

RESEARCH ON THE POTENTIAL OF INCREASING THE NUMBER OF FRUITS AND THE QUANTITY OF SEEDS IN EGGPLANT USING FLOWERING STIMULATORS

CERCETĂRI PRIVIND POTENȚIALUL DE CREȘTERE A NUMĂRULUI DE FRUCTE ȘI A CANTITĂȚII DE SEMINȚE LA PĂTLĂGELELE VINETE FOLOSIND STIMULATORI DE ÎNFLORIRE

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Abstract. *The objective of this paper is to evaluate the potential of some flowering stimulators to improve the quantity of eggplant fruits, but also the quantity of seeds, if the purpose of the culture is the seed production. There were used two varieties of Romanian eggplant, Luiza and Belona, which were treated with four flowering stimulators. The quantity of fruits that reached physiological maturity per plant and per hectare, the weight of fruits per hectare and the weight of seeds per hectare were measured. Some flowering stimulators used for treatments significantly improved fruit yield and seed quantity.*

Key words: cultivar, fruit setting, bioactive substances

Rezumat. *Lucrarea de față are ca scop evaluarea potențialului unor stimulatori de înflorire de a îmbunătăți cantitatea de fructe de pătlăgele vinete, dar și a cantității de semințe, în cazul în care se urmărește producerea de semințe la această specie. Au fost utilizate două soiuri de pătlăgele vinete românești, Luiza și Belona, asupra cărora au fost realizate tratamente cu patru stimulatori de înflorire. Au fost determinate cantitatea de fructe ajunse la maturitatea fiziologică pe plantă la hectar, masa fructelor la hectar și cantitatea semințelor la hectar. O parte dintre stimulatorii utilizați au îmbunătățit semnificativ producția de fructe și de semințe.*

Cuvinte cheie: cultivar, încărcătura de fructe, substanțe bioactive

INTRODUCTION

Seed production is a vital process for horticulture and agriculture. Without a conservative selection and basic seed production, the cultivars would lose in a few years the properties that make them valuable, through genetic degeneration. In order to maintain the constant characteristics, the production of seeds is carried out under controlled conditions and must, in the end, meet standards regulated by law (Ciofu *et. al.*, 2004; Echim and Scurtu, 2020; George, 2009; Munteanu, 2003; Rashid and Singh, 2000).

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It has been known for a long time that some macro and micro elements have an important role in the formation of flowers, fruits and seeds in vegetable plant. Phosphorus deficiency leads to late flowering and fruiting of plants. Boron has positive effects on the flowering of vegetable plants by favoring the rapid germination of pollen (Maier, 1961).

Eggplants have a higher specific consumption than peppers or tomatoes, especially in terms of nitrogen and potassium. Also, they are sensitive to the reduced content of magnesium (Munteanu, 2003) iron, boron and molybdenum (Tudor *et. al.*, 2009). Nitrogen treatments reduce the number of days until flowering on eggplant, but in excess it can cause negative effects on the vitality of the plants (Aminifard *et. al.*, 2011). The lack of these nutrients has a negative influence on fruit setting. In addition, in some varieties of this species, the flowers show the phenomenon of heterostyly, some of them having a long-style, others short or medium-style pistil. Flowers with a long-style pistil have the best pollination, while those with a short-style cannot self-pollinate (Munteanu, 2003; Şekara and Bieniasz, 2008).

For seed production in eggplant, the fruits must be harvested at the time of reaching the physiological maturity, when the seeds have hardened and acquired a yellow-brown color. In the seed production technology for this species, in the conditions of our country, it is important to increase the number of fruits that can reach physiological maturity faster. Adequate plant nutrition ensures faster fruit formation and ripening.

Macro and microelements necessary for the development of eggplants can be found in the composition of a wide variety of organic or inorganic fertilizers. The purpose of the present experience is to promote and introduce flowering stimulators into the eggplant seed production technology.

MATERIAL AND METHOD

An experiment that aimed the influence of foliar treatments with flowering stimulators on the amount of eggplant seed was carried out at the Institute for Research and Developing for Vegetable and Flower Growing, Vidra, Ilfov County, Romania, during May - October 2020 period.

The bifactorial experiment was organized in split plot design, with three replications, depending on the studied factors. Factor A is represented by the eggplant cultivar, and factor B is represented by the stimulator treatment. There were used two Romanian eggplant cultivars, Luiza and Belona, on which four foliar treatments with four flowering stimulators were applied, at a time interval of 14 days. The products used for treatments are Florone, Flower 50, Florabax and Rerum.

Table 1 shows the chemical composition of the fertilizers used for the treatments. They have a different content of macro and microelements, especially with regard to phosphorus and boron, chemical elements that influence the mechanism of plant flowering.

Table 1

The chemical composition of the flowering stimulators

Flowering stimulator	Chemical composition
Florone	Free aminoacids - 4%; total N (organic N) - 1%; P (P ₂ O ₅) - 10%; K (K ₂ O) - 10%; B - 0.25%; Mo - 0.20%
Flower 50	P (P ₂ O ₅) - 50%; free aminoacids- 2%; total N (organic N) – 0.4%
Florabax	P (P ₂ O ₅) – 10.5%; B – 8%; Mo – 10%; free aminoacids – 8%
Rerum	N - 0.5%; P - 0.5%; K - 0.5%; Fe - 0.15%; Zn - 0.075%; Mn - 0.075%; Cu - 0.075%; B - 0.03%; Co - 0.015%; Mo - 0.015%; ASFAC BCO-4 - 20%; aminoacids- 20%; MgO - 0.15%

The experimental variants resulting from the combination of the two factors are the following:

- V1 = Belona unfertilized
- V2 = Belona treated with Florone (0.5 ml at 1 L water)
- V3 = Belona treated with Flower 50 (3 ml at 1 L water)
- V4 = Belona treated with Florabax (1.5 g at 1 L water)
- V5 = Belona treated with Rerum (5 ml at 1 L water)
- V6 = Luiza unfertilized
- V7 = Luiza treated with Florone (0.5 ml at 1 L water)
- V8 = Luiza treated with Flower 50 (3 ml at 1 L water)
- V9 = Luiza treated with Florabax (1.5 g at 1 L water)
- V10 = Luiza treated with Rerum (5 ml at 1 L water)

The distances between rows were 70 cm, and between plants per row were 40 cm, resulting in a density of 35000 plants/ha. The size of one variant was 11.2 m².

For eggplant plants, the physiological maturity differs from the consumption maturity. The present experience aims to improve seed production in this crop. Therefore, only the fruits that reached physiological maturity were harvested, counted and weighed, then the seeds were extracted. The following determinations were done: the number of fruits on the plant and on hectare that have reached physiological maturity, the fruit weight per hectare and the amount of seeds per hectare. The obtained data were statistically evaluated by Duncan's multiple range test at 5% level of confidence.

RESULTS AND DISCUSSIONS

The data obtained after the measurements were statistically analyzed, the results and their significance being presented in table 2.

The effects of treatments with flowering stimulators on the number of fruits:

Increasing the number of eggplant fruits that reach physiological maturity is important for seed production in this species.

The treatments made with Florabax and Rerum determined the most important increases in number of fruits per plant and per hectare, both in Belona variety and in Luiza variety. In the case of Belona, the two products led to a significant difference of about 21%. In the variety Luiza, significant increases of 18-19% were obtained.

Treatments with the stimulators Florone and Flower 50 did not cause a significant increase in the number of fruits that reached physiological maturity, in any of the eggplant varieties studied.

Table 2

Results regarding the influence of treatments with flowering stimulators on the two eggplant varieties studied

Variant	The variety	The flowering stimulator used	Number of fruits/ plant	Number of fruits/ ha	Fruit weight/ ha (t)	Seeds/ ha (kg)
V1	Belona	Untreated	2.603 bc	91000.0 bc	28.19 d	125.12 e
V2		Florone	2.710 abc	94791.7 abc	29.95 cd	146.33 de
V3		Flower 50	2.887 ab	100916.7 ab	32.41 c	190.44 bcd
V4		Florabax	3.150 a	110250.0 a	31.65 cd	226.49 ab
V5		Rerum	3.170 a	110833.3 a	33.54 c	229.22 ab
V6	Luiza	Untreated	2.620 bc	91583.3 bc	37.93 b	160.88 de
V7		Florone	2.393 c	83708.3 c	39.38 b	173.83 cd
V8		Flower 50	2.843 abc	99458.3 abc	43.22 a	185.47 bcd
V9		Florabax	3.087 a	107916.7 a	45.73 a	244.48 a
V10		Rerum	3.117 a	109083.3 a	44.25 a	215.57 abc

The effects of treatments with flowering stimulators on the fruits weight:

Some of the treatments applied caused a significant differences in the weight of the fruits that reached physiological maturity.

The products Flower 50 and Rerum determined significant increases in fruit mass in the case of both varieties. The Flower 50 product determined an increase in fruit mass for about 14-15%, while Rerum led to differences of 19% in the Belona variety and 17% in the Luiza variety.

Treatments with Florabax determined significant differences only in the case of the Luiza variety. The growth in fruit mass determined by the application of the product was 20%.

The treatments with the Florone did not cause a significant differences on fruits weight.

In the case of fruit weight, significant differences can be observed between the two varieties of eggplant studied, even when they were not treated. The larger mass of the fruits of the Luiza cultivar, compared to those of the Belona cultivar is a characteristic of the cultivar. However, even if the production potential is lower, Belona still has its qualities, because of the fruits are white, of superior quality and special taste.

The effects of treatments with flowering stimulators on seeds yield:

Regarding the seed yield obtained in the Belona variety, the treatments had, in general, beneficial effects. The application of treatments with the Flower 50 product determined a significant increase of about 52%, from 125.12 kg/ha to 190.44 kg/ha. Treatments with Florabax and Rerum determined even greater increases of 81% and 83%, the seed yield reaching 226-229 kg/ha.

The variants that determined significant increases in the seed mass of the Luiza variety are V9 and V10. The V9 variant, in which Florabax treatments were applied, determined very significant increases of 52%, from 160.88 kg/ha to 244.48 kg/ha. In the V10 variant, treatments with Rerum were applied and significant increases of about 34% were obtained. Seed production has reached 215.57 kg/ha.

Even in this case, the Florone product did not determine significant differences.

CONCLUSIONS

1. Treatments with flowering stimulators can positively influence the seed production in eggplant.

2. Treatments with Florabax and Rerum determined significant increases of the number of fruits reaching physiological maturity and of the yield of seeds, in both eggplant cultivars studied.

3. The Florone product did not determine significant differences in any of the studied indicators.

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