ROOTS DEVELOPMENT CAPACITY OF RASPBERRY PLANTS

CAPACITATEA DE DEZVOLTARE RĂDĂCINILOR LA PLANTELE DE ZMEUR

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Abstract *Investigations on capacity development and location of raspberry root system growing in new conditions were performed in the experimental field plantation located in the Institute of Horticulture in 2008. Study of the objectives was to evaluate the development length and location of root mass in soil on raspberry varieties Delbard Magnific. Strain of raspberry plant is steeped in the soil up to 4 cm, followed by about 7 cm height root, which then directs lateral and in depth. Most roots penetrate the soil to a depth of 45-60 cm. The location of raspberry on the horizon of most roots, the stem in part, on the side is for a radius of 30 cm, Ø 1-2 mm roots extend further a range of 40-50 cm. The total length of roots of the raspberry cultivar studied was taken as the value of 2121.7 cm and 381.8 g mass.*
Key word: gooseberry, variety, roots, weight, length.

Rezumat. *Investigaţiile referitoare la capacitatea de dezvoltare şi amplasare a sistemului radicular al zmeurului în condiţii noi de cultivare au fost efectuate în plantaţia de zmeur în cîmpul experimental al Institutului de Horticultură, în anul 2008. Obiectivele studiului au fost aprecierea lungimii şi masei rădăcinilor, dezvoltarea şi amplasarea lor în sol, la soiurile de zmeur Delbard Magnific, Rubiin bulgăresc. Sistemul radicular a plantelor de zmeu, format dint-un rizom multianual (tulpina subterană), de circa 11 cm, de la care rădăcinile se ramifică, orientîndu-se lateral şi în adâncime. Majoritatea rădăcinilor pătrund în sol la adâncimea de 45-60 cm. Amplasarea majorităţii rădăcinilor de zmeur pe orizonală, de la tulpină în părţi, pe lateral are loc pe o rază de 30 cm, iar rădăcinile cu Ø de 1-2 mm se extind mai departe, pe o rază de 40-50 cm. Lungimea totală a rădăcinilor de zmeur la soiul studiat a fost stabilit la nivelul valorii de 2121,7 cm, iar masa - 381,8 g. iar la soiul Rubiin bulgăresc corespunnzător 1893,5 cm şi 330,9 g .*
Cuvinte cheie: zmeur, soi, rădăcina, masa, lungimea.

INTRODUCTION

The root system of raspberry bush is well branched. Main roots are placed horizontally at a depth of 20-60 cm, according to Siberia. The root system of raspberry plants is composed the rhizome (underground stem) of the horizontal and vertical branching roots. Most of the root is at depth of 20-30 cm on the young plant fruit until it enters the economic and 20-60 cm during the fruit. Growth and root development depends on soil fertility.

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Thus the low productive heavy soils roots grow weak, but the most fertile can increase up to a depth of 1.5 m horizontal spread of roots in young plants occurs on a diameter of 60 cm and a plant bearing diameter 100-150 cm.

The roots length average small fraction of raspberry plants are 93-98% from the total length. Excavations raspberry roots in young plantations bearing roots showed that large fractions of 5-15 and 2-5 mm diameter were only several layers from the depth of 10-30 cm and very few in the lower layers, but at a distance of 60-80 cm from the centre of the row, large roots in soil layers below 20 cm were not practical. Small fraction of roots with diameter of 1-2 and more than 1 mm was significantly more in all soil layers from 10 to 100 cm and 30 cm apart at a distance from the centre row. This is the fraction of roots absorbing the most active and growing. In layers below 30-to 100 cm small root fractions are considerably less, even in fruit plantations (Belîh et al., 2004). Top of the raspberry bush is represented by a rhizome (stem) of soil to start roots located at a depth of 10-80 cm. Each year, the buds on the rhizome shoots appear (suckers) that strains are fertile and began living at the expense mother plant, its roots and become independent after training (Chira, 2000).

The distribution of root system of raspberry depends on many factors and primarily, soil conditions and plant age. The raspberry bush fallow roots reach a depth of 96-175 cm and are spread to a distance of 125-180 cm at planting. Most root mass (90-95%) is concentrated in the 40-50 cm layer. (Iaroslavțev, 1987; Ianovschii, 2009).

Placing the shallow roots of raspberry plants caused great requirement of the crops on soil fertility and water. In the absence of soil humidity the raspberry ability of suckers decreases significantly, thus, reduce and harvest (Julea, 1973). The raspberry root system is fasciculate the most roots are located at a depth of 40 cm. In the roots are spread lateral to 2 -3 m from the bush, but most of them located in the root to a diameter of 50-60 cm. Superficial location of the root mass base that explains the low resistance raspberry bush insufficient soil moisture (Hapova, 2003, Ianovschii, 2009).

Most roots are in the top layers of soil to a depth of 30-40 cm, thus the raspberry bush is great need nutritive. However substances in water and fertile soils and mild roots can penetrate to a depth of 90 cm. On heavy soils, low productivity, most viable roots are in the top layer - the depth of 15-25 cm. Well developed root system, allow the formation of vigorous annual aerial part, which ensures high yield plant. Length of roots depends on soil type, her mechanical composition and fertility (Alexandrova, 1989).

MATERIAL AND METHOD

Investigations concerning the development and location of raspberry root system, on the new conditions of cultivation were performed in 2006 in the Field experimental plantation mounted in the Scientific and Practical Research Institute of Horticulture, Chisinău Republic of Moldova.

The investigations were performed according to methods established for studying roots systems (Colesnicov, 1972). This can be established as a result of

scientific research. Raspberry bush studying root system by digging on the Scientific and Practical Research Institute of Horticulture established a way of locating roots in the soil in the Central Zone of the Republic of Moldova.

The study was made on the root system of raspberry plants on varieties Delbard Magnific and Rubin bulgarian

RESULTS AND DISCUSSIONS

Gooseberry varieties created Moldova's conditions are. Introduced varieties, growing conditions, we studied other than those for which they were created, they can adapt different, being more or less resistant to the climatic conditions may be higher or lower harvest, the fruits can be higher quality or vice versa.

The location in soil of raspberry plant root system to Delbard Magnific variety is presented in figure 1.

Fig. 1 - Raspberry root system location in soil, variety Delbard Magnific.

The location in soil of raspberry plant root system to Rubin bulgarian variety is presented in figure 2.

Fig. 2 - Raspberry root system location in soil, variety Rubin bulgarian.

As shown in figure 1 and 2, on the root stock of the raspberry plants are located rhizomes (underground stem), which develops roots that turn sideways in the layers of soil from the surface.

On the horizontal roots shoots is placed the buds, which are developing other young plants, suckers. The roots, which are shifting horizontally, successfully penetrate in the depth.

The greater the forces of growth and the suckers plant roots, the greater the mass and root length. Well developed raspberry root system to favour vigorous annual aerial part formation, which can ensure high harvest and plant quality.

The results of the investigations it was established that the root system of raspberry plants consists of one long-term rhizome (underground stem, about 11 cm), from which roots branch off, focusing on lateral and depth.

The root system consists of one non raspberry plants a multi rhizome (underground stem, about 11 cm), from which roots branch off, focusing on lateral and depth.

Most roots penetrate the soil to a depth of 45-60 cm. Placing the horizon majority raspberry roots, stems in part from the side is for a radius of 30 cm, and Ø 1-2 mm roots extend further a range of 40-50 cm.

Research in raspberry plantation allowed for identify the distribution of roots in soil, and findings are presented in table 1.

Table 1

Raspberry root length and weight depending on variety, year of plantation 2000

Variety	Roots length, cm				Root weight, g			
	Ø 0,5-0,6 mm	Ø 0,25-0,45 mm	Ø 0,1 -0,2 mm	amount	Ø 0,5 -0,6 mm	Ø 0,25-0,45 mm	Ø 0,1 -0,2 mm	amo unt
Delbard Magnific	98,2	347,3	1676,2	2121,7	17,6	62,5	301,7	381,8
Rubin bulgarian	44.2	333,4	1515,9	1893,5	7,7	58,3	264,9	330,9

According to the data presented in table 1 we can say that the root system, plants of raspberry variety Delbard Magnific is more vigorous in development, and the roots are more developed. The total roots length of this variety is 2121,7 cm, and their mass is 381,8 g. Roots thick, Ø 0.5-0.6 mm in length of 98.2 cm and weight-17.6 g thin Roots, Ø 0,10 and 0,20 mm reach a length of up to 1676,2 cm, with a mass of thick Roots 301,7 g. medium Ø 0,25-0,45 mm have a length of 347,3 cm, and the mass of 62,5 g.

Plants of raspberry variety Rubin Bulgarian is less vigorous in development, and the roots are more poorly developed. The total length of this variety is 1893,5 cm, roots and their weight is 330,9 g. Roots thick, Ø 0.5-0.6 mm in length of 44.2 cm and weight-7.7 g thin Roots, Ø 0,10 and 0,20 mm reach a length of up to 1515,9 cm, with a mass of 264,9 g medium-thick Roots., Ø 0,25-0,45 mm, a length of 333 cm d: 43.4 cm, and the mass of 58.3 g.

CONCLUSIONS

So, research conducted to study root system Delbard Magnificent raspberry bush varieties, Bulgarian Rubin allowed us to determine that:

1. In developing the basic roots of raspberry plants largely influence the particularity of variety. The greater forces of growth, the greater root mass and length, allowing good growth of plants, increased harvest.

2. The root system of raspberry plants consists of one long-term rhizome (underground stem, about 11 cm), from which roots branch off, focusing on lateral and depth..

3. Most roots penetrate the soil to a depth of 45-60 cm.The location of raspberry on the horizon of most roots, the stem in part, on the side is for a radius of 30 cm, Ø 1-2 mm roots extend further a range of 40-50 cm.

4. The total length of roots of the raspberry variety Delbard Magnific, was taken as the value of 2121.7 cm and weight - 381.8 g, while the variety Rubin Bulgarian those parameters have lower values, properly 1893.5 cm and 330.9 g.

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