstract

Partial diallel design can be used to investigate the general and specific combining ability, and heterosis. Combining ability and heterosis were studied in a 6×6 partial diallel cross to see the nature of gene action for fruit quality indices in cucumber (*Cucumis sativus* L.) during 2007 to 2009. Analysis of variance revealed highly significant differences among all the F1 hybrid means and their respective six parental values for all the traits examined. The mean squares of general combining ability (GCA) and specific combining ability (SCA) were also highly significant. SCA genetic variances were greater than GCA and more important for the seedcell size, showing the additive and non-additive gene action. Fruit color was controlled by additive type of gene action due to high GCA variances. Fruit shape and overall performance were controlled additively and non-additively due to high general combining ability. Line 605 and 118 were found to be the best general combiner and its utilization produced valuable hybrids with desirable SCA F1 hybrids.

**Keywords:** Griffings, Heritability, Additive variance, Dominant variance

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## Effect of Humic acid on Growth and Yield of Tomato cv. Isabela

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Received:26-1-2010

Accepted:28-8-2012

### Abstract

Humic acid, which has hormone- like activity , not only enhances plant growth and nutrients uptake but also improve stress tolerance. To determine the effect of humic acid on the yield and vegetative characteristics of tomato an experiment was conducted with tomato cv. `Isabela` in 2008 in a plastic tunnel at the Agriculture Faculty, Guilan University using randomized completely design with four treatments (0, 1, 2, 3 mg l<sup>-1</sup> humic acid) and three replications. Humic acid was sprayed four times during the vegetation period with 10- day intervals after three weeks of planting. Results showed that humic acid could affect significantly (P<5%) the height, crown diameter, fruit number. Highest plant height (2.37 m) and chlorophyll index (60.38 Spad) were observed by 3% of humic acid and lowest plant height (1.99 m) and chlorophyll index (53.2 Spad) were obtained by control . No difference was observed by the leaf number and root dry weight. Fruit number (133) and yield per plant (8.990 Kg) were obtained also by 3% of humic acid

**Keywords:** Tomato, Humic acid, Yield, Foliar spray

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## Effects of Ammonium to Nitrate Ratio and Agar Concentration on *In Vitro* Culture of Carnation (*Dianthus caryophyllus* L.) Cultivar Mondeo Kgr

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Received: 9-2-2011

Accepted: 28-8-2012

### Abstract

Carnation is considered as the world's third most important cut flower. Tissue culture techniques offer suitable method for micropropagation of this ornamental plant. However, one of the problems during *in vitro* culture of carnation is vitrification. Ratio of ammonium to nitrate and agar concentrations in the medium affect this phenomenon. Therefore, in this study the effect of these factors on the rate of proliferation and the vitrification of carnation (*Dianthus caryophyllus* L.) cultivar Innove Orange Bogr, was evaluated. In this investigation lateral buds were cultured on MS medium containing 1 mg/l BA, 0.1 mg/l NAA and with different concentrations of agar and different ratio of ammonium to nitrate. The results showed that increasing in the agar concentration to 12 g/l lead to decreasing the rate of vitrification but regeneration also declined. Increase of agar concentration cause limitation in nutrient absorption by plants. Also, decrease in the ratio of ammonium to nitrate in the medium reduces the amount of vitrification, but did not result in adverse effects on plant regeneration rates. Multiple regressions showed that the effect of ammonium to nitrate ratio on vitrification was higher than agar concentration. So by considering the amount of shoot regeneration and vitrification, to obtain the most normal shoots, the concentration of 10 g/l agar with ammonium to nitrate ratio 1:6, is recommended.

**Keywords:** Carnation, Ammonium to nitrate ratio, Agar concentration, Vitrification, Proliferation

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## Changes in Yield and Quality Traits of Sweet Corn Influenced by Micronutrient Fertilizers and Method of Their Application

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Received: 19-4-2011

Accepted: 10-9-2012

### Abstract

In order to evaluate effects of iron, zinc and manganese, and the methods of applying them on yield and yield components of sweet corn (*Zea mays saccharata*), an experiment was performed as factorial based on randomized complete block design with four replications at the research farm of Urmia University. Experimental factors were micronutrient fertilizers with four levels (control, iron, zinc and manganese) and micronutrient applying method with two levels (foliar and soil application). Soil application of micronutrients before sowing and foliar application of these elements in two stages (knee Stage and before tasseling stage) were applied. Results indicated that interaction between experimental factors on biological and protein yield and micronutrients use efficiency in grain yield was significant. Also, in micronutrients applying method, foliar application compared to soil application was caused increasing in grain yield, leaf chlorophyll, soluble sugars yield, sugar harvest index and micronutrients use efficiency in sugar yield. Applying three types of micronutrients were increased significantly leaf chlorophyll, grain soluble sugars yield and sugar harvest index compared to control. Grain harvest index was not affected by any of the experimental factors. Based on results, application of micronutrient elements enhance the quality and economic yield of sweet corn and foliar application of micronutrients was showed better results than soil application.

**Keywords:** Foliar spray, Iron, Manganese, Sweet corn, Zinc

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## Effect of Chitosan and Calcium Chloride to Reduce Postharvest Rot and Different Quality Attributes on *Siah mashhad* Sweetcherry

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Received: 29-5-2011

Accepted: 4-9-2012

### Abstract

The use of natural compounds to control plant pathogens lead to reduction in using fungicides. Chitosan with duple effects, control pathogenic microorganisms and activate inducing defence responses, has been shown to be a reliable nontoxic material in the plant-pathogen interaction. The aim of this research was to consider the effects of chitosan and calcium chloride on decay and quality attributes of sweet cherry cv. *Siah mashhad*. This experiment was conducted factorially in the figure of completely randomized design with five replications. Treatments were included of chitosan (0, %0.5 and %1) and Calcium Chloride (0, %1 and %2) and time (20 and 40 days). Measuring factors was included total soluble solids (TSS), titrable acidity (TA), partability index (PI), pH, weight loss, fruit decay. The results showed that application of chitosan %0.5 alone lead to stabilize soluble solids, organic acid, pH and fruit weight, also partability index and fruit rot was decreased. In short time storage (20 days) CaCl<sub>2</sub> stabilize organic acids and fruit weight and caused partability index, pH, fruit decay to be decreased but fruit soluble solids increased. In total simple treatment of calcium chloride and chitosn showed better results compared to combination treatments on measured parameters.

**Keywords:** Organic matter, Storage, Calcium chloride, Chitosan, Sweet cherry c.v *siah mashhad*

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## The Effect of Culture Media and Sod Netting Materials on Qualitative Characteristics of Sod Production

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Received: 30-5-2011

Accepted: 28-8-2012

### Abstract

Since lawn cultivation is a laborious process, we need new and quick methods of cultivation such as sod production to revive and repair green spaces. Mean while, the kind of cultures media and the types of cultures net which are used to streng then the lawn parts (sodding) may influence the quality pf the produced sod. This study investigated the effect of four kinds of soil combinations including: clay, (30% compost + 70% clay), (30% clay + 40% sand + 30% compost) and (10% pitmass + 90% clay). Also, it aimed to study four types of network such as: plastic guid, metallic guid, plastic bag and guidless. This investigation was dcne without any control network in production. In addition, factorial analysis was used based on 16 random treatments in three replicates within two years (2009,2010). The lawn seed under investigation was in the form of the one used in sports' fields and it was a mixture of three species and five cultivar. The results displayed that the mean of color characteristics, chlorophyll **a**, total chlorophyll, level of chlorophyll after first winter frost and growth rate were significantly more in the bed cultuer ( 30% compost + 70% clay) than the last of bed cultuer. On the other hand bed cultuer containing hight percentage of clay displayed more uniformity and density of weed. Regarding color, chlorophyll **b** and level of chlorophyll after first winter frost, the bed cultuer with hight compost were better than the others in the growth rate. The highest rigidity obtained in plastic bag net and the level of weed in this treatment is comparing with others were lower in significant.

**Keywords:** Sod, Bed culture, Net culture, Chlorophyll content, Rigidity

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## Evaluation of Chilling Requirement in Local Cultivars of Grapevine Growing in Fars Province

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Received:31-5-2011

Accepted:27-9-2012

### Abstract

It is necessary to determine the amount of chilling requirement of present cultivars and also to produce new low chill cultivars through breeding programs because of the global warming phenomenon and tendency to grow temperate fruit in warm climate. In this study, the amount of chilling requirement in 'Askari', 'Rotaby', 'Yaghuty', 'Rish Baba' and 'Monaga' were evaluated. Uniform cuttings of mentioned cultivars were harvested when leaves were abscised in autumn, and then transferred to refrigerator (2°C). Cuttings were subject to 0 (unchilled control), 100, 200, 300, 400, 500 chilling hours, then cutting were brought from chilling condition and put them in distilled water at room temperature (20° C) and continues light conditions. Number of sprouting bud and data of first and last bud break were recorded. The lowest bud break percent in 'Askari' and 'Rotaby' were in unchilled control (25%). The highest bud break percent in 'Askari', 'Rotaby' and 'Yaghuty' were at 500 h chilling (100%), 400 and 500 h, (100%), and 400 and 500 h, respectively. There were no significant differences between 200, 300 and 500 h chilling in 'Monaga' and bud break was 100% in these treatments. The highest bud break in 'Rish Baba' was at 400 and 500 h. The shortest required period time to 50% bud break was in 'Askari' at 400 h (23d), 'Rotaby' at 500 h (23 d), 'Yaghuty' at 400 h (13 d), 'Rish Baba' at 400 h (18 d) and in 'Monaga' at 200 h (16 d). In conclusion the chilling requirements of studied cultivars were as following: 'Monaga' (200 h), 'Rotaby' (300 h), 'Askari' (300h) 'Rish Baba' and 'Yaghuty' (400 h).

**Keywords:** Vitis, Chilling requirement, Bud break

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## Effect of Paclobutrazol (PBZ) and Different Irrigation amounts on Vegetative Growth and Performance of Young Olive Plants cv. Manzanillo

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Received:30-10-2011

Accepted:25-9-2012

### Abstract

An experiment was conducted to determine the effect of paclobutrazol (PBZ) and different irrigation amount on growth of aerial parts, leaf minerals and root performance in young olive plants cv. 'Manzanillo' in the Department of Horticulture, Faculty of Agriculture, Tarbiat Modarres University in 2000. A split plot experiment in time was used based on a completely randomized block design with four replications. The aim of this experiment was to determine the effect of water irrigation amount reduction on Manzanillo olive response. Treatments were 60, 70, 80, 90 and 100 % evapotranspiration (ETp) and 60% with 0.25 g a.i /pot paclobutrazol (PBZ). Control plants were used as reference to determine evapotranspiration (ETp). Some characteristics such as root, leaf and shoot fresh and dry weight, leaf area, leaf number, plant height, root length and mineral content were measured. Results indicate that root, leaf and shoot fresh and dry weight, leaf area, leaf number, plant height and N and K amount were increased with increasing of water amounts. No differences were found in measured characters between 90 and 100% (ETp) so a 10 percent saving in water was occurred. Result showed that pbz treatment after 45 days reduced shoot growth, leaf and shoot fresh and dry weight, leaf area, plant height, root length and N and K content. Although, PBZ treatment increased root to shoot fresh and dry weight ratio and increased root diameter. In case of water shortage pbz treatment is able to ameliorate the effect of water stress.

**Keywords:** Olive cv. Manzanillo, Irrigation regimes, Evapotranspiration, Paclobutrazol (PBZ), Vegetative Growth

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## Physiological Responses to Drought Stress in four Species of Tomato

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Received:9-11-2011

Accepted:29-8-2012

### Abstract

Investigation of the cultivated tomato plant as a plant ideal system along with the drought resistant wild species can be useful to a better understanding of the mechanisms of drought resistance and improvement of tomato plants. To investigate the effect of drought stress on leaf Relative Water Content (RWC), electrolyte leakage and photosynthetic parameters in four species of tomato (a cultivated species and three wild species) at two levels of irrigation (field capacity and 40% field capacity) and four time periods (before stress, 10 days after stress, 20 days after stress and recovery) a factorial experiment based on Completely Randomized Design (CRD) was used. Among the tested species, cultivated species showed the highest decrease in RWC. Electrolyte leakage was significantly increased in stress conditions. The rate of photosynthesis and chlorophyll fluorescence yield in the two drought resistant wild species increased in stress conditions unlike of cultivated species, probably because of more adaptation of these species with low water conditions. The results showed that each of these species according to their own mechanism for dealing with drought stress, in one or more properties are superior to other species. it is therefore suggested that the different species for future studies (molecular) with different characteristics to be used.

**Keywords:** Drought, Tomato, RWC, Electrolyte leakage, Photosynthesis, Chlorophyll fluorescence

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## The Effects of Different Concentrations of 2,4-D and BA on Somatic Embryogenesis of Strawberry (*Fragaria ananassa* Duch.)

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Received: 11-12-2011

Accepted: 28-8-2012

### Abstract

Present study was conducted to consider the effects of different concentrations of 2,4-D and BA on somatic embryogenesis induction, development and maturation of three strawberry cultivars (Kurdistan, Parose and Camarosa). For this purpose, leaf blade, nodal, petiole, stamen and flower bud calli were cultured on Murashige and Skoog (MS) medium supplemented with 2, 4 dichlorophenoxyacetic acid (2,4-D at 0.25, 0.5, 1 and 2 mg/l) as well as the combination with different concentrations (0.0, 0.25, 0.5, and 1 mg/l) of benzyl adenine (BA). The concentration and kind of growth regulators, cultivar and explant had great important on strawberry somatic embryogenesis induction, development and maturation. Results obtained from the studies revealed that all explants with the exception of petiole and stamen incubated on medium formed embryonic calli. MS medium supplemented with combination of auxin and cytokinins were evidently higher than those in the single auxin treatments. 1 mg/l 2,4-D + 0.25 mg/l BA yielded the highest percentage of embryonic calli and number of globular embryo stage and 0.5 mg/l 2,4-D + 0.25 mg/l BA yielded the highest number of embryo cotyledonary in all types explants. The leaf explant calli and Parose cultivar were the most responsive to produce to somatic embryogenesis induction, development and maturation.

**Keywords:** Strawberry, Somatic embryogenesis, Explant, Growth regulators

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## A Survey of Two Different Methods of Auxin Application on Rhizogenesis of Stem Cuttings of *Duranta repens* L.

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Received: 17-12-2011

Accepted: 26-6-2012

### Abstract

The aim of this study was evaluation of two different methods of auxin application for rhizogenesis in stem cutting of *Duranta repens* shrub with 2 individual experiments and in January and February 2008. Two factorial experiment based on RCBD was used and comparison of means was done with duncan multiple test at  $p < 0.01$  and  $p < 0.05$ . First factor was methods of application and second factor was different levels of IBA and NAA (0, 100 & 200 ppm). results were compared to other published data on this species. For first method IBA and NAA were sprayed on stock plant, 24 hour prior to cuttings harvest, and second method was spraying leafy cutting with auxin solution after establishment into culture medium. Results indicated that second method was better for all factors than first method. But these results in comparable with other published data showed that basal quick dip in auxin solution was better than foliar auxin applications on rhizogenesis of stem cuttings of *Duranta repens*.

**Keywords:** *Duranta repens*, Vegetative propagation, Ornamental shrub, Foliar auxin application

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## Effect of Genotype and Different Concentration of BAP on *in vitro* Direct Regeneration of Basil (*Ocimum basilicum*)

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Received: 27-12-2011

Accepted: 28-8-2012

### Abstract

Basil (*Ocimum basilicum*) is an annual and herbaceous plant belonging to the Lamiaceae. Basil is used to as a medicinal, spicy and fresh vegetable. Tissue culture is one of important part of biotechnology, and has many uses in the field of medicinal plants, such as *in vitro* regeneration, proliferation and production of herbal drugs with high quality. The present study was conducted to investigate the effects of genotype type (Orumieh, Ardabil, Hamedan and Hungarian genotypes) and different concentration of BAP (0, 2.5, 5 and 7.5 mg/l) to identify the best hormonal concentration and best genotype type, to obtain the highest yield of *in vitro* produced plantlets. Experiment was performed in factorial based on completely randomized design, using the basic MS medium. The results showed that there is significant differences between genotype for regeneration. The highest regeneration (percentage and number of regeneration) obtained in 2.5 mg/l BAP and Hungarian genotype. As BAP concentration increased, the percentage of rooting decreased, but vitrification increased.

**Keywords:** Basil, Benzyladenin, Regeneration, Vitrification, Rooting percent

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## Effects of B Toxicity on Vegetative Growth, Physiological Characteristics and Boron Distribution in Two Scion-rootstock Combinations of Almond (*Prunus dulcis* Mill.) Tree

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Received:14-2-2012

Accepted:28-8-2012

### Abstract

Boron (B) toxicity is an important disorder that can limit plant growth in arid and semi-arid environments. It has been proven that use of tolerant rootstocks impede B uptake or transport to the aerial portions of plants. This may alleviate B toxicity in the scion, consequently improves the tolerance to excess B in the root zone. An experiment was conducted to find the effects of B toxicity on vegetative growth, physiological characteristics and B distribution of almond tree (*Prunus dulcis* Mill.) cv. "Ferragnes" grown in the controlled environment. Three levels of B (0.25, 10, 20 mg/L) from H<sub>3</sub>BO<sub>3</sub> and two almond rootstocks (GF<sub>677</sub>, Tuono) were factorially combined in a completely randomized design with four replications. The results showed that B toxicity had significant effects on vegetative growth, physiological characteristics and B distribution in almond tree. With increasing B levels in nutrient solution, vegetative characteristics including leaf production percentage and main shoot elongation was decreased significantly. However, Fr/Tuono was affected less than Fr/GF<sub>677</sub>. Also, physiological characteristics such as electrolyte leakage percentage, proline content and leaf necrosis percentage were increased significantly in two scion-rootstock combinations. On the basis of these results, GF<sub>677</sub> because of an inability to restrict uptake and/ or transport of excess B from root system to aerial parts of scion, have a higher sensitivity to B toxicity. Instead, Tuono via mechanism of preferential distribution of B in roots inhibited the accumulation of high concentration of B either in young leaves or meristematic tissues partially and protected these susceptible organs against injury caused by B toxicity. In conclusion, it seem that under excess B conditions Tuono rootstock have higher tolerance than GF<sub>677</sub>.

**Keywords:** Almond, B distribution, B toxicity, Growth, Scion-rootstock combinations

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## Impact of Pre-harvest Spry Salicylic acid Application on Storability, Postharvest Quality and Antioxidant Activity Apricot (*Prunus armeniaca* L.)

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Received:27-6-2012

Accepted:23-10-2012

### Abstract

The limited postharvest storage life of apricot causes the goal of presenting a solution in this manuscript to improve the postharvest storage of studied apricot cultivars. Studying the effect of different concentration of pre-harvest salicylic acid on quality attributes and antioxidant activity of apricot during storage is the approach in used. The apricot cultivar(Nori) were sprayed at the 3 weeks before commercial ripening stage, with 1, 2, 3 and 4 mM salicylic acid as well as distilled water (control). At commercial ripening stage, apricot fruit were harvested and immediately transported to the laboratory, and then fruits were packed in boxes with polyethylene cover and stored at 4°C and 95% relative humidity for 20 days. The changes in weight loss, fruit firmness, total soluble solids, titratable acidity, pH, ascorbic acid, total phenolics and antioxidant activity were estimated after 0, 5, 10, 15 and 20 days during storage. The results showed that the weight loss, total soluble solids, pH increased significantly while the fruit firmness, titratable acidity, ascorbic acid, total phenolics and antioxidant activity decreased significantly during storage for both cultivars. During this stage, a significant difference between control and salicylic acid treatments in all measured parameters is observed. The salicylic acid treatments reduced significantly the weight loss and maintained their firmness. In this condition, the highest and lowest of titratable acidity, ascorbic acid, total phenolics and antioxidant activity were observed in treatments of 4 mM salicylic acid and control, respectively. The data revealed that the quality of apricot fruits was improved by the use of salicylic acid treatment due to its effect on delaying the ripening processes.

**Keyword:** Antioxidant, Shelf life, Ascorbic acid

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