SHORT COMMUNICATIONS

New Hybrids of Eggplants *(Solanum melongena)* Created at Vegetable Research and Development Station Buzau

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BulletinUASVM Horticulture 76(2) / 2019
Print ISSN 1843-5254, Electronic ISSN 1843-5394
DOI:10.15835/buasvmcn-hort: 2019.0014

Abstract

At present, the Romanian market is dominated by foreign eggplant cultivars, the most widely used being the 'Aragon' and 'Mirval' hybrids. Taking into acount this major deficiency in this *Solanum* species regarding the autochthonous genotypes since 1996, Vegetable Research and Development Station Buzau Breeding Laboratory started an intensive breeding program for eggplants, finalised until now with the establishment of a valuable germplasm collection consisting of 208 genotypes structured by their genetic stability.

Keywords: breeding, genotypes, heterosis, hybridization, 'Rebeca' F1

Introduction

Cultural practices must be suited to the conditions of the specific climatic areas (Nothmann, 1986). In our country, the lack of local hybrids at these species led to the purchase of foreign hybrids at very high prices and these did not meet the consumers and growers requirement (Vinatoru *et al*., 2013). Local varieties of eggplant (*Solanum melongena* L.) represent an elite germplasm for the development of hybrids specifically adapted to open field conditions (Rodríguez-Burruezo *et al*., 2008).

Aims and objectives: Assortment enriching with new valuable varieties in this species, with high yield capacity and high quality, with different periods of maturation.

Materials and methods

In the first stage, researches started by constituting a germplasm collection. In the second stage, this collection was subjected to intense evaluation methods regarding genetic stability and unaltered transmission of their characteristics in lineage. In the third stage, valuable genotypes which had genetic stability and possessed important traits compliant with the breeding objectives were promoted in the working field. In the fourth stage, the genotypes from the working field were submitted to intense breeding works, mostly evaluating the general and specific combining ability. The 'Aragon' hybrid was used as a control variety.

Results and discussion

Researches undertaken during 1996-2019 finalized until now by establishing a valuable germplasm collection of 208 genotypes. After a firm evaluation this collection was structured in 3 groups according to their genetic stability: 84 stable genotypes, 55 advanced genotypes, 69

Table 1. Biometrical determinations of the H1BZ - mean values

Studied Character	P1 ♀ (G8)	P2 ♂ (G1BZ)	MG	F1	Control variety 'Aragon'	Incresed production	%
Plant height (cm)	112	208	160	220	216	4	1.85
Lateral branches	2	4	3	4	4	-	-
Bush diameter (cm)	56	69	62.5	78	62	16	25.81
Fruit weight (g)	262	374	318	580	435	145	33.33
Fruit length (cm)	19.8	22.6	21.2	24.5	21.9	2.60	11.87
Total weight of fruits/plant (kg)	2.620	2.992	2.806	5.220	3.480	1.740	50

Table 2. Biometrical determinations of the H2BZ hybrid - mean values

Studied character	P1♀ (G2Bz)	P2♂ (G 9)	MG	F1	Control variety 'Aragon'	Incresed production	%
Plant height (cm)	148	174	161	180	216	-36	-16.67
Lateral branches	4	3	3.5	3	4	-1	-25
Bush diameter (cm)	47	59	53	61	62	-1	-1.61
Fruit weight (g)	286	328	307	355	435	-80	-18.39
Fruit length (cm)	18.9	21.5	20.2	22.5	21.9	0.60	2.74
Total weight of fruits/plant (kg)	2.860	2.624	2.742	3.905	3.480	0.430	12.36

Table 3. Biometrical determinations of the H3BZ hybrid - mean values

Studied character	P1♀ (G 20)	P2♂ (G 31)	MG	F1	Control variety 'Aragon'	Incresed production	%
Plant height (cm)	110	170	140	145	216	-71	-32.87
Lateral branches	3	2	2.5	4	4	-	-
Bush diameter (cm)	45	55	50	59	62	-3	-4.84
Fruit weight(g)	47.2	430	238.6	143	435	-292	-67.13
Fruit length (cm)	5.4	13	9.2	7.7	21.9	-14.20	-64.84
Total weight of fruits/plant (kg)	1.416	2.580	1.998	3.675	3.480	0.200	5.75

segregant genotypes. The 84 stable genotypes were promoted from the collection field in the working field and subjected to intensive breeding works. The general combining ability was tested by crossing each genotype with the tester genotypes G1Bz and G8. After this was achieved, 39 valuable genitors were retained which proved genetically useful for the hybridization process. These selected 39 genitors were also subjected for specific combining ability testing, performing a number of 1521 combinations. After careful evaluation of the hybrid combinations it was recorded that 3 of these visible manifested the reproductive heterosis phenomenon significantly surpassing the control variety implied in this experience. The resulted hybrid combinations are: G8 ♀ × G1Bz ♂ = H1Bz; G2Bz ♀× G9♂ = H2Bz; G20 ♀ × G31 ♂ = H3Bz. The main characteristics of the fruits and plants from the new developed hybrids are presented in Table 1, 2 and 3.

H1Bz has large fruits, with an apropiate commercial aspect. with a shiny black color and green calyx. This hybrid has great production potential, it can be successfully grown in protected areas and in open field, with a good resistance to *Verticillium* sp .

H2Bz has a good yield performance of over 3.9 kg/plant, the fruits have an excellent quality with a shiny black aspect, green sepals and a medium size. Besides productivity and quality it has another valuable trait, as it behaves as the earliest hybrid studied in this experience.

H3Bz is a plant of medium vigor with small fruits of white color and green sepals with a pleasant commercial aspect. Regarding the vigor and size of fruits, this hybrid manifests intermediary characteristics between its genitors. Although it has these intermediary characteristics, its number of fruits significantly outstands both genitors, demonstrating the manifestation of the reproductive heterosis phenomenon.

Conclusion

Until now, researches finalized with constituting a valuable germplasm collection that allows the achievement of new biological creations. The germplasm collection was evaluated and structured on groups based on their genetic stability, simultaneously studying the specific and general combining ability. Three valuable hybrids were achieved that significantly overcame the control variant. Out of these, H1Bz was protected and registered in the Official Catalogue of Crop Plants under the name of 'Rebeca' F1. The other two hybrids will be proposed for testing in 2019 in order to be protected.

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New Genotypes of Sweetleaf *(Stevia rebaudiana* Bertoni*)* Acclimatized and Bred at Buzau

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BulletinUASVM Horticulture 76(2) / 2019
Print ISSN 1843-5254, Electronic ISSN 1843-5394
DOI:10.15835/buasvmcn-hort: 2019.0015

Abstract

In Romania, during the 1980s, this species was studied in addition to other sweetener plants, such as Jerusalem artichoke, sweet sorghum, sweet iris, etc. After 1996, the researches were restarted intensively at Vegetable Research and Development Station Buzau by the Breeding and Biodiversity Conservation Laboratory. A valuable germplasm collection has been made for this species and the new genotypes will be proposed for approval.

Keywords: breeding, distinct, genotype, germplasm, sweetener

Introduction

S. rebaudiana Bertoni has been known for many centuries by indigenous tribes of South America, who called it "kaa-hee" (sweet herb). South American Indians used stevia both as a sweetener and as a medicinal plant. Stevioside is the major sweetener present in leaves (Carneiro *et al*., 1997). Folk medicine of Paraguayan indigenous tribes recommends it particularly as a substance strengthening the heart, the circulatory system and regulating blood pressure (Marcinek *et al*., 2016). Stevia rebaudiana is often used by the food industry due to its steviol glycoside content, which is a suitable calorie-free sweetener (Carrera-Lanestosa *et al*., 2017). In 1990, Ovidio Rebaudi was the first chemist to study the chemical characteristics of the substances extracted. Its name was later changed to the current one, and it was recommended not only for food production, but also for the medicinal effects that were attributed to it (Yadav *et al*., 2011).

Aims: Obtaining genotypes with distinct phenotypic expression, adapted to the pedoclimatic conditions of our country and their expansion as crop vegetable.

Materials and Methods

Research began with the creation of a rich germplasm collection followed by its evaluation and the valuable genotypes were intensively bred resulting two genotypes with distinct phenotypic features. The selection method used was repeated individual selection, with particular attention being paid to genotypes that demonstrated increased resistance at low temperatures. To highlight this feature, the experience was set up in two culture environments, both greenhouse and field. Sowing has been made on March 10, and the plants sprouted on April 5 in both experimental variants. Their planting took place on May 15th. The flowering in the greenhouse took place on August 15 and in field much later, on September

Table 1. Main features of new obtained genotypes - mean values for both greenhouse and field

1	Culture system	Greenhouse		Field		G1		G2	
2	Cultivated genotype	G1	G2	G1	G2	S %	X	S %	X
3	Plant height (cm)	180	150	72	55	54	126	47,5	102,5
4	Bush diameter (cm)	68	82	32	43	18	50	19,5	62,5
5	Main shoots no. (pieces)	20	22	24	26	2	22	2	24
6	Secondary shoots no. (pieces)	156	224	72	144	42	114	40	184
7	Main shoots length (cm)	120	80	48	34	36	84	23	57
8	Secondary shoots length (cm)	56	42	12	7	22	34	17,5	24,5
9	Stem thickness at the base (mm)	9.2	9.6	9.8	11.2	0,3	9,5	0,8	10,4
10	Stem length (cm)	5	3	4	3	0,5	4,5	0	3
11	Main shoots thickness (mm)	5.1	5.3	4.4	4.8	0,35	4,75	0,25	5,05
12	Secondary shoots thickness (mm)	1.4	1.8	1.9	2.3	0,25	1,65	0,25	2,05
13	Main shoots weight (g)	65	62	33	32	16	49	15	47
14	Secondary shoots weight (g)	5.2	4.8	20.8	27	7,8	13	11,1	15,9
15	Plant weight (g)	1300	1364	792	832	254	1046	266	1098
16	Internodes distance (cm)	3.5	3.3	2.2	1.6	0,65	2,85	0,85	2,45
17	Leaf weight (g)	732	812	414	462	159	573	175	637
18	Leaf length (cm)	9.6	7.5	5.1	3.8	2,25	7,35	1,85	5,65
19	Leaf width (cm)	2.2	4.2	1.7	2.1	0,25	1,95	1,05	3,15
20	Petiole length (mm)	8	5	5	4	1,5	6,5	0,5	4,5

x-average; s-standard deviation

5. The seed production in greenhouse conditions took place much earlier compared to field, on September 10, opposed to the field plants that yielded after October 10. The planting scheme was 70 cm between rows and 30 cm between plants per row in the field and for greenhouse the crop was set up in tapes, at 70 cm between rows, 40 cm between plants per row and 1.2 m between tapes.

Results and discussion

The two genotypes have distinct phenotypic characteristics and exhibit high resistance to low temperatures. G1 (genotype 1) shows lanceolate leaves, pubescent stems and erect habit and G2 (genotype 2) shows smaller leaves, slightly ovoid, and the plant has thin branches and globular habit. The foliage is smoother and darker (Tab. 1).

In both greenhouse and field conditions, G1 recorded higher values in terms of plant height compared to G2 and in terms of plant weight, production of shoots and leaves, both in the field and in protected spaces, G2 was superior. It should be noted that yield can be doubled and even tripled if the young seedlings are harvested periodically. In protected areas the harvesting can be done 3-4 times on the vegetation cycle and 2-3 times in the field. Of all the analysed features, there was a significant decrease of the values in the field compared to greenhouse. Regarding the difference between genotypes, it is insignificant for most of the studied characters, the main distinction element being the leaf shape.

Conclusion

The researches have been completed so far with obtaining two genotypes with distinct phenotypic expressivity that can be cultivated in our country, in protected areas and field. At the same time, a valuable germplasm collection has been made for this species and a database that can assist in future breeding works. The new genotypes will be proposed for approval and can be successfully cultivated as a perennial and as an annual plant, in colder areas, with protection over winter.

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New Genotypes of Leaf Mustard *(Brassica juncea)*, Bred and Acclimatized at Vegetable Research and Development Station Buzau

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BulletinUASVM Horticulture 76(2) / 2019
Print ISSN 1843-5254, Electronic ISSN 1843-5394
DOI:10.15835/buasvmcn-hort: 2019.0016

Abstract

Since 1996, *Brassica juncea* has been studied in the Breeding Laboratory of Vegetable Research and Development Station Buzau. The aim of this study was to obtain genotypes with distinct phenotypic expressivity, suitable to be grown in protected spaces and field, adapted to the pedoclimatic conditions of our country. The genetic potential of the germplasm collection was evaluated and the seven obtained families were measured biometrically and phenologically. G1 has been registered since 2017 at The State Institute for Testing and Registration of Varieties Bucharest for approval under the temporary name 'Aroma'.

Keywords: 'Aroma', genotype, phenotype, spicy

Introduction

The genus *Brassica* is one of the 51 genera in the *Brassiceae* tribe and is, economically speaking, the most important genus within this tribe, containing 37 different species (Gomez-Campo, 1980). Since 1996, *Brassica juncea* has been studied in the Breeding Laboratory of VRDS Buzau. The researches aimed at acclimatizing, improving and developing the specific crop technology for this species. The plant provides edible roots, leaves, stems, buds, flowers and seed (Rakow, 2004). The oil extracted is used as a spice, similar to mustard, but with a spicier flavor. Among the seven edible oilseeds cultivated in India, rapeseed-mustard contributes 28.6% in the total oilseed production and ranks second after groundnut sharing 27.8% in the India's oilseed economy (Shekhawat *et al*., 2012).

Aims and objectives: Obtaining genotypes with distinct phenotypic expressivity, suitable to be grown in protected spaces and field, adapted to the pedoclimatic conditions of our country.

Materials and methods

Research has begun with a valuable germplasm collection consisting of over 20 genotypes, of which 7 have been genetically stabilized (Fig.1). Research was difficult because of the species entomophilia and therefore had to be optimally insured with specific isolation spaces. The breeding method used was repeated individual selection.

Results and discussions

The genetic potential of the germplasm collection was evaluated and the seven obtained families were measured biometrically and phenologically.

According to Table 1, differences can be seen between the studied genotypes, differences that were visible from an early stage. The observations

Figure1. Genotypes of *Brassica juncea*

Table 1. Seedlings main features measurements per each genotype

Genotype	Seedling features						
	G1	G2	G3	G4	G5	G6	G7
Seedling height (cm)	15	13.5	8.9	6.9	11	18	10.5
Leaf no.	5	6	10	5	5	7	4
Lamina length (cm)	9.4	9.4	8.9	3.9	9.2	11	7.8
Lamina width (cm)	3.8	5.8	0.3	2.5	2.9	1.7	3.5
Petiole length (cm)	4.7	4.3	Absent	1.9	2.1	6.5	2.3
Anthocyanins coloration	Absent	Absent	Absent	On the upper part of the leaves	On leafs as spots	Absent	Absent
Pubescence	Absent	On the main nervure, peduncle and leaf margins	Rare	Absent	Absent	Absent	Absent
Leaf shape	Obovate	Obovate	Lanceolate	Ovate	Lanceolate	Spatulate	Ovate
Undulation of leaf margins	Strongly undulated	Strongly undulated	Weak	Absent	Strongly undualted	Strongly undualted	Very weak

were made at 30 days after sowing. G6 showed the most rapid growth, with a seedling height of 18 cm, followed by G1 with 15 cm height and G2 with 13.5 cm height. G3 presented 10 leaves, followed by G6 with 7 leaves and G2 with 6 leaves. In what concerns the lamina length, G6 was the longest, with 11 cm while G1 and G2 had the same length, of 9.4 cm. Regarding the petiole length, we must observe that G3 was the only one which had no petiole The pubescence of the leaves is almost absent for every genotype. The leaf shape was an important character studied due to the fact that the interest was to obtain a genotype with a good marketable aspect, so G1 was the one that had the desired traits, with an obovate leaf that is strongly undulated.

Only genotype G1 showed a narrow variability range of the main characters. The leaves are obovate, with an erect stand short petiole and a very few number of lateral lobes. The leaf blade has a very strong blistering and the midrib width is quite narrow. This particular genotype has been tested both in protected areas and in open field, with the indication that in protected areas, from a vegetative point of view, the results showed a greater vigour of the plant. The rosette was made of large, succulent leaves, strongly corrugated. This is the reason why the succulent aromatic and spicy leaves are consumed as the plant matures, allowing the consumers to have a continuous harvest. Due to the fact that the leaves are spicy and pungent, both in protected areas and in open field no pathogens were detected to endanger the crop production.

Conclusion

Genotype 1 has been registered since 2017 at The State Institute for Testing and Registration of Varieties Bucharest for approval under the temporary name 'Aroma'. The feedback from the testing committee and from the growers whom received promotional seedlings and seeds were encouraging, the species being a real success among producers and consumers.

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