SPECIFIC FEATURES OF THE RADICULAR SYSTEM FOR PLUM TREE SPECIES "CENTENAR" CULTIVATED ON THE GROUND BROWN-SCARLET LUVIC

PARTICULARITĂȚI ALE SISTEMULUI RADICULAR LA SOIUL DE PRUN "CENTENAR" CULTIVAT PE SOLUL BRUN-ROŞCAT LUVIC

A. CIOBANU

University of Craiova, România
Coressponding author: A. CIOBANU, e-mail: andi.ciobanu@yahoo.com

Abstract: *In this paper are presented some researches concerning depth of the plantation of the roots horizontal of the variety "Centenar" plum tree, from the plantation created on the Experimental Station Banu Mărăcine. The researches had been achieved in the autumn of the year 2006, at the variety Centenar plum tree, grafted on 4 rootstocks, respectively: Oteşani 8, Pixy, Miroval and Roşior văratec, and the method of study it was used the profile method. We found out that the maximum depth of the horizontal roots development is of 90 cm, the most roots we can found to the 30-60 cm depth. As a result we suggest the depth of working in the orchard to be normal and the incorporation of the organic fertilizers must be realized once with autumn ploughing.*

Rezumat: *În această lucrare sunt prezentate cercetări cu privire la adâncimea de instalare a masei rădăcinilor orizontale la soiul de prun Centenar, din plantația înființată la Staţiunea Didactică şi Experimentală Banu Mărăcine. Cercetările au fost realizate în toamna anului 2006, la soiul de prun Centenar altoit pe 4 portaltoi, respectiv: Oteşani 8, Pixy, Miroval şi Roşior văratec, iar ca metodă de cercetare s-a folosit metoda profilului. S-a constatat că adâncimea maximă de dezvoltare a rădăcinilor orizontale este de 90 cm, cele mai multe rădăcini fiind întâlnite pe adâncimea 30-60 cm. Ca urmare se recomandă ca adâncimea de lucru în livadă să fie normală, iar încorporarea îngrăşămintelor organice să se realizeze o dată cu arătura de toamnă.*

Key words**:** *plum tree, variety, rootstock.*
Cuvinte cheie: *prun, soi, portaltoi.*

INTRODUCTION

The plum tree has a special importance economically for our country, because of the optimum conditions of temperature and especially for its fruits which are appreciated and requested, also for consumption in fresh (starting with the end of the June and until October), and for industrial preparation of all kinds (distillation, dehydration, jam, compote etc).

As a result, the rootstocks presented a special importance for the varieties with economical value, and they must have some kinds of biological and adoption qualities different conditions of the temperature and soil specific for each region of our country.

MATERIAL AND METHOD

The research undertook on a started in 1995 on the ground brown-scarlet luvic soil from Experimental Station Banu Mărăcine placed near the European highroad Craiova-Piteşti-Bucureşti, respectively 23^{o} 51'' Eastern longitude, 44^{o} 14'' Northern latitude, and at a altitude of 105 m in comparison with sea level.

The plantation is made of 20 varieties of plum tree beginning with extra early and maturation till those with early maturation, respectively: Diana, Ialomița, Silvia, Tuleu

timpuriu, Piteştean, Centenar, Minerva, Flora, Carpatin, Vâlcean, Tita, Tuleu gras, Renclod althan, Pescăruş, Dâmbovița, Alina, Valor, Stanley, Record and Anna spath. Each variety is grafted on 4 rootstocks, respectively: Oteşani 8, Pixy, Miroval and Roşior vărатec.

The distance of plantation is of 4.0/4.0 m, the rows of the tree being placed on the N-S direction. The tree had been directed like a superpose vessel.

The researched had been made in autumn of 2006, studding the Centenar variety grafted on the 4 rootstocks mentioned before. The content of humus of the soil is 2.5-3.5%, and reaction of the soil is weak-acid and pH=6-6.7.

Concerning the climatic date we can say that the year 2006 (without November and December) from the point of view of the temperatures is moor than normal average on 70 years, to achieving a value 13.6 degree C in comparison with 12,4 degree C (*table 1*).

Table 1

Climatic condition in the year 2006

Specification	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Annual**
Temp. Average	-3.4	0.7	5.5	13.4	18.9	21.8	24.1	22.8	18.3	14.5	13.6
Average/70 years	-2.6	-0.2	4.8	11.4	16.8	20.4	22.6	22.0	17.5	11.4	12.4
Difference	-0.8	0.9	0.7	2.0	2.1	1.4	1.5	0.8	0.8	3.1	1.2

About rainfall we observed a surplus of 204.9 mm respectively the yearly sum of 651.4 sum in comparison with 75 years of 446.5 sum (*table 2*).

Table 2

Climatic condition in the year 2006

Specification	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Annual**
Precipitations Average	21.4	106.1	76.1	53.5	53.3	110.3	46.0	109.1	20.9	54.7	651.4
Average/75 years	36.4	31.4	35.0	42.8	61.7	63.8	54.6	43.6	38.0	39.2	446.5
Difference	-15.0	74.6	41.1	10.7	-8.4	46.5	-8.6	65.5	-17.1	15.7	204.9

We observed that 2006 registered higher temperatures and also plentiful rainfall in comparison with normal values.

Concerning the research of the radicular system it was used the profile method and with its help it was established the depth proper for the horizontal roots. Taking into account the depth can be suggested the depth of working in the orchard; optimum depth for fertilizer application or we can discover some diseases of the radicular system.

To, it was chosen on tree from the Centenar variety grafted on the 4 rootstock, so it results 4 trenches. It was made at the distance of 1.0 m from the trunk, among the trees on the row, with length of minimum 1.0 m, breadth of 0.5 m and the depth of 1.0 m perpendicular on the horizontal roots direction.

The roots appeared on the wall of the cavity from the tree had been released all around of earth to be better observed.

Taking into account the genetic horizons of the soil the roots meet have been measured and noted conventionally:

-roots with diameter < 3 mm noted with (•);

-roots with diameter 3-5 mm noted with (O);

-roots with diameter > 5 mm noted with (□).

RESULTS AND DISCUSSION

For the Centenar variety grafted on the rootstock Oteşani 8, as we see in the *figure 1*, it can be observed the following features:

- maximum depth till we meet roots is 90 cm;
- in the first horizon (0-10 cm) we can't find roots;
- in the II horizon (10-20 cm) we have 2 roots with diameter < 3 mm and one root with the diameter of 3-5 mm;
- in the III horizon (20-30 cm) develop the number of roots, we can have 6 roots with diameter < 3 mm and ones with the diameter > 5 mm;
- in the IV horizon (30-40 cm) has 7 roots with the diameter < 3 mm and 2 roots with the diameter > 5 mm;
- in the V horizon (40-50 cm) we have maximum number of roots, respectively 10 with the diameter < 3 mm, 2 roots with the diameter of 3-5 mm and ones with the diameter > 5 mm;
- in the VI horizon (50-60 cm) decrease the number and the roots are only 6 with the diameter < 5 mm and ones with diameter of 3-5 mm;
- in the VII horizon (60-70 cm) we have 4 roots with diameter < 3 mm and ones with diameter > 5 mm;
- in the VIII horizon (70-80 cm) we have only one root with diameter < 3 mm;
- in the IX horizon (80-90 cm) we have only one root with diameter < 3 mm;
- in the X horizon (90-100 cm) we don't have roots.

• □ 2 ; O □ 1
• □ 6 ; □ □ 1
• □ 7 ; □ □ 2
• □ 10 ; O □ 2 ; □ □ 1
• □ 6 ; O □ 1
• □ 4 ; □□ 1
• □ 1
• □ 1

Figure 1- Centenar/Oteşani 8

For the Centenar variety grafted on the rootstock Pixy, as we see in the *figure 2*, it can be observed the fallowing features:

- maximum depth till we meet roots is 90 cm;
- in the first horizon (0-10 cm) are 3 roots with the diameter < 3 mm;

- in the II horizon (10-20 cm) are 8 roots with diameter < 3 mm;
- in the III horizon (20-30 cm) increase the number of the roots , we can have 6 roots with diameter < 3 mm, ones with the diameter of 3-5 mm and ones with diameter > 5 mm;
- in the IV horizon (30-40 cm) are 7 roots with the diameter < 3 mm and 2 roots with the diameter of 3-5 mm;
- in the V horizon (40-50 cm) are 5 roots with the diameter < 3 mm and ones with the diameter of 3-5 mm;
- in the VI horizon (50-60 cm) are 6 roots with the diameter < 3 mm;
- in the VII horizon (60-70 cm) start to decrease the number of the roots; we have 3 roots with diameter < 3 mm;
- in the VIII horizon (70-80 cm) we have only one root with diameter < 3 mm;
- in the IX horizon (80-90 cm) we have only one root with diameter < 3 mm;
- in the X horizon (90-100 cm) we don't have roots.

• □ 3
• □ 8
• □ 6 ; O □ 1 ; □ □ 1
• □ 7 ; O □ 2
• □ 5 ; O □ 1
• □ 7
• □ 3
• □ 1
• □ 1

Figure 2- Centenar/Pixy

For the Centenar variety grafted on the rootstock Miroval, as we see in the *figure3*, it can be observed the fallowing features:
- maximum depth till we meet roots is 90 cm;
- in the first horizon (0-10 cm) are 5 roots with the diameter < 3 mm;
- in the II horizon (10-20 cm) are 6 roots with diameter < 3 mm;
- in the III horizon (20-30 cm) increase the number of the roots, we can see 7 roots with diameter < 3 mm;
- in the IV horizon (30-40 cm) are 10 roots with the diameter < 3 mm and ones with the diameter > 5 mm;
- in the V horizon (40-50 cm) the roots number is maximum, respectively 10 roots with the diameter < 3 mm and 2 roots with the diameter > 5 mm;
- in the VI horizon (50-60 cm) are 7 roots with the diameter < 3 mm and ones with diameter > 5 mm;
- in the VII horizon (60-70 cm) are 9 roots with diameter < 3 mm and ones with diameter > 5 mm;
- in the VIII horizon (70-80 cm) decrease the number of roots; are 7 roots with diameter < 3 mm;
- in the IX horizon (80-90 cm) we can see only 2 roots with diameter < 3 mm;

- in the X horizon (90-100 cm) we don’t have roots.

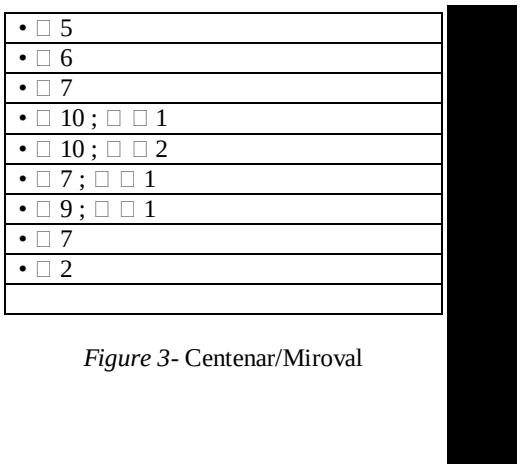

Figure 3- Centenar/Miroval

For the Centenar variety grafted on the rootstock Roşior văratec, as we see in the *figure4*, it can be observed the fallowing features:

- maximum depth till we meet roots is 100 cm;
- in the first horizon (0-10 cm) are 1 root with the diameter < 3 mm;

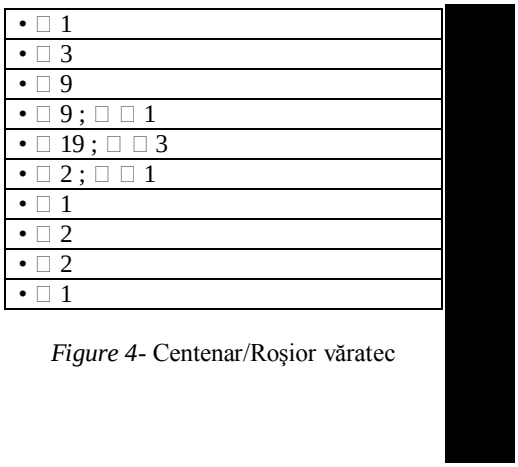

Figure 4- Centenar/Roşior văratec

- in the II horizon (10-20 cm) are 3 roots with diameter < 3 mm;
- in the III horizon (20-30 cm) increase the number of the roots and we can see 9 roots with diameter < 3 mm;
- in the IV horizon (30-40 cm) are 9 roots with the diameter < 3 mm and ones with the diameter > 5 mm;
- in the V horizon (40-50 cm) the roots number is maximum, respectively 19 roots with the diameter < 3 mm and 3 roots with the diameter > 5 mm;

- in the VI horizon (50-60 cm) decrease the number of roots; we can see only 2 roots with the diameter < 3 mm and ones with diameter > 5 mm;

- in the VII horizon (60-70 cm) is 1 root with diameter < 3 mm;

- in the VIII horizon (70-80 cm) are 2 roots with diameter < 3 mm;

- in the IX horizon (80-90 cm) we can see only 2 roots with diameter < 3 mm;

- in the X horizon (90-100 cm), only 1 root with diameter < 3 mm.

CONCLUSIONS

- the maximum depth till we can find roots is 90 cm, the exception is the Centenar variety grafted on the rootstock Roşior văratec, where we can see 1 root in the X horizon (90-100 cm);

- the Centenar variety grafted for 4 rootstocks prevail roots with diameter < 3 mm, installed till a depth 90 cm, the exception is the Centenar variety grafted on the rootstock Oteşani 8, where isn't roots on the first horizon (0-10 cm) and the Centenar variety grafted on the rootstock Roşior văratec, where the roots are and on the X horizon (90-100 cm)

- the roots of the diameter of 3-5 mm, respectively the Centenar variety grafted on the rootstock Oteşani 8, on the depth 10-60 cm, respectively the Centenar variety grafted on the rootstock Pixy, on the depth 20-50 cm;

- the roots with diameter > 5 mm is at all varieties, on the depth 20-70 cm, respectively 20-70 cm for the Centenar variety grafted on the rootstock Pixy, 30-70 cm for the Centenar variety grafted on the rootstock Miroval and 30.60 cm for the Centenar variety grafted on the rootstock Roşior văratec;

- so, we can say about roots on the ground brown-scarlet luvic isn't superficial, the roots with the diameter > 3 mm usually the depth are < 30 cm. As a result we suggest the depth of working in the orchard to be normal on the incorporation of the organic fertilizers must be realized once with autumn ploughing;

- we can say about Centenar variety grafted on the 4 rootstocks that don't have diseases of the radicular system.

LITERATURE

1. BOTU I., BOTU M., "*Metode şi tehnici de cercetare în pomicultură*", Editura Conphys, Rm. Vâlcea, 1997.
2. BOTU I., BOTU M., "*Pomicultura modernă şi durabilă*", Editura Conphys, Rm. Vâlcea, 2003.
3. CICHI M., "*Aplicaţii în pomicultură*", Editura Sitech Craiova, 2006.
4. COCIU V. şi colab., "*Prunul* ". Editura Conphys, Rm. Vâlcea, 1997.
5. POPESCU M. şi colab., "*Pomicultura generală şi specială*", Editura didactică şi pedagogică, Bucureşti, 1992.
6. VOICA ELENA, "*Pomicultură curs*", Universitatea din Craiova. Facultatea de Agricultură. Reprografia Universităţii din Craiova, 1980.