

PARTICULARITIES OF THE GRAFT-ROOTSTOCK BIOSYSTEM IN THE VARIETY OF APRICOT NJA 19

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ABSTRACT

Of the species of trees grown in the temperate climate area, apricot is considered one of the most valuable, due primarily to all the excellent taste and the very pleasant flavor of the fruit, the fine consistency and juice of the pulp, which in most cases has a special flavor.

In 2017, within an apricot plantation set up in 2000, in a family garden, researches were carried out on how trees grow in the root system. The biological material was the N.J.A. 19 variety grafted on the cherry plum, the trees in the plantation being led in the form of an improved vessel.

The purpose of the research is to determine how the roots are arranged in the soil, the depth at which the large mass of the root system is distributed, and the weighting of each thickness category, on depth ranges.

Apricot variety N.J.A. 19 shows a good development of the underground part, of the root system, respectively, which is distributed to a depth of 90 cm at a distance of 1 m from the trunk or up to a depth of 70 cm at a distance of 2 m towards the trunk.

INTRODUCTION

Apricots are required by consumers, both as fresh fruit and in processed form in many derivatives of higher quality as compared to many fruit species: compote, marmalade, jam, jelly, nectar, syrup, dried or candied fruits. Apricots are also used to make liqueur, wine and apricot brandy, and the brandy produced by distillation is clearly distinguished from other similar products (Călinescu Mirela, 2009).

The rich chemical composition of apricot fruits gives them the value of medicine that can be consumed in cases of physical and intellectual asthenia, anemia, insomnia, convalescence. They are also recommended for the feeding of children with rickets and developmental delays (Bălan, 2008).

Particular attention must be paid to the rootstocks used for grafting of apricot varieties, due to the fact that in recent years a wide range of valuable varieties have been homologated worldwide but which have a good compatibility with rootstocks only when they belong to the same apricot species (Branîște N. et al., 2002).

Aspects about the volume of soil explored by tree roots, especially the active edaphic volume, have been studied by Voiculescu N. et al., (2001).

Cichi M. (2016) found out that the architecture of the root system of the studied apricot varieties is genetically conditioned by species and variety, but obviously influenced by the soil. Popescu M., (1964) found out that using an original method of planting apricot grafted on *Prunus armeniaca*, with a collet of 0.3 m from the surface of the sand and organic fertilizers at 1.1 m deep, the horizontal roots were installed between 20-60 cm, and the vertical ones up to 240-360 cm depth, with positive consequences for growth and fructification.

MATERIALS AND METHODS

The research was carried out in 2017 within a family garden, located near Craiova. The soil is a poorly pseudogleised reddish pleuvosol with a humus content of 2.45% in the surface horizon, and the soil's reaction is poorly acidic.

The biological material is the N.J.A.19 apricot variety grafted on the cherry plum. The plantation was set up in 2000, the trees being led in the form of an improved vessel consisting of 3 ridges.

Within this variety were followed:

1. The way the roots are distributed over the depth ranges according to the thickness category at a distance of 1 m from the trunk;
2. The way of distributing the roots in depth ranges according to the thickness category at a distance of 2 m from the trunk.

For this purpose the method of the profile (Oscamp- Dragavțev) was used, which consists in making at 1 m length from the trunk, the width of 1 m and the depth of 1 m. On the walls of the trench placed at the distance 1 m from the trunk and 2 m from the trunk, the roots that emerged with the help of a tip of the knife were unearthed. Depending on their thickness, the roots were divided into 3 categories: roots up to 3 mm in diameter; roots with a diameter between 3-5 mm; roots with a diameter of more than 5 mm. The metric frame was inserted into the trench, and the roots were counted in each depth range (10 to 10 cm), depending on the thickness category to which they belong.

RESEARCH RESULTS

Through the profile method, we aimed to know the arrangement of the radicular system in the N.J.A.19 apricot variety, the rootstock used for grafting being the cherry plum, following the roots in the following thickness categories: 0-3 mm, 3-5 mm and over 5 mm.

At a distance of 1 m from the trunk, according to the three thickness categories, the distribution of the roots over the depth ranges was as follows:

Roots with a diameter of up to 3 mm – it was found a total number of 261, spread over the depth range of 0-90 cm, most of which were found on 20-30 cm and 68 roots respectively (Table 1).

Table 1

Distribution of roots with 0-3 mm in diameter at a distance of 1 m from the trunk

Depth interval (cm)	Roots number	Percentage (%)
0-10	31	11,88
10-20	56	21,46
20-30	68	26,06
30-40	48	18,39
40-50	26	9,96
50-60	20	7,66
60-70	7	2,68
70-80	4	1,53
80-90	1	0,38
90-100	0	0
TOTAL	261	100

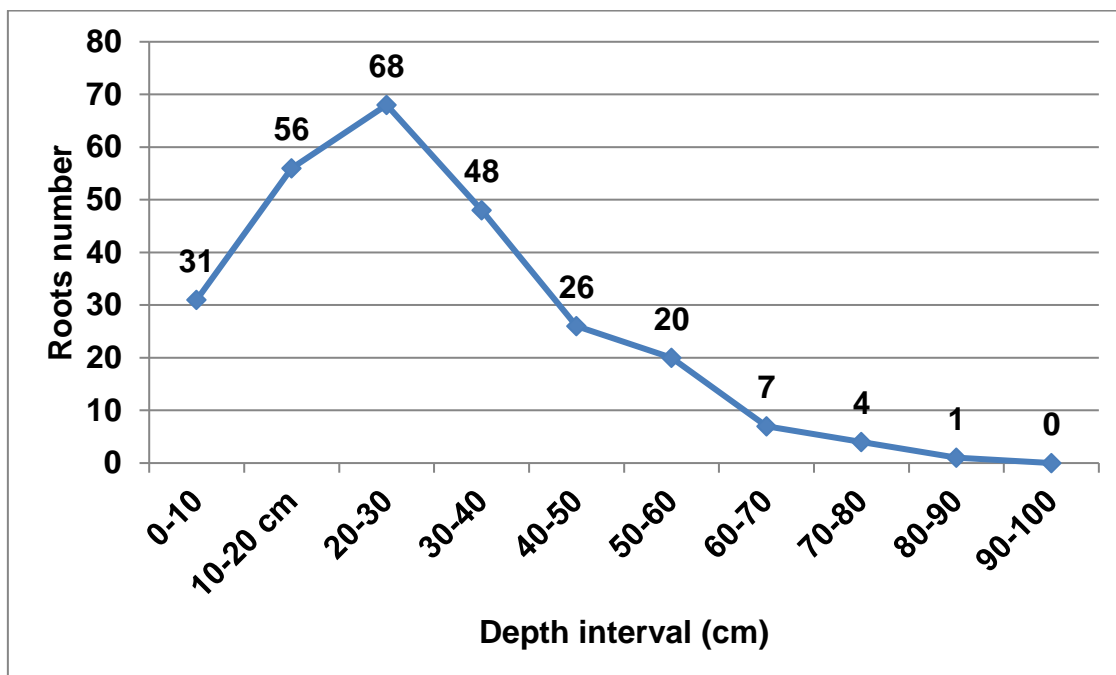


Fig. 1. Distribution of roots with 0-3 mm in diameter at a distance of 1 m from the trunk

A significant number of roots were found on the intervals of 10-20 cm (56 roots), 30-40 cm (48 roots) and 0-10 cm (31 roots) (Figure 1).

Underneath the depth of 60 cm the number of roots discovered is very low compared to the upper ranges (1-7 roots).

In terms of the weight of the roots, about 60% of them are distributed over a depth of 0-30 cm.

Roots with a diameter of 3-5 mm - were 8, being found only up to a depth of 50 cm, respectively 3 roots in the range of 10-20 cm, 2 roots in the range of 40-50 cm and one root in the intervals 0-10 cm, 20-30 cm and 30-40 cm (Table 2, Figure 2).

Table 2

Distribution of roots with 3-5 mm in diameter at a distance of 1 m from the trunk

Depth interval (cm)	Roots number	Percentage (%)
0-10	1	12,5
10-20	3	37,5
20-30	1	12,5
30-40	1	12,5
40-50	2	25,0
50-60	0	0
60-70	0	0
70-80	0	0
80-90	0	0
90-100	0	0
TOTAL	12	100

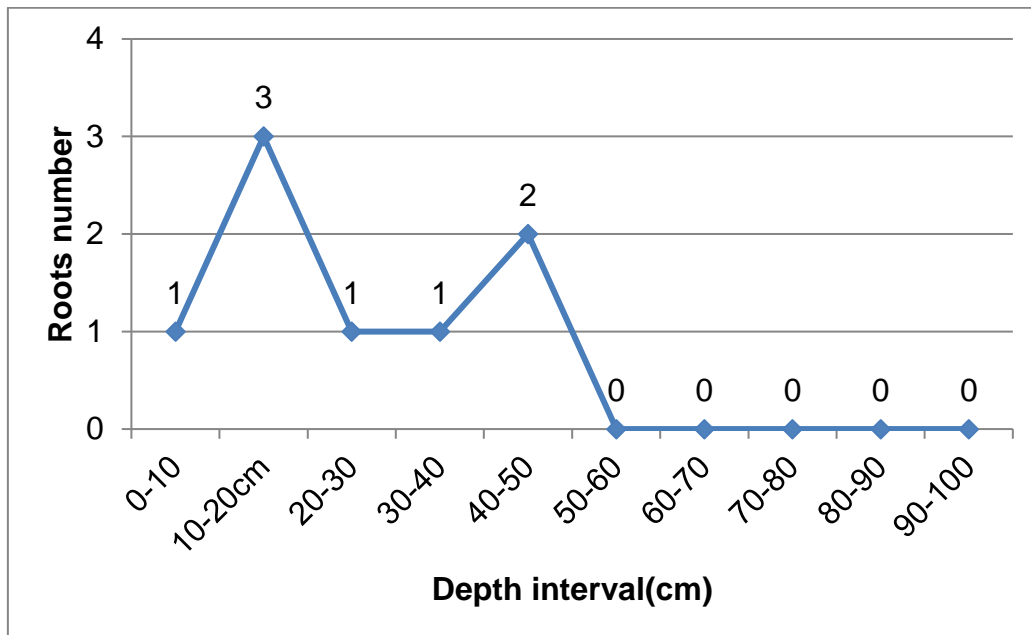


Fig. 2. Distribution of roots with 3-5 mm in diameter at a distance of 1 m from the trunk

Roots with a diameter of more than 5 mm - were found in number 14, distributed throughout the depth range studied (0-100 cm). Most roots were found on the 10-20 cm (4 roots), followed by the 30-40 cm two-rows, and the rest of the roots had a single root. Of these, over 57% were found up to a depth of 40 cm (Table 3, Figure 3).

Table 3

Distribution of roots more than 5 mm in diameter at a distance of 1 m from the trunk

Depth interval (cm)	Roots number	Percentage (%)
0-10	1	7,14
10-20	4	28,59
20-30	1	7,14
30-40	2	14,29
40-50	1	7,14
50-60	1	7,14
60-70	1	7,14
70-80	1	7,14
80-90	1	7,14
90-100	1	7,14
TOTAL	14	100

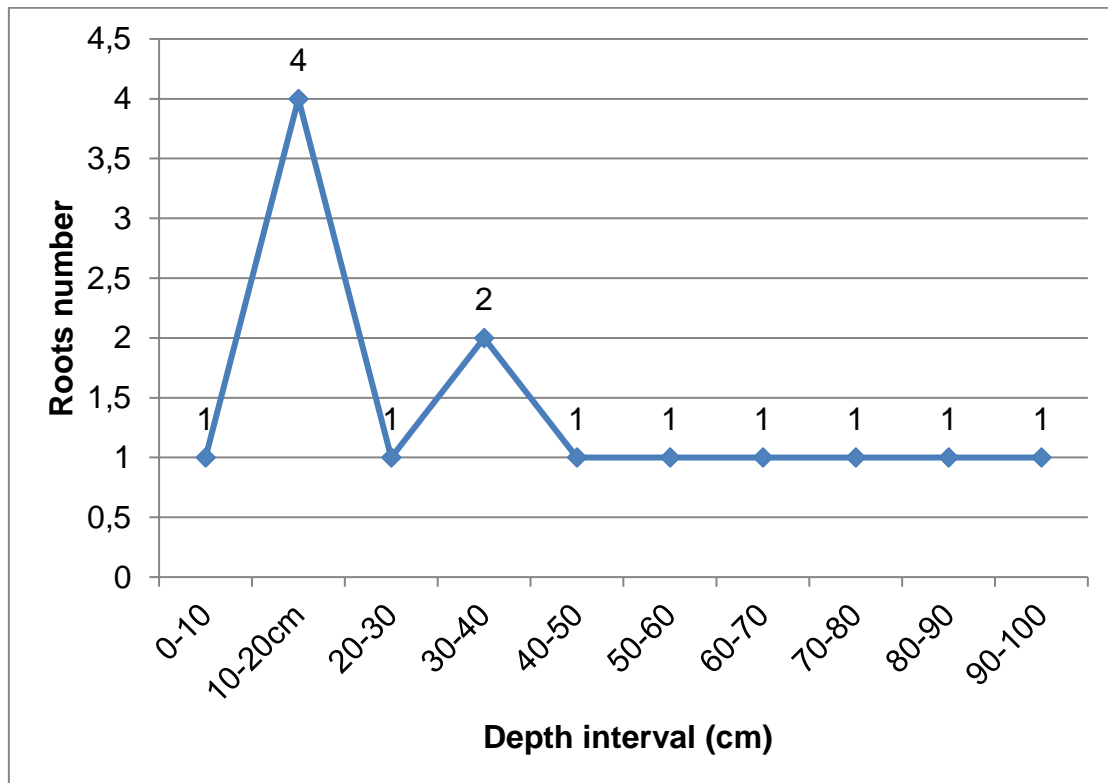


Fig. 3. Distribution of roots more than 5 mm in diameter at a distance of 1 m from the trunk



Fig. 4. Aspects regarding the root system at the distance of 1 m from the trunk

At a distance of 2 m from the trunk, the distribution of the roots was as follows:

Roots with a diameter of up to 3 mm - were present at a depth of 70 cm, 152 roots, 54 of which were on the depth range of 10-20 cm and 35.52% respectively (Table 4).

A significant number of roots was also found on depth ranges 0-10 cm (39 roots), 20-30 cm (24 roots) and 30-40 cm (15 roots) (Figure 5).

We also find out that about 77% of the roots in this thickness category are distributed to a depth of 30 cm.

Table 4

Distribution of roots with 0-3 mm in diameter at a distance of 2 m from the trunk

Depth interval (cm)	Roots number	Percentage (%)
0-10	39	25,66
10-20	54	35,52
20-30	24	15,79
30-40	15	9,87
40-50	12	7,90
50-60	5	3,29
60-70	3	1,97
70-80	0	0
80-90	0	0
90-100	0	0
TOTAL	152	100

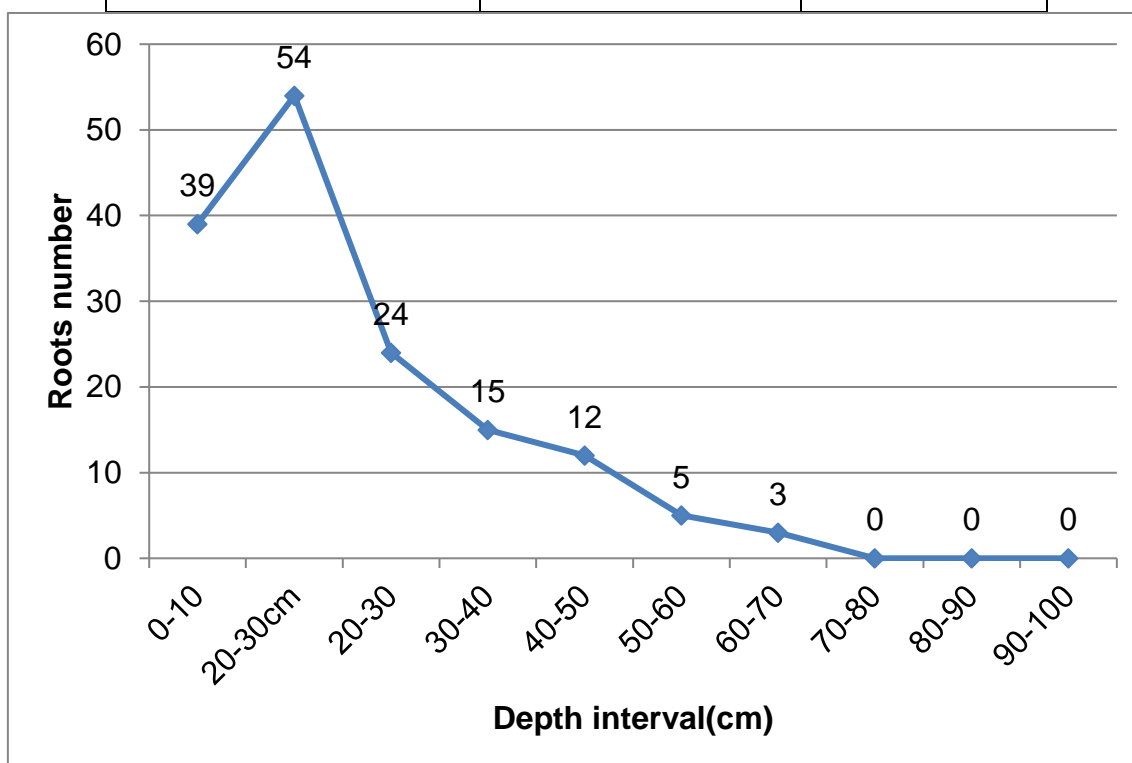


Fig. 5. Distribution of roots with 0-3 mm in diameter at a distance of 2 m from the trunk

The roots are 3-5 mm thick - were found only in the first 20 cm in the number of 3 and 2 roots respectively in the range 0-10 cm and a root in the 10-20 cm range (Table 5, Figure 6).

Table 5

Distribution of roots with 0-3 mm in diameter at a distance of 2 m from the trunk

Depth interval (cm)	Roots number	Percentage (%)
0-10	2	66,67
10-20	1	33,33
20-30	0	0
30-40	0	0
40-50	0	0
50-60	0	0
60-70	0	0
70-80	0	0
80-90	0	0
90-100	0	0
TOTAL	3	100

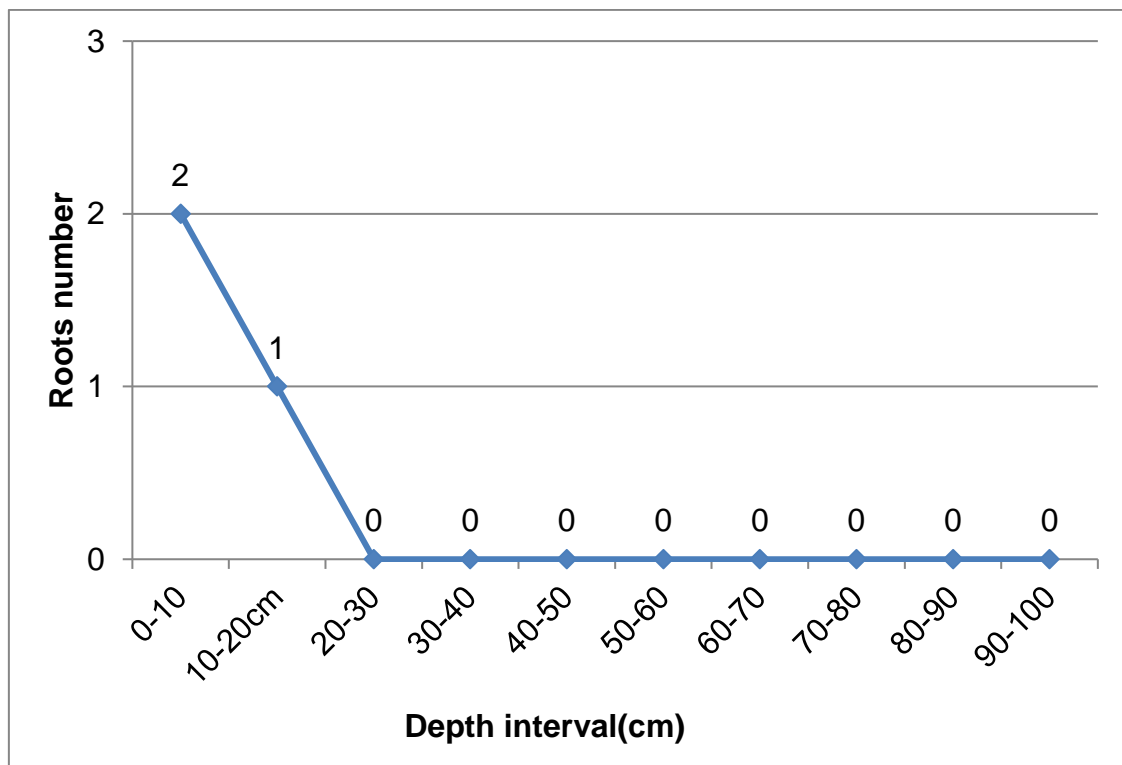


Fig. 6. Distribution of roots with 3-5 mm in diameter at a distance of 2 m from the trunk

The roots over 5 mm -were in number 5, being spread up to 30 cm in depth, namely the one on 0-10 cm and 20-30 cm 3 respectively within the deep rooted 10-20 cm (table 6, fig. 7).

Table 6

Distribution of roots more than 5 mm in diameter at a distance of 2 m from the trunk

Depth interval (cm)	Roots number	Percentage (%)
0-10	1	20,00
10-20	3	60,00
20-30	1	20,00
30-40	0	0
40-50	0	0
50-60	0	0
60-70	0	0
70-80	0	0
80-90	0	0
90-100	0	0
TOTAL	5	100

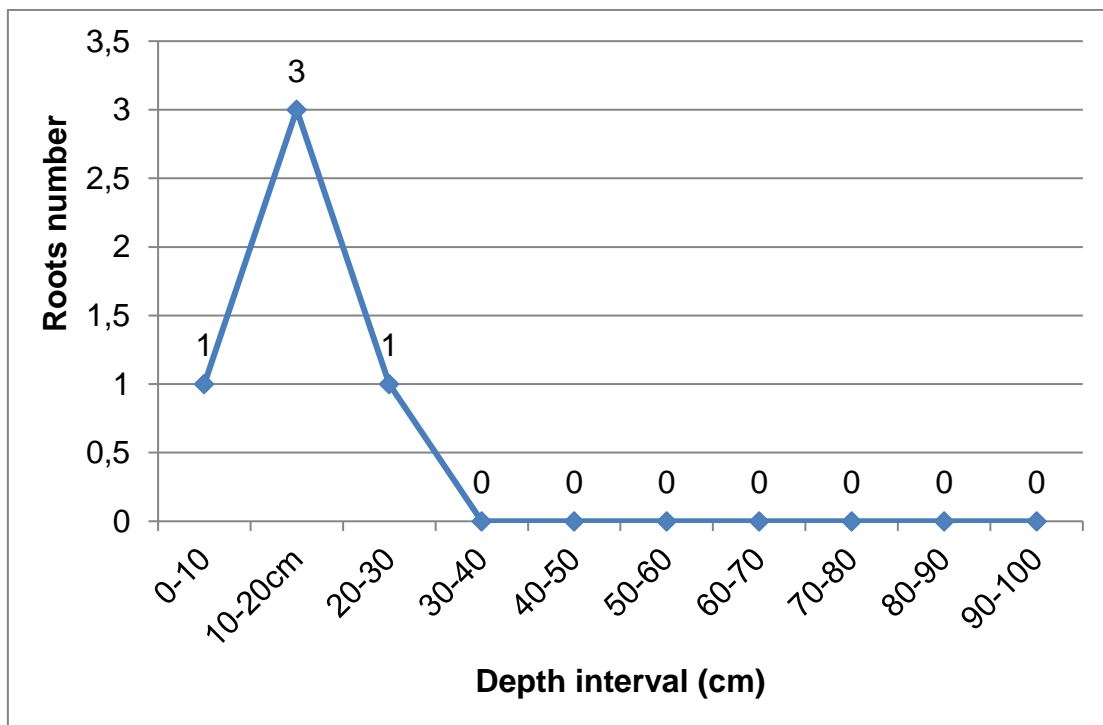


Fig. 7. Distribution of roots more than 5 mm in diameter at a distance of 2 m from the trunk



Fig. 8. Aspects regarding the root system at the distance of 2 m from the trunk

CONCLUSIONS

- roots up to 3 mm in diameter are present up to a depth of 90 cm at a distance of 1 m from the trunk and 70 cm at 2 m from the trunk;
- with regard to the weight of roots with a thickness of less than 3 mm, we find that over 60% of them are distributed on a depth of 0-30 cm.
- the 3-5 mm thick roots are met up to a depth of 50 cm at a distance of 1m from the trunk and 20 cm at a distance of 2m from the trunk.
- the roots of this category are superficially arranged (0-20 cm) both at a distance of 1m from the trunk (over 62%) and 2m from the trunk (100%);
- for roots with a thickness of more than 5 mm these were found over the entire interval at a distance of 1 m from the trunk or up to a depth of 30 cm at a distance of 2 m from the trunk.
- as a result of the superficial layout of more than 2/3 of the horizontal roots, it is recommended that the mechanical work being carried out in the plantation be done at small depths (up to 20 cm), the farmyard manure be incorporated at the surface and the watering rules have to be often and in small quantities.

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