

**NEW SOURCES OF *SOLANUM* GERMPLASM OF THE
LEPTOSTEMONUM CLADE PRESERVED AND USED IN THE
BREEDING PROGRAM OF THE PLANT GENETIC RESOURCES BANK
BUZĂU, ROMANIA**

**NOI SURSE DE GERMOPLASMĂ DE *SOLANUM* DIN CLASA
LEPTOSTEMONUM CONSERVATE ȘI UTILIZATE ÎN PROGRAMUL
DE AMELIORARE DIN CADRUL BĂNCII DE RESURSE GENETICE
VEGETALE BUZĂU, ROMÂNIA**

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Abstract. *The cultivation of aubergine is widespread in Romania. It is one of the most consumed vegetables in our country, especially in autumn. It can be found in various traditional Romanian dishes - zacusca, aubergine salad - but also in other popular dishes. There is a high demand from consumers but also from producers for new varieties of aubergine, which has contributed to the intensification of acclimatization and breeding work on the Solanum genus at PGRB Buzău. In order to diversify the complex of eggplants cultivated and consumed in our country, PGRB has introduced new lines of Solanum macrocarpon and Solanum aethiopicum into the core collection. They have shown a good capacity for acclimatization to the pedoclimatic conditions of our country, obtaining very good results in terms of growth and development, and food and seed production capacity. Solanum macrocarpon and Solanum aethiopicum have been cultivated in the experimental fields of PGRB Buzău since 2019, opening new horizons in terms of enriching the assortment of Solanum cultivated in Romania.*

Key words: *S. macrocarpon, S. aethiopicum, core collection, morphotypes, acclimatization*

Rezumat. *Cultura de pătlăgele vinete este larg răspândită în România. Este una dintre legumele foarte consumate la noi în țară, în special toamna. Aceasta se regăsește în diferite preparate tradiționale românești - zacuscă, salată de vinete - dar și în alte preparate culinare mult apreciate. Există o cerință ridicată din partea consumatorilor dar și a producătorilor de noi varietăți de pătlăgele vinete, ceea ce a contribuit la intensificarea lucrărilor de aclimatizare și ameliorare a genului Solanum în cadrul BRGV Buzău. Pentru diversificarea complexului de vinete cultivate și consumate în țara noastră, BRGV a introdus în colecția de germoplasmă linii noi de Solanum macrocarpon și Solanum aethiopicum. Acestea au demonstrat o capacitate bună de aclimatizare la condițiile pedoclimatice ale țării noastre, obținându-se rezultate foarte bune în*

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ceea ce privește creșterea și dezvoltarea plantelor, producția înregistrată de acestea dar și capacitatea de obținere a semințelor. Atât *Solanum macrocarpon* cât și *Solanum aethiopicum* au fost cultivate cu succes în câmpurile experimentale ale BRGV Buzău începând cu anul 2019, deschizând noi orizonturi în privința îmbogățirii sortimentului de *Solanum* cultivate în România.

Cuvinte cheie: *S. macrocarpon*, *S. aethiopicum*, colecția de bază, morfotipuri, aclimatizare

INTRODUCTION

Solanum L. (*Solanaceae*), with approximately 1400 species, is one of the 10 largest genera of flowering plants and contains economically important species such as the tomato (*S. lycopersicum* L.), eggplants (*S. melongena* L.), and potato (*S. tuberosum* L.) (Frodin, 2004; Bohs, 2005; Stern *et al.*, 2011). The three cultivated eggplants are all Old World in origin; the gboma eggplant *Solanum macrocarpon* L. and the scarlet eggplant *S. aethiopicum* L. are mainly grown locally in Africa but are also cultivated elsewhere as minor crops (Daunay M. *et al.*, 2012; Knapp *et al.*, 2013). The scarlet (*Solanum aethiopicum* L.) and gboma (*S. macrocarpon* L.) eggplants are two cultivated African vegetable crops locally important in their region of origin in tropical sub-Saharan Africa (Lester *et al.*, 1990; Schippers, 2000; Lester and Daunay, 2003; Maundu *et al.*, 2009, Plazas *et al.*, 2014). *S. aethiopicum*, according to Lester (1986) has four groups, respectively Aculeatum, Schum, Gilo, Kumba. The four cultivar groups of *S. aethiopicum* are completely interfertile (Lester and Niakan, 1986). The Aculeatum group is cultivated for its ornamental characteristics, the Gilo group is cultivated for fruits, the Kumba group is cultivated both for fruits and leaves and the Schum group is cultivated for leaves consumption.

Depending on the cultivar, *S. macrocarpon* is cultivated for its fruits, leaves or both (Schippers, 2000; Lester and Daunay, 2003; Maundu *et al.*, 2009, Plazas *et al.*, 2014).

In the present paper the results of research concerning the acclimatization to soil and climatic conditions of two new *Solanum* species, *Solanum aethiopicum* and *Solanum macrocarpon*, are presented. These two new species have been introduced in breeding programs since 2019 in order to allow the development of new cultivars showing resistance to the attack of the main pathogens, but also demonstrating the ability to adapt in the context of climate change and able to withstand and provide satisfactory yields in the presence of abiotic stress.

MATERIAL AND METHOD

Solanum macrocarpon and *Solanum aethiopicum* crops were established in protected spaces, because due to the colder climate of our country the fruits of certain

lines cannot reach the physiological ripening age and cannot produce seed, due to the hoar-frost specific to Romania.

The crop was established by producing seedlings in alveolar pallets, using peat mixed with sand as a substrate. At planting, the seedlings were 60 days old. The planting distances used were 70 cm between rows and 40 cm between plants per row. The breeding method used was repeated individual selection. Phenological observations and biometric determinations were carried out according to UPOV and IBPGRI standards.

RESULTS AND DISCUSSIONS

The *Solanum aethiopicum* crop has a total of 6 genotypes, divided into 3 groups: Aculeatum 2 genotypes; Gilo 3 genotypes; Kumba 1 genotype. As can be seen in figure 1, the Aculeatum group is characterized by the white colour of the flowers, similar to those of peppers (*Capsicum annuum*), and the fruits are green in the immature stage, while in the mature stage their colour varies from orange to deep red. Their shape is similar to that of a miniature pumpkin.



GSAA1

GSAA2

Fig. 1. Plant and fruit aspect of *Solanum aethiopicum* Aculeatum genotypes

The Gilo group is defined by a much greater variety of fruit shapes. As can be seen in figure 2, the fruit shape is oval, smooth, or slightly ribbed. Their color varies from white-orange to light green with striations, turning orange or bright red at physiological maturity. The Gilo group is the most common due to the diversity of fruit shapes and because the fruit is edible, with a taste similar to aubergines.



GSAG1

GSAG2

GSAG3

Fig. 2. Plant and fruit aspect of *Solanum aethiopicum* Gilo group varieties

In the *Solanum* core collection of PGRB Buzău, there is one genotype belonging to the Kumba group, a group cultivated for fruit and leaf consumption. The fruits are spherical, the color of the immature fruit is green and the apical part shows able striations. When ripe, the fruit turns bright red.



GSAK1

Fig. 3. Plant and fruit aspect of *Solanum aethiopicum* Kumba group

The *Solanum macrocarpon* crop comprised 4 genotypes.



GSM1

GSM2

GSM3

GSM4

Fig. 4. Plant and fruit aspect of *Solanum macrocarpon*

The morphotypes studied in the germplasm collection of PGRB Buzău are differentiated by fruit shape, color, ripening time. The main characteristics of the studied genotypes are listed in table 1.

Morphotypes belonging to *Solanum macrocarpon* species are characterized by fruits with a higher weight, which makes them more appreciated by growers, since they associate them with the traditional *Solanum melongena* eggplants. Compared to *Solanum melongena*, *Solanum aethiopicum* is a newly introduced species in Romania, and it did not require phytosanitary treatments to prevent and control specific pathogens.

Table 1

Main characteristics for the studied genotypes of *Solanum aethiopicum* and *Solanum macrocarpon*

Genotype/ Characteristics	Plant height (cm)	Plant canopy (cm)	Fruit length (cm)	Fruit diam. (cm)	Fruit weight (g)	Unripe fruit colour	Ripe fruit colour
GSAA1	245	62	3.25	5.1	31	light green	orange- red
GSAA2	265	46	3.13	3.63	22.8	green	orange
GSAG1	300	57	5.1	3.8	30.6	white	orange
GSAG2	225	30	3.9	1.9	28.2	light green with greener stripes	orange
GSAG3	231	32	4.2	2.3	31.4	green	red
GSAK1	242	55	3.1	2.9	26.3	light green	red
GSM1	141	62	7	9	96.5	light- plum	brownish
GSM2	110	45	5.39	4.01	47.2	white	yellow
GSM3	98	42	5.89	8.21	112	green with white stripes	light orange
GSM4	125	46	8.2	12.2	132	white	yellow

As can be seen in table 1, *Solanum aethiopicum* genotypes show higher plant vigor characterized by greater plant height, with the GSAG1 genotype showing 202 cm greater height compared to the GSM3- *Solanum macrocarpon* genotype. The high plant vigor, correlated with the increased resistance to pathogen attack recommends the study of *Solanum aethiopicum* genotypes as rootstocks in order to improve the range of rootstocks available in Romania. The weight of *Solanum macrocarpon* fruits is between 47.2 g and 132 g, compared to the weight of *Solanum aethiopicum* genotypes whose values were between 22.8 g and 31.4 g.

CONCLUSIONS

1. The genotypes of *Solanum aethiopicum* and *Solanum macrocarpon* from the germplasm collection of the Buzau Plant Genetic Resource Bank were evaluated, performing morphological observations and biometric determinations.

2. The studied genotypes showed a good acclimatization capacity to the pedoclimatic conditions of our country, obtaining very good results in terms of growth and development, as well as food and seed production capacity.

3. Both *Solanum macrocarpon* and *Solanum aethiopicum* have been successfully cultivated in the experimental fields of PGRB Buzau since 2019, opening new horizons in terms of enriching the assortment of *Solanum* cultivated in Romania.

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