RESEARCH FOR THE RADICULAR SYSTEM ALLOCATION FOR THE ANNA SPATH PLUM VARIETY, CULTIVATED ON THE BROWN-REDDISH SOIL CONDITIONS FROM OLTENIA

PARTICULARITĂȚI ALE MODULUI DE CREŞTERE ÎN FUNCȚIE DE BIOSISTEMUL ALTOI/PORTALTOI LA UNELE SOIURI DE PRUN CULTIVATE ÎN ZONA CENTRALĂ A OLTENIEI

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Abstract: *This study aims to present the disposal way of the horizontal roots mass for the Anna Spath plum tree, at Banu Mărăcine didactic plantation which was established in 1995. The research concerning Anna Spath plum variety engrafted on three rootstock (Oteşani 8, Pixy and Miroval), using the profile method, took place in 2007. It was established that most f the roots are spread within the Anna Spath bio-system, at the average depth of 0-60 cm and their thickness can reach almost 3 mm.*

Rezumat: *Lucrarea aceasta prezintă particularităţi ale modului de creştere a părţii supraterane la prunul cultivat în zona centrală a Olteniei, respectiv într-o plantaţie din cadrul Staţiunii Didactice Banu Mărăcine. Cercetările au fost efectuate în perioada 2006-2008, la trei soiuri de prun – Diana, Silvia şi Piteştean – altoite pe trei portaltoi – Oteşani 8, Pixy şi Miroval, determinările având ca scop stabilirea suprafeţei secţiunii trunchiului, diametrului coroanei, volumului coroanei, înălţimii pomului şi gradului de folosire al terenului. S-a constatat că influenţa cea mai mare asupra celor trei soiuri studiate o are portaltoiul Miroval, care imprimă cea mai mare vigoare de creştere, urmat de portaltoiul Pixy, în timp ce portaltoiul Oteşani 8 imprimă soiurilorstudiate cea mai mică vigoare*

Key words: *variety, rootstock, biosystem*
Cuvinte cheie: *soi, portaltoi, biosistem*

INTRODUCTION

The importance of plum culture consist in the fact that this species is less affected by natural elements, has an ecological plasticity which turns to good account poor and thick soils.

The plums are really appreciated under both natural (fresh or dry form) and prefabricated forms (jam, marmalade, compote, jelly, liqueurs, plum brandy). Compared to the rest of the kernelled fruits, plums are more appropriate to be refrigerated, especially in sugar syrup.

Plums are an excellent source of calcium, potassium and ferric, so necessary to the human organism and a palliative for digestion due to its high content of fibbers (cellulose), recommended as compotes, smashed and juices for both adults and children in growth.

Fresh fruits has a saccharin potential similar to the grape's one, meaning 16-20% easy assimilable glucides especially glucose and saccharine. Their special capacity to converse the solar energy into sugars can ensure 1400-3300 kg sugar/ha. (MĂDĂLINA BUTAC, 2003).

Bio-chemically, plums have a 7-18% , 0,16-2,30% organic acids, 0,5-17,6mg% C, A and B vitamins, mineral salts of Ca, Fe, P, Mg, K, Na, Mn – essential ingredients in human nourishment. The fruits cultivated on Dâmbovița, Ialomița, Piteştean and Centenar soils give

the richest species in vitamin C.

MATERIALS AND METHODS USED IN RESEARCH

The research performed to the didactical agricultural station Banu Mărăcine, placed on the right side of Craiova-Piteşti-Bucureşti highway, at a distance of about 8 km from Craiova city, took place in 2007.

The biological material consisted in a plum plantation established in 1995 on a brown-reddish soil, composed of 20 species, engrafted on three or four rootstocks, each rootstock represented in ten repetitions, the experienced being placed after the randomized blocks.

In order to accomplish this research, it was studied the disposal way of the horizontal roots mass for the Anna Spath late ripened variety, engrafted on three rootstocks – Oteşani 8, Pixy and Miroval. The trees were planted at a distance of 4,0/4,0m, N-S oriented and shaped as a superposed vase.

The soil has little acid reaction and it is medium to little supply with hummus.

The plantation is placed in a temperate-continental zone, with little Mediterranean influence, distinguished by the enough amount of rainfalls but varyingly distributed during the year, characterized by droughty summers and maximum of precipitations at the end of spring and the begging of summer (May-June).

In order to study the ridiculer system it was used the profile method which established the horizontal roots mass installation's depth. For this purpose, it was chosen one tree for each rootstock, the most representative from the stem strength point of view.

The results were three bio-systems of graft/rootstock, one and two meter trench from the truck for each bio-system and set out between the trees on the row. Each trench was one meter for both depth and length and 0,5 meter breadth and was disposed perpendicular on the horizontal roots. On the trench side near the tree were emphasized all the roots that became visible after they were cleaned from earth and they turned in white. The discovered roots were divided in three categories, depending on their thickness: in the first category – the roots with less than 3 mm in diameter, in the second category roots with 3-5 mm in diameter and the third category composed of roots over 5 mm in diameter. The roots counting from 20 to 20 distances in depth it was realized using a metric frame.

THE OBTAINED RESULTS

At the Anna Spath/Oteşani 8 bio-system, the root system presented the next disposal manner:

- at 1 m distance from the trunk, it were discovered 69 roots of which 61 roots under 3 mm, 3 roots between 3 and 5 m and 5 roots over 5 mm in diameter. Taking into consideration the distance in depth, the results were: between 0 and 20 cm were found 22 roots of which 21 until 3 mm and 1 over 5 mm; between 20 and 40 cm from 35 roots, 30 are part of the 0-30 mm thickness category, 2 between 3-5 mm category and 3 from the 5 mm category; in the interval between 40 and 60 cm, all the 8 roots are dived in 6 roots with less that 3 mm thickness, 1 between 3-5 mm and 1 over 5 mm thickness; between 60 and 80 cm, all the 3 roots did not go beyond 3 mm; between 80 and 100 cm, the only contact root had less the 3 mm in diameter.

- at 2 m distance from the trunk, the total 60 roots are composed from 55 roots from the 0-3 mm thickness category, 3 roots from 3-5 mm category and 2 roots from over 5 mm category. The depth interval allocation was: on the 0-20 cm interval, from the 28 roots discovered, 26 had less than 3 mm thickness and 2 between 3-5 mm; between 20-40 cm depth, the 21 roost found were composed from 19 roots until 3 mm, 1 root between 3 and 5 mm and 1 root over 5 mm; between 40 and 60 depth, 7 roots were discovered, of which 6 under 3 mm and 1 over 5 mm thickness; between 60-80 cm and 80-100 cm, were discovered 3 roots each

which did not go beyond 3 mm thickness.

Table 1

The roots allocation manner for Anna Spath/Oteşani 8 plum variety

Depth interval (cm)	Distance from the trunk (m)	Roots on interval (nr)	Roots number		
			Ø<3mm	Ø 3-5mm	Ø>5mm
0-20	1m	22	21	0	1
	2m	28	26	2	0
20-40	1m	35	30	2	3
	2m	21	19	1	1
40-60	1m	8	6	1	1
	2m	7	6	0	1
60-80	1m	3	3	0	0
	2m	2	2	0	0
80-100	1m	1	1	0	0
	2m	2	2	0	0
Total roots 0-100	1m	69	61	3	5
	2m	60	55	3	2

Figure 1 - The roots system for the **Anna Spath/Oteşani 8** bio-system

At the Anna Spath/Pixy bio-system, the roots disposal manner was:

- at 1 m distance from the trunk, were revealed 145 roots from the next categories: 130 roots from 0-3 mm category, 8 roots from 3-5 mm category and 7 roots from over 5 mm category in diameter. All the 145 roots were disposed on depth interval like that: between 0-20 cm depth, 42 roots of which 36 roots with less that 3 mm in diameter, 3 roots between 3-5 mm and 3 over 5 mm thickness, between 20 and 40 depth, the number of roots found increases to 60 of which 53 roots until 3 mm thickness, 3 roots between 3 and 5 mm and 4 roots which go beyond 5 mm in diameter; between 40 and 60 cm depth, the 22 roots discovered were divided in 20 roots under 3 mm and 2 roots between 3-5 mm; on the interval 60-80 cm, the 9 roots had less that 3 mm; on the interval 80-100 cm the number of roots increased to 12, but with diameter under 3.

- at 2 m distance from the trunk, were uncovered 111 roots of which 100 roots from 0-3 mm thickness category, 6 roots from 3-5 mm category and 5 roots from over 5 mm category. Their allocation in depth was: on the 0-20 cm interval, from the 32 roots, 29 had under 3 mm thickness, 1 between 3-5 mm and 2 over 5 mm; on the interval 20-40 cm, were found 41 roots, of which 37 roots under 3 mm in diameter, 2 roots between 3-5 mm and 2 roots over 5 mm; on the 40-60 cm interval the number of roots was diminished to 15, 12 roots under 3 mm, 2 between 3-5 mm and 1 over 5 mm thickness; on the 60-80 interval, from 10 roots revealed, 9 were thicker than 3 mm and 1 between 3-5 mm; on the 80-100 cm, all 13 roots did not go over 3 mm in diameter.

Table 2

The roots allocation manner for Anna Spath/ Pixy plum variety

Depth interval (cm)	Distance from the trunk (m)	Roots on interval (nr)	Roots number		
			Ø<3mm	Ø 3-5mm	Ø>5mm
0-20	1m	42	36	3	3
	2m	32	29	1	2
20-40	1m	60	53	3	4
	2m	41	37	2	2
40-60	1m	22	20	2	0
	2m	15	12	2	1
60-80	1m	9	9	0	0
	2m	10	9	1	0
80-100	1m	12	12	0	0
	2m	13	13	0	0
Total roots 0-100	1m	145	130	8	7
	2m	111	100	6	5

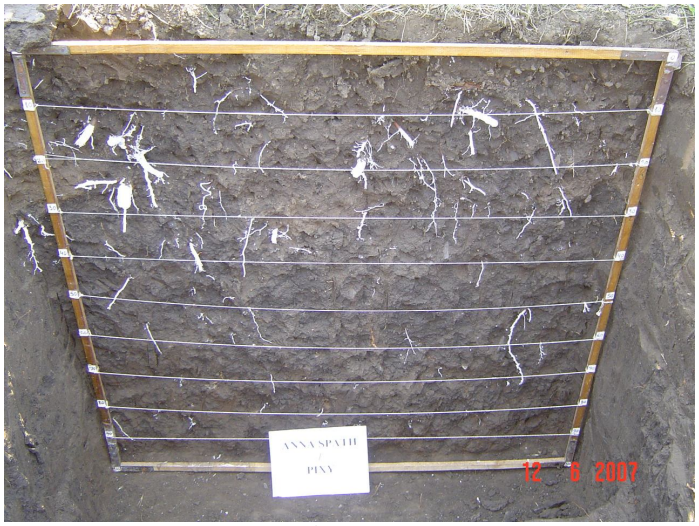

Figure 2 - The roots system for the **Anna Spath/Pixy** bio-system

At the Anna Spath/Miroval bio-system, the roots disposal manner was:

- at 1 m distance from the trunk, were found 109 roots with these characteristics: 101 roots from 0-3 mm category and each 4 roots for 3-5 mm and over 5 mm categories.

Taking into consideration the distance in depth, the roots were presented like this: between 0 and 20 cm, from the 30 roots found, 29 were until 3 mm and 1 between 3-5 mm;

between 20 and 40 cm, the number of roots increases up to 39 roots, 36 being part of the 0-30 mm thickness category, 1 between 3 and 5 mm category and 2 from over 5 mm category; on the interval between 40 and 60 cm, the 21 roots are composed from 19 roots with less that 3 mm thickness and 1 over 5 mm thickness in diameter; between 60 and 80 cm were discovered 12, 10 from the 0-30 mm category, and each one for 3-5 and over 5 mm categories; between 80 and 100 cm all 7 roots found were had less than 3 mm thickness.

Table 3

The roots allocation manner for Anna Spath/Miroval plum variety

Depth interval (cm)	Distance from the trunk (m)	Roots on interval (nr)	Roots number		
			Ø<3mm	Ø 3-5mm	Ø>5mm
0-20	1m	30	29	1	0
	2m	22	21	1	0
20-40	1m	39	36	1	2
	2m	18	18	0	0
40-60	1m	21	19	1	1
	2m	15	14	0	1
60-80	1m	12	10	1	1
	2m	5	5	0	0
80-100	1m	7	7	0	0
	2m	6	5	1	0
Total rădăcini 0-100	1m	109	101	4	4
	2m	66	63	2	1

Figure 3. The roots system for the **Anna Spath/Miroval** bio-system

- at 2 m distance from the trunk the roots number diminished at 66, of which 63 roots from 0-3 mm category, 2 from 3-5 mm category and 1 from over 5 mm thickness category. Their allocation in depth was: on the 0-20 cm interval, from the 22 roots, 21 had less than 3 mm thickness and 1 between 3-5 mm; on the interval 20-40 cm, all the 18 roots were from under 3 mm in diameter category; on the 40-60 cm interval the was discovered 15 roots, 14 roots under 3 mm,1 over 5 mm thickness; on the 60-80 interval, all the 5 roots revealed had less than 3 mm; on the 80-100 cm, was found 6 roots, out of which 5 did not go over 3 mm in diameter and 1 between 3-5 in diameter.

CONCLUSIONS

- the most developed roots system, characterized by the biggest number of roots was discovered to be Anna Spath/Pixy, both for the 1 m from trunk distance (145 roots) and 2 m from trunk distance (111 roots), followed by Anna Spath/Miroval (109 roots for 1 m from trunk distance and 63 roots for 2 m away from the trunk) and Anna Spath/Oteşani 8 (69 roots at 1 m distance from truck and 60 roots at 2 m trunk distance);

- most of the roots were discovered at 0-60 cm depth for all three studied combinations;

- concerning the roots distribution on thickness categories, over 90% from these had under 3 mm thickness and the rest were included in 3-5 mm and 5 mm categories;

- observing the study results on Anna Spath soil engrafted on 3 rootstocks, on the radicular system level were not discovered any affections caused by diseases or pests.

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