

## THE STUDY OF THE DEVELOPMENT OF THE ROOT SYSTEM ON FEW CONIFERS AND ON SOME VARIETIES OF SHRUBS

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### ABSTRACT

*The studying of the growth and development of the root system is a matter of great interest for all the crops in the country. Observing the development of the root system suggests the mechanical work that must be applied in order to avoid the damaging of the roots.*

*The role of the root system is to absorb water, nutrients and to fix the soil. In the case of varieties of shrubs studied we can mention that on the same type of soil, the varieties of raspberry and blackberry roots have reached the depth of 25 cm, the red varieties of gooseberries, red currant and black currant to a depth of 15 cm.*

*Studying the roots taken out of the pots of the varieties of conifer, *Thuja occidentalis* holmstrup, *Thuja Smaragd* and *Thuja Columnaris* we could notice that they reached to a depth of 15-18-20.0 cm. The development and root growth generally depends on environmental factors, on the species, on the variety, on rootstock and also on agricultural technology.*

### INTRODUCTION

A factor that can lead to a slow development of roots is the weed of crops, which can be a real competitor regarding water, food and so. On fertile soils, the root system grows more than on clay soil or hardened areas because the soil has not been worked.

The roots of vegetative rootstock can reach up to 20-50 cm deep. The development of the root system depends on the type of soil and on the soil preparation and the knowledge of root growth may indicate a technology culture.

Authors like Buben I., et al. (1992) have given a special attention to the species of *Thuja Occidentalis* due to its antiviral properties. Thus, the authors specify that the content of essential oils in *Thuja*, differ in leaves in the range of 0.53 to 5.25%.

Iglesias M., et al. (2008) studied the physico-chemical properties of the type of compost "gorse" and argued that the report carbon / nitrogen and the content of organic matter are suitable for the use in the growth environment.

Davidescu V., et al. (2003) established the ways of using different substrates for the process of rooting of conifers (*Thuja occidentalis*).

Also Dumitru M., et al. (2003) researched the rooting of stem cuttings for three species (*Thuja plicata*, *Chamaecyparis pisifera*, *Juniperus chinensis*), on four rooting substrates. The positive result was obtained with IBA 2000 ppm.

The development of SSR markers in the fruits of raspberry and their uses in understanding the relationships between wild raspberries and the cultivated ones, was analyzed by Graham J., et al. (2002).

Other authors (Ieremie Ioana-Anca, Bra I.I., Artenie V., 2007), have followed in terms of biochemical and cytogenetic effects of ascorbic acid and citric acid in germination of *Thuja orientalis*.

Torchik V., (2010) studied the development of ornamental conifers and their resistance to environmental factors, diseases and pests in central botanical garden in Belarus. It has been observed that the *Thuja occidentalis* decorative forms require careful supervision from the point of view of plant health.

## MATERIALS AND METHODS

The studied material which was worked on, was the following: the varieties of Thuja Occidentalis Holmstrup, Thuja Occidentalis Columnaris, Thuja Occidentalis Smaragd, species grown in pots for 4 years. As to the shrubs, they noticed the root growth at the variety of raspberry Fert di Zamos, at the variety of blackberry Thornfree, at the variety of red gooseberries Piroz Izletes, at the variety of black currant Fert di and at the red currant variety Jonkheer Van Tets. The researched varieties are Romanian and they were bred vegetatively, the root system being studied after a year of growth.

The main achieved objectives were:

- Checking the growth and the development of the roots of few Thuja conifers, their extending both vertically and horizontally;

-Checking the root growth and the development of several varieties of raspberry, blackberry, red gooseberries, black currant and red currant, the distribution of roots vertically and horizontally.

## RESULTS AND DISCUSSIONS

They have analyzed and studied the roots of Thuja species after they were taken out of the pots, the soil was removed and they were able to clearly highlight the disposal of roots both horizontally and deeply.

From Table 1 we can notice that a slight increase in height and width was bigger at Columnaris Thuja and Thuja Holmstrup, which reached the height of 71.0 to 80.0 cm in four years and the width of 26.0 cm to 21.0 cm. Thuja Smaragd had the height of 60.0 cm and the width of 18.0 to 20.0 cm.

**Table 1**

**The vigour of plants according to height and width**

Variant	Height (cm)	Width (cm)
Thuja Occidentalis Holmstrup	71.0	18.0-21.0
Thuja Occidentalis Columnaris	80.0	22.0-26.0
Thuja Occidentalis Smaragd	60.0	18.0-20.0

Analyzing the distribution of vertical and horizontal roots we can mention that Columnaris Thuja and Thuja Holmstrup have roots at the depths of 20.0 and 30.0 cm and their roots can reach up to 20.0 cm horizontally.

Having the root system more at the surface, we can notice the roots of Thuja Smaragd which can reach up to 15.0 cm deep in the ground and horizontally up to 15 to 17.0 cm. Basically the root system is shallower and the vigour of the tree is smaller both in height and width.

Analyzing the roots, we realized that there are roots: thinner than 1mm, 1mm roots, roots between 1-4 mm and 4 mm roots.

Thus, Columnaris Thuja and Thuja Holmstrup had the roots of 1-4 mm, their number being 2, with a length of 10 to 12.0 cm, (pictures 1 and 2). Two roots thicker than 4 mm had Thuja Columnaris with a length of 25 to 30.0 cm.

We notice a well-developed root system.

Thuja Smaragd had a very rich root system with many absorption roots of 1 mm and less than 1 mm, which had a length of 10 to 15.0 cm, (picture 3).



**Picture 1- Thuja holmstrup**



**Picture 2 – Thuja columnaris**



**Picture 3 - Thuja smaragd**

As to shrubs, we noticed a varied root partition, both deeply and horizontally (Table 2).

We noticed developed deep roots in raspberry species (23.0 cm), blackberry (23.0 cm) and red gooseberries species (20.0 cm) with a distribution of roots of 17 to 20.0 cm horizontally. This aspect shows that the three species have a highly developed root system both in depth and at the surface of the ground. The other two species, that is, the black currant and the red currant had roots to a depth of 15.0 cm and a horizontal surface laying between 15 to 18.0 cm. With the two species the root system is more superficial.

**Table 2**

**The method of setting the root system**

Nr. crt.	Variant	Distribution roots	
		Depth	Horizontally
1.	<b>Raspberry Tree - Fertodi Zamatos</b>	23.0 cm	17.0 cm
2.	<b>Blackberry - Thornfree</b>	23.0 cm	18.0 cm
3.	<b>Red Gooseberry - Piros Isletes</b>	20.0 cm	20.0 cm
4.	<b>Black Currant - Fertodi</b>	15.0 cm	15.0 cm
5.	<b>Red Currant - Jonkheer van tets</b>	15.0 cm	18.0 cm

Most 4 mm roots were noticed with the raspberry species (2 roots 13 to 15.0 cm long) and with the blackberry species (6 long roots 14, 17 and 30.0 cm). With the gooseberries species, we observed only a 4 mm root. These roots lead to a better anchorage in soil, the danger of plant division being void.

There were identified roots of 1 mm (10 pieces), 2 mm (3 pieces) and the roots of 1-4 mm (3 pieces) at the black and red currants. These species had a superficial root system.

**CONCLUSIONS**

1. Grouping the roots at the species of Thuja at a depth of 60 to 80.0 cm in a specific environment well supplied with nutrients, water and well aerated.
2. The analysis of the development of the root system aims to establish the planting density, determining the soil depth in order to perform the soil work.
3. The bushes of raspberry, blackberry and gooseberry stood out with a very well developed root system, an aspect which will positively influence the growth of plants and the fruit-bearing.

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