

FRUIT QUALITY IN FUNCTION OF THE GRAFT/ROOTSTOCK BIOSYSTEM WITH SOME PLUM TREE VARIETIES

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ABSTRACT

The paper emphasizes the fruit quality with different plum tree varieties in function of the graft/rootstock biosystem in an orchard located eastward of Craiova town.

The researches have been carried out in 2006-2008 period and there were studied 7 plum tree varieties (IALOMI A, FLORA, VÂLCEAN, TULEU GRAS, DÂMBOVI A, VALOR and STANLEY) which were grafted on 4 rootstocks (Ote ani 8, Pixy, Miroval and Roiorv ratic)

The main researched aspects on fruit have been: the size and the mass of the fruit, the mass of the kernel, the pulp and kernel ratio, the number of fruits and kernels per kg as well as the content of soluble dry matter and sugar of the fruits.

After the study, the Vâlcean variety recorded the fruits with the biggest size (49.34 mm) and mass (71.58 g), for one kg of fruits there was needed 14 units. Another conclusion is that Stanley variety has recorded the highest percent of soluble dry matter (23.10%).

INTRODUCTION

Plum tree is a less pretentious species as regard environment conditions, having a high ecological adaptability capitalizing even thin and poor soils. This species records a rapid growth, early fructification (3-4 year since planting), high and constant yields year by year. The plum tree wood is used for making crayons, handicrafts as well as fuel. The plum tree flowers are an important food source for bees yet an unsurpassed landscape for rural areas.

The fruit quality obtained after several combinations of graft and rootstock is given by a series of morphological features of plums which make them different between them and allowing them good trade features, too.

It is evident influence of variety, rootstock and combination variety/rootstock on production and fruit quality, the effect was very significantly positive (Cichi M., 2013).

MATERIAL AND RESEARCHING METHOD

The researches have been carried out near Craiova, at Experimental Didactical Station (EDS) Banu Maracine during 2006-2008 period. The soil is a weak gleysated reddish preluvosoil which has 2.35% humus content in the upper horizon but it decreases along with the depth till 0.78%. the soil reaction is low acid, pH=5.50-6.64.

The biological material consisted on 7 plum tree varieties (Ialomi a, Flora, Vâlcean, Tuleu gras, Dâmbovi a, Valor and Stanley) grafted on 4 rootstocks (Ote ani 8, Pixy, Miroval and Roiorv ratic) every rootstock having 10 repetitions.

Within every variety there were studied the size and the mass of the fruit, the mass of the kernel, the pulp percent, the kernel percent, the number of fruits per kg, the number of kernels per kg, the soluble dry matter content, the sugar content as well as the influence of the rootstock on the studied indicators.

RESULTS AND DISCUSSIONS

The size of the fruits was determined by calculating the size index. With 7 studied varieties the size index varied between 37.90 mm with Tuleu Gras and 49.34 mm with Valcean (table 1). A high value of the size index has been recorded by the Dambovita variety, too (42.76 mm).

The weight of the fruits is an important indicator used in plums trade. After EU norms, the fruits designed for table consumption are divided in three, after their weight: over 40 g (large fruits), between 20-40 g (average fruits) and under 20 g (small fruits) (Botu M., 2000).

The fruits of the studied varieties can be split, after their weight, in the following weight groups (table 1):

- Very large fruits (over 60 g) – Valcean variety;
- Large fruits (40-60 g) – Dambovita and Flora varieties;
- Average fruits (20-40 g) - Valor, Stanley, Ialomi a, Tuleu gras varieties.

The weight of the kernel varies between 1.41 g with Flora variety and 2.42 g with Valor variety. The varieties whose kernels are less than 2 grams are: Dâmbovi a (1.46 g), Ialomi a (1.52 g) and Tuleu gras (1.64 g).

The pulp percent varies between 93.79% with Valor variety and 96.80% with Valcean variety. Values over 96% are recorded with the following varieties: Flora (96.72%) and Dâmbovi a (96.61%).

The kernel percent varies between 3.20% with Valcean variety and 6.21% with Valor variety, high values of the kernel percent (over 4%) being recorded with the following varieties: Tuleu gras (5.59%) and Ialomi a (4.24%).

The number of fruits per kg varies between 14 fruits with Valcean variety and 29 fruits with Tuleu gras variety.

The number of kernels/kg varies between 413 kernels with Valor and 709 kernels with Flora variety. High values of the number of kernels/kg (over 600 kernels/kg) are recorded with the following varieties: Dâmbovi a (685 kernels/kg), Ialomi a (657 kernels/kg) and Tuleu gras (610 kernels/kg).

Table 1

The features of plum tree varieties cropped in Central Zone of Oltenia (2006-2008)

Nr. crt.	Variety Feature	IALOMI A	FLORA	VÂLCEAN	TULEU GRAS	DÂMBO -VI A	VALOR	STANLEY
1.	Fruit size (mm)	39.69	41.19	49.34	37.90	42.76	41.54	41.38
2.	Fruit weight (g)	35.74	42.86	71.58	34.33	43.06	38.92	37.90
3.	Kernel weight (g)	1.52	1.41	2.28	1.64	1.46	2.42	2.20
4.	Pulp percent (%)	95.76	96.72	96.80	94.41	96.61	93.79	94.20
5.	Kernel percent (%)	4.24	3.28	3.20	5.59	3.39	6.21	5.80
6.	Nr. of fruits/kg	28	24	14	29	23	26	26
7.	Nr. of kernels/kg	657	709	438	610	685	413	454

After studying the average features of the 7 plum tree varieties in function of the rootstock (table 2) there can be observed that the size of the fruit varies as follows: 43.9 mm with the Miroval rootstock, 42.8 mm with Rosior varatic, 42.1 mm with Otesani 8 and 41.2 mm with Pixy rootstock.

The weight of the fruit do not varies much, recording the following values: 44.8 g with Miroval rootstock, 44.2 g with Rosior varatic, 43.7 g with Otesani 8 and 42.9 g with Pixy rootstock. Between rootstocks there are recorded small differences.

The weight of the kernel varies between 2.1 g with Miroval, 1.8 g with Rosior varatic, 1.7 g with Otesani 8 and 1.6 g with Pixy rootstock.

The percent of the pulp is between 96.3% with Miroval and 95.2% with Pixy rootstock. With Rosior varatic and Otesani 8 rootstocks the pulp percent is of 96.0% and, respectively, 95.7%.

The kernel percent is of 3.7% with Miroval, 4.0% with Rosior varatic, 4.3% with Otesani 8 and 4.8% with Pixy rootstock. The highest number of fruits/kg is recorded by Pixy (27 fruits/kg), followed by Otesani 8 (25 fruits/kg), Rosior varatic (23 fruits/kg) and Miroval (21 fruits/kg).

Table 2

The average features of fruits with 7 plum tree varieties in function of rootstock (2006-2008)

Nr crt	Rootstock	Fruit size (mm)	Fruit weight (g)	Kernel weight (g)	Pulp percent (%)	Kernel percent (%)	Nr. of fruits/kg
1.	OTE ANI 8	42.1	43.7	1.7	95.7	4.3	25
2.	PIXY	41.2	42.9	1.6	95.2	4.8	27
3.	MIROVAL	43.9	44.8	2.1	96.3	3.7	21
4.	RO IOR V RATIC	42.8	44.2	1.8	96.0	4.0	23

As regard the chemical composition of the fruits there were determined the soluble dry matter content (%) and the sugar content (%) of plums during the study period (2006-2008) (table 3, figure 1).

The fruits of the plum tree varieties accumulate different percent of soluble dry matter (12.66-23.10%). The lowest values have been recorded with the following varieties: Ialomia (12.66%) and Flora (15.36) and the highest, with Stanley (23.10% and Valor (22.68%).

Table 3

The soluble dry matter and sugar contents of the 7 studied plum tree varieties cropped in the central zone of Oltenia

Nr crt	Plum tree variety	Soluble dry matter content (%)	Sugar content (%)	Difference +/-	Significance
1.	IALOMI A	12.66	10.50	-4.483	ooo
2.	FLORA	15.36	12.75	-2.240	ooo
3.	VĂLCEAN	15.53	12.88	-2.103	ooo
4.	TULEU GRAS(Mt)	18.06	14.99	—	Ctrl.
5.	DĂMBOVI A	18.10	15.02	+0.030	-
6.	VALOR	22.68	18.83	+3.847	***
7.	STANLEY	23.10	19.17	+4.180	***

DL 5% = 0.1 %

DL 1% = 0.2 %

DL 0,1% = 0.3 %

The sugar content varies between 10.50% (lalomita) and 19.17% (Stanley). When the control is taken the Tuleu gras variety whose sugar content is 14.99% there can be observed the following differences: positive very significant differences with Stanley (+4.18%) and Valor (+3.84%), respectively, negative very significant differences with lalomita (-4.49%), Flora (-2.24%) and Valcean (-2.11%). The Dambovita variety has not determined significant differences as compared with the control.

As regard the influence of the rootstock on the soluble dry matter content with the plum tree studied varieties, in 2006-2008 period there can be observed that the average value is 17.14% and, in comparison with it there were recorded positive differences with Otesani 8 (+0.25%) and Pixy (+0.11%), respectively, negative differences with Miroval (-0.14%) and Rosior varatic (-0.22%) (table 4)

Table 4

The influence of the rootstock on the soluble dry matter content and sugar content with researched plum tree varieties (2006-2008)

Nr crt	Rootstock	Soluble dry matter (S.D.M.) content (%)		Sugar content (%)	
		S.D.M.(%)	Difference (%)	Sugar (%)	Difference (%)
1.	OTE ANI 8	17.44	+0.25	14.47	+0.21
2.	PIXY	17.30	+0.11	14.36	+0.10
3.	MIROVAL	17.05	-0.14	14.15	-0.11
4.	RO IOR V RATIC	16.97	-0.22	14.08	-0.18
AVERAGE		17.14	-	14.26	-



Figure1 – The soluble dry matter content

The average sugar content is 14.26% and in comparison with this value there were recorded positive differences with Otesani 8 rootstock (+0.21%) and Pixy (+0.10%), respectively, negative differences with Miroval (-0.11%) and Rosiorvaratic (-0.18%) rootstocks.

CONSLUSIONS

The Valcean plum tree variety has the largest (49.34 mm) and heaviest (71.58 g) fruits, for one kilo being necessary a number of 14 fruits.

The early plum tree varieties have a low content of soluble dry matter and sugar being recommended for fresh consumption while late varieties have a higher content of soluble dry matter and sugar, being recommended for industrialization (drying: Stanley and Tuleu gras).

The rootstocks do not influence either the soluble dry matter content or sugar content as it was recorded with the varieties.

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