

CHARACTERIZATION OF NEW ORNAMENTAL CHILLI GENOTYPES CREATED AT V.R.D.S. BUZĂU

Elena BĂRCANU¹, Costel VÎNĂTORU¹, Bianca ZAMFIR¹,
Camelia BRATU¹, Elena DRĂGHICI²

¹Vegetable Research and Development Station Buzău, No. 23, Mesteacănului Street, zip code 120024,
Buzău, Romania

²University of Agronomic Sciences and Veterinary Medicine of Bucharest,
59 Marasti Blvd., District 1, Bucharest, Romania

Corresponding author email: barcanuelena@yahoo.com

Abstract

The recent study was conducted at the Vegetable Research and Development Station Buzău, the unit has a number of 214 pepper genotypes in various stages of breeding. A number of 8 accession who demonstrated genetic stability and adequate for breeding were chosen for this study. The 8 accession whom are retained for evaluation are: A 24, A 25, A 26, A 54, A 55, A 56, A 57, A 58. These accession are characterized by a dwarf port and can be grown in pots as they are, in particular, appreciated like ornamental plants, having a long growing season and nice, decorative foliage and miniature fruits. Fruits can be eaten fresh throughout the whole year if pots are kept indoor or in a greenhouse during winter period. The lifetime of these accession is much longer than the varieties with large fruit, like bell pepper and long pepper. Kept in a pot, they can vegetate for nearly two years if pruning is made to stimulate new growth, knowing that pepper is a plant that blossoms and bears fruit continuously. New accession obtained have a distinct visible character like the shape and color of fruit: A 24, A 56 and A 58 presents red at fruit maturity stage, A 26 and A 54 orange, cultivars A 25 and A 55 have yellow fruits, and A 57 has fruit who passes through three stages color: purple, red and at physiological maturity becomes dark red. Researches will continue with patenting and extending in culture the new accession. The purpose of these research was to identify pepper genotypes, evaluating and entering them into germplasm of Vegetable Research and Development Station Buzău to be used for breeding.

Key words: *Capsicum frutescens*, germplasm, ornamental, chilli.

INTRODUCTION

"Economically speaking, pepper crop represents one of the most important crop national and world wide due to high yields and best sales price" (Luchian, 2015). Despite that, chilli peppers, are not intensively cultivated in România and there are insufficient researches nationwide. Hot peppers are rather grown in small areas, predominantly in the farm system. In 1996, species has been taken in studies for intensive cultivation at Vegetable Research and Development Station Buzău. It has been taken a great care constructing a germplasm collection. "Considerable diversity exist in *Capsicum* L. germplasm for fruit and leaf shape and size, as well as plant habit. This morphological diversity, together with diverse ripe fruit color and varying hues of green to purple and variegated foliar pigmentation, affords a myriad of opportunities to develop

unique cultivars for ornamental applications" (Stommel, 2004).

Depending on the directions of use, peppers are structured in: cultivars for fresh consumption, for production of paprika, preserved and for ornamental purposes. "A breeding program involves several activities such as germplasm bank maintenance, evaluation of genetic diversity, selection of superior genotypes, progenitor's selection, hybridization, and evaluation of segregating populations. These activities are necessary, in general, to develop new cultivars." (Rêgo, 2016).

The aims of these paper is to select and obtain suitable cultivars for growing in pots as well as having ornamental purposes. "An ornamental pepper is a plant that is grown mainly for its aesthetic value. The architecture of ornamental pepper cultivars have to be compact and attractive, making them suitable for decorative purpose. These peppers vary widely in leaf and fruit color and growth habit." (Rêgo, 2012).

MATERIALS AND METHODS

Vegetable Research and Development Station Buzău possess a number of 214 pepper genotypes at different stages of breeding, of which: *Capsicum anuum* - 77 genotypes, *C. baccatum* - 8 genotypes, *C. chacoense* - 36 genotypes, *C. chinense* - 18 genotypes, *C. eximium* - 21 genotypes, *C. frutescens* - 48 genotypes, *C. galapagoense* - 6 genotypes.

Eight representative accessions were studied chosen from 48 genotypes of germplasm collection of *Capsicum frutescens*, as follows: A 24, A 25, A 26, A 54, A 55, A 56, A 57 and A 58. These accessions are genetically stable and transmit unaltered in descending all characteristics.

The breeding methods used to obtain these accessions were the following: intraspecific hybridization between homozygous accessions, and the hybrid population resulted were individually selected for six generations followed by the annual mass selection.

Each line was cultivated in greenhouse, having in study 100 plants of each accession Seedling were made in a greenhouse multiplier, sow in alveolar pallets in the middle of march.

Planting was made at the begining of may, a special care should be considered as a species requires a light, well drain soil. Planting scheme used was 70 cm between rows and between plants in the row distance 25 cm, the lenght of vegetation period is 180-221 days. Each genotype was analyzed in accordance with UPOV examination of distinctness, uniformity and stability and also by characteristics such as: height, plant diameter, number of branches, plant height, leaf characteristics (length, width, lenght petiole).

RESULTS AND DISCUSSIONS

On the following study were analyzed plant characteristics and it can be noticed that plant height various between 9.4 cm to 22.3 cm from A 24 to A 58. Diameter of crown plant was different from genotype to genotype which is between 18.5 cm to 31.4 cm at A 54 to A 58. Another observation made was stalk height, A 24 had the shortest height and the tallest was 6.3 cm at A 55. It was noticed that cultivars have strong shoots from the base lines,

registering a number of 4 branches at A54 and 10 branches at A 56. More details can be found in table 1.

Table 1. Main characteristic of chilli plant

Accession	Plant high (cm)	Diameter of crown plant (cm)	Stalk high (cm)	Number of shoots
A 24	9.4	22.3	2.2	6
A 25	16.5	28.4	5.4	9
A 26	14.2	24.2	4.3	7
A 54	12.6	18,5	4.6	4
A 55	19.3	23.7	6.3	8
A 56	13.2	25.4	2.4	10
A57	13.4	26.8	4.2	7
A 58	22.3	31.4	5.1	5

Analyzing the main characteristics of the leaves it can be noticed that A 57 has tiny leaves averaging only 4,7 cm lenght and a width of 1,7 cm of the leaf. Accession 58 showed the highest leaf with 11.0 cm long, 5.8 cm wide and 5.1 cm long petiole, as seen in table 2.

Table 2. Main characters of chilli peppers leaves

Accession	Leaf length (cm)	Leave with (cm)	Petiole length (cm)
A 24	5.4	2.0	3.4
A 25	6.1	2.7	4.2
A 26	5.8	2.4	3.5
A 54	5.7	2.2	3.2
A 55	4.9	2.3	3.2
A 56	6.1	2.3	4.2
A57	4.7	1.7	3.0
A 58	11	5.8	5.1

Regarding the number of fruit plant A 57 has recorded more than 100 fruits/plant and A 58 has recorded a total of 31 fruits / plant with a much greatest weight of 4.3 g/fruit and the smallest value in terms of weight was registered by A 24 with 1.4 g/fruit. The lowest value of lenght fruit was recorded by A 24 with a 2.8 cm and A 54 shows fruit over 3.3 cm, see table 3.

Table 3. Main character of chilli peppers fruits

Accession	Number fruits/plant	Total mass of fruits/plant (g)	Mass fruit (g)	Fruit length (cm)
A 24	53	74.2	1.4	2.8
A 25	55	176	3.2	3.2
A 26	51	163.2	3.2	2.9
A 54	38	110.2	2.9	3.3
A 55	53	100.7	1.9	2.6
A 56	60	132	2.2	3.2
A57	100	230	2.3	3.1
A 58	31	133.3	4.3	2.9

Visible elements of distinction based on fruit characteristic of these 8 genotypes are shown in figure 1.



Figure 1. Fruit aspect in different stages of maturity

Thus, accession 24, 56 and 58 shows red at fruit maturity stage. Accession 25 and A 55 shows yellow at fruit maturity stage, A 26 and A 54 shows orange-yellow fruit at maturity stage. A distinguish fruit color had genotype A 57 which shows fruits whom pass through three stages. In the first phenophase, developing and fruit setting, shows purple fruit, in phenophase second turns red, and in the third phenophase, corresponding to physiological maturity, the fruits are dark red. Crop plant detail can be shown in figure 2.



Figure 2. Crop plant detail

A laboratory test was made to determine the content of capsaicin for each cultivar. In figure 3 it can be seen that cultivars A 26, A 54 and A 55 shows a poor pungency and A 57 and A 58 are having a higher content capsaicin, feature a sharp pungency.

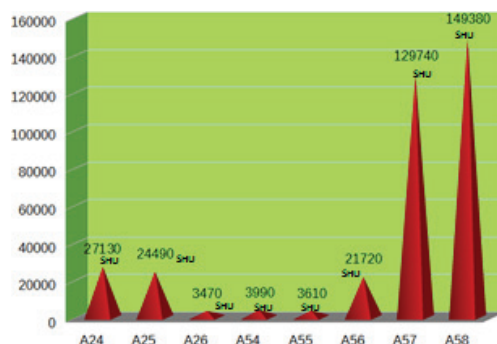


Figure 3. The capsaicin content (Scoville units-SHU)

CONCLUSIONS

Research were completed with the identification and recommendation of new eight distinct genotypes suitable for growing in pots, jardiniere, greenhouses and farms, especially in ornamental purposes. Besides the interesting coloring fruit and plant port, an advantage is that fruits are edible. Therefore, A 57 will be patented and extended for cultivation with specific direction of use. Also, the research ended with the establishment and evaluation of a valuable pepper germplasm collection which allows us obtaining new creations in the future.

REFERENCES

- Luchian Viorica, Vinătoru C., 2016. Legumicultură. Editura „Alpha MDN”, Buzău.
- Ramalho do Rêgo Elizanilda, Fortunato F.L.G., Nascimento Mayana, Finger F., 2012. Inheritance for earliness in ornamental peppers (*Capsicum annuum*), Acta horticulturae 961, 405-410.
- Ramalho do Rêgo Elizanilda, Monteiro do Rêgo Mailson, 2016. Genetics and Breeding of Chili Pepper *Capsicum* spp. Production and Breeding of Chilli Peppers (*Capsicum* spp.). Springer International Publishing, 57-80.
- Stommel J.R., Griesbach J.R., 2004. *Capsicum annuum* L. Tangerine Dream, HortScience 39(2), 448-449.