

## STUDY OF SPECIES, VARIETIES AND HYBRIDS SUITABILITY FOR ORGANIC FARMING

*Silvica Ambăruș, Maria Călin, Petre Marian Brezeanu, Creola Brezeanu, Tina Oana Cristea, Lucian Stoian*

*Key words: vegetables, biodiversity, healthy, production*

### INTRODUCTION

The request for organic food registered tremendous increase in the last 20 years. This situation is due also, to this increasing public concern about the harmful effects of excessive use of fertilizers, herbicides, fungicides and insecticides on the environment and their negative impact on human health. It has been demonstrated that organic farming improves the quality of the environment and human health (1, 2). Although the potential benefits to the environment and life quality of organic farming are obvious, remains to be seen whether ecosystems can produce enough food to feed the world population, whose demands until 2050, will double (3). As a result, one of the objectives of organic farming systems is to increase the production yields by maintaining high agronomic performance, under production certification conditions, using methods and practices with minimal impact on the environment, supported by regulations (3). More and more research in the field shows that plant varieties for conventional agriculture doesn't have suitability for organic cultivation due to very low yields. In order to achieve eco-functional ecological systems with optimal performance, farmers should cultivate crop varieties with suitability for organic cultivation (4 5, 6, 7, 8).

### MATERIAL AND METHODS

The study of some species, varieties and hybrids suitability for cultivation in organic farming was performed during 1991 - 2014 in the organic farming polygon of VRDS Bacău, certified for the organic quality of production.

Studies of assortment were performed using methods and practices of organic farming to the following species and cultivars:

Culture in tunnels

Tomatoes: V1 - Bersola F1; V2 - Aegen F1; V3 - Arbason F1; V4 - Baldwin F1; V5 - Buran F1; V6 - Charlotte F1; V7 - Winona F1; V8 - Elpida F1; V9 - Francisca F1; V10 - Gironda F1; V11 - Mokito F1; V12 - Rahmat F1; V13 - Sampei F1; V14 -

Venezia F1, V15 - Siriana. The results were compared with Baldwin F1.

Pepper: V1 - Apollo F1; V2 - Brill F1; V3 - Bianca F1; V4 - Bobita F1; V5 - Ceops F1; V6 - Century F1; V7 - Cyclon F1; V8 - Csango F1; V9 - Emese F1; V10 - Kincsem F1; V11 - Lehel F1; V12 - Lozorno F1; V13 - Mavras F1; V14 - Vedrana F1. The results were compared both with the media of experience obtained (52,74 t/ha) and with hybrid Bianca F1 with a production almost similar with the experience media (53,0 t/ha)

Eggplants: V1 - Aragon F1; V2 - Tudela F1; V3 - Black Pearl F1; V4 - Edna F1; V5 - Mirabelle F1; V6 - Contesa.

Cucumber: V1 - Beluga F1; V2 - Componist F1; V3 - Fivos F1; V4 - Mandy F1; V5 - Madita F1; V6 - Magdalena F1; V7 - Mirabelle F1; V8 - Levina F1; V9 - Pant hibrid F1; V10 - Bodina F1; V11 - Cosima F1; V12 - Ginga F1. The comparison witness was Beluga F1.

Culture in open field

The following varieties were cultivated in conventional and organic farming: tomatoes - Unibac, sweet pepper - Dariana Bac, round pepper - Creola, long pepper - Ionel, sweet corn - Dulce de Bacău, climbing beans: Auria Bacăului și Verdana, garden beans - Milenium, lovage - Rarău, dill - De Brad, spinach - Premier, parsley - Zaharat, lettuce: Marilena, Silvia and Serata, cucumber - Mapamond, carrot - Ceahlău, red beet - Rubiniu, celery - Bistrița, thyme - Daria, moon radish - Roșioară. Observations regarding the tolerance to pathogens, pests attack and yields were performed. The experiments in tunnels and fields were set in randomized blocks in three repetitions.

### RESULTS AND DISCUSSIONS

#### Study of species, varieties and hybrids suitability for cultivation in organic agriculture

##### Tomatoes

The results obtained are presented in figure 1. On observe that Bersola F1, Winona F1 and Venezia F1 produced more than 100 t/ha; Aegen F1, Arbason F1 and Buran F1 between 90-100 t/ha; Elpida F1, Mokito F1, Charlotte F1, Sampei F1 and Siriana

between 80-90 t/ha. The rest of the hybrids: Baldwin F1, Francisca F1, Gironda F1 and Rahmat F1 registered productions under 80 t/ha in prolonged cycle 1 of production. All experimented hybrids „long shelf life” type.

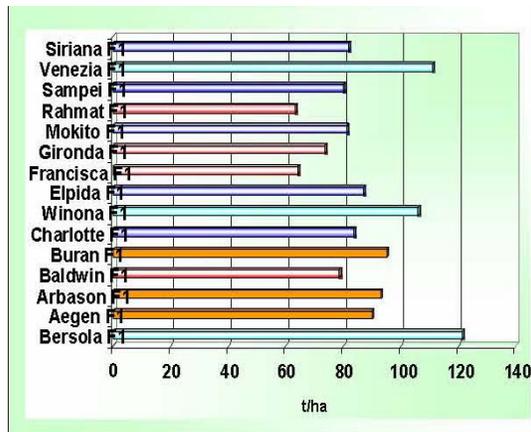


Fig. 1 The production of tomatoes hybrids cultivated in tunnels

Except Syrian F1 hybrid, all present at harvest obvious cellulosic leaks in the stem area, in interlobular walls and under-epicarp area. The cellulose is maintained 8-14 days after harvest, period in which the fruit remain firm.

### Pepper

The results obtained are shown in fig. 2. The analysis of data obtained show that peppers grown in tunnels in organic farming is a profitable crop, the hybrids: Ceops F1 and Emese F1 registering production of 83,0 t/ha and 89,0 t/ha, while Apollo F1 Bianca F1, Bobita F1, Century and Vedrana F1 over 50 t/ha.

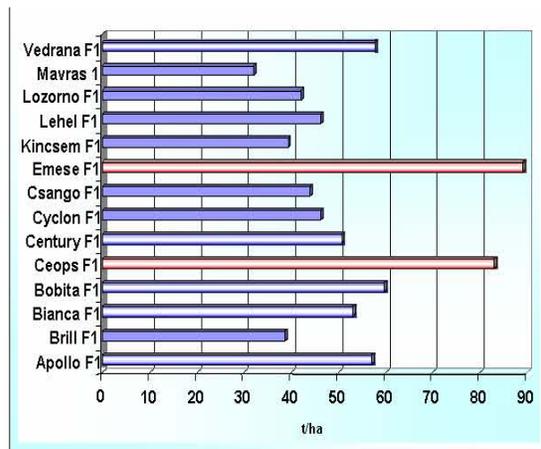


Fig. 2 The production obtained at pepper cultivars in tunnels

### Eggplants

The yields obtained by the eggplants cultivated in tunnels are shown in fig. 3. It can be seen that all hybrids experienced remarked themselves by higher production than Romanian variety Contesa. The best results were obtained by the hybrids Aragon F1 and Black Pearl F1 cu 80,4 t/ha and respectively 76,4 t/ha, with high quality fruits. Good results were obtained also by the hybrids Tudela F1 and Edna F1 with yields of 56, 3 t/ha and 57,3 t/ha.

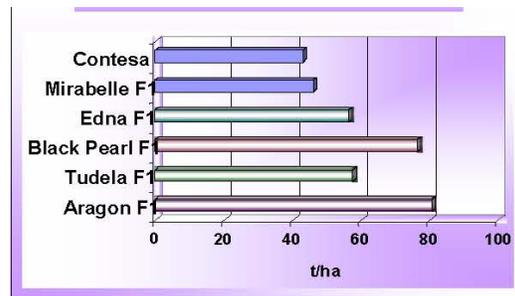


Fig. 3 The production of eggplants obtained in tunnels

### Cucumber

In Fig. 4 the yields obtained hybrids of cucumber grown in tunnels are presented.

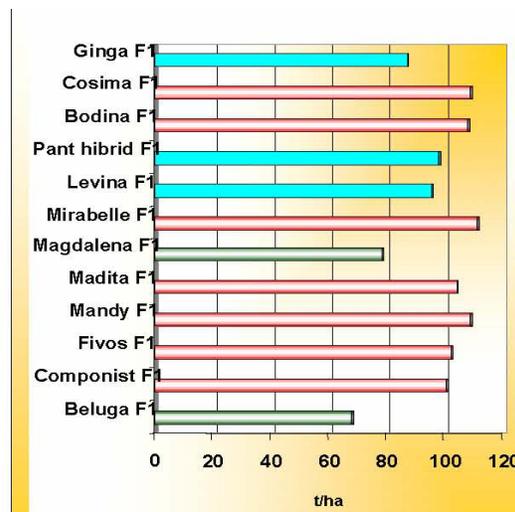


Fig. 4 The production obtained by cucumber hybrids cultivated tunnels

Cornichon type cucumbers: Most hybrids studied had lower yields, comparing with witness Mirabelle F1, a hybrid culture well adapted to organic tunnels cultivation. Similar productions were obtained by hybrids: Mandy F1, Bodina F1 and Magdalena F1 (between 108-111 t/ha). At cucumbers for salads (medium long) the best productions were

realised by the hybrid Fivos F1 with 102 t/ha. Te hybrids Cosima F1 and Ginga F1 had a large number of malformed fruits (60-75%). Pant Hybrid – of Indian origin is not qualitative competitive with the market demands from our country, as it is too consistent in cellulose.

The varieties of: tomatoes - Unibac, sweet pepper - Dariana Bac, round pepper - Creola, long pepper - Ionel, sweet corn - Dulce de Bacău, climbing beans: Auria Bacăului and Verdana, garden beans - Mileniu, lovage - Rarău, mărar - De Brad, spinach - Premier, root parsley - Zaharat, lettuce: Marilena, Silvia and Serata, cucumber - Mapamond, carrot Ceahlău, red beet - Rubiniu, root celery - Bistrița, thyme - Daria, moon radish - Roșioară had a good tolerance to pathogen attack. The yield obtained was lower by 10-15% in organic agriculture compared to conventional agriculture harvest, but the higher prices at selling, due to ecological quality recover the diminish of production.

### CONCLUSION

The tomatoes have a good ability for cultivation in organic agriculture. The hybrids: Bersola F1, Winona F1 and Venezia F1 yielded over 100 t/ha; Aegen F1, Arbason F1 and Buran F1 between 90-100 t/ha; Elpida F1, Mokito F1 and Sampei F1 and Siriana between 80-90 t/ha.

The pepper cultivated in tunnels, in organic agriculture is a profitable culture, the hybrids: Ceops F1 and Emese F1 registering productions of 83,0 t/ha and 89,0 t/ha, while Apollo F1, Bianca F1, Bobita F1, Century and Vedrana F1 more than 50 t/ha.

The eggplant hybrids can be cultivated in organic agriculture, Aragon F1 and Black Pearl totalizing productions over 75 t/ha; Tudela F1 and Edna F1 over 56 t/ha.

Cucumber hybrids: Componist F1, Fivos F1, Mandy F1, Madita F1, Magdalena F1, Mirabelle F1, Levina F1, Pant hibrid F1, Bodina F1, Cosima F1, Ginga F1, cultivated in tunnels obtained productions of more than 78,3 t/ha. Mirabelle F1 was the best hybrid from the assortment tested for organic culture in tunnels, being tolerant to pathogen attack and registering a production of 111 t/ha.

#### Culture in open field

The varieties of: tomatoes - Unibac, sweet pepper - Dariana Bac, round pepper - Creola, long pepper - Ionel, sweet corn - Dulce de Bacău, climbing beans: Auria Bacăului and Verdana, garden beans - Mileniu, lovage - Rarău, mărar - De Brad, spinach - Premier, root parsley - Zaharat, lettuce: Marilena, Silvia and Serata, cucumber - Mapamond, carrot Ceahlău, red beet - Rubiniu, root celery - Bistrița, thyme - Daria, moon radish - Roșioară had a good tolerance to pathogen attack. The yield obtained was lower by 10-15% in organic agriculture compared to conventional agriculture harvest.

### ABSTRACT

This paper presents a study of species, varieties and hybrids suitability for cultivation in organic agriculture. The study of assortment were performed using methods and practices of organic farming - culture in tunnels and culture in open field - to the following species and cultivars: tomatoes, eggplants, pepper and cucumber. All vegetables have a good ability for cultivation in organic agriculture.

### REFERENCES

1. BULLUCK III, L.R., BROSIUS M., EVANYLO G.K., RISTAINO J.B., 2002 - Organic and synthetic fertility amendments influence soil microbial, physical and chemical properties on organic and conventional farms. *Appl. Soil Ecol.* 19,147–160;
2. KRAMER S.B., REGANOLD J.P., GLOVER, J.D., BOHANNAN B.J.M., MOONEY H.A., 2006 - Reduced nitrate leaching and enhanced denitrifier activity and efficiency in organically fertilized soils. *Proc. Natl. Acad. Sci. U.S.A.* 103, 4522–4527;
3. TILMAN D., CASSMAN K.G., MATSON P.A., NAYLOR R., POLASKY S., 2002 - Agricultural sustainability and intensive production practices. *Nature* 418, 671–677.
4. MURPHY KEVIN M., KIMBERLY G. CAMPBELL, STEVEN R. LYON, and STEPHEN S. JONES, 2007 - “Evidence of Varietal Adaptation to Organic Farming Systems.” *ELSEVIER, Field Crops Research* 102 (3): 172–177;
5. CĂLIN MARIA, STOIAN L., CRISTEA TINA OANA, AMBĂRUȘ SILVICA, AVASILOAIEI D. I., CREOLA BREZEANU, BREZEANU P.M., 2010 - The study of tomatoes hybrids ability for cultivations in tunnels in ecological agriculture conditions, Simpozionul Aniversar „20 ani – Stiinta, calitate si performanta”, USAMV Timisoara, *Journal of Horticulture, Forestry and Biotechnology*, vol. 14, ISSN 2066-1797, p. 270 – 273;
6. CĂLIN MARIA, FENEȘAN MARIA, CRISTEA TINA OANA, SILVIA AMBĂRUȘ, AVASILOAIEI DAN IOAN, CREOLA BREZEANU, P.M. BREZEANU, 2010 - Use of synthetic pheromones for sequential monitoring of *Plutella xylostella* L. specie in summer cabbage. *Scientific Studies and Research. Series Biology*, XIX, I.S.S.N. 1224-919 X;
7. CĂLIN MARIA, CRISTEA TINA OANA, AMBĂRUȘ SILVICA, BREZEANU CREOLA, BREZEANU, P.M., SOVA G.F., BARBU IULIANA, BARBU DIANA, AVASILOAIEI D.I., PRISECARU MARIA 2013 - Suitability study of vegetable cultivars in organic farming. vol. 56, *Serie Horticulture*, Ed. “Ion Ionescu de

la Brad”, ISSN 2069 – 847X, vol. 2, pp. 149-154;

8. RENAUD ERICA N. C., EDITH T. LAMMERTS VAN BUEREN, MARIA JOÃO PAULO, FRED A. VAN EEUWIJK, JOHN A. JUVIK, MARK G. HUTTON, AND JAMES R. MYERS, 2014 - “Broccoli Cultivar Performance under Organic and Conventional Management Systems and Implications for Crop Improvement.” Crop Science, 54 (4): 1539.

#### **AUTHORS` ADDRESS**

AMBĂRUȘ SILVICA, CĂLIN MARIA, BREZEANU PETRE MARIAN, BREZEANU CREOLA, CRISTEA TINA OANA, STOIAN LUCIAN - Vegetable Research and Development Station Bacau, Calea Barladului, No. 220, Bacau, code: 600388, e-mail prim autor: [silvia\\_ambarus@yahoo.com](mailto:silvia_ambarus@yahoo.com)