ASPECTE PRIVIND BIOSISTEMUL ALTOI/PORTALTOI LA SOIURILE DE CAIS NJA 42 ŞI CEA MAI BUNĂ DE UNGARIA PE PRELUVOSOLUL ROŞCAT DIN ZONA CENTRALĂ A OLTENIEI

ASPECTS REGARDING GRAFT/ROOTSTOCK BIOSYSTEM OF APRICOT CULTIVARS NJA 42 AND CEA MAI BUNA DE UNGARIA ON REDDISH PRELUVOSOIL FROM THE CENTRAL ZONE OF OLTENIA

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Abstract

This paper presents the installation depth of horizontal roots of the apricot species, as part of a plantation established in 1999, at the Didactic Station Banu Maracine. The research was carried out on the apricot cultivar 'NJA 42', 'Cea mai buna de Ungaria' grafted on the 'Miroval' rootstock, using the profile method in the spring of 2012. It was ascertained that the maximum installation depth of horizontal roots with the diameter between 3-5 mm was up to 40 cm, those with the diameter of over 5 mm being found to the depth of 60 cm, and those with the depth of up to 3 mm were found on the entire depth of the soil profile (0-100 cm). The largest share of roots (over 2/3) was found on the depth of 0-30 cm, thus it is recommended that the depth of incorporation of mineral and organic fertilizers be superficial, respectively the working depth in the orchard be up to 20 cm.

Cuvinte cheie: caisa, radacina, profil de sol
Keywords: apricot, root, cavity

1. Introduction

The climatic conditions in our country are favorable to the apricot culture with regard to the thermal resources, light and humidity but they show differences on the territory, determined by climatic micro-zoning.

The apricots are requested by consumers, not only as fresh fruits, but also in a processed form in numerous derivatives qualitatively superior than many species of fruit: stewed fruit, marmalade, jam, jelly, nectar, syrup, dried or candied fruit. Also, from apricots can be obtained liqueur, wine while the brandy is obtained by distillation and has a superior quality in comparison with other similar products.

The rich chemical composition of the fruits makes them valuable as medicine and they can be consumed in cases of physical and intellectual asthenia, anemia, insomnia, convalescence. Also, they are recommended for slow growing children and children with rickets (Bălan, 2008).

2. Material and methods

The research was carried out in 2012, at the Didactic Station Banu Maracine, on an apricot plantation established in 1999, which consists of 10 cultivars, grafted on the 'Miroval' rootstock.

The experiment was carried out using the method of randomized blocks, each variety being represented by 4 repetitions. The plantation distance was 5/4.5 m, and the trees were trained according to flat vessel mode.

The plantation land is a reddish preluvosoil and it is characterized by pH values ranging between 5.50-6.64 (weak acid reaction), humus content varying between 2.35% on the surface (Ao: 0-30 cm) and lowers on the profile to the value of 0.78% on the horizon B/C (97-120 cm).

In terms of climate, the area has a temperate continental climate with a small Mediterranean influence, enough precipitations but uneven allocated during the year, dry summers and the maximum of precipitations at the end of spring- beginning of summer (May and June).

The average annual temperature exceeded the value of the normal temperature in 48 years, on average with -0.3°C,recording negative deviations in January, February, March, September, October and December, respectively positive deviations in April, May, June, July, August and November (Table1).

The annual average precipitations recorded in 2012 had the value of 598.5 mm, exceeding the normal value in 48 years with 13.1 mm, their allocation during the vegetation period being pretty even (between 35.0 mm in August and 80.5 mm in April) (Table 2). Positive deviations from the normal were

recorded in February, March, April, June, July and September while in January, May, August, October, November and December the deviations were negative.

The atmospheric humidity recorded an average value of 71%, varying between 50% in June and 80% in September during the vegetation period (Table 3).

The research method used was the profile method, by means of which the distribution depth in soil of horizontal roots was determined. Based on the results, it can be estimated: the application depth of mineral and organic fertilizers, soil tillage depth in the orchard; also, some eventual affections of the root system can be discovered. Therefore, it was digged a soil profile with the length of minimum 1.0 m, width of 0.50 m and the depth of 1.0 m, perpendicular on the horizontal roots' direction, at the distance of 1.0 m, respectively 2.0 m from the trunk. The roots that appeared on the wall of each soil profile, from the tree, were released all round on the ground to be observed better.

In terms of the genetic horizons of the soil, all the roots were measured and noted, by depth and they are divided in 3 categories: with the diameter of up to 3 mm; with the diameter ranging between 3-5 mm and with the diameter over 5 mm.

3. Results

3.1. For the 'NJA 42' cultivar

The distribution of roots on depth intervals, at the horizontal distance of 1 m from the trunk, by depth was as it follows: 365 roots with the diameter of up to 3 mm were found , distributed among the whole interval (0-100 cm), most of them being found on the interval 20-30 cm depth, respectively 94 roots. Regarding the share of the roots, over 66% of these were distributed among the depth of 0-30 cm (Figure 1).

12 roots with the diameter between 3-5 mm were found, to the depth of 50 cm, respectively 4 roots on the first two intervals, representing over 66% from their total (Figure 2).

The roots with the diameter over 5 mm were 13 in number, distributed on intervals to the depth of 60 cm, with the exception of the 30-40 cm interval which has no roots. Many of the roots were found on the 10-20 cm interval (5 roots), and from their total, over 69% were found to the depth of 30cm (Figure 3).

At the distance of 2 m from the trunk, the distribution of the roots was as follows: the roots with the diameter of up to 3 mm were found on the entire depth interval (0-100cm), 285 in number, 82 of these being found on the first depth interval (0-10 cm), respectively with a share of 28.77% (Figure 1).

The roots with the diameter of 3-5 mm were found only in the first 30 cm depth, 5 in number, respectively 2 roots on the first two intervals (0-10 cm and 10-20 cm) and one root on the 20-30 cm interval (Figure 2).

The roots with the diameter of over 5 mm were 5 in number and had an even distribution to the depth of 60 cm, one on each interval, with the exception of 40-50 cm depth interval (Figure 3).

3.2. For the 'Cea mai buna de Ungaria' cultivar

The roots with the diameter of up to 3 mm were found on the whole interval (0-100 cm), not only at the distance of 1 m from the trunk (310 roots) but also at the distance of 2 m from the trunk (228 roots) (Figure 4).

The roots with the diameter between 3-5 mm were 3, found at the distance of 1 m from the trunk (respectively 1 root on the interval 10-20 cm and 2 roots on the interval 20-30 cm), and at the distance of 2 m from the trunk were found 7 roots (respectively 1 root on the intervals 0-10 cm,10-20 cm, 20-30 cm and 2 roots on the intervals 40-50 cm and 90-100 cm) (Figure 5).

The roots with the diameter of over 5 mm were 6, placed at the distance of 1 m from the trunk and 3 roots at the distance of 2 m from the trunk (Figure 6).

4. Conclusions

For both cultivars studied, the roots with the diameter of up to 3 mm are found on the entire profile depth not only at the distance of 1m, but also at the distance of 2 m from the trunk;

For the 'NJA 42' cultivar, the roots with the diameter of 3-5 mm are found to the depth of 50 cm at the distance of 1 m from the trunk, respectively 30 cm at the distance of 2 m from the trunk. In the case of the 'Cea mai buna de Ungaria' cultivar, the roots from this category are found to the depth of 30 cm, at the distance of 1 m from the trunk, respectively on the whole interval at the distance of 2m from the trunk.

Regarding the roots with the diameter of over 5 mm, these were found to the depth of 60 cm in the case of 'NJA 42' cultivar, respectively up to 30 cm in the case of the 'Cea mai buna de Ungaria' cultivar for both studied distances.

The 'NJA 42' apricot cultivar presents a better distribution of the root system in comparison with the 'Cea mai buna de Ungaria' cultivar;

As a result of the superficial disposition of over 2/3 of the horizontal roots, it is recommended that the mechanical tillage carried out on the plantation be done at shallow depths (up to 20 cm), the manure be incorporated at the surface, as possible, and regarding the irrigation standards to be applied frequently and in small quantities.

References

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Tables and figures

Table 1. Evolution of average monthly temperatures (Weather station Craiova)

Specification	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Average temperatures	-5.0	-3.5	2.0	12.0	17.7	23.0	22.8	23.5	17.0	10.0	5.5	1.3	10.5
Normal in 48 years	-1.7	0.4	5.1	11.3	16.7	20.3	22.3	21.8	17.2	11.3	5.1	-0.1	10.8
Deviation	-3.3	-3.9	-3.1	0.7	1.0	2.7	0.5	1.7	-0.2	-1.3	0.4	-1.4	-0.3

Table 2. Evolution of monthly precipitations (Weather Station Craiova)

Specification	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Sum
Average temperatures	20.0	40.1	70.2	80.5	55.2	77.3	75.7	35.0	66.3	33.5	34.2	10.5	598.5
Normal in 48 years	38.1	37.9	40.8	51.9	63.7	72.9	54.5	48.0	38.1	40.4	52.4	46.7	585.4
Deviation	-18.1	2.2	29.4	28.6	-8.5	4.4	21.2	-13.0	28.2	-6.9	-18.2	-36.2	13.1

Table 3. Relative air humidity in 2012 (Weather Station Craiova)

Year 2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
Value	92	70	72	65	70	50	60	62	80	70	75	85	71

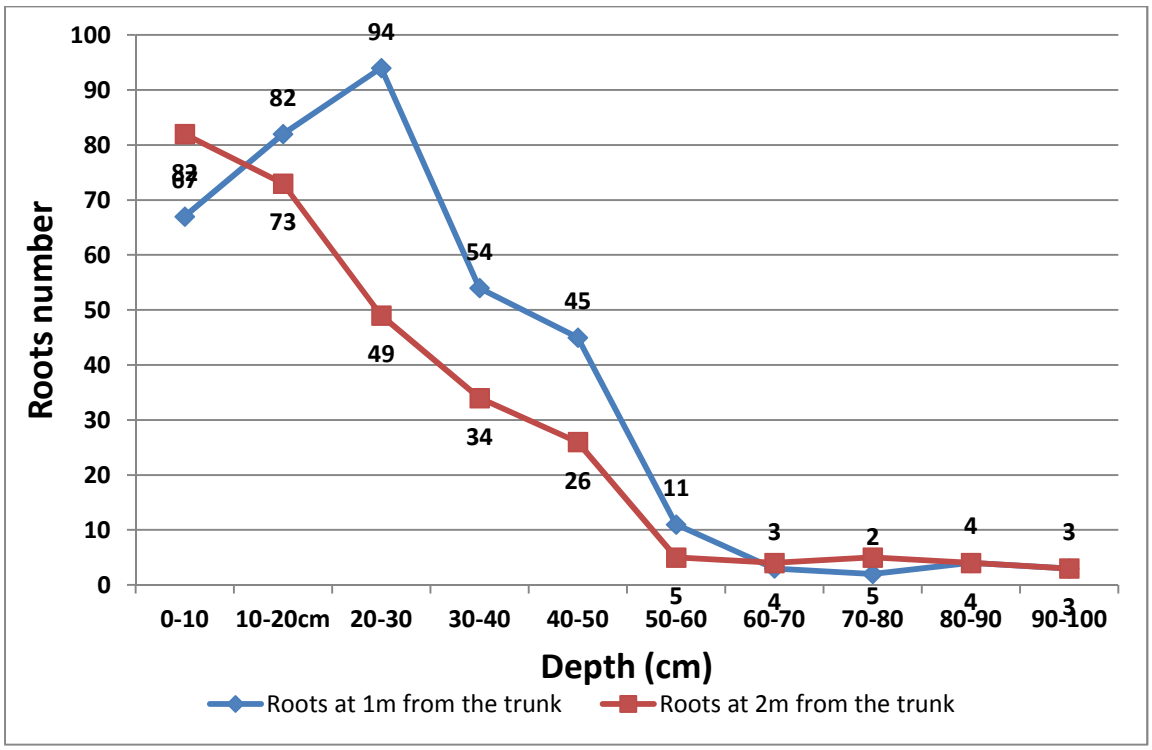

Figure 1. The distribution of roots with the diameter of 0-3 mm at the distance of 1 m and 2 m from the trunk at 'NJA 42' cultivar

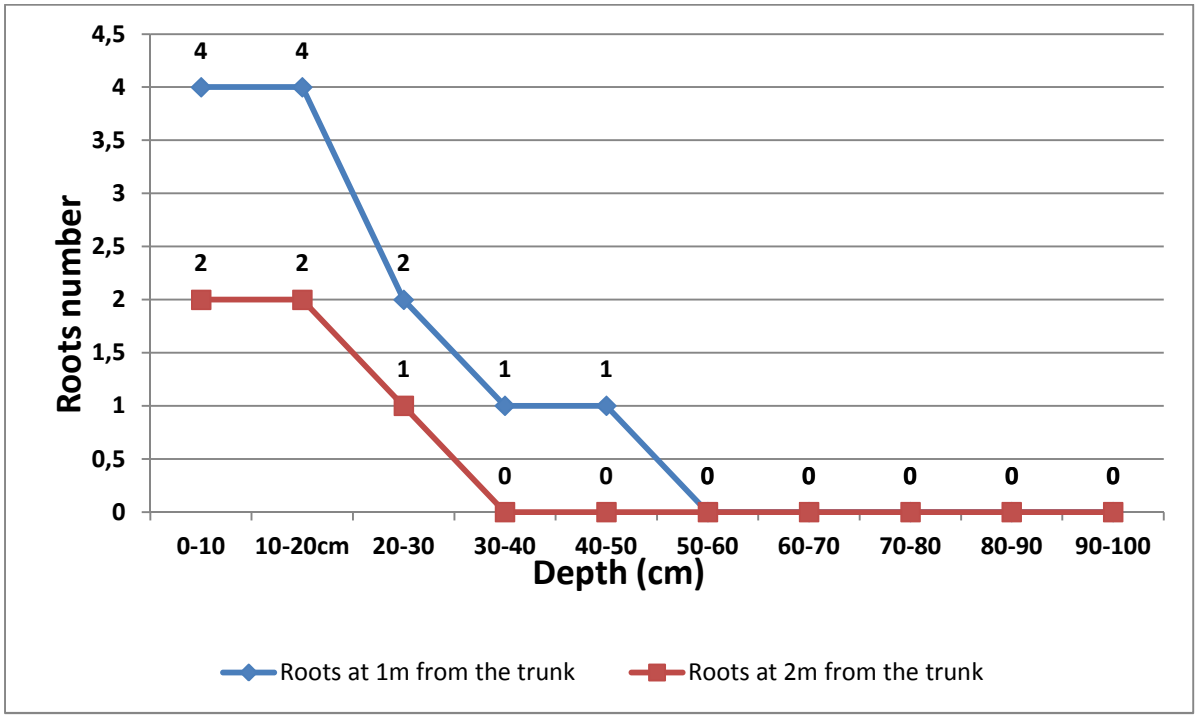

Figure 2. The distribution of roots with the diameter between 3-5 mm at the distance of 1 m and 2 m from the trunk at 'NJA 42' cultivar

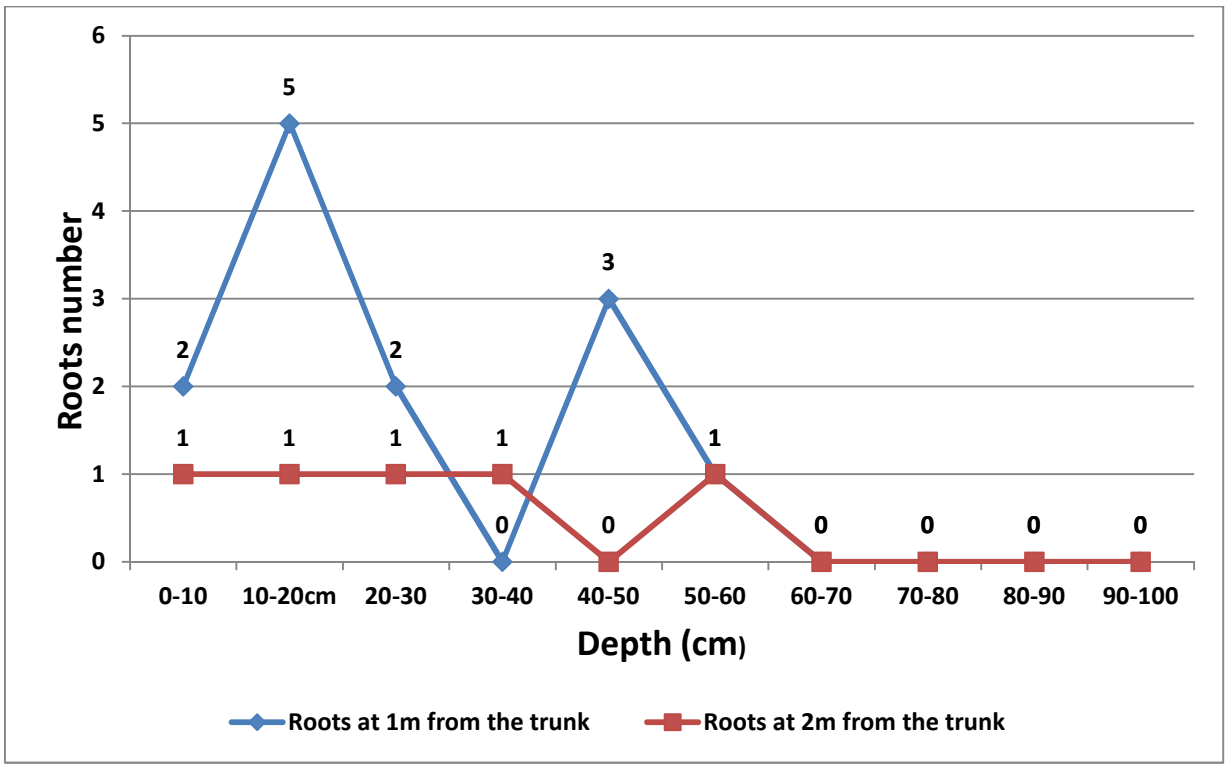

Figure 3. The distribution of roots with the diameter of over 5 mm at the distance of 1 m and 2 m from the trunk at 'NJA 42' cultivar

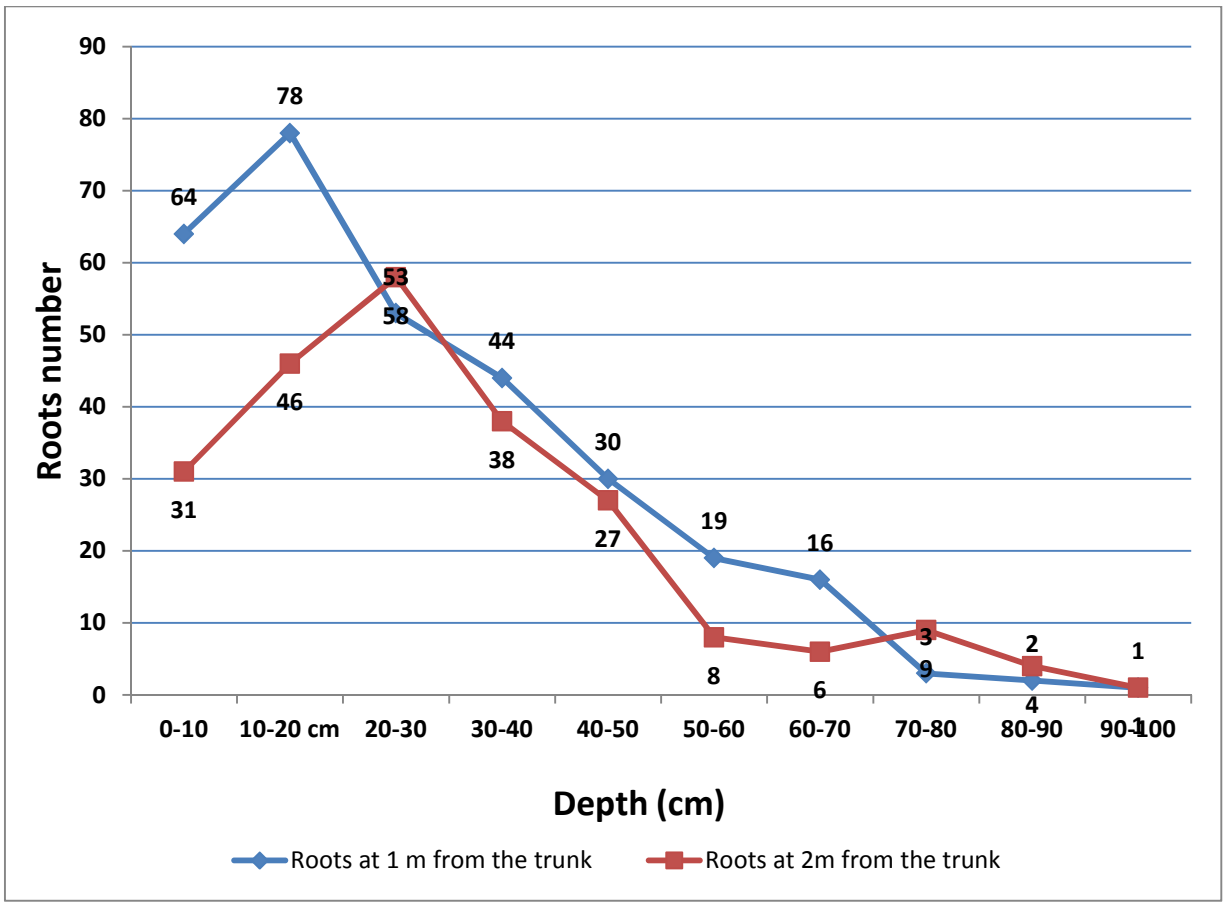

Figure 4. The distribution of roots with the diameter of 0-3 mm at the distance of 1 m and 2 m from the trunk at 'Cea mai buna de Ungaria' cultivar

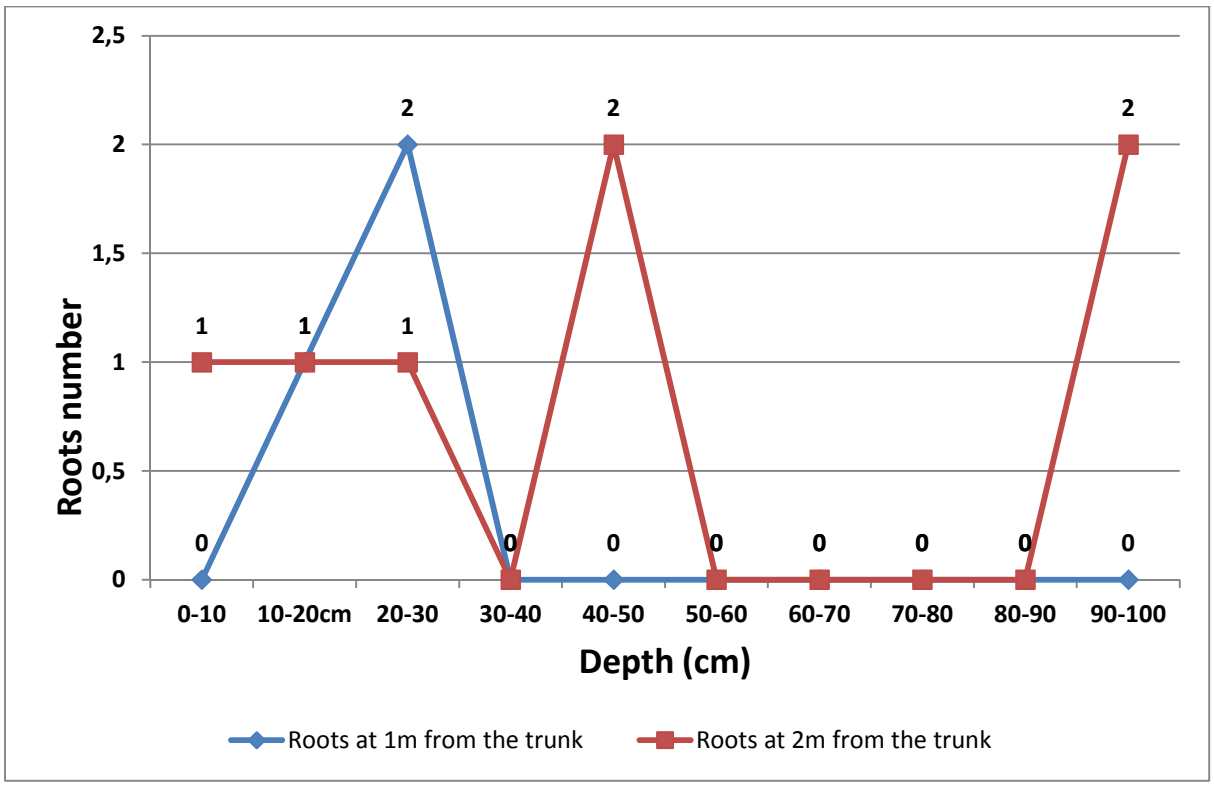

Figure 5. The distribution of roots with the diameter of 3-5 mm at the distance of 1 m and 2 m from the trunk at 'Cea mai buna de Ungaria' cultivar

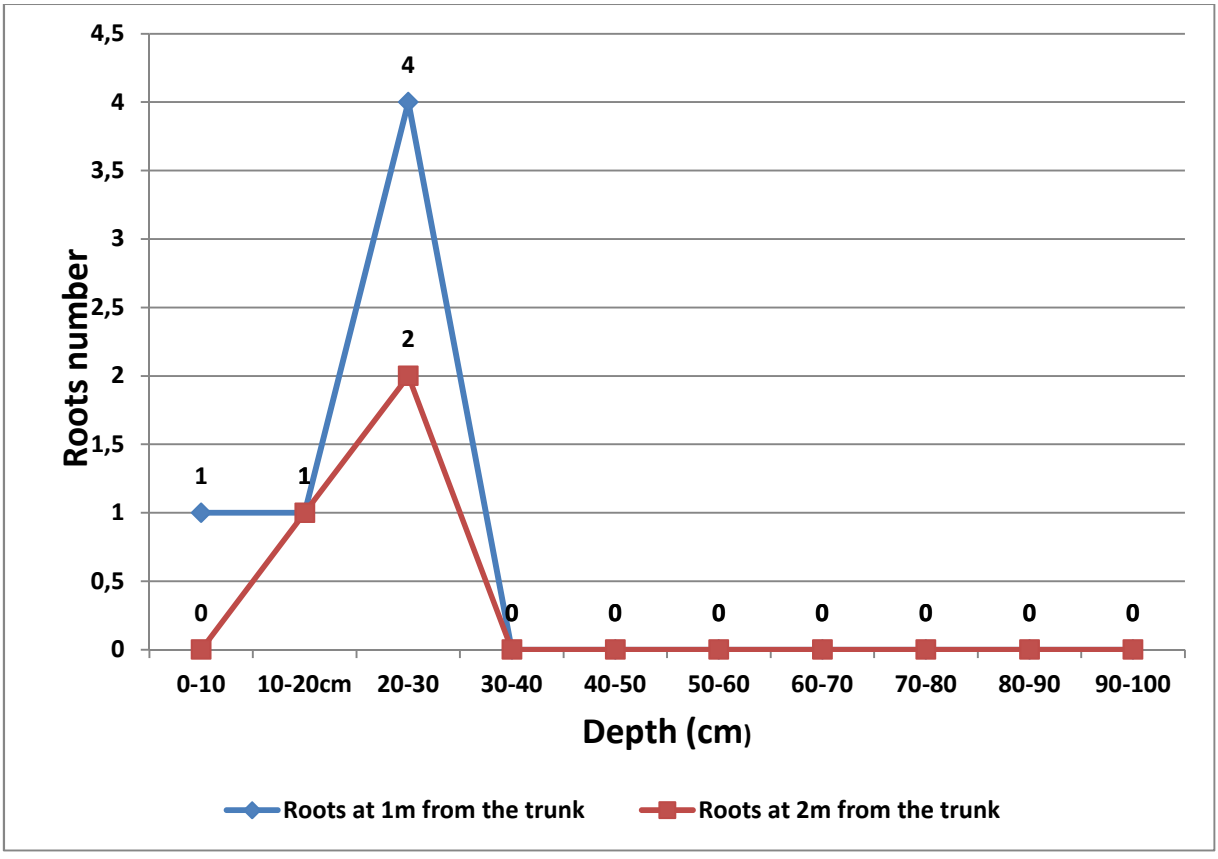

Figure 6. The distribution of roots with the diameter of over 5 mm at the distance of 1 m and 2m from the trunk at 'Cea mai buna de Ungaria' cultivar

Figure 7. Aspects regarding the soil profile and root system at the distance of 1 m from the trunk

Figure 8. Aspects regarding the soil profile and root system at the distance of 2 m from the trunk

Figure 9. Aspects regarding the soil profile and root system at the distance of 1 m from the trunk at 'Cea mai bună de Ungaria' cultivar

Figure 10. Aspects regarding the root system at the distance of 2 m from the trunk at 'Cea mai buna de Ungaria' cultivar