CONSIDERATIONS ON THE EVOLUTION OF PAPAVER SOMNIFERUM L. PLANTS, IN GREENHOUSE CONDITIONS, AFTER TREATMENTS WITH GROWTH STIMULATORS

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In this paper we observed the evolution of opium poppy plants, Papaver somniferum L., in greenhouse conditions, after the foliar treatment with growth regulators. Plant growth regulators are chemical substances that are designed to affect plant growth and/or development.

The growth regulators we used are: 2 chloro, 4 amino-sulphonic phenoxy acetic acid, sodium salt (BCO-2), 2 chloro, 2 amino-sulphonic phenoxy acetic acid, sodium salt (BCO-4) and 2, 4 dichlorophenoxy – acetic acid (2,4-D). All substances were used in two concentrations: 25 ppm and 50 ppm.

The 2 chloro, 4 amino-sulphonic phenoxy acetic acid, sodium salt and 4 chloro, 2 amino-sulphonic phenoxy acetic acid, sodium salt are growth stimulators and the 2, 4 dichlorophenoxy – acetic acid is a growth inhibitor. The 2,4 dichlorophenoxy – acetic acid is used as a herbicide affecting the dicotyledonous plants, increasing the rate of DNA, RNA and protein synthesis and impeding thus an outbalanced, controlled growth. The treatments were made on opium poppy plants, in different vegetation phases. After the treatment we made the biometrical measurements of plants' height at three, five and seven weeks from rising.

A very significant effect had the treatment with BCO-2, at 50 ppm concentration for all vegetation stages and the variant with 2,4 D at 50 ppm concentration. A significant effect had also the treatment with BCO-4 and BCO-2 in a concentration of 25 ppm.

***Keywords**: growth stimulators, BCO-2, BCO-4, 2,4-D, biometrical measurements, poppy, height.*

Opium poppy, *Papaver somniferum* is an herbaceous, annual, oleaginous and medicinal plant, with Mediterranean origin, from Papaveraceae family.

The plant is cultivated for its fruits that present an important role in human and veterinary medicine therapeutics.

The experimental data presented here are related to a more extended study on the effects of the growth stimulators: 2 chloro, 4 amino-sulphonic phenoxy

acetic acid, sodium salt (BCO-2), 4 chloro, 2 amino-sulphonic phenoxy acetic acid, sodium salt (BCO-4); 2, 4 dichlorphenoxy – acetic acid (2,4-D) was added as treatment on the poppy plants, from the rising to the fruit appearance moment. In the experiments, we observed the positive and also the negative action of the growth stimulators on the plants height.

MATERIAL AND METHOD

Opium poppy plants, Papaver somniferum L., were treated by spraying with growth stimulators: 2 chloro, 4 amino-sulphonic phenoxy acetic acid, sodium salt (BCO-2), 4 chloro, 2 amino-sulphonic phenoxy acetic acid, sodium salt (BCO-4) and 2, 4 dichlorophenoxy – acetic acid (2,4-D) in concentrations of 25 ppm and 50 ppm for each substance. The treatments were applied on the plants' leaves. The observations and the biometrical measurements on plants' height were made at 3, 5 and 7 weeks from rising for each treatment variant.

There were established 6 treatment variants and one variant control:

V_1 – control
V_2 – BCO-2, 25 ppm
V_3 – BCO-2, 50 ppm
V_4 – BCO-4, 25 ppm
V_5 – BCO-4, 50 ppm
V_6 – 2,4 - D, 25 ppm
V_7 – 2,4 - D, 50 ppm.

All biometrical data were synthesized for each particular variant, at pre established vegetation stages, and the average poppy plants' heights for each treatment variant were compared by a graphic method.

Using the statistical method for capitalizing the experiments placed in randomized blocks – limit differences, we established the influence of the applied treatments on the final average height's value of the poppy plants at 3, 5 and 7 weeks from rising.

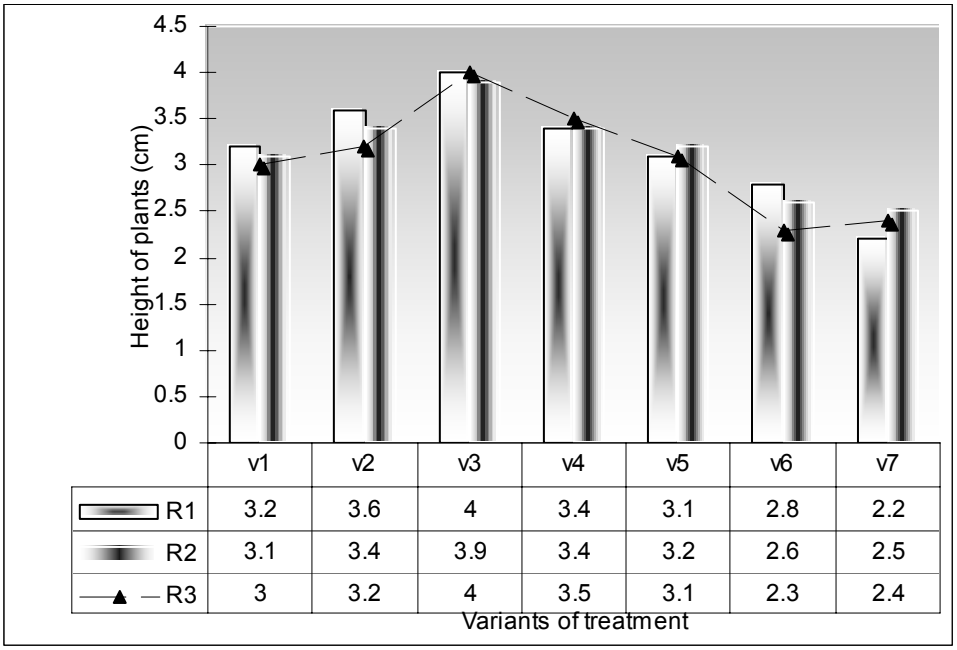
RESULTS AND DISCUSSIONS

After 3 weeks from rising, the poppy plants part of the three repetitions treated with BCO-2, 50 ppm, (V_3 variant), had the most significant average height values compared to the control, followed by V_2 and V_4 variants (*fig. 1*).

Compared to the control, at 5 weeks from rising we observed an increase of the plants' height starting with variant V_5 to V_7. Variant V_3 had the most significant average height value, compared to the control, for every repetition at 5 weeks from rising (*fig. 2*).

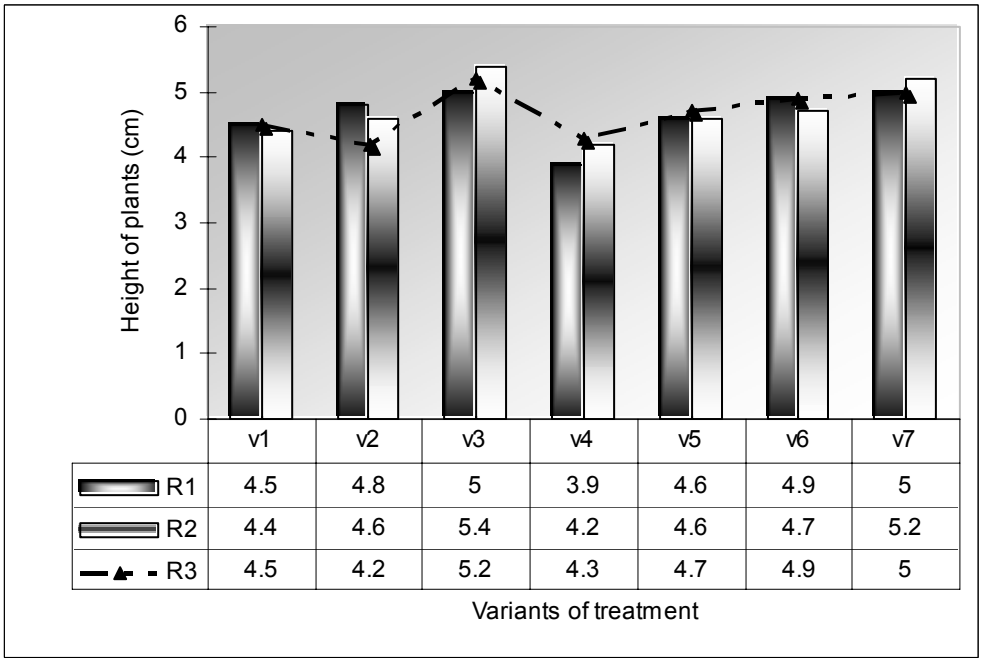
After 7 weeks from rising, for all repetitions, variant V_4 had a stimulating effect on poppy plants, inducing a very significant increased height of the plants, compared to the control (*fig. 3*).

Using the variance analysis and the statistical method for capitalizing the experiments placed in randomized blocks – limit differences, we established the significance of all treatment variants and the limit differences occurred for each studied vegetation stage (*tab. 1, 2, 3*).



	v1	v2	v3	v4	v5	v6	v7
R1	3.2	3.6	4	3.4	3.1	2.8	2.2
R2	3.1	3.4	3.9	3.4	3.2	2.6	2.5
R3	3	3.2	4	3.5	3.1	2.3	2.4

Figure 1. **Average height for poppy plants at 3 weeks from rising after treatments with growth stimulators**



	v1	v2	v3	v4	v5	v6	v7
R1	4.5	4.8	5	3.9	4.6	4.9	5
R2	4.4	4.6	5.4	4.2	4.6	4.7	5.2
R3	4.5	4.2	5.2	4.3	4.7	4.9	5

Figure 2. **Average heights for poppy plants at 5 weeks from rising after treatments with growth stimulators**

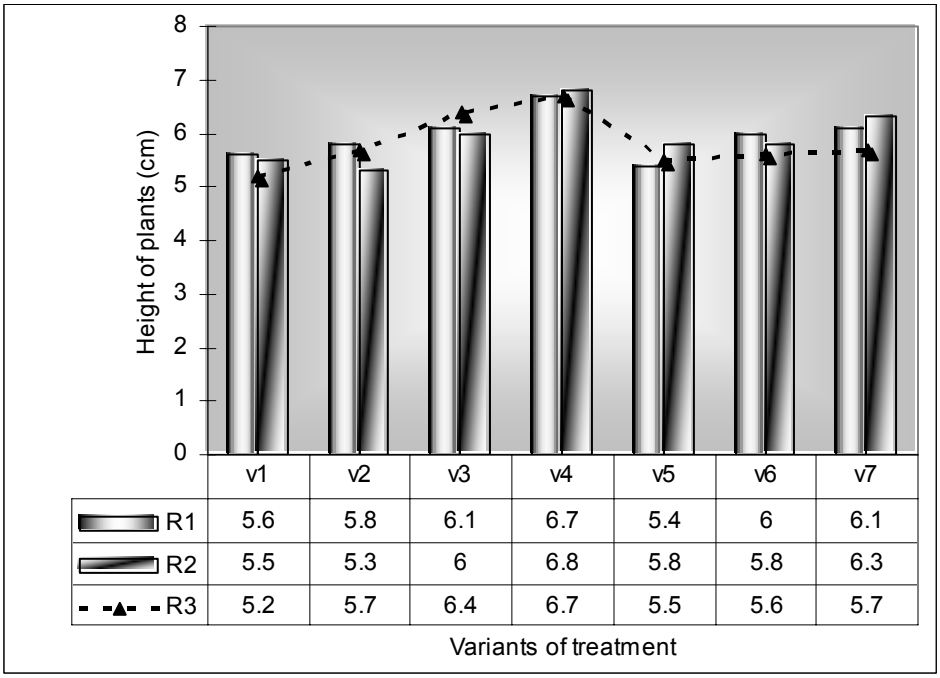


Figure 3. **Average heights for poppy plants at 7 weeks from rising after treatments with growth stimulators**

Table 1

The influence of the applied treatments on height plants at 3 weeks from rising

Variant	Height (cm)	% compared to the control	Differences	Significance
V_3	4,0	129,03	0,9	XXX
V_2	3,4	109,68	0,3	X
V_4	3,4	109,68	0,3	X
V_1	3,1	100,00	0,0	-
V_5	3,1	100,00	0,0	-
V_6	2,6	83,87	-0,5	00
V_7	2,4	77,42	-0,7	000
DL 5%: 0,3 cm; DL 1%: 0,4 cm; DL 0,01%: 0,5 cm				

Variant V_3 with BCO-2, 50 ppm, had, during all three studied vegetation stages, a very significant influence on increasing the plants' height, compared to the control V_1 (*tab. 1, 2*). Positive significant differences, at 3 weeks from rising, also had variants V_2 and V_4; negative differences were registered, distinct significant for variant V_6 and very significant for variant V_7, compared to control (*tab. 1*).

After 5 weeks from rising variant V_7 stands out for its positive, distinct significant differences and also variant V_4 for negative, significant differences compared to control (*tab. 2*).

Table 2

The influence of the applied treatments on height plants at 5 weeks from rising

Variant	Height (cm)	% compared to the control	Differences	Significance
V_3	5,2	115,56	0,7	XXX
V_7	5,1	113,33	0,6	XX
V_6	4,8	106,67	0,3	-
V_5	4,6	102,22	0,1	-
V_1	4,5	100,00	0,0	-
V_2	4,5	100,00	0,0	-
V_4	4,1	91,11	-0,4	0
DL 5%: 0,3 cm; DL 1%: 0,5 cm; DL 0,01%: 0,7 cm				

In the case of the analysis made after 7 weeks from rising variant V_4 (BCO-4, 25 ppm) and variant V_3 (BCO-2, 50 ppm) stand out, with positive and very significant differences for this experiment. Positive and distinct significant differences also had variant V_7 (2,4 D, 50 ppm).

Constant positive and very significant differences in the poppy plants' evolution can be observed for all studied vegetation stages at variant V_3 (BCO-2, 50 ppm).

Table 3

The influence of the applied treatments on the height of plants at 7 weeks from rising

Variant	Height (cm)	% compared to the control	Differences	Significance
V_4	6,7	124,07	1,3	XXX
V_3	6,2	114,81	0,8	XXX
V_7	6,0	111,11	0,6	XX
V_6	5,8	107,41	0,4	-
V_2	5,6	103,70	0,2	-
V_5	5,6	103,70	0,2	-
V_1	5,4	100,00	0,0	-
DL 5%: 0,5 cm; DL 1%: 0,7 cmp; DL 0,01%: 1,0 cm				

CONCLUSIONS

1. A very significant stimulating effect on poppy plants had the treatment variant V_3, with BCO-2, at 50 ppm, being stable for all studies vegetation stages.

2. 2,4 D, in concentration of 50 ppm produces an inhibition of poppy plants' growth during the first 3 weeks, then induces a distinct significant growth.

3. BCO-4, in concentration of 25 ppm, after 3 and 7 weeks produces a significant growth of the poppy plants, and after 5 weeks appears a slight inhibition of the plants' growth.

REFERENCES

1. Jităreanu G., 1994 – *Tehnică experimentală*, curs, Univ. Agronomică I.I.de la Brad Iaşi, Facultatea de Agricultură, Iaşi, 134-138; 53-58.

2. Jităreanu G., 1992, *Tehnica experimentală*, lucrări practice, Univ. Agronomică I.I.de la Brad Iaşi, Facultatea de Agricultură, Iaşi, 35-48.
3. Oniscu, C. Trofin, A.,2002 - *Influența tratamentului cu biostimulatori din clasa acizilor sulfamoil – fenoxialchil carboxilici asupra procesului de germinație la semințe de tomate*, Cercetări Agronomice în Moldova, Vol. 35, No. 3/4, Iaşi, pp. 29-34, 3 ref.
4. Oniscu, C. Trofin, A.,2002 – *Influența tratamentului cu biostimulatori din clasa acizilor sulfamoil – fenoxialchil carboxilici asupra înrădăcinării şi dezvoltării răsadurilor de tomate,* Cercetări Agronomice în Moldova, Vol. 35, No. 1/2, Iaşi, pp. 35-40, 4 ref.
5. Trofin, Alina, 2003 – *Cercetări privind obținerea şi experimentarea de noi biostimulatori*, Teză de doctorat, Univ. Tehnică „Gh. Asachi", Iaşi.