STUDIES AND RESEARCHES CONCERNING THE GROWING OF THE REAL AND FINAL FERTILITY AT THE ONION SEED CULTURE

STUDII ŞI CERCETĂRI PRIVIND CREŞTEREA FERTILITĂŢII REALE ŞI FINALE LA SEMINCERII DE CEAPĂ

VÎNĂTORU C., NEICU Eliza
Vegetable Research and Development Station Buzău, Romania

Abstract. *Because of the climatic changes concretized in prolonged atmospheric drought, abrupt temperature changes, lack of precipitations, winds etc., the pollination of the onion seed culture is deterrent. The researches made at S.C.D.L. during 2000 – 2010 had shown that there is a great difference between real and potential fertility, thus, during the latest 10 years, 4 years were favorable to the onion seed culture, and the other 6 years did not presented optimum conditions for this culture. There material used was the onion variety called Diamant, to which were applied three pollination variants (V_1 – free pollination, V_2 –classic pollination and V_3 – pollination by using bio stimulators). Each experimental variant had a surface of 5000m^2, and there were observed significant differences between the three experimental variants. Comparative to V_1, where there were obtained 600kg seed/ha, V_2 had an impregnation percent over 20%, and for V_3 the impregnation percent was over 50%.*

Key words: onion, seed culture, biostimulator

Rezumat *Datorită schimbărilor climatice apărute în ultima perioadă, concretizate prin secetă atmosferică prelungită, schimbările bruşte de temperatură, lipsa precipitaţiilor, vânturile etc. împiedică polenizarea în condiţii optime a semincerilor de ceapă. Cercetările efectuate la S.C.D.L. Buzău în perioada 2000 – 2010 au arătat că există o mare diferenţă între fertilitatea reală şi potenţială, astfel, în ultimii 10 ani, patru ani au fost favorabili semincerilor de ceapă, iar ceilalţi şase nu au prezentat condiţii optime pentru această cultură. Materialul folosit a fost soiul de ceapă Diamant la care s-au organizat trei variante de polenizare(V_1 – polenizare liberă, V_2 – polenizare clasică şi V_3 – polenizare prin folosirea biostimulatorilor). Fiecare variantă experimentală a avut o suprafaţă de 5000m^2 şi s-au constatat diferenţe semnificative între cele trei variante experimentale. Comparativ cu V_1, la care s-au obţinut 600kg sămânţă/ha, polenizarea clasică efectuată a avut un procent de fecundare de peste 20%, iar V_3 prin folosirea biostimulatorilor de peste 50%.*

Cuvinte cheie: ceapă, cultură din sămânţă, biostimulator

INTRODUCTION

The researches made at S.C.D.L. Buzău during 2000 – 2010, concerning the seed culture, dignified the fact that the plants manifest significant differences between the potential fertility (F_p) and the real one (F_r). This fact leads to significant differences between initial and final productivity (F), which is similar to the yield capacity (Leonte, 1996). The greatest differences were registered at the

allogamy plants (onion, cabbage, carrot etc.) especially during the years which are difficult from the climatically point of view, with low temperatures, precipitation or up wind during the flowering, conditions which limit and endanger insects circulation, bees specially, the main pollinator of these plants.

The researches made at S.C.D.L. Buzău had in view finding optimum solutions in order to increase real fertility of the vegetables seed culture, especially the onion seed culture. By means of the researches made, there was followed the quality and quantity increase of the seeds obtained with unpollutant and cheap methods. In the conditions of the climatic changes for the last period, the vegetables seed culture, especially onion, it had registered significant production losses; implementing the technological link can cure this phenomenon.

MATERIAL AND METHOD

The species studied in the frame of these experience, was the onion seed culture to which the parent plant were obtain by direct seeding. The biological material was the onion variety *Diamant*, created at S.C.D.L. Buzău. This variety, which is the most performing Romanian onion variety, occupies the largest surface cultivated in Romania.-For the onion seed culture, there was applied the specific crop technology, with the peculiarity that at each eight lines there was let a furrow. On this furrow, there was seed as well onion to facilitate the tractor's access L445 + MSPP in order to apply treatments (Ciofu, 2003). There were chosen three experimental variants in a 1000m^2 surface:

V_1 – free pollination;

V_2 – manual classic pollination;

V_3 – pollination in bio stimulators conditions.

There were used ecological bio stimulators that have no negative impact on plants and environment and contain sugar, honey and water. There were made studies and researches concerning the solution concentration, the quantity of substance used for the surface unit and the solution applying moment. During the vegetation period, there were made observations concerning the main fenophases (table 1).

Table 1

The main fenological data for *Diamant onion variety* (mean values 2000 – 2010)

FENOPHASE	Culture	
	Butaşi	**Seed culture**
Sowing/planting	14.03	28.11
Plants rising	10.04	–
Vegetation start	–	10.03
Bulbs forming	25.05	–
Stems issuance	–	21.04
Bulbs sweeping	06.08	–
Flowering	–	07.06
Seeds forming	–	15.07
Bulbs/ flourish harvest	14.09	24.08

The main biometric determinations made at the plants from the experimental crop are shown in table 2.

Table 2

The main characteristics followed

Followed character	Mean values (2000 – 2010)
Plant's stem (cm)	58,13
No. of stem/plant	4,88
Stem length (cm)	111,042
Flourish diameter (cm)	7,439
No. flowers/flourish	613,1
Seed quantity/plant (g)	33,2

At the beginning of the experience there was in view that V_3, variant, to which was applied the bio stimulation solution, to be situated at enough distance from in order to not influence the results of the other experimental variant.

The experimental variants were set conforming to the Latin square with three repetitions.

RESULTS AND DISCUSIONS

Because of the lately climatic changes, there was observed that during last 10 years, - 4 years were favorable for the onion seed culture and 6 years were not favorable (there were registered production losses.

After the researches made, there was observed the fact that there are significant differences between the three experimental variants. Thus, V_2 variant has registered a yield increase proxy. 20% higher than V_1 variant (115kg/ha). There must be specified the fact that for V_2 variant there was applied the classical pollination method, and in order to not disturb and destroy the flowers, there was made a bunny fur glove in order to palpate the flourishes.

V_3 variant had obtained an distinct significant yield increase than V_1 (322kg/ha), having the highest fertility quotient, 54,64%, from the din experience (table 3).

Table 3

Onion plants fertility potential (mean values 2000 – 2010)

Experimental variant	No. flower/flourish	Fecundate flowers		Yield (kg/ha)
		No.	%	
V_1	613	215	35,07	600
V_2	613	262	42,74	715
V_3	613	335	54,64	922

When using bio stimulator there must have in view the following aspects:

1. the concentration of the bio stimulator must be 10% sugar or bee honey;

2. the optimum applying moment is in the morning between 7 and 9, in order to have enough time to attract insects. Thus, around noon and after-noon, when the flowers are open, there has been observed a great presence of the pollinating insects;

3. there is recommended that the bio stimulator to be applied in a quantity of 300 l/ha in sunny days;

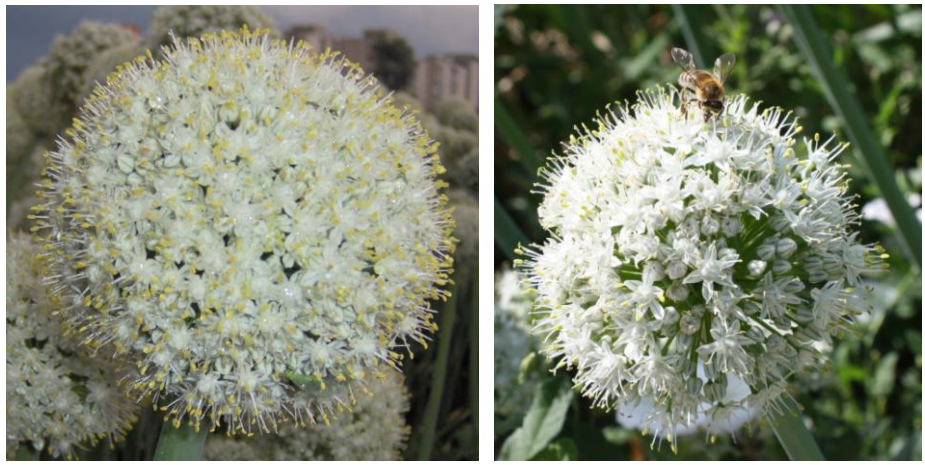
4. during the flowering, there are recommended two treatments/week.

The values presented are mean values for the studied interval of time, but, during the favorable years, by applying bio stimulator, the seed yield can surpass 1200kg/ha.

Recent studies of the beekeepers show that in conditions of hydric stress (atmospheric drought) the onion becomes from melliferous plant, a plant that secretes repellent substances for insects. For this reason, using bio stimulators contributes to attract insects and to obtain positive results even in unfavorable years.

Carefully analyzing the fertility potential not capitalized for this species, our researches will extend upon finding other technological variants with the purpose to valorize this potential.

Fig. 1. General aspect of the onion seed culture



a) **b)**

Fig. 2. Onion flouring from the V_3 variant: a) after applying bio stimulator; b) during pollination

V_1 V_2 V_3

Fig. 3. Onion flouring obtained in unfavorable conditions for the seed culture

CONCLUSIONS

1. The onion yield potential is big, but low capitalized (35 – 54%).

2. Applying bio stimulator on the onion flouring during the flouring period constitutes a success variant for increasing the seed production. From our researches we can observe that this method can be successfully applied to the seed culture of other vegetables.

3. The bio stimulation solution favors insects attraction that ensure pollination.

4. The bio stimulator used is a natural product which can be used in ecological cultures.

5. From the economic efficiency analysis, there was observed that from the three experimental variants, V_3 is the most convenient method.

REFERENCES

1. **Ciofu Ruxandra. and col., 2003** – *Tratat de legumicultură*. Editura Ceres, Bucureşti.
2. **Crăciun T., 1981** – *Genetica plantelor horticole.* Editura Ceres, Bucureşti.
3. **Drăcea, I., 1972** – *Genetica.* Editura Didactică şi Pedagogică, Bucureşti.
4. **Dumitrescu I. and col., 1998** – *Producerea legumelor.* Editura , Bucureşti.
5. **Leonte C., 1996** – *Ameliorarea plantelor horticole,* Editura Didactică şi Pedagogică, Bucureşti.