NEW ACHIEVEMENTS REGARDING SWEET PEPPER BREEDING (*CAPSICUM ANNUUM* L.) OBTAINED AT V.R.D.S. BUZĂU

NOI REALIZĂRI ÎN AMELIORAREA ARDEIULUI GRAS (*CAPSICUM ANNUUM L.*) OBŢINUTE LA S.C.D.L. BUZĂU

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Abstract. *In the Plant Breeding Laboratory from Vegetable Research and Development Station (S.C.D.L.) Buzău researches to obtain new valuable genotypes of sweet pepper in order to correspond to the requirements of the farmers started in 1990. Until now, there were obtained and homologated 3 varieties of sweet pepper and other 2 lines (L_3 and L_5) will be soon homologated.*

Key words: sweet pepper, genotype, germplasm collection, breeding

Rezumat. *În Laboratorul de Ameliorare din cadrul Staţiunii de Cercetare - Dezvoltare pentru Legumicultură (S.C.D.L.) Buzău au fost efectuate, încă din anul 1990, cercetări privind obţinerea de noi genotipuri valoroase la ardeiul gras care să corespundă cerinţelor cultivatorilor autohtoni. Până în prezent au fost obţinute şi omologate trei soiuri la această specie şi alte două linii (L_3 şi L_5) sunt în curs de omologare.*

Cuvinte cheie: ardei gras, genotipuri, colecţie de germoplasmă, ameliorare

INTRODUCTION

The vegetable areas from Romania offers favorable conditions for the sweet pepper crop in open field, solarium and greenhouse (Ciofu R. 2003).

Despite these opportunities, the surfaces cultivated with this species started to decrease from year to year (M.A.D.R.). The main cause of this decrease is represented by the small number of Romanian creations which registers visible fluctuations in what it concerns productivity and quality from a year to other. Taking advantage of these market niches the foreign firms brought a lot of varieties and new hybrids with expensive prices. All of them were insufficiently tested or even not tested at all in the environmental conditions of our country and did not always get to a desirable result.

The attempt to introduce foreign creations in culture proved the fact that the varieties import is a temporary solution. These new varieties cannot maintain the same parameters like in the origin country.

The different development of the foreign varieties leads to the conclusion that their introduction in culture must be made carefully, taking into consideration

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the ecological plasticity and also the necessity of the breeding works in order to create a proper variety.

In these circumstances, the Vegetable Research – Development Station (V.R.D.S.) Buzău, by the Plant Breeding Laboratory, started 1990 the researches in order to obtain new sweet pepper genotypes. Until now there were obtained and homologated 3 varieties and other 2 lines (L_3 şi L_5) will soon be homologated.

The researches made until now had as a main purpose the evaluation, the conservation and the capitalization of the germplasm base that exists in our institution.

MATERIAL AND METHOD

The initial breeding material that was collected over 20 years in the germplasm base of our institution was undergone to an intensive selection process. The valuable genotypes were promoted in the evaluation field (Leonte C., 1996).

During the breeding works there were taken into consideration the value of some qualitative and quantitative indexes according to the main purpose of the research (Drăcea, 1972).

During the experience there was used as a control variant the variety called "Superior Yellow" ("Galben Superior"). This variety detains the supremacy in our country for over 5 decades (Luncă Lucia, 1974).

There were used the following experimental variants:

– V_{1Mt} – Superior Yellow variety;

– V_2 – sweet pepper line L_3;

– V_3 sweet pepper line L_5.

The methods used were the following:

– individual selection repeated in the local populations (Vînătoru C., 2008);

– the selection in advanced homozygote populations (Crăciun T., 1981);

– the verification of the agronomic value of the perspective lines in comparative cultures (Andronicescu D., 1971);

– the supervision in comparative cultures for the attack of pathogens.

RESULTS AND DISCUSSIONS

The researches dignified the following partial and final positive results:

- there was evaluated the germplasm base detained by our institution;

- there was conserved and enriched the germplasm base which detains 24 lines in an advanced homozygote stadium;

- there were made and completed the observation papers;

- there were stock taken and supervised the useful characteristics detained by each line, the amplitude of their transmission in lineage and the genetic stability;

- there were obtained the lines L_3 and L_5 which were studied in comparative cultures for 3 years, demonstrating superiority in what it concerns the phenotypical expression in comparison the control variant and the other studied lines (table 1).

Table 1

The morpho- physiological characterization of the control variant and the new created lines L_3 and L_5

No.	Specification	Experimental variant		
		V_{1Mt}	V_2	V_3
1	Plants height (cm)	45 - 50	55 - 60	65 - 70
2	Characteristics foliage	Light green rich	Dark green mean	Black green rich
3	Fruits characteristics	Tronconic 3 – 4 lobes	Prismatic 3 facet	Tronconic 3 – 4 lobes
4	Fruits color at the technical maturity	Light yellow	Yellow green	Gold yellow
5	Fruits color at the physiological maturity	Red	Red	Red
6	Fruits length (cm)	9,5	12,2	11,4
7	Fruits mean diameter (cm)	4,8	4,6	6,1
8	Fruits mean weight	71,2±2,3	105±2,6	131±2,8
9	Number of fruits/plant	5 – 6	8 – 9	6 – 7
10	Pericarp thickness (mm)	5,6±0,08	6,8±0,06	7,1±0,05
11	Receptacle weight (g)	12,8	13,6	10,4
12	Seeds weight/fruit (g)	2,2	2,4	2,0
13	Number of seeds/fruit	212	230	195
14	Early yield (t/ha)*	25 - 28	30 - 35	20 - 27
Yield quality – nutritive value				
15	Ascorbic acid (mg/100g)	112	116	110
16	Dry substance (%)	6,22	6,18	5,75
17	Sugar (%)	2,06	2,72	2,07

* Yield until the 30th of July

The lines obtained and the control variants are presented in the following paragraphs.

Superior yellow variety. It is mean early, 115 – 118 days since the coming up until the first harvest in the V.R.D.S. Buzău conditions (table 2).

Table 2

Phenophase duration in the VRDS Buzău conditions (days)

Phonological data	Experimental variant		
	V_{1Mt}	V_2	V_3
Emergence – flourish	68 – 71	65 – 70	70 – 75
Flourish – harvest	47	40	45
Emergence – harvest	115 – 118	105 – 110	115 – 120

Plants dimensions are approximately 45 – 50 cm, with mean vigor ramifications, great foliage with mean leafs colored light green. The fruit has a tronconic shape, with a smooth surface with 3 – 4 lobes easy apical marked, the pericarp, with a 4 – 6 mm thickness. It has a light yellow color at the consume maturity and red at the physiological maturity. It has a voluminous epidermis with a specific luster. It is recommended for conservation and it has a remarkable commercial aspect.

Line L_3. The plant is vigorous, with an erect port, 55 – 60 cm height; the foliage is dark green colored, mean coverer for the fruit with a prismatic shape (fig. 1).

Fig. 1 – Culture aspect of the line L_3

The fruit has a mean weight of 105 g and a thick pericarp 6,8 mm (fig. 2).

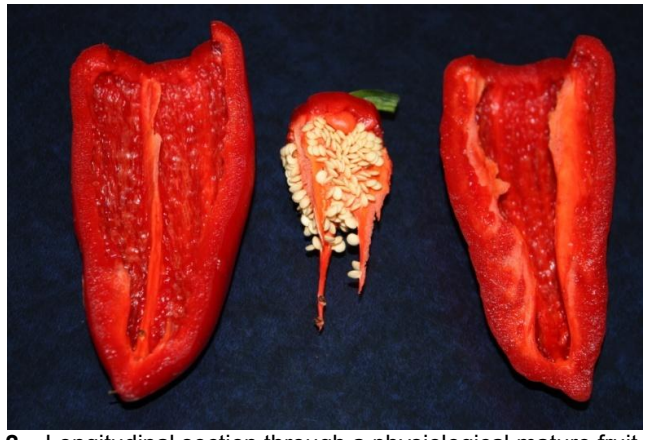


Fig. 2 – Longitudinal section through a physiological mature fruit of L_3

At the consume maturity the fruit is green yellow, and at the physiological maturity is intense red (fig. 3).

Fig. 3 – The evolution of the fruits belonging to L_3 at the technological maturity and at the physiological maturity

It ensures a 45 – 50 t yield/hectare, with over 80% fruits STAS qual. I. Until the 30th of July it ensures 30 – 35% from the total yield (table 3). L_3 has the best comportment (tolerant) against the *Verticilium dahliae*, but also against the other pathogenic agents. L_3 is remarkable for its great commercial aspect and also for its valuable organoleptic qualities.

Table 3

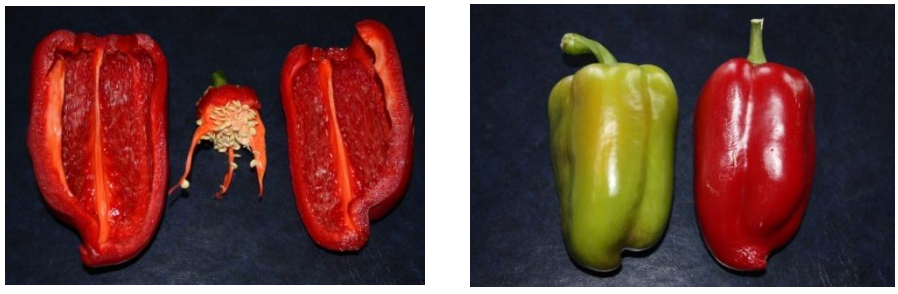
Mean yield potential (2008 – 2010)

Experimental variant	Yield		Difference t/ha	Signification	
	t/ha	%		Reported to error	Reported to the V x A interaction
V_2	48,56	153,7	17	xxx	xxx
V_3	41,6	132,2	10,23	xxx	xx
V_{1Mt}	31,52	100	–	–	–

Pt E DL 5% = 2,76 t/ha
DL 1% = 3,69 t/ha
DL 0,1% = 4,82 t/ha

Pt V x A DL 5% = 4,79 t/ha
DL 1% = 6,49 t/ha
DL 0,1%=8,47 t/ha

Line L_5 is a high plant, approximately 65 – 70 cm height, with a great foliage, great coverer for the fruit with a tronconic shape. The fruit is voluminous with 3 – 4 edges, easy marked longitudinal. The pericarp has a 7,1mm thickness, gold yellow colored, at the physiological maturity the color becomes dark red (fig. 4).



a **b**

Fig. 4 – Longitudinal section (a) and the fruits evolution (b) belonging to L_5 since the technological maturity to the physiological maturity

The mean weight of the fruit is 131g. It is a mean early variety; it needs 115 –120 days since the emergence until the first harvest. It has a great yield capacity (41,6 t/ha), with over 10 t/ha more than the yield registered at the control variant. It is recommended especially for the fresh consume for its equilibrated taste and tenderness, but also for conserved products.

CONCLUSIONS

1. The green pepper variety called Superior Yellow maintain itself performing, but it can be successfully concurred with 2 new creations obtained at VRDS Buzău – lines L_3 and L_5.

2. L_3 is productive (48,56 t/ha), it presents a 105 g/fruit and is recommended for open field and protected spaces culture.

3. L_5 is productive (41,6 t/ha) and presents a 131 g/fruit.

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