THE BEHAVIOR OF PLUM VARIETIES GROWN ON WET PHREATIC CHERNOZEM

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Abstract

Minerva variety is intended exclusively for fresh consumption, Centenar variety is suited for fresh consumption but also for processing and in particular to obtain plum nectar; Stanley and Anna Spath varieties can be used both for fresh consumption and industrialization in any form (compotes, jams, comfitures, marmalades, fruit nectar, distillation, dehydration). Due to the obtained yields of 40.8 tons / ha and 37.3 t / ha, and the special qualities of the fruits and multiple use possibilities, Stanley and Centenar varieties as well as Minerva variety being an early variety are recommended to be included into culture on any type of soil.

Key words: *apple, main fructification phenophases, physico-chemical parameters of fruits*

INTRODUCTION

The plum tree, being adapted to the most diverse climatic and soil conditions, with diminishing technological requirements with respect to other species will continue to populate different areas both on the hills and in the plain, enjoying the attention in all countries with climate conditions that are appropriate to the biological requirements of known species and varieties.

The large expansion and feedback from consumers enjoyed by the plum culture are due to the following features:

- widely-spread trees and ability to adapt to special ecological conditions compared to other species
- easy seed and sucker multiplication and grafting on the most common rootstock (cherry plum) and early entry in fruit bearing (years 3-4 after planting)
- high productions and the long life of the fruit trees
- long period of fruit recovery (about 90 days) due to the numerous varieties with different ripening periods
- multiple opportunities to exploit the fruits (fresh consumption, industrial processing in various forms, distillation, dehydration)
- food and therapeutic value of fruits

The plum culture in the plain on chernozem was unthinkable before 1990, but after the landowners cultivated only cereal crops, starting with

2000 several fruit tree plantations began to be established due to their high profitability.

The plum culture by its less demanding technology and high productions every year, but also because the vast majority of plantations are old and should be replaced, and accessing European funds for agriculture, aroused a great interest among population setting up many young plantations.

MATERIAL AND METHOD

Branches were taken from SCDP Oradea, from the following summer apple varieties: Minerva, Centenar, Stanley and Anna Spath.

These varieties were grafted on cherry plum rootstock in the nursery of PFA Gîtea Daniela and were planted in the spring of 2004 with four meters between rows and four meters in the row (625 trees per ha) liniarly with 12 trees per variant (4 repetitions of 3 trees).

Annually 150 kg N, 100 kg P_2O_5 and 200 kg K_2O were applied during the first four years after planting and 250 kg N, 250 kg P_2O_5, 250 kg K_2O in the coming years.

Between the rows, dead fallow was maintained through repeated works with disc and miller and in the row the works were performed manually in the first three years after planting; then Roundoup herbicide 3 l / ha as well as mechanical and manual mowing have been applied in the coming years.

Measurements and determinations were related to:

- main fructification phenophases

Flowering – there was a daily visit of the experience/experiment and it was noted the first flower blooming as well as the end of the flowering taken as the date when the petals were shaken under the tree.

Harvest Maturity - As of July 10, there was a dayly visit in front of each cultivar and it was noted the beginning and end of harvesting maturity

- surface of trunk section,

Two diameters for each tree were measured with calipers and made the average to calculate the radius. The formula $\frac{\pi R^2}{2}$ was applied calculating the trunk sectional area in cm².

- production of fruit per ha,

Fruit production - For every tree of the 12 on variant, the fruits were completely harvested and weighed in kg / tree, there was the sum of the 12 fruit trees and settled kg / variety, then they were reported per hectare.

- physico-chemical parameters of fruits (size index, weight and dry matter index determined refractometrically)

Size – the large diameter, small diameter and height were measured with the caliper on samples of 25 fruits, the average of the 75 measurements was made, after that the fruit size was calculated in millimeters according to the formula: $\frac{D + d + h}{3}$

Weight - sample of 50 fruits were weight with analytical balance and then the average weight in grams(g) was established.

Dry matter - refractive / refractometrically. All data were processed statistically by variance analysis method.

RESULTS AND DISCUSSION

The flowering begins on the date of 09.04 for Anna Spath variety and continues up to 15.04 for Stanley variety and the end of flowering starts on the date of 21.04 for Minerva variety and ends on the 24.04 for Stanley variety.

Harvest maturity begins on the 15.07 for Minerva variety being the earliest variety, and continues up to 01.08 for Centenar variety, 18.08 for Stanley variety and ends on the 10.09 for Anna Spath variety.

Table 1

Main fruiting phenophases in plum varieties
(average values 2012-2014)

Crt. no.	Variety or hybrid	Flowering			Harvesting maturity	
		Beginning	Peak	End	Beginning	End
1	Minerva	10 - IV	14 - IV	21 - IV	15 – VII	25– VII
2	Centenar	12 - IV	17 – IV	22 – IV	01 – VIII	12 – VIII
3	Stanley	14 - IV	16 – IV	24 – IV	18 – VIII	05 – IX
4	Anna Spath	09 - IV	14 - IV	22 - IV	10 – IX	22 – IX

As regards the trunk section surface, Stanley varieties, Minerva and Centenar varieties have values above the average of varieties but they are not significant; instead Anna Spath variety is below the average of varieties.

Table 2

Surface of trunk section in the 11th year after planting in plum varieties

Crt. no.	Variety or hybrid	Surface of trunk section - 2014 -		±d (cm^2)	Significance
		Absolute (cm^2)	Relative (%)		
1	Stanley	53.9	106.1	+3.1	-
2	Minerva	51.6	101.6	+0.8	-
3	Centenar	50.9	100.2	+0.1	-
4	Media(Mt)	50.8	100.0	0.0	-
5	Anna Spath	46.7	91.9	-4.1	-

LSD 5%=6.1

The fruit production has values of 40.8 tons / ha for Stanley variety significantly positive with respect to the average of varieties, 37.3 tons / ha for Centenar variety over the average of the other varieties, 34.2tone / ha for Minerva variety below the average of the varieties and 31.2 tons / ha for Anna Spath variety that is significantly negative with respect to the average of varieties.

Table 3

Fruit production in plum varieties (2012- 2014)

Crt. no.	Variety or hybrid	Production(t/ha)			Average production		±d (t/ha)	Significance
		2012	2013	2014	Absolute (t/ha)	Relative (%)		
1	Stanley	38.8	46.3	37.4	40.8	113.6	+ 4.9	x
2	Centenar	32.8	36.3	42.9	37.3	103.9	+ 1.4	-
3	Media(Mt)	31.7	37.2	38.0	35.9	100.0	0.0	-
4	Minerva	29.3	32.6	40.7	34.2	95.3	- 1.7	-
5	Anna Spath	26.1	36.3	31.2	31,2	86.9	- 4.7	o

LSD 5% = 4.3

LSD 1% = 6.2

The fruit size varies between 15.8 mm for Minerva variety and 22.3 mm for Centenar variety.

The size of the fruit has values above 40 g for Stanley, Centenar and Anna Spath varieties, only Minerva variety has smaller fruits of 35.7g.

Dry matter of over 15% is present for Stanley, Centenar and Anna Spath varieties.

Table 4

Physico-chemical properties of the fruits
(average values 2012-2014)

Crt. no.	Variety or hybrid	Size index (mm)	Weight index (g)	Dry matter (%)
1	Stanley	18.9	42.7	15.2
6	Centenar	22.3	46.9	15.0
8	Minerva	15.8	35,7	13,6
12	Anna Spath	17.4	40.2	15,8
13	Media(Mt)	18.6	41.4	14.9

CONCLUSIONS

Flowering begins on the date of 09.04 Anna Spath variety and continues up to 15.04 for Stanley variety and the end of flowering starts on the date of 21.04 for Minerva variety and ends on 24.04 for Stanley variety.

Harvesting maturity begins on the date of 15.07 for Minerva variety being the earliest variety, then it continues on the date of 01.08 for Centenar variety, and 18.08 for Stanley variety and ends on the date of 10.09 for Anna Spath variety.

If Minerva variety is intended exclusively for fresh consumption, Centenar variety is intended for both fresh consumption and processing but it is suited in particular to obtain plum nectar; Stanley and Anna Spath varieties can be used both for fresh consumption and industrialization in any form (compotes, jams, comfitures, marmalades, fruit nectar, distillation, dehydration).

As regards the trunk sectional area, Stanley, Minerva and Centenar varieties have values above the average of varieties but not significant; instead Anna Spath variety is below the average of varieties.

The fruit production has values of 40.8 tons / ha for Stanley variety, significantly positive than the average varieties, 37.3 tons / ha above the average of varieties for Centenar variety, 34.2tone / ha below the average of varieties for Minerva and 31.2 tons / ha for Anna Spath variety that is significantly negative with respect to the average of varieties.

In terms of physico-chemical characteristics, Centenar variety distinguishes itself both by size (22.3 mm) and weight (46.9 g).

Stanley and Centenar varieties due to the obtained yields of 40.8 tons / ha and 37.3 t / ha and the special qualities of the fruits and multiple use possibilities and Minerva variety being an early variety are recommended to be used within culture on any type of soil.

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