ASPECTS REGARDING THE EFFECT OF RADISTIM GROWTH STIMULATOR ON GERMINATION POWER, GROWTH AND DEVELOPMENT OF THE *THUJA ORIENTALIS* AND *THUJA OCCIDENTALIS* PLANTLETS

ASPECTE PRIVIND EFECTUL STIMULATORULUI RADISTIM ASUPRA GERMINABILITĂȚII, CREȘTERII ŞI DEZVOLTĂRII PLANTULELOR LA SPECIILE *THUJA ORIENTALIS* ŞI *THUJA OCCIDENTALIS*

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Abstract. *Radistim is used to stimulate a faster multiplication and with a more efficient multiplying rate both for generative and vegetative process. Key findings and determinations wanted to highlight any differences between seedlings from seeds treated with Radistim and the untreated control variant. Observations and measurements in the range of observation 02.2008 - 05.2009 showed a clear influence of Radistim on the germination process and the subsequent Thuja orientalis and Thuja occidentalis plant growth and development. Thus, between the variants treated with Radistim and the control variants there was a difference of approx. 20% for T. orientalis to 18% for T. occidentalis in the germination power of the seeds, signaling significant differences in root system development also, between treated and control variants.*
Key words*: Thuja,* stimulating substances, germination power, growth.

Rezumat. *Preparatul Radistim este folosit pentru stimularea unei înmulțiri mai rapide şi cu un procent mai efficient, atât pentru înmulțirea generativă, cât şi pentru înmulțirea vegetativă. Principalele observații şi determinări au dorit să evidențieze eventualele diferențe dintre plantulele rezultate din semințele tratate cu Radistim şi cele din varianta martor netratată. Observațiile şi măsurătorile efectuate în intervalul 02.2008 – 05.2009 au evidențiat influența clară a stimulatorului Radistim atât asupra procesului de germinație, cât şi asupra creşterii şi dezvoltării ulterioare a plantelor de Thuja orientalis şi Thuja occidentalis. Astfel, între variantele tratate cu Radistim şi variantele martor, s-a demonstrat o diferență de cca. 20% la T. orientalis şi 8% la T. occidentalis în ceea ce priveşte germinabilitatea semințelor, semnalându-se diferențe evidente şi în dezvoltarea sistemului radicular între variantele tratate şi cele martor.*
Cuvinte cheie*: Thuja,* substanțe stimulatoare, germinație, creştere.

INTRODUCTION

Ecological plasticity of the genus *Thuja*, its resistant temper to half shade, its soil improving and fixing properties and the decorative foliage and port, lead to the need of extending the ornamental culture of these species. *Thuja* specimens

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have a remarkable resistance to pollution, as evidenced in Iasi's green spaces, being important for planning urban green areas (Draghia, 2000**).**

Experience aimed at identifying the possible effect of stimulator RADISTIM on the germination of Thuja seeds because this stimulator is often recommended for treating cuttings in order to stimulate rooting, with obvious positive effects (Ieremie et al., 2007**).**

MATERIAL AND METHOD

The paper presents the results of a research on the response of species *Thuja occidentalis* and *Thuja orientalis* at treatment with RADISTIM - powder.

The biological material used in this experiment is represented by *Thuja orientalis* L. seeds, harvested at full maturity from U.Ş.A.M.V. Iaşi Park (October 2007), properly stored and moistened with cold water before seeding; approximately 2 months after they were seeded in boxes, the plantlets were prick out in cavitary trays, in U.Ş.A.M.V. Iaşi lower greenhouse.

Used substances: - RADISTIM powder, in moistened form, beige, insoluble in water.

The double factor experiment took into account the following factors:

Factor A – *Thuja* specie: a_1 – *Thuja occidentalis* and a_2 – *Thuja orientalis*;

Factor B – rooting stimulator: b_1 – untreated control and b_2 - treated with RADISTIM powder.

The data regarding the rooting percentage were processed as a double factor experiment. The seeding was realized on 08.02.2008, using 100 seeds for each variant: V_1 - treated with RADISTIM powder and V_m – untreated control, mentioning that for *T. orientalis* the seeds were moistened in cold water for 7 days before seeding.

RESULTS AND DISCUSSIONS

Observations on the emergence and growth of seedlings of the species *Thuja occidentalis* and *Thuja orientalis* were conducted periodically during the observation interval 03.2008 - 04.2009, measurements being recorded weekly. For *Thuja orientalis***,** the emergence started on 02.03.2008 (after approx. 22 days after sowing), and for *Thuja occidentalis,* on 17.03.2008 (after 35 days), for this specie the control variant emerged faster than the treated one, but for the control plants, the growing rate slowed down, the seedlings being quite fragile.

Observations and measurements have shown some influence of RADISTIM stimulator on the germination process and the subsequent plant growth and development, especially for *Thuja orientalis* (Rubțov, 1971**).**

Thus, between treated and control variants, we observed a difference of approx. 20% for *T. orientalis* and 8% for *T. occidentalis* in the seeds germination power, signaling the significant differences in the root system development between treated and control variants.

Observations in May 2008 showed that from the total number of seeds sown in the treated variants, the emergence percentage for *Thuja orientalis* was about 72% and for the *Thuja occidentalis* about 60%.

Table 1 presents the mean values for vegetative growth recorded for the double factor experiment values measured between 23.03.2008 - 19.04.2009. Note that these results aimed to establish correlations between treatments and germination power, plant growth and development of *Thuja*.

Thus, according to the data in table 1, the most significant growths during the observations were registered for *T. orientalis* – V.t. (approx. 17 cm) while the untreated variant's plants had, as average values, an approx. 12 cm growth, the difference of 5.3 cm between variants being distinctly significant.

Table 1

Plant growth evolution during the experiment

Variant		Observation date / seedlings growth (mean values - cm)									% compared to control	Difer.	S.
		23. III '08	22. IV '08	16. V '08	13. VI '08	28. VII '08	13. VIII '08	18. IX '08	20 III '09	19. IV '09			
V.t.	T. oc.	0,4	1,3	2,4	3,6	6,9	8,7	9,1	10,7	12,2	120	+2,1	x
	T. or.	1,2	1,9	3,3	5,9	7,8	10,5	12,7	14,8	17,0	144	+5,3	xx
V.m.	T. oc.	0,2	0,8	1,6	2,9	5,7	7	7,3	8,6	10,1	100	-	-
	T. or.	0,8	1,4	2,7	4,4	7,4	8,3	9,5	10,4	11,8	100	-	-

Legend: T. oc. – *Thuja occidentalis*, T. or. – *T. orientalis*. V.t. – treated variant RADISTIM; V.m. – untreated control variant, Difer. – difference, S. – significance.

LSD 5% -1.5%; LSD 1% - 2%; LSD 0.1% - 2.8%

Observations made on about 10 seedlings of each variant which have been extracted from substrate for measurements, provided the mean total length of roots per brood, presented in table 2. Data showed that *Thuja orientalis* seedlings treated with RADISTIM showed a significantly more developed root system than the control variant (+ 6.3).

Table 2

***Root system evolution in experimental seedlings** (May 2009)*

Variant	Species		% compared to control		Difference		Significance	
	T. occidentalis *(average value – cm)*	***T. orientalis*** *(average value – cm)*	T. oc.	T. or.	T. oc.	T. or.	T.oc	T.or.
Treated variant	76.7	122.5	133.8	157.2	+3.4	+6.3	x	xx
Control variant	57.3	77.9	100	100	-	-	-	-

LSD 5% -1.6%; LSD 1% - 2.5%; LSD 0.1% - 3.6%

Also, the *Thuja orientalis* specimens treated with RADISTIM showed a better plant development, being better complied, with well developed root system whereas the control seedlings showed a slower development.

CONCLUSIONS

1. Seed germination in the variants treated with RADISTIM powder took place at the earliest (after approx 22 days) for *Thuja orientalis*, 15 days earlier than for the *T. occidentalis* treated seeds, and about 10 days faster than for the control variant of *T. orientalis*.

2. Differences between species in terms of germination power, germination interval and emergence percentage is known as being in favor for *Thuja orientalis* our study wanted to compare these values particularly between the two experimental variants and not between species;

3. The most significant growths during the observations were registered for *T. orientalis* – V.t. (approx. 17 cm) while the untreated variant's plants had, as average values, an approx. 12 cm growth, the difference of 5.3 cm between variants being distinctly significant.

4. *Thuja orientalis* seedlings treated with RADISTIM showed a significantly more developed root system than the control variant (+ 6.3).

5. RADISTIM-powder treatments did not reveal major effects on *Thuja occidentalis* seeds and plants, compared to the untreated variant, considering that the seed treatment with RADISTIM is not recommended as effective for this specie.

REFERENCES

1. **Draghia Lucia, 2000 -** *Producerea materialului săditor dendrologic.* Editura „Ion Ionescu de la Brad" Iaşi.
2. **Ieremie Ioana-Anca, Bălan Mihaela, Băra I. Ion, 2007** – *Citogenetics effects induced by the administration of substances with reduction potential at Larix decidua Mill. ssp. carpatica (Dom.), Picea abies (L.) Karst. and Thuja orientalis L.* Editura Universităţii„Al.I.Cuza", Analele Ştiinţifice, Tom VIII, Fasc.1.
3. **Rubţov Şt., 1971** – *Ecologia şi cultura speciilor lemnoase în pepinieră.* Ed. Ceres, Bucureşti.