

RESEARCH REGARDING THE CONTENT OF DRY SUBSTANCE AND MINERAL ELEMENTS OF THE LEAVES OF THUJA OCCIDENTALIS UNDER THE INFLUENCE OF THE CULTURE SYSTEM AND OF THE FERTILIZATION CONDITIONS

Vlad Ioana Andra*, Ioan Vlad, Mariana Vlad, Raluca Vlad

*University of Oradea, Faculty for environmental Protection, 26 General Magheru Street, 4100848, Oradea, Romania; ioana.mester@yahoo.com

Abstract

The experiments concerning the influence of substrate and of environmental factors over rooting, growing and rapid development of young plants of *Thuja* have been made between 2008 and 2009, in the dendrological nursery, private property, from Les, county of Bihor.

The goal of the research was to follow the influence of substrate and of environmental factors over rooting and growing of the young plants of *Thuja*. The working hypothesis was that by using of some valuable cultivars in terms of ensuring a reasonable and easy to acquire substrate, a favorable microclimate, controlled by uniform and effective shading and correct fertilizations, production performances and of economical efficiency superior to regular applied technologies can be achieved.

It has been followed the influence of the factors over the following aspects:

- Rooting period;
- Percentage of rooted cuttings;
- Roots length and thickness;
- Plants growing in the nursery soil and also in containers;
- The evolution of humidity and temperature in soil and in atmosphere;
- The evolution of chemical composition from the culture substrate;
- The chemical composition of the leaves of *Thuja Occidentalis*.

In order to achieve the goal and the objectives of research, two series of experiments have been made, the first aiming the rooting of cuttings, and the second aiming the growing of the young plants in the nursery soil and in containers.

Keywords: *Thuja Occidentalis Smaragd*, *Thuja Occidentalis Rheingold*, rooting substrate variants, cuttings.

MATERIAL AND METHODS

The number of varieties and cultivars belonging to *Thuja species* is very large. Many of those have special applications: for hedges, groups, isolated. Considering the requirements from Oradea area, we took into study the cultivars of *Smaragd* and *Rheingold* belonging to *Thuja occidentalis* species.

Thuja occidentalis Smaragd. It has a right stem, with brown-red bark and the conical crown. The stalks are compressed, oblique or horizontally ordered, having the color dark-green on the top and light-green on the bottom (figure 9).

The leaves in form of scales are placed oppositely, on four rows, those dorsal-ventral being flat and the lateral ones being boat-shaped bent, completely dressing the stalk. The pair leaves dorsal-ventral are each provided with a round resin gland.

Thuja occidentalis Rheingold. It has golden leaves in the summer and yellow-orange in the winter and a globular appearance. In our country it is less spread, situation which can be attributed also to the lack of planting material as a consequence of low efficiency in multiplication process.

RESULTS AND DISCUSSIONS

By determining the content of the leaves of *Thuja occidentalis* in dry substance and mineral substances it has been followed the control of mineral nutrition.

The sampling of vegetal material and the laboratory analyses have been made at moments which coincided with the needs of plants' maximum consumption.

Through laboratory analyses it has been determined the content in N, P, K, Ca and Mg, with percentage expression from the total of dry substance determined in the analyzed vegetal material. From adding data for N, P and K it has been obtained the global nutrition, and by percentage expression of each of them from their sum it has been obtained the nutrient balance. It is evaluated as a nutritional deficiency when for nitrogen are registered values below 3.2%, for phosphorus when they are below 0.2%, and for potassium when they are below 2.5%.

To determinate the content of the leaves of *Thuja occidentalis* in dry substance and mineral elements it has been used:

The Nelson-Boodley method, which provides using the leaves.

The content of the leaves in dry substance vary with the intensity of the light radiation received (table 1).

The content of the leaves in nitrogen can be correlated with the average temperature excepting the period of rapid growing when it is produced a "dilution" of the assimilated substances reported to the volume of the whole plant which develops rapidly and an intense translocation of the same substances to other organs.

At the leaves sampling level it has been registered a decrease in the concentration of phosphorus during the rapid growing of the plants (March-June).

The results from the foliar analyses indicate the evolution of the potassium content with that of the light radiation excepting spring time, when it is registered a decrease of potassium concentration.

The variation of the calcium content in leaves was similar to the average temperatures variation, excepting spring time, when in conditions of plants rapid growing it has been registered an apparent decrease in the concentration of the tissues analyzed in this element.

The leaves content in magnesium has marked a decrease in September-October without having any connection with the intensity of light radiation or with average temperatures.

Table 1

The content of dry substance and mineral substance in the leaves of *Thuja occidentalis* in studied variants. Leş, 2008-2009

No. Crt.	Variants	Cultivar	D.S. %	Mineral substances % from D.S.				
				N	P	K	Ca	Mg
1	Culture in containers in celery ground 60%, heating manure 20% and peat 20%	Thuja occidentalis Smaragd	21,94	4,90	0,95	3,84	2,94	0,47
2	Culture in containers in celery ground 60%, heating manure 20% and peat 20%	Thuja occidentalis Rheingold	21,87	4,88	0,92	3,82	2,94	0,46
3	Culture in containers in urban waste compost	Thuja occidentalis Smaragd	21,97	4,90	0,96	3,89	2,95	0,48
4	Culture in containers in urban waste compost	Thuja occidentalis Rheingold	21,98	4,91	0,97	3,92	2,96	0,49
5	Culture in nursery soil fertilized with organic fertilizers	Thuja occidentalis Smaragd	21,86	4,86	0,91	3,82	2,93	0,45
6	Culture in nursery soil fertilized with organic fertilizers	Thuja occidentalis Rheingold	21,85	4,83	0,91	3,81	2,91	0,44
7	Culture in nursery soil unfertilized with organic fertilizers	Thuja occidentalis Smaragd	21,79	4,81	0,90	3,80	2,90	0,43
8	Culture in nursery soil unfertilized with organic fertilizers	Thuja occidentalis Rheingold	21,78	4,80	0,89	3,78	2,89	0,42

CONCLUSIONS

Analyzing the data regarding the content of dry substance and mineral substances of the leaves of *Thuja occidentalis Smaragd* and *Rheingold*, from the performed experiments resulted that there are no essential differences between the variants.

Analyzing the data regarding the content of dry substance and mineral substances of the leaves of *Thuja occidentalis Smaragd* and *Rheingold*, from the performed experiments resulted that there are no essential differences between the variants.

In terms of plants content in mineral elements (N, P, K, Ca, Mg), it is higher for the variants cultivated in containers than for those cultivated in the nursery soil fertilized or unfertilized with organic fertilizers (table 1).

The cultivator's knowledge about the content of plants leaves in mineral elements and the relation between them helps him intervene with fertilizations at the right time.

REFERENCES

1. Denis Buican ,2001, Dicționar de biologie, Editura Univers Enciclopedic,București.
2. Nessman Pierre,2000, Conifers, Paris;
3. Parantjothy K. and others,1990, Clonally multiplication of woody perennials. Plant tissue culture, applications and limitations. Ed SS. Bholjwani, Elsevier, 1990;
4. Pierick R.L.M.,2009, Rejuvenation and Micro propagation Progress in Plant Cellular and Molecular Biology, Kluwer Academic Publishers, The Netherlands;
5. Pudelsky T.,2003, Composted and Noncomposted wood wastes in growing vegetablin Poland,Acta Hort.
6. Thome S.,2007, Pépinière d'arboriculture ornementale, ISI, Germbloux;
7. Vlad I.,2004, Lucrari practice de Arboricultura ornamentală (Practical works of ornamental arboriculture).
8. Willi Braun ,1994, Der neue Hausgartner, Berlin.
9. Zăhan P.,Gh.Bandici,1997, Dicționar de Agobiologie, Editura Universității din Oradea
10. Zaharia D., A. Dumitraș ,2003, Arboricultură ornamentală, Editura Risoprint Cluj –Napoca.