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Studies Regarding Tomatoes Suitability for Ecological System Culture

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Abstract In this research paper, we discuss aspects regarding type of growth, vigurozity, production potential (t/ha), precocity, plant resistance to pathogens, some fruit characteristics: shape, color, weigh, lodge number, firmness, storage and split resistance. Our observations and determinations were made on a range variety of tomatoes cultivated in ecological system culture.

Key words

Lycopersicon esculentum, organic

In the recent years the society began to pay increasing attention to the environment, demonstrating a growing concern for viable solutions to reduce negative impacts and pressures on agriculture in particular, they perform on the environment. There are also health problems associated with nutrition. One of the answers to these problems is organic agriculture. An increasing demand for organic vegetables is a great opportunity and a challenge for organic vegetable growers. Tomatoes in various forms, fall within the daily diet of the population being consumed fresh, prepared, canned or dried very well appreciated in all world cuisines. Tomatoes are providing nutrients (carbohydrates, proteins, lipids, organic acids), minerals, vitamins (A, B1, B2, B6, C, PP, E, K) and are one of the most balanced fruit in rational nutrition.

Material and Method

The biological material is represented by *Lycopersicon esculentum* species. The paper presents o literature review on the species *Lycopersicon esculentum*, as a preliminary study regarding the suitability of this specie to the organic culture system. The paper also presents some of our obtained results regarding tomatoes features in case of three groups cultivated in ecological system culture. The accomplishment of the paper will assure a good acknowledgement of causes that conducted to the current situation in which the surfaces cultivated with ecologic tomatoes are very small in our country. The main items analyzed are following: type of growth, vigurozity, production potential (t/ha), precocity, plant resistance to pathogens, some fruit characteristics like: shape, color, weigh, lodge number, firmness, storage and split resistance.

Results and Discussions

Climate changes in recent years, ozone depletion, global warming, have made researchers to try hard to find solutions for environmental protection, maintaining biodiversity, preserving natural resources (especially land and water). Organic culture is one of these solutions. In ecological culture system by not using synthetic chemicals to control weeds, diseases and pests, is so exclude soil, and groundwater, the environment in general but especially the tomatoes fruits do not have residual products pesticides.

15 - 20 years ago, ecological farming was present in our country only in literature, few works publicity trying to acquaint those concerned with the concepts and techniques of organic farming.

In 1991, at Vegetable Research Station Bacau, it was founded the first organic vegetable polygon, in which was studied, the possibilities of achieving efficient production of vegetables "bio" and the evolution of land conversion from conventional agriculture to organic farming.

Romania has unique conditions for organic production (soil, climate, the share of agriculture, traditional agriculture) and the interest that could motivate the development of this production.

In figure, 1 and 2 it can be observed a situation of number of registered organic operators and also the evolution of areas in organic system in Romania in the recent years, according Minister Of Agriculture and Rural Development.

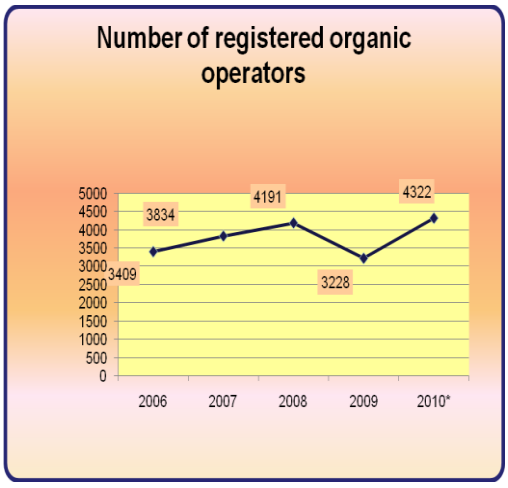

Fig. 1 Dates regarding number of registred organic operators in Romania (according www.madr.ro)

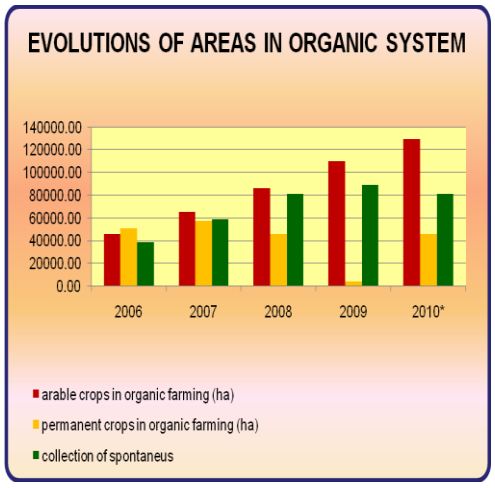

Fig. 2 Dates regarding evolution of areas in organic system in Romania (according www.madr.ro)

Organic farming system evolution imposed taking into account risk factors such as:

- pedoclimatic risks (climatic, orographic, soil, agrochemical),
- biological (pests, diseases),
- technological (location, biological material, soil, culture maintenance),
- economical (material/ technical equipment, lack of a production contract, scarcity of labor, absence of labor, uncertainly capitalization, absence or non co-operative principles) and
- other factors (pressure and fiscal instability, legislative instability, legislative gaps, no standards)

In our research study, we took some special precautions like the next ones:

- use of genetically resistant varieties,
- use of virus-free planting material,
- keeping the soil loose, mobilized,
- decreasing density of culture by 15-20% over conventional culture,
- performing strengthening treatments- 2-3 vegetation treatments with infusion of nettle or comfrey, and organic products trade (Cropmax, Algifol, Nutrimax),
- avoid irrigation during warm and overcast.

Compliance with the strict rules of crop rotation, removal and burning of plants attacked, hygiene, location row on NE direction for obtaining good sun exposure, administration of organic compost in culture (40 - 50 t / ha) and incorporate its superficial, positive is associated with cabbage, beans, celery and also with *Tropeolum majus* to remove aphids and other insects.

In our study, we analyzed 16 varieties as presented in Table 1.

From the group of early tomatoes we analyzed Isalnita 150 F1, Ioana F1, Barleta F1, Marfa F1, Marmande, Marisa F1. All varieties presented indeterminate type of growth, round shape of fruit at Isalnita 150 F1and flat globose in rest. Lodge number varies from four to five, and fruits presented good firmness at Isalnita 150 F1and Ioana F1and very good firmness in rest.

The second analyzed group was the one of summer tomatoes for fresh consumption including next varieties: Unibac, Buzau 21, Ace Royal, Buzau 1600, Red Cheef F1, Carolina. Only Buzau 21 and Ace Royale presented determinate type of growth. The fruit shape was round at Carolina fruits, round flat at Unibac, Ace Royal and Red Cheef F1, round globose at Buzau 1600 and spherical at Buzau 21. The lodge number started with three, four in case of Buzau 21, presented four - five in case of Unibac Ace Royal and Carolina. Buzau 1600 and Red Cheef F1 presented many lodge. The Red Cheef F1 fruits presented best degree of firmness. Buzau 1600 presented a medium firmness of fruits. In rest all fruits presented a good firmness.

The last analyzed group was the group of summer autumn tomatoes for fresh consumption: Buzau 47, Romec. Roma, San Marzzano all with a determinate type of growth and a ovoid – oblong shape. The fruits presented two, three lodge number in case of San Marzzano fruits and two, four in rest. The fruit firmness was good in Roma fruit case and very good in rest.

We presented all these items in Table 1.

Table 1

Characteristics of the most known tomatoes varieties cultivated in NE part of Romania in ecological culture system

Earliness	Variety name	Type of growth	Fruit features				Yield t ha^{-1}
			Weight (g)	Shape	Lodge Numer	Firm - ness	
Early tomatoes	Isalnita 150 F1	ND	100-110	round	4-5	G	20-25
	Ioana F1	ND	75-80	flat globose	4	G	25-28
	Barleta F1	ND	120-140	flat globose	4-5	VG	30-35
	Marfa F1	ND	130-150	flat globose	4-5	VG	35-40
	Marisa F1	ND	130-150	flat globose	4-5	VG	35-40
	Marmande	ND	120-140	flat globose	many	VG	30-35
Summer tomatoes for fresh consumption	Unibac	ND	40-50	round flat	4-5	G	40-50
	Buzau 21	D	30-40	spherical	3-4	G	30-40
	Ace Royale	D	35-50	round flat	4-5	G	35-50
	Buzau 1600	ND	180-200	round globose	many	M	40-60
	Red Cheef F1	ND	150-180	round flat	many	VG	50-60
	Carolina	ND	90-100	round	4-5	G	40-45
Summer autumn tomatoes for fresh consumption	Buzau 47	D	90-100	round flat	5-6	M	35-40
	Romec	D	50-60	ovoid oblong	2-4	VG	40-45
	Roma	D	50-60	ovoid oblong	2-4	G	40-45
	San Marzzano	D	70-80	ovoid oblong	2-3	VG	35-40

We choose this range variety of tomatoes becouse there are the most known and cultivated in the Nord Est part of Romania and we wanted to see the behavoiur in ecologycal culture system.

In figure 1 we can observe the obtined productions in case of all analised varieties.

Regarding the group of early tomatoes, the production varies from 20-25 t/ha in case of Isalnita 150 F1 to 35-40 t/ha obtained by Marfa F1 and Marisa F1.

The highest yield in case of summer tomatoes for fresh consumption was obtained at variety Red Cheef F1, 50-60 t/ha. The variety Buzau 1600 obtained 40-60t/ha, the lowest yield obtained at Buzau 21 30- 40y/ha.

In summer - autumn tomatoes for fresh consumption the yield varies from 35-40 t/ha at Buzau 47 and San Marzzano to 40-45 t/ha at Romec and Roma - the most productive varieties from this group.

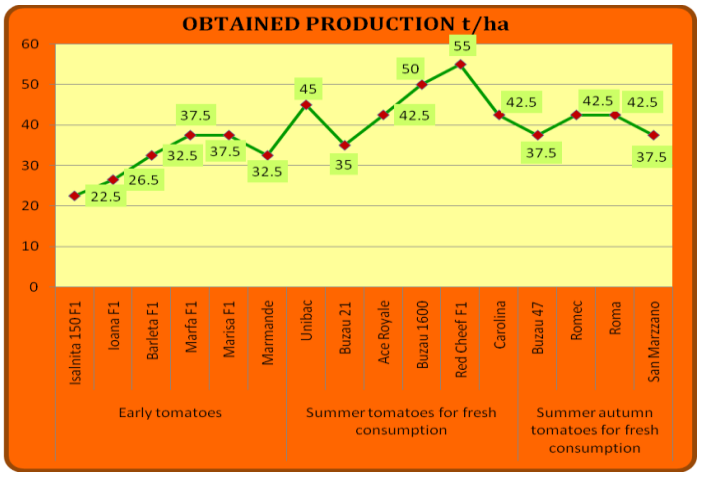

Fig. 3
Tomatoes obtained production in organic culture system

Conclusions

The best results obtained with the following conditions:

- compliance with the strict rules of crop rotation,
- we used of genetically resistant varieties and free planting material,
- decreasing density of culture by 15-20% over conventional culture,
- performing strengthening treatments,
- removal and burning of plants attacked, hygiene.

Regarding the group of early tomatoes, the highest production was 35-40 t/ha obtained by Marfa F1 and Marisa F1.

The highest yield in case of summer tomatoes for fresh consumption was obtained at variety Red Cheef F1, 50-60 t/ha. The variety Buzau 1600 obtained 40-60t/ha.

Romec and Roma were the most productive varieties from the group of summer autumn tomatoes for fresh consumption. The production was 40-45 t/ha.

The majority of analyzed germplasma presented good and very good degree of fruit firmness.

Acknowledgements

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