

NEW VALUABLE GENOTYPES OF TOMATO ADDED IN CULTURE TO INCDBH STEFANESTI-ARGES

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Abstract

Growing vegetables was one of the first practical human activities. But with the advent of society have continuously developed knowledge and methods of cultivation of vegetable plants, this rate becomes very fast in the modern era, which led to the strengthening of vegetables as a science of its own, detach thus the cultivation of which belonged. It should be noted that Romanian farming was found and is still in a less pleasant due to the unified European market liberalization, and globalization of trade in such products. Among the new creations of the vegetable produced in the country are those approved and patented in INCDBH Ștefănești in recent years: Arges 11 Arges 20 Arges 123, Arges 16 varieties of tomato growing determined Ștefănești 22, Ștefanesti 24, Costate 21, Costate 23 tomato varieties with indeterminate growth.

Keywords: determined growth, indefinite growth, tomato varieties.

1. INTRODUCTION

It should be noted that Romanian vegetable-growing has been and still is in a less favorable situation as a result of the liberalization of the united European market, but also of the globalization of trade in such products (Baylei, 2015). The lack of professional organizations of small farmers, as well as legislation to protect them in the beginning stages of the development of vegetable farms, have in many cases made the Romanian producers unable to cope with external competition (Cărbunaru and Domuța, 2006) The Romanian agricultural research has generated and continues to generate new biological plant creations with valuable characteristics of productivity and quality in environmentally changing conditions, new plant culture technologies, preservation and processing of primary production in order to increase the added value of these (Apahidean et al, 2009). Among the new legacies produced in the country are those approved and patented at INCDBH Ștefănești in the last years: Argeș 11, 20, 16, 123, Ștefănești 22, 24, Costate 21, 23 (The official catalog of varieties of crop plants from Romania, 2013).

2. MATERIAL AND METHOD

Unspecified growth varieties have been obtained through hybridizations between the Rila F₁ and F₂ strains, highly productive, pathogenic but late in tolerance, with one of the biotypes with early determinacy and growth, productivity and resistance to Notorius pathogens. Varieties have been

approved in the years 2012-2013 and patented. Fruits are intended for fresh consumption. To obtain the determined growth varieties, autofecundation of hybrids of F₁, F₂, F₃ of the Pablo and Notorius varieties was used, followed by the identification of valuable biotypes, carrying out hybridizations between selected biotypes with the aim of diversifying the autochthonous tomato assortment; harvesting and preserving seeds from representative biotypes (selected) for carrying out the DUS test (distinctiveness, downward character uniformity and genetic stability of selected biotypes) by ISTIS; the culture was set up in the greenhouse belonging to National Research & Development Institute for Biotechnology in Horticulture Stefanesti-Arges, on an area of 250 m².

3. RESULTS AND DISCUSSION

Seedlings obtained from own production from seed obtained from the varieties concerned were planted. The realization in the edaphic area of a hydric regime favoring the growth of vegetable plants has been carried out by irrigation by flooding the intervals between the billas, repeated at two weeks. Protection of cultures against harmful organisms was carried out during the experiment, by two plant-health treatments with herbal extracts and two treatments with 0,8% bordelamine.

Thus, in Tables 1 and 2, the biometric measurements recorded on the varieties studied during the 3 years of experimentation can be observed.

Table 1. Biometric measurements recorded in the 2014-2016 period for the determined growth varieties

Determinations	2014				2015				2016			
	Ag. 11	Ag. 20	Ag. 16	Ag. 123	Ag. 11	Ag. 20	Ag. 16	Ag. 123	Ag. 11	Ag. 20	Ag. 16	Ag. 123
Plant height (cm)	75	80	75	78	80	79	80	81	82	80	84	80
Number of inflorescences	4	5	6	5	4	5	5	6	5	6	5	5
Number of fruits in inflorescence	7	6	6	7	7	6	7	7	7	5	6	5
Average fruit diameter (mm)	70.9	75.4	78.6	68.5	69.6	79.2	78.5	69.4	70.5	72.4	75.1	69.8
Average fruit length (mm)	76.3	72.5	70.5	78.6	77.0	80.1	78.2	72.9	76.5	71.2	69.4	76.1
Average fruit weight (g)	208	286	162	150	218	269	165	165	203	270	160	182

Biometric measurements consisted of determining the average plant height, the number of inflorescences per plant, the average number of fruit per inflorescence, the average size, and the average weight of the fruit.

Table 2. Biometric measurements recorded in 2014-2016 for varieties with undetermined growth description of varieties

Determinations	2014				2015				2016			
	St. 22	St. 24	Ct. 21	Ct. 23	St. 22	St. 24	Ct. 21	Ct. 23	St. 22	St. 24	Ct. 21	Ct. 23
Plant height (cm)	175	175	170	180	180	178	175	176	182	180	189	186
Number of inflorescences	8	9	8	9	8	9	10	9	8	9	9	8
Number of fruits in inflorescence	5	7	5	4	5	7	6	5	6	7	5	5
Average fruit diameter (mm)	70.9	71.4	70.5	68.5	69.6	68.2	70.1	67.2	70.5	68.8	70.0	65.8

Average fruit length (mm)	76.3	71.4	72.1	65.2	77.0	71.8	72.8	65.4	76.5	72.4	70.3	68.1
Average fruit weight (g)	220	298	320	350	238	300	340	280	223	310	315	297

Measurements and determinations have been instrumental in determining the cultural value of each biotype, establishing the production direction, retention period, and eliminating atypical or low productivity seed production. These records are performed periodically, depending on the phenophase (at the beginning of the bloom, at the beginning of the baking, full production, harvesting and deforestation).

Separately, records have been made on the degree of infestation with harmful organisms, the tolerance to certain pathogens, the treatments carried out and their efficacy. The resistance or tolerance to specific pathogens must be traced and appreciated as ecological cultures are difficult to maintain if very sensitive varieties are used. Resistance to specific pathogens is much more important in the maintenance of seed lots in order to maintain the fruit on the plant for a longer period than in the case of being used as fresh fruit or for industrialization (Tămaş et. al., 2012).

Biometric measurements consisted of determining the average plant height, the number of inflorescences per plant, the average number of fruit per inflorescence, the average size, and the average weight of the fruit.



Figure 1 - Variety Arges 11, Arges 20



Figure 2 - Variety Arges 123, Arges 16

Measurements and determinations were closely correlated with the cultural value of each variety, production direction, retention period; (Acatrinei, 2010; Dumitru and Apahidean, 2004). were eliminated from seed production atypical plants or low productivity. These records were periodically based on phenophase (at the beginning of bloom, at the beginning of baking, full production, harvesting and grubbing).

During the 3 years of the experiment, laboratory analyzes were carried out consisting of: determination of total water content, dry substance, ash, total polyphenols, flavonoids, anthocyanins, carotenoid pigments by the refractometric method and the titrimetric method determined total acidity.



Figure 3 - Variety Costate 21, Stefanesti 22



Figure 4 - Variety Stefanesti 24, Costate 21

These analyzes resulted in the following:

- total acidity, measured in g / l malic acid 2.8 - 3.5 g / l, in all studied varieties. Acidity gives the fruit taste a pleasant taste which recommends it to fresh consumption;
- dry matter content, based on the amount of soluble carbohydrates calculated in grams of sugar per 100 grams of fresh fruit between 26.5-28.1%. The content of soluble carbohydrates gives the sweet taste and superior yield to the production of tomato paste;
- the dry matter content, calculated as a percentage, with values between 3.8 and 4.1%. Dry matter content gives fruit firmness and superior yields for tomato paste production;
- the total polyphenol content varied between 400.5 and 405.0. Polyphenols accumulated in fruit play a role in the natural resistance of varieties against specific pathogens, with an important role for ecological crops;
- flavonoids, anthocyanins and carotenoids give fruit the nutritional value of food, since all these organic compounds are antioxidants that play a role in reducing free radicals accumulated in the human body. The most important accumulations were recorded in Arges 11 and Arges 20 and 22.2 respectively; 25.6.

Table 3. Total production of varieties studied, growing of varieties with determined growth

Indicator	2014				2015				2016			
	Ag. 11	Ag. 20	Ag. 16	Ag. 123	Ag. 11	Ag. 20	Ag. 16	Ag. 123	Ag. 11	Ag. 20	Ag. 16	Ag. 123
Production per plant (kg)	4.5	5.2	4.2	4.0	4.1	4.8	4.1	4.0	4.2	4.9	4.2	4.0
Production per ha (t)	135	156	126	120	123	144	123	120	126	147	126	120

Table 3 shows the production expressed in t / ha each year of those studied, so it is noticed how in 2014 the Argeş 20 variety recorded the highest production / plant (5.2 kg) and 156 t / ha, and the

lowest production per plant was recorded in the Argeş 123 (4 kg) and 120 t / ha respectively in all years of study.

Table 4. Total production of studied varieties, cultivation of varieties with indeterminate growth

Indicator	2014				2015				2016			
	St.	St.	Ct.	Ct.	St.	St.	Ct.	Ct.	St.	St.	Ct.	Ct.
	22	24	21	23	22	24	21	23	22	24	21	23
Production per plant (kg)	8	9.8	10	9.3	7.2	9.6	9.8	8	9.4	9.7	10	9.8
Production per ha (t)	240	294	300	279	216	288	294	240	282	291	300	294

4. CONCLUSIONS

1. The varieties studied showed very high production capacity, respectively the production per plant ranges between 4.0-5.2 kg in the determined growth varieties and 8-10 kg / plant in varieties with indeterminate growth.
2. The acidity of the studied varieties ranged from 2.8-3.5 g/l, which gives the fruits a pleasant taste and recommends them for fresh consumption.
3. The dry matter content, based on the amount of soluble carbohydrates calculated in grams of sugar per 100 grams of fresh fruit, was between 26.5-28.1%; soluble carbohydrates give sweet taste and superior yield to produce tomato paste.

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