

RESEARCHES OF THE PRODUCTION OF MANY BREEDS OF TOMATOES CULTIVATED IN ECOLOGIC SYSTEM IN NORTH WESTERN ROMANIA

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Abstract

The present paper is proposing to analyze in ecologic culture many breeds of tomatoes, under the aspect of earliness and of the productive potential. The ensemble of cultural measures concerned the assuring of some reasonable productive performances and with a high quality degree of some breeds of tomatoes with different colors cultivated in the solar in ecologic system of culture.

The technology of culture applied in the experimental culture was aligned in general in the general technology of culture of tomatoes in solar systems by adapting to the proposed thematic for analysis.

The production of tomatoes is limited by the high temperatures during the day, but especially during the night (Moore and Thomas, 1952). Peet et al. (1997) have demonstrated the fact that although the high temperatures during the day are more harmful than during the night.

By this analysis we try to contribute to the informing of those interested about the demands of the vegetable plants for water, air and soil, factors with which they are in complex relations of interdependence, and their influence on the development, production and exploitation of the vegetables (Bei, 2014) .

Key words: culture of tomatoes in ecologic system, early productions of tomatoes, breeds of tomatoes, demands of the tomatoes towards the temperature

INTRODUCTION

The tomatoes being thermophile plants have certain demands towards the temperature, thus the maximum growth of the radicular system takes place on temperatures between 15-19°C and 25-29°C depending on the breed (Chaux and Foury, 1994).

The roots of the tomatoes are very sensitive to the absence of air from the soil, for this reason the plants don't bear compact and too wet soils. In the soils with excess of humidity the roots are developed in the superficial layer, at 10-15 cm depth (Chilom, 2002; Indrea et al., 2009; Indrea and Apahidean, 2012).

For the breeds with undetermined growth this method of growth continues like this until it intervened the death of the plant from a certain cause or until the growth is limited. These plants can reach to heights of 2-3

m, and in certain special system of culture from the glass houses, can reach heights of 6-7 m or even over 10 m (Apahidean, 2003).

Many researches underlined the role of light in the process of formation of bodies and fructification of the tomatoes (Ciofu et al, 2004).

MATERIAL AND METHOD

The research was carried out in Husas[u de Tinca in the polyethylene tunnel in the years 2015-2016. According to the thematic of research proposed, the objectives of the experiment have concerned the average weight of the fruits, the analysis of the growths and fructification, the early production of tomatoes, the total production of tomatoes, the color of the fruits in different stages of development.

In order to reach the proposed objectives, in 2015 in a polyethylene tunnel from a vegetable micro farm ecologically certified from Husas[u de Tinca, NW of Romania, an area of passage from the Western hills to the Western plain of Romania was founded a mono factorial experiment organized with the method of sub divided blocks, and had as biological material 13 breeds and a hybrid of tomatoes, respectively Merveille des Marchés, Double Rich, Brandywine Pink, Roze de Berne, Giant Belgium, Osu Blue, Blue Fog, Caroten de Plovdiv, Blue Beauty, Ananas, JL Midnight Select, Potiron Ecarlate, Estiva F1.

The 14 versions had three repetitions, each version having 10 plants.

The witness of the experiment was Roze de Berne, an old breed of tomatoes that was already cultivated in the respective micro farm. The breeds from the experiment have the fruits with different colors at maturity. Beside the red color of different shades, we have fruits of yellow color, orange with different shades, pink and indigo mixed with red.

The first element analyzed in the study of those 14 breeds, was the early production of tomatoes. Because the glass house did not benefit of additional infusion of heat (only natural heat) the first fruits reached to maturity in the beginning of June. The early production was cumulated until the middle of July.

RESULTS AND DISCUSSION

The data regarding the early production of tomatoes for the breeds studied, and their statistical processing are presented in table 1.

Analyzing in ensemble the earliness of the breeds is found that there are no great differences comparing to the witness breed. The best early production was obtained by the breed Double Rich, which beat the breed Roze de Berne, with 0.68 Kg/m^2 , the difference being assured statistically significantly distinctively positive and the hybrid Estiva F1 registered an

early production increment of 14.13 %, the difference towards the witness was assured statistically significantly positive. The third breed that deserves attention from the point of view of earliness is Blue Beuty, to which was harvested with 4.7t/ha more than for the witness. The difference was assured statistically significantly positive. The breeds Merveille de Marchés and Brandywine Pink had a better earliness than of the witness, but the difference towards this was smaller that they were not assured statistically.

Table 1

Early production of tomatoes					
No. crt.	Version	Absolute production kg/m ²	Relative production %	±d	Significance
1	Roze de Berne Mt	3.68	10.00	0.00	-
2	Merveille de Marchés	3.79	102.98	+0.11	-
3	Double Rich	4.36	118.47	+0.68	xx
4	Muscat	3.29	89.40	-0.39	-
5	Brandywine Pink	3.97	107.88	+0.29	-
6	Giant Belgium	3.08	83.69	-0.60	00
7	Osu Blue	3.64	98.91	-0.04	-
8	Blue Fog	3.16	85.86	-0.52	0
9	Caroten de Plovdiv	3.37	91.57	-0.31	-
10	Blue Beuty	4.15	112.77	+0.47	x
11	Ananas	3.20	86.95	-0.48	0
12	JL Midnight Select	2.91	79.07	-0.77	00
13	Estiva F1	4.20	114.13	+0.52	x
14	Potiron Ecarlate	3.59	97.55	-0.09	-

Two breeds were underlined with the smallest early production, respectively Giant Belgium with 83.69 % from the production of the witness and JL Midnight Select with 79.07 % of the production of the breed Rose de Berne. To both breeds the differences were assured statistically significantly distinctly negative.

With early productions smaller than the witness were also the breeds Pineapple (86.95 %) respectively Blue Fog (85.86 %). The differences from this were assured statistically significantly negative. As for the rest the other breeds, Muscat, Osu Blue, Caroten de Plovdiv and Potiron Ecarlate, had smaller productions than the witness breed Rose de Berne, but the differences were not assured statistically.

The potential of production of each breed studied was determined by the cumulating to the early production of all the harvests of tomatoes until the eradication of the culture. The data regarding the total production obtained from the average of the repetitions for each breed are presented in table 2. If in case of the early production of tomatoes, the differences

between the breeds were not large, to the total production the breeds with high productive potential were underlined considerably, compared to the witness but also with the others. Thus with an absolute production of 10 kg/m², the hybrid Estiva proved to be the most productive, having a production increase towards the witness of 57.72 %. The difference towards it was assured statistically significantly distinctly positive.

Table 2

Total production of tomatoes					
No. crt.	Version	Absolute production kg/m ²	Relative production %	±d	Significance
1	Roze de Berne Mt	6.34	100.00	0.00	-
2	Merveille de Marchés	8.10	127.76	+1.76	xxx
3	Double Rich	8.69	137.06	+2.35	xxx
4	Muscat	5.33	84.07	-1.01	00
5	Brandywine Pink	8.45	133.28	+2.11	xxx
6	Giant Belgium	3.91	61.67	-2.43	000
7	Osu Blue	6.16	97.16	-0.18	-
8	Blue Fog	6.03	95.51	-0.31	-
9	Caroten de Plovdiv	7.75	122.39	+1.41	xxx
10	Blue Beuty	7.59	119.71	+1.25	xx
11	Ananas	7.17	113.09	+0.83	x
12	JL Midnight Select	7.40	116.71	+1.06	xx
13	Estiva F1	10.00	157.72	+3.66	xxx
14	Potiron Ecarlate	8.08	127.44	+1.74	xxx

Very productive was proved also the breed Double Rich from which were harvested only 1.31 kg/m² lesser fruits than from the hybrid Estiva, but with 2.35 kg/m² more than for the breed Rose de Berne. The difference was assured statistically very significantly positive. Other breeds with large capacity of production that beat the production of the witness with quantities large enough of fruits were Brandywine Pink (with 2.11 kg/m²) Merveille de Marchés (with 1.76 kg/m²), Potiron Ecarlate (with 1.74 kg/m²) and Caroten de Plovdiv (with 1.41 kg/m²). For all these breeds the differences towards the witness were assured statistically very significantly positive. With productions a bit more decreased than the previous breeds were Blue Beuty with 7.59 kg/m² and JL Midnight Select with 7.40 kg/m². For both breeds the differences towards the witness were assured statistically significantly distinctly positive. The breed Pineapple beat the production of the breed Rose de Berne only with 13.09 %, the difference towards it was assured statistically significantly positive.

From the breeds studies, the weakest productive was Giant Belgium, which accomplished only 61.67 % of the production of the witness. The difference towards it was assured statistically very significantly negative

Nor the breed Muscat was raised to the production potential of the witness, from this being harvested 1.01 kg/m² lesser, difference that was assured statistically significantly distinctively negative.

In table 3 are given the productions with repetitions, the average weight of the fruits and the taste.

Table 3

Production of tomatoes with repetitions

No. crt.	Version	Production R1 kg/m ²	Production R2 kg/m ²	Average weight of the fruit	Taste
1	Rose de Berne Mt	5,71	6,98	250-300	Tasty
2	Merveille de Marchés	8,39	7,82	200-250	Average
3	Double Rich	9,07	8,31	350-400	Average
4	Muscat	4,91	5,57	200-250	Average
5	Brandywine Pink	8,22	8,68	300-350	Tasty
6	Giant Belgium	3,11	4,72	180-250	Average
7	Osu Blue	5,73	6,59	70-90	Very tasty
8	Blue Fog	6,32	5,74	300-350	Average
9	Caroten de Plovdiv	7,56	7,95	100-120	Tasty
10	Blue Beuty	7,02	8,16	200-250	Very tasty
11	Pineapple	7,31	6,84	350-400	Very tasty
12	JL Midnight Select	6,88	7,93	80-100	Very tasty
13	Estiva F1	10,52	9,49	250-300	Tasty
14	Potiron Ecarlate	7,80	8,36	400-450	Very tasty

The greatest average weight of the fruits was registered at the breed Potiron Ecarlate for which the fruits had an average weight of 400-450 g/fruit, buing also very tasty, and the smallest average weight was registered at the breed Osu Blue for which the fruits had an average weight of 70-90 g/fruit, being also a breed of tomatoes with very tasty fruits of purple-indigo color.

CONCLUSIONS

The researche carried out in Husasau de Tinca and and studied more breeds of tomatoes in ecologic culture allowed the elaboration of some conclusions:

1. The breed Double Rich had the best earliness with an absolute production of 4.36 kg/m² beating the production of the witness with 0.68 kg/m².
2. Estiva, was the second breed with an early production that beat the witness, with 19.13% and afterwards Blue Beauty with 18.77%, and the two breeds Merveille de Marche and Brandwine Pink, had early positive production very close to that of the breed Roze de Berne.

3. The most belated breeds were JI. Midnight Select, with 79.07% of the production of the witness, respectively 83.69% for the breed Giant Belgium.
4. The majority of the breeds (9) had a potential of production superior to the witness and only 4 breeds had inferior productions to the witness.
5. With an increase of production towards the witness of 3.66 kg/m², the hybrid Estiva accomplished the largest production, compared to the studied breeds.
6. Giant Belgium is the breed with the weakest potential of production (3.91 kg/m²), but also one of the most belated.

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