

OBSERVATIONS ON THE ANNUAL GROWTH IN SOME DENDROLOGICAL SPECIES IN THE CONDITIONS OF IASI COUNTY

OBSERVAȚII PRIVIND CREȘTERILE ANUALE LA UNELE SPECII DENDROLOGICE ÎN CONDIȚIILE JUDEȚULUI IAȘI

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Abstract. *Within the multitude of dendrological species, the species in the Cupressaceae family are of particular importance in the arrangement of green spaces and especially in the conditions from us in the country which are generally favorable and very favorable for these species. The purpose of the paper is to highlight the evolution of annual growths in some species of conifers under the conditions of Iasi county. Observations were made on the species Chamaecyparis lawsoniana 'Blue Piramidal' Al.(Murr. Parl), Juniperus scopulorum 'Skyrocket' Sarg. , Thuja occidentalis 'Fastigiata' L. During the vegetation period observations were made regarding the determination of the annual growth length and the influence of the complex chemical fertilizers N, P, K (1: 1: 1) on the annual growths.*

Key words: trees, annual growths, chemical fertilizers

Rezumat. *În cadrul multitudinii de specii dendrologice, speciile din familia Cupressaceae au o importanță deosebită în amenajarea spațiilor verzi și mai ales în condițiile de la noi din țară care sunt în general favorabile și foarte favorabile pentru aceste specii. Scopul lucrării este de a pune în evidență evoluția creșterilor anuale la unele specii de conifere în condițiile județului Iași. Observațiile au fost făcute asupra speciilor Chamaecyparis lawsoniana 'Blue Piramidal' Al.(Murr. Parl), Juniperus scopulorum 'Skyrocket' Sarg. , Thuja occidentalis 'Fastigiata' L. Pe parcursul perioadei de vegetație s-au efectuat observații privind determinarea lungimii creșterilor anuale și influența îngrășămintelor chimice complexe N, P, K (1:1:1) asupra creșterilor anuale.*

Cuvinte cheie: arbori, creșteri anuale, îngrășămintă chimică

INTRODUCTION

One of the basic components of the green spaces that ensure the aesthetic aspect of the localities is the landscaping.

Within the multitude of dendrological species within the ornamental shrubs the species of the Cupressaceae family are of particular importance in the arrangement of

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the green spaces and the conditions in us from the country that are generally favorable and very favorable for this species (Bernardis, 2010; Iliescu, 2002).

The need to diversify the assortment is required as a priority considering the diversity of the biological material and especially the achievements obtained worldwide. This work complements the specialists in the field, as an efficient and well documented material because it follows the evolution and influence of complex chemical fertilizers N, P, K (1: 1: 1) on the annual growths of some species of conifers under the conditions of Iasi county (Mihail, 2005).

MATERIAL AND METHOD

The objective proposed in carrying out this work was to study the annual growths and the development of the trees in climatic conditions of the year 2018.

The biological material studied were species of conifers from the Cupressacea family such as: *Chamaecyparis lawsoniana* 'Blue Pyramidal' Al. (Murr. Parl), *Juniperus scopulorum* 'Skyrocket' Sarg., *Thuja occidentalis* 'Fastigiata' L. The research method was that of blocks placed on a single row. For each species, 10 trees were taken into account, in which measurements were made regarding the annual increases at about 4 (increases of the annual length of the axis, from the branches of the upper floor, branches from the middle of the tree and branches from the lower floor), branches from each tree then these values adding up and averaging the growths on each tree (fig. 1,2,3).

Prior to entering the vegetation, 0.100 kg /complex fertilizer tree was applied by spraying around the plants by their immediate incorporation into the soil.



Fig.1 *Chamaecyparis lawsoniana*
'Blue Pyramidal'



Fig.2 *Juniperus scopulorum*
'Skyrocket'



Fig.3 *Thuja occidentalis*
'Fastigiata'

RESULTS AND DISCUSSIONS

The studies were carried out in the year 2018 having as study material 3 species of conifers.

The measurements were made in the first decade of November, on the annual increases and then averaging the increases for each species.

In assessing the quality of the planting material, it is also of interest to the nature and quantity of the nutrient reserves accumulated in the trees, which depends largely on their capacity to grow after planting.

In the trees of *Chamaecyparis lawsoniana* 'Blue Pyramidal' A. (Murr) Parl. (tab. 1) it was observed that the largest increases were recorded in tree 6 with

branch 4 with an increase of 38 cm, branch 3 from tree no. 7 also with an annual growth of 38 cm, followed by the branch 3 from the trees 4, 8 with a growth of 35 cm. The smallest annual increases were recorded in tree 9 branch 1 by 10 cm, and tree 8 branch 1 by 14 cm.

The highest average annual growth on the tree branches of *Chamaecyparis lawsoniana* 'Blue Pyramidal' A. (Murr) Parl. was at tree 2, 7 by 30 cm, followed by trees 3, 4, 5, 6, each 29 cm. The smallest annual growths of the *Chamaecyparis* branches were recorded in tree 10 of 23 cm. The largest average difference from the 2.7 trees is 9 cm, and the smallest difference from the average at the 2 cm tree 10. The total average increase in tree branch lengths was 21 cm (tab. 1).

In the *Juniperus scopulorum* 'Skyrocket' Sarg. trees it can be observed that the largest growths were registered in the tree with the number 10 branch 3 with an increase of 48 cm and the tree 6 on the branch 2 with an increase of 45 cm, and the smallest annual growths. were registered in tree 5 on branch 4 with 24 cm.

Table 1

Annual growth for *Chamaecyparis lawsoniana* 'Blue Piramidal' A. (Murr) Parl

Species	Nr. of trees	Medium length os shoots/ plant					Average differences	
		Branch					+	-
		1	2	3	4	Growth average (cm)		
<i>Chamaecyparis lawsoniana</i> 'Blue Piramidal' A.(Murr.) Parl.	1	24	26	32	21	26	5	1
	2	32	27	30	30	30	9	-
	3	30	25	33	28	29	8	-
	4	20	29	35	31	29	8	-
	5	25	24	32	35	29	8	-
	6	20	26	30	38	29	8	-
	7	19	23	38	41	30	9	-
	8	14	20	35	25	24	3	-
	9	10	25	30	35	25	4	-
	10	22	30	22	16	23	2	-
Total average						21		

The highest average of the annual growths on the branches of the *Juniperus* tree is observed in the tree with the number 10 being 39 cm, hated by the tree 9 with an average of 37 cm, and the tree 4 and 6 having an average of 36 cm, and the ones lower values we meet at tree 1 having 32cm. The total average length increases of tree branches was 35 cm (tab. 2).

Table 2

Annual growth for *Juniperus scopulorum* 'Skyrocket' Sarg.

Species	Nr. of trees	Medium length os shoots/ plant					Average differences	
		Branch					+	-
		1	2	3	4	Growth average (cm)	-	-
<i>Juniperus scopulorum</i> 'Skyrocket' Sarg	1	28	48	33	31	35	-	-
	2	26	40	30	33	32	-	3
	3	30	41	35	37	36	1	-
	4	35	46	38	29	36	1	-
	5	26	43	35	24	32	-	3
	6	37	45	28	34	36	1	-
	7	40	38	29	31	35	-	-
	8	42	36	27	35	35	-	-
	9	39	25	44	38	37	2	-
	10	41	29	48	38	39	4	-
Total average						35		

Thuja occidentalis 'Fastigiata' saw an increase in tree 9 the first branch by 33 cm, tree 7 with an annual growth of 31 cm, and on the first tree there was an increase of 32 cm. The smallest growths were recorded on the first tree with branch 4 of 14 cm, followed by tree 9 on branch 4 also with 14 cm (table 3).

The highest average is observed in tree 5 with 28 cm, followed by tree 4 with an average of 25 cm, and the smallest average is at tree 1,7,10 with an average of 20 cm. The total average annual growth is 23 cm (tab. 3).

Analyzing the physiological role of complex fertilizers (N, P, K) on the growth and development of the studied plants, it turns out that many macro elements are absolutely necessary for the normal growth and development of the plants. Some groups of plants also add Na, Cl and Si.

Nitrogen is a plastic element and enters the structure of nucleoprotein molecules, protoplasmic proteins, cytomembrane lipoproteins, the structure of apoenzymes, coenzymes, vitamins B1, B6, B12, plant hormones, photosynthetic pigments (chlorophylls and phybobilines) and stearid plant.

The lack of nitrogen in the nutrition of plants leads to the yellowing of the leaves to slowing or stopping their growth. The excess nitrogen leads to the prolongation of the vegetation period, to the abundant formation of the leaves and to the increased sensitivity to diseases.

Annual growth for *Thuja occidentalis* 'Fastigiata' L.

Species	Nr. of trees	Medium length os shoots/ plant					Average differences	
		Branch					+	-
		1	2	3	4	Growth average (cm)	-	-
<i>Thuja occidentalis</i> 'Fastigiata' L.	1	32	19	16	14	20	-	3
	2	28	22	15	19	21	-	2
	3	30	24	18	25	24	1	-
	4	26	20	22	30	25	2	-
	5	20	29	30	31	28	5	-
	6	23	30	30	16	25	2	-
	7	17	14	16	31	20	-	3
	8	29	20	15	18	21	-	2
	9	33	26	10	14	23	-	-
	10	30	15	18	17	20	-	3
Total average					23			

Nitrogen can be taken from plants from the soil, from water, from the atmosphere and even from the body of other organisms.

Phosphorus is absorbed from the environment in the form of PO_3^- ions, reaches the cell without being reduced and enters the composition of organic compounds of high physiological significance

It participates in the formation of phosphoprotids and phospholipids from protoplasm and nucleus, phospholipids from starch and aleurone grains, cytomembrane, phytin and nucleotide lecithins, with P (ADP, ATP) macrogroups. Phosphorus enters the composition of coenzymes. It plays the central energy role in the synthesis and biological oxidation reactions. Phosphorus accumulates in young organs and seeds.

In its absence, the plants remain small, the roots are long and rare, the leaves dark green to blue-green, often taking on a red or purple color.

Potassium is an indispensable element for the metabolism of the plant, participating in the synthesis of amino acids and proteins. It acts as a biocatalyst element, stimulating numerous physiological processes.

It regulates the absorption of nitrogen by plants, processing ammoniacal nutrition, oxidation of ammonia, and in the case of nitric nutrition, reduction of nitrates. Potassium stimulates the functioning of enzymes that participate in the process of breathing and metabolism of carbohydrates, in the metabolism of nitrogen and the synthesis of vitamins

It also stimulates the synthesis of chlorophylls and the intensity of photosynthesis. Increases the ability of plants to absorb water, and to withstand frost and drought. It favors the intensification of carbohydrate accumulation in the plant. In autumn, before the leaves fall, potassium migrates from them into branches or stems.

The lack of potassium in plant nutrition slows their growth and development, produces browning and twisting of the leaves. Metabolism is impaired, the intensity of photosynthesis, photosynthesis decreases. The amount of starch and protein is diminished, the resistance to diseases is diminished, and white, yellow, brown-reddish or brown spots appear on the lower leaves.

CONCLUSIONS

Following the results obtained, the following conclusions were drawn:

1. At *Chamaecyparis lawsoniana* 'Blue Pyramidal' A. (Murr) Parl. it was observed that the largest increases were recorded in tree 6 with branch 4 with an increase of 38 cm, and the smallest annual growths were recorded in tree 9 branch 1 by 10 cm.

2. The highest average annual growth on the tree branches of *Chamaecyparis lawsoniana* 'Blue Pyramidal' A. (Murr) Parl. was at tree 2, 7 by 30 cm, the smallest results of the annual growths of *Chamaecyparis* branches was recorded at tree 10 by 23 cm. The total average length increase of tree branches was 21 cm

3. In the *Juniperus scopulorum* 'Skyrocket' Sarg. trees it can be observed that the largest growths were recorded in tree 10 with branch 3 with an increase of 48 cm, and the smallest annual growths were recorded in tree 5 on branch 4 with 24 cm. The highest average annual growth on the branches of the *Juniperus* tree is observed in the tree with the number 10 being 39 cm. The total average length increases of tree branches was 35 cm.

4. For *Thuja occidentalis* 'Fastigiata' there was an increase in tree 9 the first branch by 33 cm. The smallest growths were recorded on the first tree with branch 4 of 14 cm, and the highest average is observed on tree 5 having 28 cm, followed by tree 4 with the average of 25 cm, and the smallest average is on the tree 1,7,10 with an average of 20 cm. The average annual growth is 23 cm.

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