

Research Paper

## **Evaluation of the adaptation of some olive genotypes and cultivars under climatic conditions of Tarom using multivariate statistical methods**

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(Received: May. 15, 2019 - Accepted: Aug. 18, 2019)

### **Abstract**

This research was conducted to study the interaction between genotype  $\times$  environment and to determine the adaptation of some olive genotypes using multivariate GGEbiplot and AMMI methods. To conduct this research, ninety-two genotypes were collected from all regions of Iran, along with eight Local and Foreign cultivars including: Konservolia, Manzanilla, Koroneiki, Arbequin, Roghani, Tokhm-kabki, Zard and Shenghe cultivars, and were compared in a Randomized Complete Block Design (RCBD) for six years from 2011 to 2016 in Tarom conditions. After collecting the yield per year, in order to eliminate the genetic fluctuations caused by the "Alternate bearing" phenomenon, the "Alternate bearing index" for each genotype in a two-year period was evaluated and was used as a Covariate variable. In combined analysis of data, genotype and environment effects and their interaction effects were significant at 1% level. Among them, the highest justification of variance was done by interaction. Koroneiki cultivar was found to have the highest overall stability, considering the two parameters of performance and stability, Also, the genotypes 'Bn7', 'Bn6' and 'No10' in unfavorable conditions also had an acceptable performance.

**Keywords:** AMMI, GGEbiplot, Horticultural, Mega environment, Yield adaptation

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Research Paper

**Effect of nitrogen and iron nutrition on some quantitative and qualitative characteristics in apple cv. 'Granny Smith'****Safoora Dehghani Poodeh<sup>1\*</sup>, Mohammad Ali Askari<sup>2</sup>, Alireza Talaei<sup>2</sup>  
and Mesbah Babalar<sup>3</sup>**

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**Abstract**

To evaluate the effect of different levels of nitrogen and iron on some quality indices and yield parameters of 'Granny Smith' apple a factorial experiment, in a completely randomized block design with three levels of nitrogen (0, 144 and 288 g ammonium nitrate per tree) and three levels of iron (0, 1500 and 3000 mg Fe-EDDHA per tree) as soil application, was conducted during 2015. Nitrogen application increased chlorophyll index and yield efficiency. The highest chlorophyll index (58.77) and yield efficiency (0.889 Kg.m<sup>-2</sup>) were observed in 288 g/tree ammonium nitrate. Iron application increased pH of fruit juice and fruit iron concentration, and decreased leaf K concentration. Positive correlation between total antioxidants and leaf Fe concentration ( $r = 0.84$ ), a\* parameter and leaf Fe concentration ( $r = 0.68$ ), leaf K content and leaf N content ( $r = 0.69$ ), fruit K content and fruit N content ( $r = 0.74$ ), leaf N and fruit N content ( $r = 0.66$ ) was observed. In conclusion, nitrogen application at 288 g/tree was more effective in improving the mentioned characteristics. Iron nutrition had no much impact and seems that more concentrations of iron are required to a greater effect.

**Keywords:** Ammonium nitrate, Fruit quality, Granny Smith, Iron chelate

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Research Paper

**Preliminary evaluation of quantitative and qualitative traits of fruits from Russian grapevine cultivars in Urmia region****Hamed Doulati Baneh<sup>1\*</sup> and Valiollah Rasoli<sup>2</sup>**

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**Abstract**

Comparison of commercial grape cultivars with native cultivars and study of their adaptation is a traditional way for replacement of conventional orchards and establishment of new vineyards. To evaluate the adaptation of 69 grapevine cultivars imported from Russia this research was conducted as a rectangular lattice design of 8\*9 in Kahriz research station, Urmia. After planting the vines were trained according Cordon bilateral system. In the fourth-year different parameters including flowering time, fruit ripening time, fruit and leaf morphology, fruit TSS, TA, PH and TSS/TA and some other characteristics were evaluated. More than half of the genotypes had spherical berries and the remaining had oval shapes. The six different colors including light green, green, red, yellow, light yellow and black colors were observed in berries of different varieties. Only Morus genotype had seedless berry. Morus and Zambil with TSS of 21.93 and 22.18 had the highest TSS, and Yolski biser, X45, Dedeski rumphi and number 47 with 2.05, 1.44, 1.44 and 1.5 gr in 100 ml of juice (acid tartaric) had the highest total acidity, respectively. Comparison of means for ripening time showed that Supran bulgar and Vormunk genotypes with 189 and 192 days of fruit growth duration late ripening genotypes and Rumphi izadnegare with 142 day was the most early ripening genotype. Skif, Yloaski and Druzhba cultivars, with 8.7, 9.12 and 7.5 Kg per tree were the most bearing cultivars respectively. In addition to the Red Bidane cultivar, which had good performance among the endemic genotypes, the two other control (endemic) cultivars had a lower performance than Russian cultivars.

**Keywords:** Grapevine, Germplasm, Russian grapevine, Preliminary evaluation

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Research Paper

**Evaluation of vegetative traits, yield and alternate bearing habits of some imported apple cultivars grown under Urmia climate conditions****Ghasem Hassani<sup>1\*</sup>, Hassan Haj Najjari<sup>2</sup> and Mohsen Pirmoradian<sup>3</sup>**

(Received: Des. 19, 2018 - Accepted: Jun. 26, 2019)

**Abstract**

In order to develop new apple cultivars, imported apple (from Italy) seedlings were evaluated for their growth, yield and quality characteristics. Imported combinations including Red Chief, Galaschniga, Fujikiko, Fuji, Gala cultivars grafted on M<sub>9</sub> rootstocks as well as 'Golden Delicious' and 'Red Delicious' on M<sub>9</sub> rootstocks as control were planted in a randomized complete block design at Horticultural Research Station, Urmia. Growth parameters and vegetative characteristics of trees and qualitative traits of fruit were measured, and 3 year combined statistical analysis of data was performed. The results showed that all vegetative traits except for trunk diameter were statistically different among cultivars. Vegetative growth of one-year shoots, height, area of canopy expansion and leaf size in 'Red Chief', 'Golden Delicious' and 'Red Delicious' Leaves were lower than other imported varieties. Total chlorophyll content in new cultivars was higher than control cultivars. Yield and fruit size were significantly lower in control trees than in other trees. Fruit quality indices in imported apple cultivars were significantly higher than control trees. The alternate bearing index and yield variations were lower in new cultivars of 'Galaschniga' and 'Fuji Kiko' than other cultivars. Yield performance in 'Red Chief' and 'Galaschniga' was higher than other cultivars.

**Keywords:** Adaptability, Apple, Fruit quality, Healthy sapling

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Research Paper

## **Comparison of salt stress tolerance of two fig (*Ficus carica* L.) cultivars under in vitro conditions**

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Gholamabas Mohammadi<sup>3</sup> and Mahmoud Shabbani<sup>4</sup>**

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### Abstract

The aim of this study was to evaluate the salt tolerance of two cultivars of fig ('Kushki' and 'Rounou') under in vitro conditions. Salinity treatment was performed using different concentrations of sodium chloride (0, 40, 80 and 120 mM). The results showed that salinity significantly reduced fresh and dry weight, shoot length and leaf number in both cultivars after three weeks' treatment with sodium chloride. However, the decline was more in the 'Kushki'. In both cultivars, the activity of antioxidant enzymes were increased with increase in the concentration of sodium chloride, and this increase was significantly higher in Kushki cultivar. The amount of sodium accumulation and Na<sup>+</sup>/K<sup>+</sup> ratio in leaves and roots of 'Rounou' was significantly higher than Kushki cultivar. At 120 mM concentration, all traits were significantly reduced. Seedlings of the two cultivars showed different responses for most of the evaluated traits. According to the results of this study, the Kushki cultivar was more tolerant than the Rounou cultivar to the salinity stress.

**Keywords:** Antioxidant, Culture medium, Kushki cultivar, Peroxidase, Rounou cultivar

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Research Paper

## **Influence of drying temperature and maturity at harvest on biochemical properties and quality of jujube fruit**

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### **Abstract**

Jujube is one of the invaluable fruits from nutritional and medicinal aspects. However, its shelf life is short in ambient temperature. Drying is used as a common method to extend the shelf life, but optimum maturity stage at harvest and drying conditions is crucial for maximizing the nutritional value and maintaining the antioxidant properties during the processing stage. Hence, the effect of drying temperature and maturity stage (crisp mature and full ripe) on quality parameters, sensory and antioxidant properties of jujube fruit was examined. The results showed that the higher values of total phenolic content, ascorbic acid, and skin color characteristics include lightness ( $L^*$ ), redness ( $a^*$ ) and chroma ( $C^*$ ) were obtained in fruit harvested at crisp mature fruit. An increase in ascorbic acid, antioxidant activities and  $L^*$ ,  $a^*$  and  $C^*$  values were obtained in fruit dried at a lower temperature (45°C), while the greater value of  $hue$  ( $h^\circ$ ) was achieved at fruit dried at a higher temperature (60°C). In general, from sensorial and nutritional aspects, fruits harvested at fully ripe stage and dried at a lower temperature (45°C) were better.

**Keywords:** Ascorbic acid, Dryer, Total phenol, *Ziziphus jujuba*

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Research Paper

## Effect of different nitrogen to potassium ratios on physicochemical traits and antioxidant potential of physalis fruits (*Physalis peruviana*) under greenhouse conditions

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### Abstract

Due to the high nutritional and medicinal importance of physalis fruits, this research was carried out to optimize the cultivation of this valuable plant in greenhouse conditions. In the present study, effects of different nitrogen to potassium ratios (including 1/1.25 as control, 1/1.5, 1/1.75 and 1/2) on physical parameters including fruit length, diameter, weight, and color parameters of  $a^*$ ,  $b^*$ ,  $L^*$ , Chroma and hue, phytochemicals including total phenols and total flavonoid contents, as well as antioxidant activity were studied. According to the results, different ratios of nitrogen to potassium had a significant effect on studied traits. The highest fruit length (18.64 mm), fruit diameter (19.1 mm) and fruit fresh weight (4.31 g) were recorded in 1/1.75 and the lowest values for the mentioned parameters were observed in treatment 1/2 of nitrogen to potassium ratio. The treatments had a positive and significant effects on  $a^*$ , hue and chroma indices. The highest total phenols (253.58 mg gallic acid per 100 g fresh weight) and total flavonoids (29.5 mg quercetin in 100 g fresh weight) were recorded in the ratio of 1/2, and the highest antioxidant activity (55.58%) was observed in the ratio of 1 to 1.75 of nitrogen to potassium. The results showed that by modulating the mineral nutrient concentrations such as levels of potassium, which is a key element in plants, we can increase the productivity of greenhouse products, such as physalis.

**Keywords:** Antioxidant activity, Medicinal plants, Phenol, Physalis, Potassium

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Research Paper

## Effect of calcium ascorbate on quality changes of ‘Golden Delicious’ apple fruit at cold store

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### Abstract

In order to investigate the effect of calcium ascorbate on quality changes of ‘Golden Delicious’ apple during storage, an experiment was conducted in a completely randomized design with three replicates in 2017. The main factor was the concentration of calcium ascorbate (0, 2.5 and 5%) and the sub factor was different storage times (90, 150 and 210 days). The results showed a significant increase in total soluble solids, browning index, ethylene production and a significant reduction in total phenols content, vitamin C, titratable acidity, fruit firmness, and fruit postharvest life with increase in storage time. In addition, by the increase in calcium ascorbate concentration, the total acidity, tissue firmness and shelf life were increased (22.31, 17.83 and 8.54 %, respectively) and ethylene production rate was decreased (60.82 %). The interaction effect of calcium ascorbate and storage time on phenolics content and ethylene production was also significant. The results showed that calcium ascorbate at all concentrations decreased the ethylene production and with increase in storage time, the production rate of the ethylene was increased in all treatments. The highest ethylene production rate was recorded in control fruit after 210 days of storage. However, calcium ascorbate increased the shelf life of apple fruit during storage by slowing the rate of ethylene production and ripening processes.

**Keywords:** Calcium Ascorbate, Durability, Ethylene, Phenol

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Research Paper

## **Effect of nano chitosan based edible coating containing salicylic acid on shelf life and some quality attributes of fresh cut 'Red Gold' nectarine**

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### **Abstract**

Nowadays, with the change in lifestyles and feeding habits of the people, the demand for safe ready to eat and high quality products is increasing. Due to the sensitivity of fresh cut products to decay extension, the use of modern technologies for maintaining the quality and shelf life of these products is necessary. In this study, the effect of chitosan nano emulsion in combination with salicylic acid, as an edible coating, to increase the shelf life of nectarine fresh cuts was studied. Nectarines fresh cut were coated with nano chitosan emulsion at 0.4 % and salicylic acid at 2 mM, and packed and stored at  $0\pm 1^\circ\text{C}$  with 90 to 95% R.H for 16 days. Fruit quality indices including TSS, TA, pH, weight loss, total phenolics content and total antioxidant activity were evaluated at harvest and during storage. The results showed that the edible coating significantly affected fruit total soluble solids (TSS), titratable acidity (TA), pH, weight loss, total phenolics content and total antioxidant activity. This findings demonstrate the synergistic effects of salicylic acid and chitosan nano emulsions, as a safe method with no side effects of the chemicals, in increasing the shelf life and preserving the quality of fresh cut 'Red Gold' nectarines.

**Keywords:** Antioxidant, Natural compounds, Shelf life, Total phenolics, Soluble solids

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Research Paper

## Evaluation of phenotypic variation of some almond genotypes using morphological markers

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### Abstract

In order to group and compare 100 almond seed genotypes in Malayer region, 65 different quantitative and qualitative attributes related to vegetative and fruit traits of nut and kernel were measured based on the almond descriptor. Based on the results obtained some of the traits like the habit of tree growth, marking of outer shell, the durability of the outer layer of the outer shell, the opening of the outer shell, the presence of an extra edge of the nut, the time of leaves fall in the autumn, the percentage of twin kernels, the amount of leaf phosphorus and taste of the kernel had a high coefficient of variation. Simple correlation coefficients between traits showed that there were some vegetative, nut and kernel measured traits have a positive or negative correlation. Significant positive correlation between the ratio of length to width of the kernel and the shape of the nut ( $r= 0.60$ ), the outer shell thickness and the softness and hardness of the outer shell ( $r = 0.65$ ) existed. The cluster analysis divided the genotypes into two main groups at 15 Euclidean distances and the most important factors in the separation of genotypes from each other are the outer shell thickness, the outer layer thickness of the outer shell, the softness and hardness of the outer shell. With decrease in the Euclidean distance from 15 to 5, genotypes were divided into six main groups. Among the important factors were the separation of traits such as fruit ripening, nut shape, outer shell thickness, softness and hardness of the crust and the percentage of twin kernel. Factor analysis reduced the assessed traits to 11 main factors, justifying 61.17 percent of total variation. The traits related to the nut and kernel had the greatest effect on the separation of cultivars and genotypes. According to the results, there is a good genetic variation in almond genotypes in this region which can be used in almond breeding programs.

**Keywords:** Almond breeding, Cluster analysis, Morphological markers, Traits correlation

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