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PLUM VARIETIES FEATURES FROM LUGOJ, TIMIŞ COUNTY, ROMANIA, IN TERMS OF FRUIT QUALITY

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Abstract

Plums have the highest nutritional value of cultivated species, not only in terms of high sugar content (16-20%) but also in terms of content of biologically active substances, especially minerals and vitamins, which have an increasingly important role in human nutrition. Sugars are the substances with the highest share in fruits (about 90% of the dry matter). Fruit carbohydrate content varies depending on species, ranging from 3.4% in gooseberries and 16.72% in apples; plums contain 7-18% carbohydrates. Fruit sugars, especially simple ones, are rapidly absorbed into the body, rebuilding the glycogen reserve of the liver and refreshing the body. This research aimed at studying four plum varieties: 'Cacanska Lepotica' (Serbia), 'Stanley' (USA), 'Record' (Romania), ''Vinete românești'' (Romania). All four varieties are cultivated in our country: 'Stanley', 'Record', ''Vinete românești'' are widely cultivated in our country while 'Cacanska Lepotica' is less cultivated. In this paper, the features of the fruit of the plum varieties were monitored in the conditions of the Lugoj locality, in 2018, from a biometric and qualitative point of view.

Key words*: fruit, plum, quality, sugars, variety.*

INTRODUCTION

Plum is a fruit species of great economic importance for the temperate zone, especially for the Balkan countries, where it spread on a large area of culture due to the rusticity of the species, its food value and the therapeutic value of the fruit and, last but not least, its many uses (Iordănescu, 2008; Iordănescu& Olaru, 2014). *Prunus domestica* L. originates from Europe and Asia, where it grows spontaneously but never wild (Drăgănescu, 2006).

Because of the financial crisis in traditional plum growing countries like Serbia, Hungary, Romania, Greece and Moldova the investements in new plum orchandes had falled dramatically (Botu et al., 2012).

It is information about these particularities, useful to the breeding or growing processes,or to enlarge the assortment of local fresh, preserved or conditioning fruits (Vitanova et al, 2004; Okatan et al., 2017)

Fresh, plums contain all the microelements necessary for the human body: K, Ca, Mg, P, Fe etc., (mainly alkaline ones). Of the vitamins, the most representative are vitamin C, carotene, vitamin B1, B2, PP and others. However, plums are poor in protein and lipids, thus having a low caloric value.

Researches made by Cojocaru (2016) at different varieties study, showed that content in dry substance had values between 26% and 12%.

Population form the largest fruits in weight and size, but with a content in dry matter lower, 18.24%, relative to the T2 and T4 populations (Potor et al, 2018).

The intensification of the plum culture in Europe took place in the 17th century, when it supposedly began to be cultivated in the Romanian provinces.

From the previous researches, it can be said that plum has medium requirements in eco-pedological conditions; it requires simple cultivation technologies, and the productions are good and constant (Mihuţ, 2004), plus the rusticity and ecological plasticity of the tree on a wide variety of soils (Berar et al., 2000; Hoza, 2000).

The assortment covers a large and diversified range, the most widely spread being 'Tuleu' 'Gras', 'Vinete romanesti', 'Stanley', 'Agen' (Branişte, Drăgoi, 1999).
As a result, in Romania plum is grown almost everywhere, from the plain to the semi-high hills with altitudes of 600 and even 700 m, but the vast majority of plantations are found in the low and medium hills and even in the plain. The counties where plum predominates are Argeş, Vâlcea, Sălaj, Caraş-Severin, Buzău, Dâmboviţa, Gorj, Mehedinţi, Timiş etc.

MATERIALS AND METHODS

This research aimed at studying four varieties of plum - Romanian varieties ('Record', ''Vinete românești''), an American variety ('Stanley') and a Serbian variety ('Cacanska Lepotica').
The fruits of the studied varieties were harvested from Lugoj, Timiş County, on Farm 3 belonging to the Timişoara Didactic Resort. The farm has 103 ha of agricultural land, of which 12 ha of nursery, 4 ha of haymaking fields and the difference of arable land.
The trees studied were planted in 2013 at distances of 4 m per row and 4 m between rows. The crown was designed in the form of a 60 cm trunk vessel. The soil is kept loose and clean of weeds with herbicides and the interval between the rows through grassing.
The soil was fertilized in January with complex fertilizers NPK - 15:15:15 (400 kg/ha) and in March with ammonium nitrate (300 kg/ha).
Controlling diseases and pests was done by applying two treatments during the vegetative rest period and 8 treatments during the vegetation period, depending on the intensity of the disease and of the pest attack.
As regards biometric aspects, fruit samples (25 fruits for each variety) harvested from different parts of the crown were made and the following measurements were made: large diameter, small diameter, fruit height, dry matter, sugar content. The weight of the fruits and the weight of the sap that were determined by weighing them were also monitored. In the case of these indicators, the data obtained were statistically processed using the variance analysis method (Iancu S., 2002), as the average of the varieties used.

RESULTS AND DISCUSSIONS

As regards the large diameter of the varieties studied in 2018, it can be seen that the highest value of this indicator was recorded in the 'Record' variety (47.00 mm), the difference from the control being very distinctly positive, and the lowest value was obtained in the 'Vinete românești' variety (28.00 mm), the difference from the control being very distinctly significantly negative, with a variety average of 38.42 mm (Table 1 and Figure 1).

Table 1. Large fruit diameter of the plum varieties studied in 2018

Variety	Large diameter mm	Relative value %	Difference from the control	Significance
Variety mean	38.42	100.00	0.00	Control
Cacanska Lepotica	42.00	109.33	3.58	-
Vinete românești	28.00	72.89	-10.42	000
Stanley	36.67	95.44	-1.75	-
Record	47.00	122.34	8.58	XXX
		DL5% = 3.90 mm	DL1% = 5.27 mm	DL0.1% = 7.03 mm

From the data in Table 2 and Figure 1 we can see that the small diameter of the analysed fruits had values between 46.33 mm and 26.67 mm. with an average of 37.00 mm.
As for the small diameter, it can be observed that the 'Record' variety recorded the highest value of 46.33 mm, the difference from the control being very distinctly significant compared to the control.

Table 2. Small fruit diameter of the plum varieties studied in 2018

Variety	Small diameter (mm)	Relative value (%)	Difference from the control	Significance
Variety mean	37.00	100.00	0.00	Control
Cacanska Lepotica	39.67	107.21	2.67	-
Vinete românești	26.67	72.07	-10.33	000
Stanley	35.33	95.50	-1.67	-
Record	46.33	125.23	9.33	XXX
		DL5% = 3.30 mm	DL1% = 4.46 mm	DL0.1% = 5.95 mm

The height of the fruits in the plum varieties studied in 2018 ranged between 51.33 mm and 47.33 mm, with an average of 46.25 mm (Table 3 and Figure 1).
The 'Record' variety had the highest average height of 51.33 mm. the difference from the control being significantly positive and the 'Vinete românești' variety recorded the smallest height, with a value of 35.33 mm the difference from the control was significantly negative.

Table 3. Height of the plum varieties studied in 2018

Variety	Height (mm)	Relative value (%)	Difference from the control	Significance
Variety mean	46.25	100.00	0.00	
Cacanska Lepotica	47.33	102.34	1.08	-
Vinete românești	35.33	76.40	-10.92	000
Stanley	51.00	110.27	4.75	-
Record	51.33	110.99	5.08	X
		DL5% = 4.86 mm;	DL1% = 6.57 mm;	DL0.1% = 8.75 mm

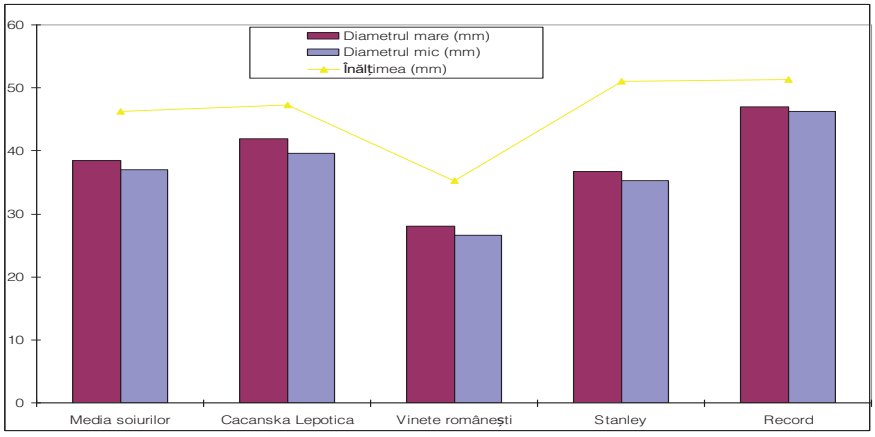

Figure 1. Large diameter, small diameter and height of plum fruits studied in 2018

The fruit weight of the plum varieties taken in the study in 2018 ranged from 60.50 g to 16.63 g. with an average of 39.09 g (Table 4 and Figure 2).

From a statistical point of view, 'Record' and 'Cacanska Lepotica' varieties had the highest values in terms of fruit weight i.e. 60.50 g and 45.73 g the difference from the control being very significant.

Table 4. Weight of the plum varieties studied in 2018

Variety	Fruit Weight (g)	Relative value (%)	Difference from the control	Significance
Variety mean	39.09	100.00	0.00	Control
Cacanska Lepotica	45.73	116.99	6.64	XXX
Vinete românești	16.63	42.55	-22.46	000
Stanley	33.50	85.70	-5.59	000
Record	60.50	154.77	21.41	XXX
		DL5% = 1.03g ;	DL1% = 1.39g;	DL0.1% = 1.86g

Statistically, the value produced by the 'Cacanska Lepotica' variety (2.05 g) at the weight of the stone had very significant positive meanings, followed by the 'Stanley' variety with a weight of 1.91 g (Table 5 and Figure 2). The 'Record' and 'Vinete românești' were statistically very significantly negative to the control of the experience.

Table 5. Stone weight of the plum varieties studied in 2018

Variety	Stone weight (g)	Relative value (%)	Difference from the control	Significance
Variety mean	1.51	100.00	0.00	Control
Cacanska Lepotica	2.05	135.98	0.54	XXX
Vinete românești	1.01	67.11	-0.50	000
Stanley	1.91	126.71	0.40	XXX
Record	1.07	71.08	-0.44	000
		DL5% = 0.14 g ;	DL1% = 0.19 g ;	DL0,1% = 0.25 g

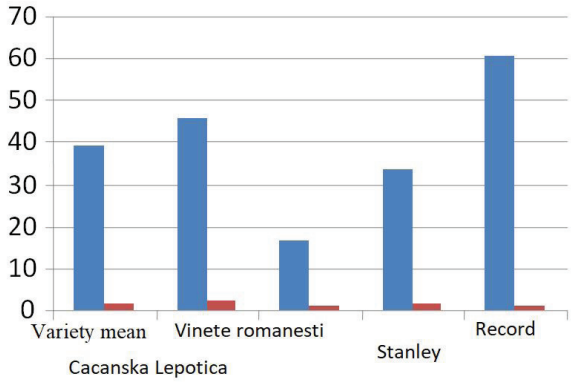

Figure 2. Fruit/stone weight of the plum varieties studied in 2018

From the data in Table 6, it can be seen that the dry fruit content of the plum varieties studied ranged between 25.63% and 13.73%, with a varieties average of 19.17%.
Statistically speaking, the 'Vinete românești' variety was very significantly positive for the control (25.63%), and the 'Stanley' variety had a 13.73% dry substance, the difference from the control being very significantly negative. As we can see from the data in Table 7, the highest sugar content recorded was in the 'Vinete românești' variety, with a value of 24.73% the difference from the control being very significant, and the 'Stanley' variety recorded the lowest content in sugars, which is 12.09%.

Table 6. Dry fruit content of the plum varieties studied in 2018

Variety	Dry matter (%)	Relative value (%)	Difference from the control	Significance
Variety mean	19.17	100.00	0.00	Control
Cacanska Lepotica	15.13	78.94	-4.04	00
Vinete românești	25.63	133.72	6.46	XXX
Stanley	13.73	71.64	-5.44	000
Record	22.20	115.81	3.03	X
DL5% = 2.96%; DL1% = 4.00% ; DL0.1% = 5.33%				

Table 7. Sugar content of the plum varieties studied in 2018

Variety	Sugar %	Relative value %	Difference from the control	Significance
Variety mean	18.01	100.00	0.00	Control
Cacanska Lepotica	13.57	75.37	-4.44	00
Vinete românești	24.73	137.33	6.72	XXX
Stanley	12.09	67.11	-5.92	000
Record	21.65	120.21	3.64	XX
DL5% = 2.61%; DL1% = 3.52%; DL0.1% = 4.695%				

CONCLUSIONS

As regards the large fruit diameter in the studied varieties in 2018, it can be seen that the highest value of this indicator was recorded in the 'Record' variety (47.00 mm), the difference from the control being very distinctly positive.

As for the small diameter, it can be observed that the 'Record' variety recorded the highest value, i.e. 46.33 mm, the difference from the control being very distinctly significant compared to the control.

The 'Record' and 'Cacanska Lepotica' varieties had the highest values in terms of fruit weight, i.e. 60.50 g and 45.73 g the difference from the control being very significant. The value of the 'Cacanska Lepotica' variety (2.05 g) in the weight of the stone gave it a very positive significance.

From the statistical point of view, the 'Vinete românești' variety was very significantly positive towards the control (25.63%) and the 'Stanley' variety had a 13.73% dry substance, the difference from the control being very significantly negative.

The highest sugar content recorded the 'Vinete românești' variety with a value of 24.73% the difference from the control being very significant and the 'Stanley' variety recorded the lowest sugar content, this being 12.09%.

Following the measurements made on the fruit of the varieties studied, we can say that all four varieties responded well after fertilizations with NPK and ammonium nitrate treatments.

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