

## NEW CHERRY TOMATOES VARIETIES OBTAINED AT BRGV BUZĂU

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### Abstract

*BRGV Buzău owns a rich germplasm collection of tomato, consisting of over 3600 genotypes, over 35% of which are cherry cultivars. The research aimed to obtain new cherry type varieties with high yield potential and superior quality, especially taste and aroma, with high resistance to the main pathogens attack. The research was completed with obtaining many lines, and 4 of them were registered for homologation and patenting. These received the provisional names of Serena, Simila, Rapsodia and Monalisa. Simila variety has round, slightly juicy, tasty dark brown fruits, with an average weight of 12 g. Serena variety presents red, round, slightly ovoid, firm, tasty fruits, with an average weight of 17 g. Rapsodia variety presents brindle, green with burgundy-red fruits, round, firm, tasty, brown-pink pulp, with an average weight of 23.5 g. Monalisa variety has red, ovoid, crunchy, tasty fruits, with an average weight of 15 g, being very productive. Research will continue with the promotion of these varieties as crops and by increasing the seeding surfaces and obtaining new valuable varieties.*

**Key words:** directions of use, interspecific, kumato, local landraces, selection.

### INTRODUCTION

Tomato ranks first among processed vegetables in the world (Prema, G. et al., 2011). Botanically classified as a berry, tomatoes originated in the South American Andes, ranging from northern Chile in the south, through Bolivia, Peru to Ecuador and Colombia in the north (Grubben and Denton, 2004; Bai and Lindhout, 2007). Initially, Peru had been proposed as the center of domestication of tomato, thus coinciding with its center of origin and genetic diversity. However, genetic evidence points to Mexico as the center of domestication, as modern cultivars appear to be closely related to a cherry tomato-like cultivar grown widely in Mexico and throughout Central America at the time of discovery by the Spanish (Ebert A.W. and Chou Y.Y., 2015). Cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) is a botanical variety of the cultivated tomato. It is thought to be the ancestor of all cultivated tomatoes (Renuka D. M. et al., 2014). Cherry tomato is grown for its edible fruits; they are perfect for making

processed products like sauce, soup, ketchup, puree, curries, paste, powder, rasam and sandwich. They also have good nutritional and antioxidant properties. The size of cherry tomatoes range from thumb tip to the size of a golf ball. And can range from being spherical to slightly oblong in shape. The possible exploitation of hybrid vigour in cherry tomato has been taken up at few research centres however very little systematic attention has been paid by plant breeders to study performance for yield and its components in cherry tomato. The genotypes performing well can be used further in heterosis breeding programme (Renuka D. M. et al., 2014). Tomato (*Solanum lycopersicum*, formerly *Lycopersicon esculentum*) is a highly autogamous species. Cultivated tomato shows a low genetic diversity, but higher phenotypic diversity compared to *S. pimpinellifolium* (Miller and Tanksley, 1990) due to intensive human selection (Xu. J. et al., 2002). Although it is well known that cultivated germplasm resources provide an important genetic basis for both breeding and genetic research

(Thornsberry et al., 2001). Conventional tomato (*Solanum lycopersicum* L.) descriptors are of great utility for gross morphological characterization but may not be practical for the precise fruit description required for distinguishing closely related cultivar groups (Figàs, M. R. et al., 2015). Most species within the *S. lycopersicum* complex can reciprocally hybridize with cultivated tomato, with the exception of *S. habrochaites* (Robertson and Labate, 2007).

The loss of genetic diversity due to the replacement of local tomato varieties by improved cultivars has been in many cases mitigated by the collection and safe storage of germplasm in genebanks (Figas R. M. et al., 2015). It is a self-pollinating species with high genetic variability (Aguirre N. C. et al., 2017). Agricultural biodiversity is fundamental to production and food security, as well as for environment conservation (Corrado G. et al., 2014). Although it is well known that cultivated germplasm resources provide an important genetic basis for both breeding and genetic research (Flint G. et al., 2005). The evaluation of the diversity of a given collection can be based on phenotypic traits (Yan et al., 2007).

## MATERIALS AND METHODS

BRGV Buzău owns a rich collection of tomato germplasm, consisting of over 3600 genotypes, over 35% of which are cherry cultivars.

Among the cherry tomato species that BRGV Buzău has in its collection, we mention: *Solanum lycopersicum* var. *lycopersicum*, *S. lycopersicum* var. *cerasiformae*, *S. lycopersicum* var. *pimpinelifolium*, *Solanum cheesmanie*, *Lycopersicum hirsutum*, *S. peruvianum*, *Solanum spontaneum*, *S. sisymbriifolium*.

From the assortment of cherry tomatoes, the Flaviola variety was chosen as control, a variety obtained by BRGV Buzău specialists and registered in the Official Catalog of Cultivated Plants in Romania in 2018. Compared to the control, 4 lines with distinct phenotypic expressiveness and genetically stable were introduced into the study, which received the provisional names of Serena, Simila, Rapsodia and Monalisa (Figure 1).

Control variety has red, ovoid, crunchy, tasty fruits, with an average weight of 11.5 g.

Simila variety presents round, slightly juicy, tasty fruits with an average weight of 12 g, dark brown in color.

Serena variety presents red, round, slightly ovoid, firm, tasty fruits, with an average weight of 17 g.

Rapsodia variety presents brindle, green with burgundy-red, round, firm, tasty fruits, brown-pink pulp, with an average weight of 23.5 g.

Monalisa variety presents red, ovoid, crunchy, tasty fruits, with an average weight of 15 g, being very productive.



Figure 1. Tomato cherry varieties: Flaviola (control), Monalisa, Serena, Simila and Rapsodia

Statistical analysis was performed using SPSS, ANOVA followed by Duncan's post-hoc test with 95% confidence interval and p-values < 0.05. Evaluation of the germplasm core collection was carried out by performing biometric measurements for the main characters based on the international UPOV and IPGRI descriptors. The amount of total soluble solids was measured by refractometer.

## RESULTS AND DISCUSSIONS

After the biometrical evaluation of cherry tomato assortment, the following quantitative and qualitative features were identified:

The 5 lines taken in the study showed distinct phenotypic traits (Table 1, Figure 1). The accessions have indeterminate growth.

Monalisa (Figure 5) is a cherry tomato with rich, intense green foliage, with an average of 8 inflorescences on the main stem, with an ovoid, intense red fruit, weighing on average 9.8 g, good firmness, high production. The inflorescences are mixed, branched and very rich, compact and with concentrated ripening. They can be harvested as such and marketed for fresh consumption.

Simila (Figure 5) is a black cherry tomato, with a distinctive, strawberry-like aroma and low firmness. The plant has small leaflets, medium green in color, fruits weighing 15 g on average, round, brownish pink. They are part of kumato

tomatoes group known to be rich in antioxidants and vitamins. The fruits come off the pedicel very easily. The inflorescences are mixed, branched with concentrated ripening.

Flaviola (Figure 3) has cherry tomatoes with high yields, reaching 1500 g per plant. The fruits are small, ovoid, with an average weight of 18 g. The fruits are very crunchy, show great firmness, the inflorescences reach 318 fruits per plant, a value that no other line reaches.

Rapsodia (Figure 2) is a medium tricolor cherry tomato, with high firmness. The variety has round fruits, 10.7 g on average, with a specific aroma and taste, very fragrant and intensely aromatic.

This variety is also part of the group of kumato tomatoes. It presents specific resistance to diseases and pests. Also, the superior nutritional quality is indicated by the sugar content (TSS) of 15.6°Brix, the highest value recorded compared to the other varieties.

Table 1. Main biometric characteristics of the cherry varieties, average values

Accession	Plant height (cm)	Leaf length (cm)	Petiole length (cm)	Florets no./flowering stem (unit)	Fruit weight (g)	Fruit no./plant (unit)	Fruit height (cm)	Fruit width (cm)	TSS (°Brix)
Monalisa	195.8±2.6 <sup>c</sup>	26.6±1.1 <sup>b</sup>	2.22±0.2 <sup>bc</sup>	8±0.7 <sup>b</sup>	9.82±0.1 <sup>a</sup>	65.2±1.3 <sup>c</sup>	2.8±0.2 <sup>d</sup>	2.9±0.2 <sup>d</sup>	8.18±0.2 <sup>c</sup>
Simila	235±1.6 <sup>a</sup>	34±1.6 <sup>c</sup>	8.66±0.2 <sup>a</sup>	10±1.6 <sup>a</sup>	15±0.2 <sup>b</sup>	117±1.6 <sup>a</sup>	2.84±0.1 <sup>d</sup>	2.86±0.1 <sup>a</sup>	6.14±0.1 <sup>c</sup>
Flaviola (control)	210±1.6 <sup>d</sup>	44±1.6 <sup>a</sup>	1.26±0.2 <sup>d</sup>	7.8±0.8 <sup>b</sup>	18.74±0.1 <sup>c</sup>	318±1.6 <sup>a</sup>	3.68±0.1 <sup>bc</sup>	2.14±0.1 <sup>b</sup>	11±0.2 <sup>b</sup>
Serena	215.2±1.3 <sup>c</sup>	32.6±0.2 <sup>cd</sup>	2±0.2 <sup>b</sup>	7.4±0.5 <sup>bc</sup>	18.56±0.2 <sup>b</sup>	312.6±1.1 <sup>b</sup>	2.62±0.2 <sup>c</sup>	2.7±0.2 <sup>a</sup>	7±0.7 <sup>d</sup>
Rapsodia	218±1.6 <sup>b</sup>	32.2±0.8 <sup>d</sup>	-	10.8±0.8 <sup>a</sup>	10.78±0.9 <sup>a</sup>	87.8±1.3 <sup>d</sup>	4.12±0.1 <sup>a</sup>	1.6±0.5 <sup>c</sup>	15.6±1.1 <sup>a</sup>

Note: Different letters between cultivars denote significant differences (Duncan test,  $p < 0.05$ , 95% confidence level)

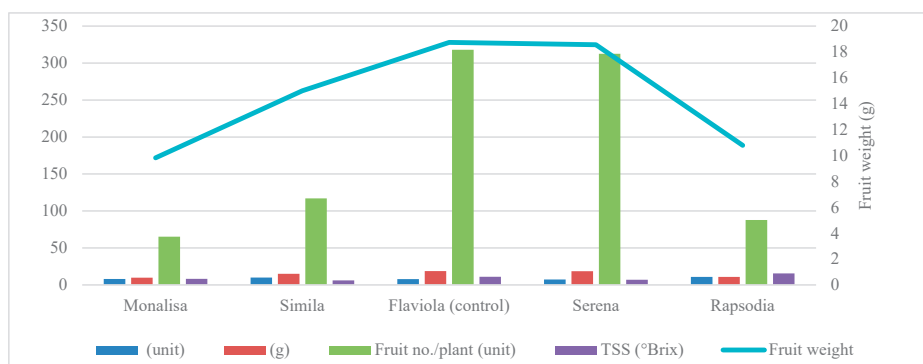


Figure 1. Main biometric characteristics of the cherry varieties



Figure 2. Rapsodia plant detail, immature and mature fruits, fruit cross-section



Figure 3. Flaviola (control) plant detail, immature and mature fruits, fruit cross-section



Figure 4. Simila plant detail, immature and mature fruits, fruit cross-section

Serena variety (Figure 6) is characterized by cherry fruits whose strong point is the very high firmness, the 4 mm crispy and very tasty pericarp. The fruits are slightly truncated ovoid with a mucronate tip.

Also, this variety is distinguished by the strong and characteristic glossy fruits, which gives it a pleasant commercial appearance. The inflorescences are linear, bifurcated, compact, competing in production with the Flaviola variety, recording a value of 312 fruits per plant.

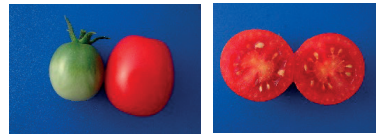


Figure 5. Monalisa plant detail, immature and mature fruits, fruit cross-section

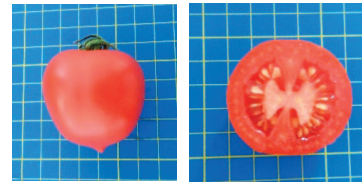


Figure 6. Serena plant detail, immature and mature fruits, fruit cross-section

As a result of the phenotypic and descriptive studies as well as the biometric measurements carried out, it is found that, unlike the Flaviola control, cherry tomato varieties with superior characteristics have been identified.

Thus, in terms of plant height, the Simila variety registered an average height of 235 cm, as opposed to 210 cm, the value recorded by the control variety Flaviola.

Regarding the length of the petiole, also the Simila variety registers a maximum value of 8.6 mm.

Rapsodia variety has the maximum value of 11 inflorescences, unlike the control, which has an average of 7 inflorescences per plant.

Many market requirements for the weight of cherry tomato fruits are that they fall within the



range of 8-10 g, average weight recorded by the Monalisa variety with 9.8 g.

And in terms of total soluble substances, Rapsodia surpasses the average value of the control Flaviola, registering 15.6°Brix compared to the control variety, with only 11°Brix.

Therefore, the varieties under homologation and patenting of BRGV Buzău meet superior qualities compared to the Flaviola control, both from the phenotypic point of view, the commercial aspect, but also the biochemical and nutritional quality.

The new varieties have multiple directions of use, being intended for both industrialization and fresh consumption.

## CONCLUSIONS

An assortment of cherry tomatoes intended both for fresh consumption and for processing from the germplasm collection of BRGV Buzău, which has over 4,200 tomato lines, was involved in the study.

From these, 4 varieties were chosen that are in the process of approval and patenting and a control variety, Flaviola, approved and patented and entered in the official Catalog of Cultivated Plants since 2018 by the research team of BRGV Buzău.

The cherry varieties were researched, being characterized phenotypically and biochemically, thus emphasizing the nutritional quality, the commercial aspect and the direction of use.

Thus, we conclude that the four varieties present distinct phenotypic and biochemical characteristics in contrast to the control variety, Flaviola, being clearly superior to it, registering much higher values of the main quantitative characters.

The varieties under homologation and patenting by BRGV Buzău have the provisional names of Monalisa, Serena, Simila and Rapsodia.

Monalisa is distinguished by high production, great firmness and very rich and branched inflorescences.

Serena's strong point is cherry-type glossy fruit very firm and mucronate.

Simila is part of the group of kumato tomatoes, having pinkish-brown fruits, with a special raspberry-like aroma.

Rapsodia variety is a kumato-type but tricolor cherry tomato, with a taste and aroma specific to traditional tomatoes, with exceptional nutritional quality.

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