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NEW GENOTYPES OF EGGPLANTS OBTAINED AT V.R.D.S. BUZĂU

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Abstract

The V.R.D.S. Buzău breeding laboratory has put a great emphasis on maintaining the biodiversity of this species by constituting a valuable germplasm collection which has 84 genotypes and it is still growing. Our unit, V.R.D.S. Buzău, has patented so far two varieties, 'Dragaica' and 'Zaraza', and recently the F1 hybrid Rebeca. After evaluating their genetic stability it was found that 36 genotypes are stable, 23 are in an advanced form of stabilization and 25 accessions are still segregating. Researches completed until now by stabilizing an important number of valuable accessions with distinct phenotypic expressivity: A 10 with white fruits, A25A with brindle markings of white and purple, A 26 has purple fruits, A20 with small egg-shaped fruits, A29A. A29B, A29C and A29D with small red fruits at the physiological maturity, arranged in raceme, and of different shapes: round, ovoid, pumpkin etc. From all this varieties, the A10 accession was proposed for patenting and homologation, and will be followed by other varieties that are still under evaluation.

Key words*: breeding, varieties, Rebeca F1.*

INTRODUCTION

Our country has favorable pedo-climatic conditions for cultivating the *Solanum melongena* species. Preoccupations in breeding this species have been since V.R.D.S. Buzău was founded. For starters, imported varieties were cultivated, and in time, the researchers from V.R.D.S. Buzău achieved valuable genotypes that were very appreciated both by growers and consumers, among which the variety 'Dragaica', destined for protected areas and open field cultivation, the 'Zaraza' variety destined only for open field cultivation and, recently the F1 hybrid 'Rebeca' has been obtained, with a mixed destination, protected areas and open field culture.

Researches were constituted among achieving a rich germplasm collection for this species, comprising local populations, accessions, autochthonous and foreign varieties. "Most species within *Solanum* are endemic to the Americas; however, ~20% is Old World species. The common name eggplant encompasses three closely related cultivated species that belong to *Solanum* subgenus Leptostemonum: *Solanum melongena* L., brinjal eggplant or aubergine; *S. aethiopicum* L., scarlet eggplant; *S. macrocarpon* L., gboma eggplant." (Daunay et al., 2001).

Among the old and traditional cultivars, an emphasis was put on preserving this species biodiversity.

"The first center of diversity for eggplants is in India, and the second one in China." (Ramalho do Rêgo, 2012)

Thorough specific breeding work programs we can achieve new distinct genotypes.

"Eggplants (*Solanum melongena* L.) were domesticated in tropical Asia where they are used abundantly as both food and medicine. Human selection has produced hundreds of landraces that differ in morphology and chemistry in ways that may be related to local ethnobotanical preferences." (Meyer et al., 2012).

MATERIALS AND METHODS

Researches were targeted on collecting valuable genetic material and structuring it based on the breeding objectives. The general

field collection has a large number of genotypes that are in different stages of breeding, among which 84 accessions were promoted in the working field and submitted to an intensive breeding program. Among these, 36 accessions are genetically stabilized, 23 are in an advanced stage and 25 are still segregating. From all the 36 stabilized accessions, 11 part of this paper due to their distinct phenotypic expressivity.

The breeding methods used were repeated individual selection, hybridization, segregation and negative mass selection. The crop technology used both for protected areas and open field was the species specific one. Crop establishment was made through seedlings aged of 55-60 days.

For the open field crop, the planting scheme used was of 70 cm between rows and 35-40 cm between plants on rows, and for the protected areas, the crop establishment was made in bands at 70 cm between rows, 1.2 m between bands and 40 cm between plants on the rows (Figures 1 and 2).

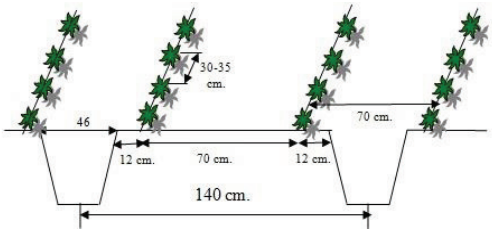

Figure1. Planting scheme for protected areas

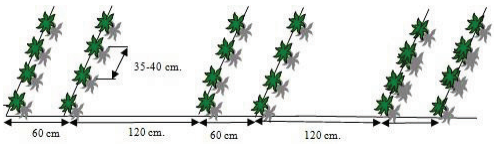

Figure2. Planting scheme for open field

RESULTS AND DISCUSSIONS

The research conducted since 1990 at V.R.D.S Buzău, finalized with the achievement of ten genetically stabilized accessions and with distinct phenotypic expressivity: A 1 S, A 7, A 10, A 20, A 25 A, A 22 A, A 23 A, A 24 A, A 29 A, A 29 B.

The main plant characteristics are presented in table 1.

The values recorded in table 1 demonstrates visible distictibility between the accessions in what regards the main traits of the eggplants. Regarding the plant height, on the first place is A 29 B, with a medium height of 180 cm and the lowest value was recorded at L 20 with 112 cm height. Differences were recorded regarding thr anthocianic coloration. It was founded that the accessions A 1 S, A 22 A and A 23 A have a strong anthocianic pigmentation on the stem, sprouts and on the main leaf veins. Due to this characteristic these eggplants weren't preffered by the Colorado beetle.

The foliage is an important marker for distictivness for all the new creations. Important differences were observed regarding the length of the stalk, the length and width of the lamina, and leaf type.

Table 1. The main characteristics of the plants, mean values

Character/accession	Rebeca F1	L1 S	L7	L 10	L 20	L 25 A	L 22 A	L 23 A	L 24 A	L 29 A	L 29 B
Plant height(cm)	155	147	125	120	112	129	128	118	126	156	180
Stem height (cm)	14	26	13	9	13	22	33	19	47	8	19
Main sprouts no.	3	4	2	5	2	2	2	4	4	3	4
Main sprouts length (cm)	116	123	73	91	99	83	87	98	71	115	103
Stem diameter (cm)	2.2	2.3	1.5	2.3	1,6	1.4	1.9	1.7	1.5	2.1	1.8
Peduncle length (cm)	13	11	11	11	11.5	15	8	8.5	11	10.5	12
Lamina length (cm)	27	21	14.5	29	25	35	29.5	30.5	33	33.5	31
Lamina width (cm)	19	18	17.5	22	15.5	20	20	18.5	15.5	22	27
Flower color	Mauve	Mauve	Purple	Purple white	Mauve	Purple white	Purple	Mauve	Mauve	White	White
Corolla diameter (mm)	35	32	48	45	31	42	35	40	53	24	20
Anthocianic pigmentation	-	Stem, sprouts, leaf, sepals	-	-	-	-	Sprouts, main and sec. veins	Stem, main veins	-	-	-

A special attention for fruit setting was given in the breeding. The accessions achieved are distinguished by productivity, quality, earliness and genetic resistance to the main specific diseases. The researches conducted had as the main purpose, the assortment enrichment with new cultivars at this species, valuing its genetic potential by introducing new totally different genotypes beside the old, classic ones.

A special emphasis, was on the color and shape of the fruit, correlated with the directions of use (Figure 3.).

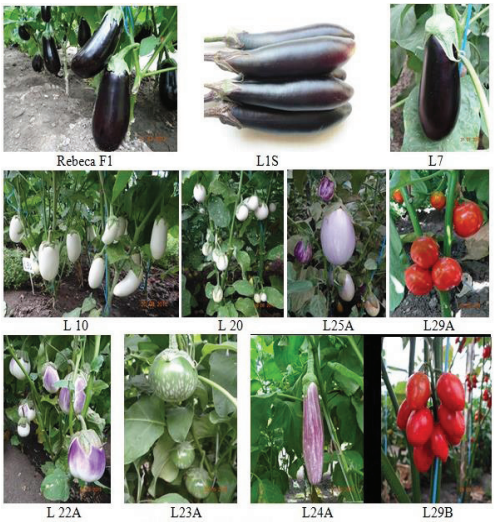

Figure 3. Main accessions studied

The fruit main traits are presented in table 2. Throughout the experience, V.R.D.S. Buzău managed to obtain the F1 hybrid Rebeca, a hybrid that can be used in protected areas, but also in a open field crop.

It is presented as a globular bush, with an average height of 155 cm and has no spines. The color of the fruit is black and shiny, cilindrically shaped.

It preserves the characteristics of the traditional eggplants that have a large fruit. The average fruit weight is of 590 g, has a small number of seeds that are mostly present in the apex of the fruit. This variety is genetically resistent at the main pathogens. Average production per plant is registered with 3.5 kg.

A 1 S has long black fruits, sword-type, with an average length of 26 cm and 8.4 cm median diameter. This accession is distinguished by a high productivity, strength, the presence of anthocianic pigmentation on the plants vegetative organs, including the fruit sepals. Due to it's strength and strong radicular system, well developed, it can be recomended to be used as a rootstock. This genotype has the "*mi*" gene, known as a repelent gene for nematodes. The average plant production is of 2.8 kg.

A 7 has medium length fruits, with green sepals, a small number of seeds dispersed throughout the length of the fruit. The average fruit weight is of 457.4 g, and 2.7 kg fruit/plant production.

A 10 has large white fruits, a trait that distinguishes it from the other varieties, along with a reduced number of seeds. It is highly productive, with fruits that have a good quality, and the average production per plant is of 4.1 kg. Due to it's exceptional traits, productivity, earliness, along with fruit quality and good process capacity made this genotype to be highly demanded by growers and consumers, and the request for seeds and seedlings grew significantly year by year.

A 20 is a premier for our country, especially for culinar dishes; it is distinguished by its small white, egg-shaped fruits. It can be used in a great variety of dishes in order to replace mushrooms, or can be pickeled as cucumbers and mushrooms. It has a large variety of fruit uses and it can also be used as in an ornamental system. The fruit has an average weight of 49.2 g and the registred production/plant is of 1.7 kg.

A 25 A is distinguished by white fruits that have purple shadows, and a mean fruit weight of 155.5 g with an average production/plant of 1.3 kg. Regarding the cpacity of production is below the other genotypes, but, due to its shape and colour it is highly demanded both by consumers and growers.

Another trait of distinctibility are the spines that are very much present on the sepals and peduncle, giving it a rustic aproach. Also, it was recorded an increased resistance to specific diseases, especially to *Verticilium*.

A 22 A has large, obovate, white with purple patches fruits. They are over 600 g, and as a special trait has ribbs. This cultivar is remarkable by its productivity, obtaining the highest production/plant, 4.7 kg. All of this features made this genotype to have a great

request from growers and consumers, for open field crops and for protected areas.

A 23 A, a cultivar remarked by the shape and colour of the fruits, white with green patches, small rounded shape.

The average weight is 101.6 g and the mean production/plant is of 1.3 kg. Its shape and colour makes it very special, and we believe it will have great opportunities for the future.

A 24 A is distinguished by its productivity, quality, and the main feature is represented by the fruit colour. It has stripped fruits, white with mauve stripes. The fruit average weight is 530 g and the total production per plant is of 3.7 kg. Due to its attractive shape and colour that gives it a special appearence, this genotype is more and more demanded by the market.

Table 2. Fruit characteristics

Character/accession		Rebeca F1	L1 S	L7	L 10	L 20	L 25 A	L 22 A	L 23 A	L 24 A	L 29 A	L 29 B
Peduncle length (cm)		12	5.9	7.3	9,8	2.9	6.6	5	5.6	6.3	1.8	1,6
Spines presence on		Sepals	-	Sepals	Peduncle	Sepals	Sepals, peduncle	Sepals	-	Peduncle, sepals	-	-
Sepals colour		Green	Green	Green	Light green	Light green	Green	Green	Light green	Light green	Dark green	Green
Fruit length (cm)		24.3	26	18.5	18	5.4	12.6	10.5	5.2	14	5.5	4.3
Fruit diameter (cm)	Apex	6	4.3	7,1	7.5	3.6	6.1	10.7	5.2	7.9	5.7	1.6
	Median	8.4	5.7	6,4	9.1	4.4	8.5	12.5	6.3	9.6	6.3	2.4
	Base	5.4	4.4	4,5	7	4.3	6.9	10.7	5.2	7.2	5.7	1.8
Fruit colour	Technological maturity	Black	Black	Black-mauve	White	White	White + mauve	White + mauve (patches)	White/ green patch	White+ mauve patches	Stripped green	Beige+ green
	Physiological maturity	Black	Black	Dark mauve-dark green	Yellow	Yellow	Yellow+ mauve	Yellow with mauve patches	Yellow	Yellow+ mauve	Red with green stripes	Dark orange
No of. fruits/plant		6	7	6	7	36	9	7	13	7	16	81
Fruit weight (g)		590	412.6	457.4	592	49.2	155.5	685	101.6	530	106.6	11.4
Total fruit weight/pl. (kg)		3.5	2.8	2.7	4.1	1.7	1.3	4.7	1.3	3.7	1.6	0.92

A 29 A is a new valuable genotype obtained at V.R.D.S. Buzău, that is distinguished by green fruits that colours in red at the physiological maturity, with small flat-globular fruits. The fruit has an average weight of 106.6 g and a total production/plant of 1.6 kg. This cultivar is characterized by a great vigour, making it suitable for the ongoing tests as a rootstock. So far, the preliminary results showed a great compatibility between it and the scions used, imprinting them a great resistance to the specific pests and pathogens.

A 29 B is a special variety that is distinguished by its pepper-type flower, and and linear raceme type inflorescence. The fruits are small, ovoid, beige with small green stripes. The average fruit weight is of 11.4 g and total production/plant is 0.9 kg. This cultivar is also being tested as a rootstock, with very good results.

CONCLUSIONS

Researches finalized by setting a solid germplasm collection, evaluation and computerized data gathering of new stable in lineage genotypes. From all of them, due to its special appearance and features, A 10 was in 2017 registered at ISTIS Bucharest to be patented under provisional name ‘Camelia’.

The achieved genetic resources allow us to obtain new valuable cultivars.

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