

**POMOLOGICAL PROPERTIES OF CULTIVAR "ČAČANSKA RODNA" IN  
CONDITIONS OF SARAJEVO**

Zlatka ALIC-DZANOVIC<sup>1</sup>, Mirjana RADOVIC<sup>2\*</sup>, Bosko GACESA<sup>1</sup>, Mirko KULINA<sup>2</sup>,  
Omer KURTOVIC<sup>1</sup>

<sup>1</sup>Federal Bureau of Agriculture, Sarajevo, Bosnia and Herzegovina

<sup>2</sup>Faculty of Agriculture, University of East Sarajevo, Republic of Srpska, Bosnia and Herzegovina

\*Corresponding author: rmirjana26@yahoo.com

**Abstract**

The paper presents results of two – year study of some pomological properties of cultivar of plum "Čačanska rodna" grafted on GF 655/2 and Fereley rootstocks. The research was carried out in the plum orchard for cultivar testing of Federal Bureau of Agriculture of Bosnia and Herzegovina. Obtained results showed that the average earlier time of maturation was on rootstock GF 655/2 (04.09.). Cultivar "Čačanska rodna" had the lowest fruit weight on rootstock Fereley in 2012 (27,48 g), while the highest fruit weight was on rootstock GF 655/2 in 2012 (30,53 g). There are significant differences between rootstocks and years which were included in the research. During of the research, the highest yield was on rootstock Fereley (2013), while the lowest yield was on same rootstock in 2012. The obtained results have confirmed that agro – environmental conditions of Sarajevo are favorable for growing the above mentioned cultivar of plum "Čačanska rodna" grafted on GF 655/2 and Fereley rootstocks.

**Keywords:** *plum, rootstock, pomological properties.*

**Introduction**

Plum is one of the dominant fruit species in our and neighboring countries. The total production of plums is on the ninth place in the world. The average annual production of 36151.25 t represents about 45.67% of the total fruit production in Bosnia and Herzegovina. The yield of plum was 35,312 t in 2012, which was about 38% less in quantity of produced plums compared to 2011. The reason for this was the unfavorable weather conditions, long dry periods accompanied by high temperatures. In Bosnia and Herzegovina there are very suitable agro - ecological conditions for the production of plums, but even so, the actual production does not meet the needs of the domestic market due to extensiveness of production, old plantations, inadequate rootstock, protection and very low agricultural technology and pomotechnical. The largest amount of produced fruit is processed into brandy, a small amount has been dried and only a small percentage of produced fruit is used in fresh form. Fresh fruits of plum have a better price on the market, but this cultivar has not an important place in the production in Bosnia and Herzegovina. One of the most important factors in the production of fruit is a cultivar, but also the rootstock (Ogasanovic et al., 2005), because the whole success of in fruit production depends of rootstock (Misic, 2006). Plum production is characterized by extensiveness, and the use of generative rootstocks, primarily use of seedling rootstock. Seedlings are usually lush and with uneven increase compared with rootstocks for plum. To achieve the intense plum production, it is necessary to introduce new varieties and vegetative surfaces, which has less vigor, more uniform growth, earlier yield in combination with adequate variety for obtaining higher yields. The aim of this work was to study some of the pomological properties of the cultivar "Čačanska rodna" grafted on rootstocks Fereley and Julijanka GF 655-2.

### Material and method

The research was carried out on the location of Sarajevo, in the plum orchard for cultivar testing of Federal Bureau of Agriculture of Bosnia and Herzegovina located in Butmir – Ilidza. Test plantation was built in the spring of 2007, at the altitude of 600 meters above sea level. Mentioned area is characterized by subalpine climate (Hydrometeorological Institute of Bosnia and Herzegovina), with colder winters that are longer than in the continental zone. The winds are frequent, summers are moderately warm with large annual fluctuations in temperature. The average annual air temperature is below 10°C.

We studied a cultivar ‘Cacanska rodna’ grafted on two rootstocks: Fereley and Julijanka GF 655-2.

Fereley is a French, temperate vigor rootstocks. It has a good adaptability to alkaline soils.

Julijanka GF 655-2 is vegetative rootstock of medium exuberance and has a good affinity with many cultivars of domestic plums. Cultivars grafted on this rootstock have early, regular and good yield. This rootstock tolerates well heavy, moist soil and frost.

Experiment was designed as block system with two replications of 10 trees, with planting space of 4.0 x 2.5 meters. Type of soil is fluvisol (alluvial soil). During research standard agrotechnical and pomotechnical measures, including irrigation were applied. Research was carried over a period of two years (2012 – 2013). Research included time of maturation, the physical properties of the fruit and obtained yield. Time of maturation was determined by the date of harvest.

Properties of the fruit or fruit weight was determined on a sample of 30 fruits, on the analytical scale ‘Adventurer - Ohaus’, with an accuracy of 1/10 g, and the values are expressed in grams. Yield of the cultivars was registered by the determination expressed as yield per tree (kg/tree) and yield per hectare (kg/ha).

The results were statistically analyzed using analysis of variance for a two factorial experiment, and significance between the mean values was determined using the LSD test probability 0.05 to 0.01.

### Results and discussion

Time of maturation depends on the genotype and agro ecological conditions. Agro ecological conditions influence the earlier and later time of maturation.

The average time of maturation of cultivar ‘Cacanska rodna’, grafted on rootstocks Fereley and GF 655-2, is shown in Table 1.

Table 1. Time of maturation cultivar ‘Cacanska rodna’ in conditions of Sarajevo (2012 – 2013)

Rootstock	Time of maturation		
	2012	2013	Average
Fereley	07.09.	05.09.	06.09.
GF 655 - 2	04.09.	04.09.	04.09.

The results of time of maturation showed that the average early ripening of cultivar was observed on the rootstock GF 655-2 (04.09.). *Bozovic et Jacimovic* (2011) say that cultivar “ a anaska rodna”, on the seedling rootstock in the conditions of Montenegro, had average time of maturation a little later than in our results. The reason for earlier time of maturation in conditions of Sarajevo can be explained by the influence of vegetative rootstock. The results of time of maturation we obtained in our research show a later time of maturation compared to the results of *Minev et Stoyanova* (2012). *Nenadovi – Mratini et al.* (2007) recorded an early time of maturation of cultivar “ a anaska rodna” on seedling rootstock in area of Belgrade. *Popovic et al.* (2006) came to similar results when it comes to time of maturation. Weight of the fruit was measured immediately after harvest. The characteristics of the fruits were determined on a sample of 30 fruit. We used the standard morphometric methods to determine these properties, and the results are presented in Table 2.

Table 2. Weight of the fruit cultivar “ a anaska rodna” in conditions of Sarajevo (2012 – 2013)

Rootstock	Weight of the fruit		
	2012	2013	Average
Fereley	27,48	29,92	28,70
GF 655 – 2	30,53	29,64	30,08
Average	29,01	29,78	29,39

  

LSD	A rootstock	B year	AB interaction
0,05	0,258	0,258	0,366
0,01	0,341	0,341	0,483

The weight of fruit is one of the most important characteristics of pomological properties, which affects the whole range of other properties, primarily yield of which is the utmost objective of any production. Cultivar “ a anaska rodna” had the highest fruit weight in 2012, grafted on rootstocks Julijanka GF 655-2, while the lowest fruit weight was in 2012, also, grafted on rootstocks Fereley.

Average higher fruit weight was in cultivar grafted on rootstocks Julijanka GF 655-2.

Year and rootstocks, as factors, had a statistically significant effect on fruit weight.

Comparing the weight of the fruit of the cultivar “ a anaska rodna” with the results by *Popovic et al.* (2008), there is a slightly higher value in our studies.

Slightly lower values of fruit weight of cultivar “ a anaska rodna” reported *Minev and Stoyanova* (2012).

The weight of fruit cultivar ‘Cacanska gender’ in condition of Sarajevo has shown a higher or lower fruit weight, depending on the planting spaces that were included in the study by authors *Miletic et al.* (2011).

*Walkowiak-Tomczak et al.* (2008), made classification of plum fruits according to fruit size as: very small (5-10 g), small (10-20 g), medium (20-40 g), medium (40-50 g), large (50-60 g) and very large (60-80 g). According to this classification, the fruits of the cultivars in our studies belong to the medium in size.

Many factors affect the yield and quality of plum cultivars, which primarily depends on the genotype (cultivar and rootstock), planting density, and physical and chemical properties of the soil, maintenance of soil structure in the orchard and the use of irrigation.

Biological potential of yield of fruit trees is conditioned by the genetic basis of cultivars, environmental growing conditions and applied pomotechnical and agrotechnical measures. The knowledge of the characteristics of yield is of paramount importance, particularly in the selection of cultivars and rootstocks for intensive production.

Intensive production depends on the characteristics of cultivars and rootstocks, and their interactions.

The yield of plum 'Cacanska gender', grafted on rootstocks Fereley and GF 655-2, in conditions of Sarajevo are present in Table 3.

Table 3. Yield of cultivar " a anska rodna" in conditions of Sarajevo (2012 – 2013)

Rootstock	Yield					
	2012		2013		Average	
	kg/tree	kg/ha	kg/tree	kg/ha	kg/tree	kg/ha
<b>Fereley</b>	16,20	16.200,00	21,4	21.400,00	18,80	18.800,00
<b>GF 655 – 2</b>	17,80	17.800,00	19,70	19.700,00	18,75	18.750,00

The highest yield of the cultivar " a anska rodna" was obtained on those trees grafted on rootstocks Fereley, in 2013. The same combination had the lowest yield in 2012. In average, during these years there was no significant difference in yield in the studied rootstock.

Comparing our results with the results of the authors Miletic et al. (2011) for the yield, it is evident that the variety " a anska rodna" showed a better yield in the agro-ecological conditions of Sarajevo.

### Conclusion

On the basis of two-year investigations of the time of maturation, fruit weight and yield of plum cultivar " a anska rodna" grafted on GF 655/2 and Fereley rootstocks in region of Sarajevo, we have made the following conclusions:

- Average time of maturation was from 04.09. to 06.09. depending of rootstocks.
- Average weight of fruit ranged from 28,70 g (" a anska rodna" grafted on Fereley) to 30,08 g (" a anska rodna" grafted on GF 655/2).
- The highest fruit weight had cultivar " a anska rodna" grafted on GF 655/2 in 2012., while the lowest fruit weight, had cultivar " a anska rodna" grafted on Fereley in 2012.
- The highest yield had cultivar " a anska rodna" grafted on Fereley in 2013.
- The lowest yield in 2012 year had the cultivar " a anska rodna" grafted on Fereley
- Taking all into account, cultivar of plum " a anska rodna" grafted on GF 655/2 and Fereley rootstocks in region of Sarajevo can be recommended for the advancement of Bosnia and Herzegovina plum assortment.

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