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Analyzing Effect of Seedling and MM106 Rootstocks on Quantitative and Qualitative Characteristics of Two Apple Cultivars of Delicious Red and Golden Delicious in Aleshtar

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Abstract: *In this research, the qualitative and quantitative characteristics of red delicious and golden delicious cultivars on MM106 and seedling rootstocks were studied. The experiment was conducted in a completely randomized factorial design with five repetitions. Golden delicious cultivar on MM106 rootstock has the highest percentage of flowering, flower density and fruit's number. June drop was more in golden delicious cultivar than red delicious cultivar but the preharvest drop was more in the red delicious cultivar than golden delicious cultivar. Results indicate the significant increase of drop in seedling rootstock in contrast to the MM106 rootstock. MM106 rootstock increased significantly the amount of product in contrast to the seedling rootstock. The acidity amount of fruit was more in the seedling rootstock rather than that of the MM106 rootstock, but the amount of total sugar, TSS, vitamin C and percentage of dry weight were more in the MM106 rootstock rather the seedling rootstock.*

Keywords: *APPLE, Red Delicious, Golden Delicious, MM106 Rootstock, Seedling Rootstock, Drop, Product*

INTRODUCTION

Apple is a grainy fruit, belonging to rosaceae family, pmoideae subfamily and malus species (Westwood, 1996). The MM106 rootstock produces strong trees with good establishment without any need for a support. The size of trees with this rootstock is 60-70% bigger than treed with seedling trees and they bear so many fruits (Mitra, S.M. &Khathore, 1992). During determination of most appropriate rootstock for reproducing the commercial apple cultivars, Ghasemi (2015) reported that grafted trees on M9 and M26 rootstocks in the 2nd year and on MM106 in the 3rd year started but the trees on seedling rootstock started flowering and fruiting in the 6th year (Proceedings of 4th Congress in Iran Horticulture, 2005).

Materials and Methods

To conduct the research, the completely randomized factorial design was utilized in 5 repetitions in a 2.5-ha field in Kaka-Reza Village. Counting flowers determines the amount of flowering and flower density. Then, the difference between the fruits and their number at the previous step determines the drop amount. The yield is achieved after fruit harvest. The fruit size was measured with calipers and the fruit weight was measured using a digital scale. The amount of acidity with 0.1 normal soda along phenolphthalein and vitamin C is achieved using 3% meta-phosphoric acid by DCIP2 with titration act (Behraves, 1999). To measure the dissolved solids, a refractor was used and oven was used to measure the fruit's dry weight. The most regular method of sugar measurement, Line. A. Noon. 1992, was used to measure the fruit's sugar (Behraves, 1999).

Results

The results showed that golden delicious cultivar includes higher number of flowers, flower density, and fruiting as compared to the red delicious cultivar and these characteristics are higher in the grafted trees on MM106 rootstock rather than seedling rootstock. MM106 rootstock produced more crop rather than seedling rootstock. The difference happens because of the effect of dwarfed rootstocks on early fruiting. Fruit size, sugar amount, vitamin C, and percentage of dry weight are higher in red delicious cultivar than golden delicious cultivar. These characteristics were higher in MM106 rootstock rather than seedling rootstock. The acidity amount was higher in seedling rootstock than MM106 rootstock. Additionally, acidity amount was higher in golden delicious cultivar than that of red delicious cultivar. The dissolved solids was higher in seedling rootstock than MM106 rootstock.

Discussion

Rasco et al. (2004) analyzed 33 commercial apple cultivars on MM106, M9 and seedling rootstocks and reported that the highest flower density related to the vegetative rootstocks and the lowest flower density related to the seedling rootstocks. The report is in tune with the results of this research (Racsk et al., 2004). According to Rasco's (2006) research, the seedling rootstock consists of more drop in contrast to vegetative rootstocks which is in harmony with the present research (Racsko et al., 2006). Sotropolos/Sotiropoulos (2008) analyzed the yield of red delicious cultivar and reported that the rootstock affects the average weight of fruit. The highest average weight of fruit was for the grafted trees on the rootstocks with little growth such as MM106 and the lowest weight of fruit was for the grafted trees on the seedling rootstocks. These results were in harmony with the results of this research (Sotiropoulos, 2008).

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