

Effect of culture medium, type and concentration of carbon source on the proliferation of Gisela 6 rootstock

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Abstract

Due to the problems raised from planting the seedlings in stone fruit orchards, the use of uniform and compatible rootstocks is essential. Tissue culture technique is one of the most important and useful methods for propagation of this type of rootstocks. In order to obtain suitable culture medium, type and concentration of sugar for proliferation of Gisela 6 under the *in vitro* conditions, present study was conducted in two separate experiments. In first experiment the effect of four culture media (MS, VS, QL and NN) was investigated in a completely randomized design. In the second experiment the type of sugar (sucrose, glucose, fructose and sorbitol) and different concentrations of sugar (15, 30 and 45 g.L⁻¹) in a factorial experiment based on a completely randomized design with 5 replications were studied. Length and number of shoots per explant, number of nodes and leaves, fresh and dry weight of the explants and length of internodes were evaluated. According to the results, MS culture medium had the greatest effect on shoot length, and NN had the lowest effect on length and number of the shoots. Sorbitol (at all concentrations) had the lowest effect on proliferation rate of Gisela 6. The highest shoot length and number were observed in the concentration of 15 g.L⁻¹ fructose and 45 g.L⁻¹ glucose respectively. MS culture medium with 30 g.L⁻¹ sucrose and glucose was the most suitable culture medium, for the proliferation of Gisela 6.

Keywords: Carbohydrate, Explant, *In vitro* propagation, MS culture medium

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Effect of foliar application of potassium sulphate and naphthalin acetic acid on yield and quality of 'Pearl Tangelo' mandarin

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Abstract

Use of plant growth regulators and mineral nutrition may affect the fruits yield and quality. This study was conducted to evaluate the effect of foliar application of naphthalin acetic acid (at 0, 50, 100 and 150 mg.L⁻¹) and potassium and sulphate (at 0, 0.5 and 1%) on yield and quality of Pearl tangelo (*Citrus Paradisi* Macfad × *Citrus reticulata* Ten.) fruit. A randomized complete block with three replications comprising 12 treatments on 16 years old Pearl mandarin trees grafted on sour orange rootstock was conducted in a commercial orchard located in Dezfool during 2014. The trees were sprayed with the solutions on 3 June and fruits were harvested on 6 December 2015. Harvested fruits were then transferred to Horticultural Sciences laboratory at Shahid Chamran University for the quality and yield measurements. The results showed that the treatments significantly enhanced the vitamin C content of the fruits. The trees received 100 mg NAA showed vitamin C content of about %19.45 higher than the untreated trees. Potassium sulfate significantly enhanced soluble solids; whereas the fruits from the trees which sprayed with 0.5 % of K₂SO₄ showed 5% higher soluble solids compared to the control. The results indicated that the interaction effect of NAA and potassium sulfate was significantly different on fruit weight, water content, acidity and yield. According to the results, 150 mg.L⁻¹ NAA and 0.5 % potassium sulfate was the best treatment combination for enhancing the quality and yield of fruit.

Keywords: Foliar application, Fruit quality, Nutrition, Yield

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Study on genetic diversity of 33 walnut genotypes (*Juglans regia*) using morphological and pomological markers for introducing of superior genotypes

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Abstract

Evaluation of genetic diversity among populations, cultivars and genotypes is the first step in breeding programs. For this reason, identification and introducing the superior genotypes is very important in development of improved walnut gardens. In the present study genetic diversity of 33 seed- genotype of walnut located in the Agriculture Research Station of Malayer University were evaluated using some morphological and pomological traits for identifying superior genotypes. Based on the results, a significant difference was found among different genotypes regarding the studied traits. Time of leaf bud burst in MKG₁₁₂, MKG₆₅ and MKG₁₀₅ genotypes were later than other genotypes. The highest kernel percentage and kernel weight with 67.51% and 5.94 g were found in MSG₁₅. The lowest shell weight with 3 g was observed in MKG₈₂ genotype. Also, MKG₁₀₅ genotype had the highest nut weight with 33.80 g. The highest (72.95%) and lowest (51.93%) oil percentage was related to MSG₁₅ and MKG₄₆ genotypes, respectively. Simple correlation coefficients between traits indicated the existence of significant, positive as well as negative correlations among some important vegetative, nut and kernel traits. Cluster analysis at Euclidean distance of 5, divided all genotypes into five main branches. Factor analysis reduced the assessed traits to 11 main factors justifying 71.01 % of total variation. Based on the results, genotypes including; MKG₁₁, MKG₁₂, MSG₁₅, MKG₁₆, MKG₃₆, MKG₄₁, MKG₄₄, MKG₄₅, MKG₅₅, MKG₆₅, MKG₁₀₅, MKG₁₁₁, MKG₁₁₂ and MKG₁₁₄ for some of the important traits such as nut and kernel characters, were better than other genotypes. These desirable genotypes can be used in walnut breeding programs.

Keywords: Genetic diversity, Morphological traits, Traits correlation, Walnut

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Investigate on the effect of salinity and culture medium on nutrient absorption and yield of three strawberry cultivars

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Abstract

Strawberry fruit has a high nutritional value and is cultivated worldwide. In recent decades, due to the lack of water resources, low-quality water is used for plant irrigation. This research was conducted in two separate experiments as a completely randomized design with three replications. In first study the effects of four salinity levels of 0, 20, 40 and 60 mM sodium chloride were studied on Kurdistan, Camarosa and Selva strawberry cultivars. In second experiment the effect of four culture mediums including perlite, cocopeat and two combination levels of perlite and cocopeat under salinity conditions on yield and leaf area index in Kordistan cultivar were studied. Leaf and fruit nitrogen, phosphorus, potassium, calcium, magnesium and sodium contents were measured in three replications. In general, there was no significant difference between strawberry cultivars in absorption of most nutrient elements under different salinity conditions. The lowest Na accumulation under 60 mM salinity stress was recorded in 'camarosa' leaves. In all three cultivars, the highest reduction in nutrient absorption rate of the fruit was related to potassium content with amount of 41.74% under all salinity conditions. The highest fruit yield was seen in perlite medium. With increase in salinity level, the fruit yield was decreased, and the lowest decrease was recorded in perlite medium.

Keywords: Camarosa, Nitrogen, Nutrition, Perlite, Selva

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Evaluation of Oregano essential oil effects on quality and biochemical attributes of sweet cherry (*Prunus avium* L. cv. 'Takdaneh Mashhad')

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Abstract

Fruits and vegetables contain antioxidants, among which sweet cherries has the highest antioxidants and plays a major role in preventing diseases and protecting human health. In addition, consumption and demand of fruits with high-quality, healthy and chemical free is increasing. The present study was carried out to evaluate the effect of postharvest spray with marjoram essential oil with 5 levels (0, 250, 500, 750 and 1000 $\mu\text{L.L}^{-1}$) on harvested 'Takdaneh Mashhad' sweet cherry fruits. The fruits were kept at 1 ± 0.5 °C with 90 to 95% RH. The fruits were removed from the cold chamber every 15 days in a 30-day period. Different physiological indices such as total soluble solids (TSS), titratable acidity (TA), pH, fruit firmness, total antioxidants based on the DPPH-free radical scavenger capacity, phenols and total flavonoid content were evaluated. The results showed that marjoram essential oil at 750 $\mu\text{L.L}^{-1}$ had a significant effect on pH, TSS, TA, firmness, antioxidant activity, and at 1000 $\mu\text{L.L}^{-1}$ affected total phenols and flavonoid contents. The essential oil treatment increased the storage time and maintained pH and TSS at a lower level than control. The treatment reduced the rate of TA and firmness reduction. In addition, the higher levels of essential oil, enhanced antioxidant activity and phenolic compounds. The results showed that postharvest use of marjoram essential oil increased the quality and antioxidant properties of the sweet cherry fruits, and can be used as a safe method for increasing the shelf life of sweet cherries.

Keywords: Phenolic compounds, Shelf life, Sweet cherry, Total antioxidant

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Recognition the potential of agro-climatic classification in areas of Khuzestan province for planting horticultural crops

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Abstract

Recognition the climatic potential of the regions for planting the horticultural crops is the first step in agricultural planning. In order to achieve this goal, one of the most important tools is to use agro-climatic classification methods. In this research, the Papadakis classification method was used which has a high level of accuracy due to the presence of 440 climatic subgroups and the emphasis on ecological characteristics. Initially, 10 synoptic weather stations were selected with a common statistical period of 23 years (1994-2016) due to the continuity of statistical data. It should be mentioned that each weather station was represented the climate condition of each city and the stations were classified according to the climatic indices of the Papadakis method. The results of the study showed that three stations namely Abadan, Bostan and Mahshahr port had a hot sub-tropical climate which is highly suitable for planting tropical crops. In addition, Aghajari, Ahvaz, Behbahan and Ramhormoz regions, due to the sub-tropical semi-arid Mediterranean climate, and also in Izeh, Safi Abad and Masjed Soleiman regions because of the sub-tropical semi-arid Mediterranean climate, are suitable for planting various types of cold season temperate fruits, citrus and early and late season vegetables.

Keywords: Agriculture, Classification, Climate, Papadakis Method

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Comparison on the effects of salicylic acid and nano-salicylic acid in reducing the effects of salinity stress on 'Camarosa' strawberry fruit

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Abstract

Strawberry is one of the most important temperate zone crops, which is very sensitive to salt stress. Because of salinization of soil and water resources, today the main purpose in strawberry production is to overcome the adverse effects of salinity stress. In order to reduce the adverse effects of salinity on 'camarosa' strawberry salicylic acid and nano-salicylic and salinity stress on Camarosa strawberry fruit, a study was carried out as a RCBD design with four replications under hydroponic condition. NaCl salinity was applied at three concentrations (0, 25 and 50 mM) and treatments were applied at three levels, including control (water), SA at 1mM and nano-SA at 1mM. Results showed that, NaCl treatments reduced growth indices, including shoot length, shoot fresh weight, root fresh weight and chlorophyll content, as well as fruit qualitative and quantitative indices, including yield, fruit weight, antioxidant capacity and titratable acidity. However, the anthocyanin and Na content in the fruits were increased with NaCl treatments. SA and nano-SA treatments ameliorated the adverse effects of salinity stress and reduced Na accumulation rate in the fruit. Nano-SA was more effective than SA in reducing salinity effects on strawberry fruit.

Keywords: NaCl, Nano particle, Quality, Strawberry, Yield

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