RESEARCHES REGARDING THE PARENTSTOCKS' INFLUENCE OVER THE TREES' WAIST FOR SOME SEED SPECIES

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Abstract

A modern fruit-trees growing has as main objective obtaining a high economical efficiency,reason why an intensive crop becomes a priority.From all factors that influence this fact, parentstocks represents one of the most important factors.(Vasile Maxim Danciu,Venig Aurora,2004)

Parent stocks is a very significant factor in the process of producing planting material.(Ghena,2004).An intensive crop and an efficient one represent a main object in the fruit growing process. (Chira,2006). Parent stock represents a significant factor in the process of producing planting material .in choosing the parentstock,they are taken into consideration:the planting system,the affinity level between the chosen varieties and some parent stocks.,The main reasons of this research were represented by the plum exemplaries identification that could be used as seeds in order to obtain small wasted stocks. The studies that were carried out related to the growth and fructification but also to the obtained seeds' quality. Another objective was the seeding material behavior in the nursery and also the significant variants' behavior in the first and second field.

Key words: relation variety-parentstock, biological base, planting material, biotypes, slected plants.

INTRODUCTION

The apricot and plum yields are influenced in the modernization process by the planting density and the relation variety-stock.

The modernization and greening of the plum crop system by finding new stocks represent the necessity of this kind of approaches.

The main reason is to capitalize natural potential by identifying local plum populations used as stocks for the North-Western part of the country.

MATERIALS AND METHODS

Wax cherry has affinity for most apricot varieties, but it has irregular growth and fructification because it is represented by several biotypes. (Draganescu, 2002)

The apricot varieties, grafted on wax cherry, do not maintain their fruit features for the grafted variety. The same happens with the variety, building the aerial part with leaves that produce the sap, nourish the roots and have a deep influence over the parent stock, over the radicular system growth. A hard variety grafted on a small wasted parent stock will develop the growth of the radicular system of the parent stocks (Venig, 2006). The grafted apricot trees are 6-8 m high, with a regular and hard block (Cepoiu,

2008). Plum species are grafted mainly on generative parent stocks, the most important being the wax cherries and the "franc" plum (Draganescu, 2004)

The vigor of the trees is quite the same, the difference being of about 25-30% between the varieties. The absence of small sized parent stocks makes impossible the intensive crop with high density. The plum trees develop a height of 3.5 - 5 m and a diameter of 4-5 m. To obtain an intensive plantation, it is necessary to use technology (adequate treetop systems) at most 600-800 trees/ha.

In the nursery, plum trees build a good structure with the apricot trees; the varieties with yellow pulp are more suitable, as parent stocks, for the apricot (Chira, 2005). In the nursery, the plum parent stocks are more significant than the wax cherry used as parent stocks for the apricot (Venig, 2006).

The researches were carried out in the period 2005-2009 within the fruit-growing resort, the used material and technical resort being the existing one at the farm. In order to identify the small sized trees, the biological resort was used; the resort includes 10 hectares of plum and apricot seedlings, a plantation established in the spring of 1998. The main reason of this plantation was to get the necessary seeds for obtaining generative root-stocks for apricot and plum. At the beginning, an aspect taken into consideration was to widen the variety of plum parent stocks. For the plantation, there were used seedlings obtained from plum seeds "Albe mici" obtained in Marghita area. The planting distance was 4 x 4 m, with seedlings representing hybrid down wards of two Prunus insititia varieties, Iuliana and Pomariorum, existing in Bihor County. Taking into consideration the hybrid genetic origin of the plum seeds, we tried to identify those small-sized, productive and drought resistant trees. 12 trees (variants) were chosen for the research, using the wax cherry (M2) and the parent stock Albe mici (M1) as control samples for comparison. The descriptive and the biological methods were used as working methods; measurements and determinations were made for the entire research period. (Botu I. & co.,1980)

RESULTS AND DISCUSSIONS

From the growing and fructification process analyses, there were registered some differences related to the size and to some morphological and biological characteristics of the seed plants but also related to the main characteristics of the fruits used in the nursery (Tab.1). After an overall analysis of all parameters taken into consideration for the plum seeds but also of the seeds and seedlings behavior (Tab.2,Tab.3), it resulted that the

significant products which meet the object and the research and production reason have only the following selections: 20/17, 20/22, 50/46 and 25/25.

"Albe mici" is a cloned selection from several seedlings after a free pollination of a biotype from Prunus insititia Juss, approved as generative parent stocks for apricot trees in 1991. (Stefan N.,1952)

Table 1

The size, production and efficiency for obtaining one kg of seeds from the identifies plum seeds (2005 production**)**

Seed	The trunk section surface	Kg production / tree	Obtained seeds quantity	Fruit quantity for one kg seeds	Report pulp/ seed
20/17	63.6	68	3.800	17.9	94.4/5.6
20/22	105.5	37	1.900	19.7	94.9/5.1
21/21	102.0	35	2.000	17.5	94.3/5.7
21/25	88.0	63	1.760	35.1	97.2/2.8
22/18	94.8	46	1.500	30.0	96.7/3.3
24/5	109.2	47	2.220	21.1	95.3/4.7
24/31	78.5	29	1.370	21.0	95.3/4.7
25/19	72.2	31	0.700	43.4	97.7/2.3
25/25	52.7	23	1.250	18.2	94.6/5.4
49/37	55.3	23	0.650	36.1	97.2/2.8
50/20	72.2	12	0.325	36.9	97.3/2.7
50/46	78.5	53	2.200	24.1	95.8/4.2
Medium (Mt)	81.0	38.9	1.640	26.75	95.9/4.1
M_1 – Albe mici		80	4.320	18.5	92.0/8.0
M_2 – wax cherry		58	3.152	18.0	94.5/5.5

Table 2

Results related to the increased seedlings percentage

Seed (variant**)**	Increasing percentage %	Relative percentage %	Differences ±(d)	t	DL 5%	P 5%	Significance
20/17	63	166.2	+25.1	4.13	12.34	32.5	xxx
20/22	70.25	185.3	+32.35	5.32	12.34	32.5	xxx
21/21	35.25	93.0	-2.65				-
21/25	20.2	53.3	-17.7				00
22/18	25	66.0	-12.9				0
24/5	28.75	75.8	-9.15				-
24/31	22.75	60.0	-15.15				00
25/19	30.75	81.1	-7.15				-
25/25	41.75	110.1	+3.85	0.63	12.34	32.5	-
49/37	39	102.9	+1.1	0.18	12.34	32.5	-
50/20	35	92.3	-2.9				-
50/46	43	113.4	-5.1	0.83	12.34	32.5	-
Medium	37.9	100	Mt				

DL 5% = 12.34; DL 1% = 16.53; DL 0.1% = 21.82

Parnia established the optimum planting distances for apricot tress in the nursery (Parnia P.,1977). Regarding the seedlings percentage in the nursery, this value is situated between 1800 and 2000 kg, that has a springing percentage of 60-70% (Dutu I.,1994).

Table 3

Production and quality of the seedlings

Seed	Seed pieces	Raised pieces	Harvested pieces	STAS pieces	On $1m^2$ pieces	On 1ha thousand pieces	STAS thousand pieces	%
20/17	8824	5519	4584	2063	70	700	315	45
20/22	4476	2674	2350	940	72	720	288	40
21/21	3714	1211	806	484	25	250	150	60
21/25	5781	877	502	241	20	200	96	48
22/18	3508	664	460	230	18	180	90	50
24/5	2884	672	429	215	15	150	75	50
24/31	2629	544	408	216	20	200	106	53
25/19	1495	324	182	106	32	320	186	58
25/25	3531	1346	955	573	67	670	402	60
49/37	1520	683	477	291	33	330	201	61
50/20	515	188	185	102	38	380	209	55
50/46	4620	2138	974	555	47	470	268	57
Medium	3625	1403	1026	501	38	381	199	53,1
M_1 – Albe mici	400	127	100	87	40	400	348	87
M_2 – wax cherry	400	230	190	138	70	700	420	60

The behavior in the first and second field of the selected seedlings as parent stocks for plum, of the four biotypes, selected after the obtained seedlings, was researched by organizing a trifactorial experience (4 x 2 x 3), where the graduation of factor A (the parent stocks) appears just once, of factor B (the varieties) twice and of factor C (the soil) six times. In the first field 3 plum varieties (Comandor, Sirena, Favorit) were grafted. The grip percentage, the percentage for gripped eyes and those remained in vegetation were researched (Tab 4).

In the first field 3 plum varieties (Tulen gras, Stanley and Anna Spath) were grafted. The grip percentage, the percentage for gripped eyes and those remained in vegetation were researched (Tab 4).

For apricot trees, the values of the varieties were close to the control sample regarding the increased seedlings percentage which had also been proven by Prica D., Catavela St.(1961).

Table 4

The gripped eyes percentage

Species	Variety	Parent stock					Control Sample	
		20/17	20/22	25/25	50/46	Medium (Mt)	M_1	M_2
Gripping proof (in autumn, after 25 days) %								
Apricot	*Comandor*	47	53	55	44	49.75	42	32
	Sirena	44	29	47	45	41.25	49	45
	Favorit	33	30	42	48	38.25	27	27
Medium		41.33	37.33	48.00	45.67	43.08	39.33	34.66
Gripping eyes (in spring 2008) %								
Apricot	*Comandor*	27	34	38	29	32.00	31	20
	Sirena	25	17	31	23	24.00	22	21
	Favorit	20	22	31	27	25.00	15	16
Medium		24.00	24.33	33.33	26.33	27.00	22.66	19.00

Table 5

The gripped eyes percentage

Species	Variety	Parent stock					Control Sample	
		20/17	20/22	25/25	50/46	Medium (Mt)	M_1	M_2
Gripping proof (in autumn, after 25 days) %								
Plum	*Tulen gras*	74	43	49	47	53.25	42	31
	Stanley	54	53	40	67	53.50	48	63
	Anna Spath	75	70	56	47	62.00	50	58
Medium		67.66	55.33	48.33	53.67	56.25	46.66	50.66
Gripping eyes (in spring 2008) %								
Plum	*Tulen gras*	57	29	33	26	36.25	31	25
	Stanley	37	31	25	48	35.25	35	32
	Anna Spath	57	51	30	35	43.25	40	47
Medium		50.33	37.00	29.33	36.33	38.25	35.33	34.66

For the apricot varieties, the percentage was almost concurrent with that for the parent stock, the highest gripping percentages were registered for the selections 50/46 and 25/25 for all species (44-48%, 42-52%). The Comandor variety registered the best behavior on all four parent stocks sections.

Concerning the gripping percentage, the varieties Tulen gras and Anna Spath registered results when they were grafted on the selection 20/17; for Stanley the best parent stock seemed to be the selection 50/46.

Table 6

The growing dynamics of the grafted branches in the second field

Species	Parent stock	Branches length – cm					
		1 V	1 VI	1 VII	1 VIII	1 IX	1 X
Plum	20/17	22.4	48.1	89.2	105.6	124.0	135.6
	20/22	17.7	44.3	88.2	107.3	126.8	140.3
	25/25	20.5	46.1	98.0	110.9	134.5	142.3
	50/46	18.0	40.3	85.6	105.0	126.8	132.0
	Medium	19.7	44.7	90.2	107.2	127.9	137.6
	Wax cherry	24.6	56.3	114.8	141.3	182.7	211.7

Related to the growing dynamics, the grafted varieties have different intensities in the first stage, the 20/17 and 25/25 parent stocks having a constant growing rate.

Table 7

The growing dynamics of the grafted branches in the second field

Species	Parent stock	Branches length – cm					
		1 V	1 VI	1 VII	1 VIII	1 IX	1 X
Apricot	20/17	18.3	40.9	63.6	83.9	117.0	138.3
	20/22	20.2	42.9	71.6	100.4	137.2	159.0
	25/25	19.7	43.0	67.1	91.5	126.9	147.0
	50/46	17.4	38.8	65.7	86.3	118.4	133.0
	Medium	18.9	41.4	67.0	90.5	124.8	143.6
	Wax cherry	13.2	26.8	51.0	73.7	103.5	153.7

The length growing dynamics correspond with the fact that the parent stocks 50/46 and 20/17 registered the lowest growth. All apricot varieties registered a low growth on all 4 parent stock selections as compared to Albe mici plums and wax cherry.

The best period for grafting the apricot trees is the first decade of August, a period also recommended by Venig A.(2006)

The behavior of apricot trees on different parent stocks was also studied by Popescu M.(1977), Botez M. (1962), and Sonea V.(1963).

Table 8

The evolution of the trees production in the second field

Parent stock	Variety	Medium production for ha	STAS %
20/17	*Comandor*	25,9	78,4
	Sirena	24,2	80,5
	Favorit	18,1	86,7
x		22,7	81,5
20/22	*Comandor*	29,2	80,5
	Sirena	16,0	88,1
	Favorit	16,5	86,7
x		20,5	84.4
25/25	*Comandor*	30,3	86,8
	Sirena	25,8	87,2
	Favorit	23,1	90,0
x		26,4	87,9
50/56	*Comandor*	24,2	86,0
	Sirena	24,8	80,6
	Favorit	26,4	72,3
x		25,1	81,3
Medium mt	*Comandor*	27,4	83,2
	Sirena	22,7	82.8
	Favorit	21,0	84,7
x		23,7	83,5
M_1 – Albe mici	*Comandor*	23,1	93,9
	Sirena	27,0	69,6
	Favorit	14,9	87,2
x		21,6	82,4
M_2 – wax cherry	*Comandor*	17,6	92,0
	Sirena	24,7	78,9
	Favorit	14,8	95,9
x		19,1	86,9

Table 9

The evolution of the trees production in the second field

Parent stock	Variety	Medium production for ha	STAS %
20/17	*Tulen gras*	40,7	79,4
	Stanley	29,7	81,8
	Anna Spath	41,2	82,5
x		37,2	81,2
20/22	*Tulen gras*	23,7	84,4
	Stanley	29,1	76,6
	Anna Spath	38,5	81,0
x		30,4	80,6
25/25	*Tulen gras*	27,0	84,1
	Stanley	22,0	83,2
	Anna Spath	30,8	76,3
x		26,6	80,8
50/56	*Tulen gras*	25,9	77,2
	Stanley	36,8	79,9
	Anna Spath	25,9	87,2
x		29,5	81,4
Medium mt	*Tulen gras*	29,3	80,9
	Stanley	29,4	80,3
	Anna Spath	34,1	81,2
x		30,9	80,9
M_1 – Albe mici	*Tulen gras*	23,1	88,7
	Stanley	26,4	87,1
	Anna Spath	27,5	92,7
x		25,7	89,5
M_2 – wax cherry	*Tulen gras*	17,1	93,5
	Stanley	34,6	67,9
	Anna Spath	31,9	87,8
x		27,9	80,6

Analyzing the number of the grafted trees, there were some similarities with regard to apricot selections 25/25 and 50/46, for Comandor and Favorit varieties, which registered the highest production. The production quality (STAS trees) was higher in case of the selections 25/25 and 20/22. A good quality material was met for the Comandor variety (Nica St., 1998, Parnia P. et. al.,1977)

The highest production was registered at the parent stock 20/17 for Tuleu gras and Anna Spath. The production quality (STAS) was high for the selections 50/46.

CONCLUSIONS

The selection 20/17 meets the desired nursery parameters and registers the best results in order to obtain a small wasted planting material.

As a parent stock, the plum franc builds uniform middle and low sized trees for apricot, as it was also proven by Cepoiu in 1982.

The selection 50/46 meets the desired nursery parameters and registers the best results in order to obtain a small sized planting material.

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