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# Evaluation of sour cherry (*Prunus cerasus* L.) landraces originated from the west Serbia region

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**Abstract**. Autochthonous genotypes of sour cherry (*Prunus cerasus* L.) are important source of genetic variability and represent valuable material for breeding work. In order to evaluate the main biological properties of ten sour cherry landraces ('GV-6', 'GV-7', 'GV-8', 'GV-10', 'GV-11', 'GV-13', 'GV-14', 'GV-15', 'GV-16', 'GV-17') from the West Serbia region, flowering and ripening time, fruit quality traits (morphometric, chemical and organoleptic), tree vigour, yield and field resistance to causal agents of diseases (cherry leaf spot and brown rot) were investigated. The highest average fruit weight was found in 'GV-10' and 'GV-13' (>7.5 g), whereas the highest soluble solids content was detected in 'GV-7' (17.30%). In terms of field resistance to pathogens, 'GV-6' and 'GV-10' showed the best performance. Owing to desirable biological and productive traits, some of the examined genotypes ('GV-6' and 'GV-10') have already been used as parents in the Fruit Research Institute, Čačak sour cherry breeding programme. Furthermore, 'GV-6' and 'GV-10' have potential for commercial production.

**Key words**: autochthonous genotypes, morphometric properties, sugars, acidity, sensory properties, field resistance

## Introduction

Sour cherry (*Prunus cerasus* L.) represents one of the most important fruit species in the Republic of Serbia with an average annual production of 142.061 t (Statistical Office of the Republic of Serbia, period 2018-2022). The dominant cultivar is 'Oblačinska', with a share of 60%, followed by 'Cigany' and 'Šumadinka' (Milatović et al., 2015). Market's criteria are becoming stricter in terms of fruit quality. Furthermore consumers are nowadays more oriented towards fruits' nutritional and health-beneficial properties as well as environmentally-friendly production. Therefore, the assortment should be improved, i.e. some new cultivars with high quality fruit that are more resistant to pathogens should be cultivated.

Fruit Research Institute, Čačak has a sixty-year long tradition in sour cherry breeding work, which resulted in the development of five cultivars ('Čačanski Rubin', 'Šumadinka', 'Sofija', 'Nevena', 'Iskra') and a number of promising hybrids (Radičević et al., 2018). The main breeding objectives are self-fertility, high cropping potential, early ripening time, high fruit quality for fresh consumption and/or processing (adequate fruit size; small, easily detached stone; high soluble solids content, balanced sugar/acid ratio), resistance to causal agents of diseases (Radičević & Cerović, 2015). Sour cherry landraces in Serbia are an abundant source of diversity, particularly for desirable traits, i.e. early ripening time, high yield potential, adequate fruit quality and resistance to diseases. Therefore, in the Fruit Research Institute, Čačak both planned hybridization within *P. cerasus* and clonal selection have been applied.

This study was carried out to evaluate the main biological properties of ten sour cherry genotypes (‘GV-6’, ‘GV-7’, ‘GV-8’, ‘GV-10’, ‘GV-11’, ‘GV-13’, ‘GV-14’, ‘GV-15’, ‘GV-16’, ‘GV-17’) selected in the West Serbia region from the natural population. In order to determine their potential for growing as a ‘final products’ of natural selection, or as parents used in breeding programmes, flowering and ripening time, fruit quality traits (morphometric, chemical and organoleptic), yield, tree vigour and field resistance to causal agents of diseases Šcherry leaf spot (*Blumeriella jaapii* (Rehm.) v. Arx.) and brown rot (*Monilinia spp.*) were investigated.

## Materials and Methods

*Plant material*. During two consecutive years (2020–2021) the main biological properties of ten indigenous sour cherry genotypes selected in the West Serbia region were evaluated. The trees in a good conditional state were selected based on the desirable traits and adequately labeled (Table 1).

*Phenological characteristics*. The onset and the end of flowering were determined according to the BBCH scale (stages 61 and 69; Meier, 2018). Ripening time was noticed at the consumption maturity stage (BBCH stage 89).

*Fruit quality assessment*. For each genotype, fruits of the same ripening stage (BBCH 89) were harvested in order to achieve sample uniformity. Harvested fruits were transported to the laboratory of the Fruit Research Institute, Čačak, where morphometric and organoleptic properties were determined, while chemical analyses were performed during 2022. Fruit weight (g) was measured using an Ohaus Adventurer technical scale (Parsippany, NJ, USA). Fruit length (mm), width (mm) and thickness (mm) were determined using a digital caliper. Stone share in the total fruit weight was calculated. The manual refractometer was used for the measurement of soluble solids content (SSC). Titratable acidity (TA) was determined by neutralization with 0.1 N NaOH to pH 8.2, using phenolphthalein as an indicator. The results were expressed as a percentage (%) of malic acid. The content of total sugars (TS), inverted sugars (IS), and sucrose (SUC) was determined according to the Luff-Schoorl method (Trajković et al., 1983). Fruit’s organoleptic characteristics (skin colour, flesh colour, juice colour, firmness, juiciness and acidity) were evaluated according to the UPOV descriptors (UPOV, 2007).

Table 1. Selected and labeled sweet cherry genotypes
*Tabela 1. Izdvojeni i inventarisani genotipovi višnje*

| Genotype name *Naziv genotipa* | Number of trees *Broj stabala* | Locality *Lokalitet* | Coordinates *Koordinate* | Altitude *Nadmorska visina* (m) |
|---|---|---|---|---|
| ‘GV-6’ | 6 | Gornja Gorevnica | 43°57’24,67“N20°19’16,43“E | 370 |
| ‘GV-17’ | 1 | Gornja Gorevnica | 43°57’24,67“N20°19’16,43“E | 370 |
| ‘GV-10’ | 3 | Jezdina | 43°51’38“N20°18’11“E | 399 |
| ‘GV-11’ | 1 | Jezdina | 43°51’40“N20°18’08“E | 383 |
| ‘GV-14’ | 1 | Ljubić | 43°54’811“N20°20’671“E | 253 |
| ‘GV-15’ | 1 | Ljubić | 43°54’811“N20°20’671“E | 253 |
| ‘GV-13’ | 1 | Trbušani | 43°54’106“N20°18’406“E | 243 |
| ‘GV-16’ | 7 | Pakovraće | 43°53’29“N20°14’36“E | 370 |
| ‘GV-8’ | 1 | Banjica | 43°49’34“N20°22’52“E | 375 |
| ‘GV-7’ | 1 | Guča | 43°46’30,5“N 20°13’33,8“E | 349 |

*Assessment of tree yield and vigour*. Productivity and tree vigour were evaluated during both seasons, in compliance with the UPOV procedure (UPOV, 2007) using nine-point scale. The scale applied for productivity evaluation was as follows: 1 – very low yield, 3 – low yield, 5 – medium yield, 7 – high yield, 9 – very high yield. The following marks for evaluation of tree vigour were applied: 1 – very weak, 3 – weak, 5 – medium, 7 – strong, 9 – very strong.

*Field resistance to fungal diseases*. Evaluation of field resistance to causal agents of diseases [cherry leaf spot (*Blumeriella jaapii* (Rehm.) v. Arx.) and brown rot (*Monilinia spp.*)] was conducted during both seasons according to the UPOV procedure (UPOV, 2007). Symptom intensity was determined on a scale from 1 to 9 (1 – no attack, 3 – minor attack, 5 – moderate attack, 7 – strong attack and 9 – very strong attack).

*Statistical analysis*. In order to examine the effect of genotype (factor A) and season (factor B) on biological and pomological traits, the obtained data were subjected to a two-way analysis of variance (ANOVA). Significant differences (P = 0.05) between the mean values were determined by Tukey's *post-hoc* test. Statistical analyses were performed using STATISTICA 7.0 software (Statsoft Inc., Tulsa, OK, USA).

## Results and Discussion

*Phenological characteristics*. Flowering onset differed significantly among examined genotypes, from 8$^{th}$ ('GV-15') to 23$^{rd}$ April ('GV-8'). However, the effect of ecological factors on flowering onset should been taken into account, e.g., higher the altitude, later the flowering onset (Milatović, 2023). The duration of flowering varied from nine to 14 days (Table 2). Milatović et al. (2015) emphasized that the flowering of sour cherry cultivars can last six to 18 days. Ripening time in all examined genotypes was in June, with pronounced differences though. The earliest ripening time was observed in 'GV-6' (11$^{th}$ June) and the latest in 'GV-7' (25$^{th}$ June), which is particularly important for extending 'harvest window' and consequently better organization of labor and equipment. Ripening time of several examined genotypes ('GV-6', 'GV-10', 'GV-15', 'GV-13', 'GV-16'), particularly 'GV-6', is favorable since it does not coincide with the ripening of the majority commercially important cultivars ('Heimanns Konserven Weichsel', 'Rexelle', 'Kelleris 14', 'Šumadinka') (Milatović et al., 2015).

*Fruit quality*. Statistical analysis of fruit's morphometric properties showed the significant influence of both factors year and genotype, as well as their interaction on fruit weight, stone weight and stone share (Table 3). Although sour cherry fruit are mainly used for processing, fruit size is an important characteristic. The largest fruit weight was found in genotypes 'GV-13' (8.14 g), 'GV-10' (7.87 g) and 'GV-15' (6.70 g). Fruits of the aforementioned genotypes can be used for fresh consumption since they meet the market's criteria in terms of desirable fruit weight, ranging from 6 to 8 g (Radičević et al., 2012). On the other side, 'GV-7' and 'GV-8' had the smallest fruit (2.85 and 2.92 g, respectively); notwithstanding their fruits were larger in comparison to fruit weight of 2.66 g detected in 'Cigany' by Milošević & Milošević (2012). Stone weight

Table 2. Characteristics of flowering and ripening phenophases of examined sour cherry genotypes (2020-2021, average)
*Tabela 2. Osobine cvetanja i zrenja ispitivanih genotipova višnje (2020-2021, prosek)*

| Genotype/ *Genotip* | Flowering onset *Početak cvetanja* | End of flowering *Kraj cvetanja* | Ripening time/ *Vreme zrenja* |
|---|---|---|---|
| 'GV-6' | April 16$^{th}$ | April 26$^{th}$ | June 11$^{th}$ |
| 'GV-17' | April 19$^{th}$ | April 28$^{th}$ | June 22$^{th}$ |
| 'GV-10' | April 21$^{st}$ | May 3rd | June 16$^{th}$ |
| 'GV-11' | April 20$^{th}$ | May 2nd | June 20$^{th}$ |
| 'GV-14' | April 9$^{th}$ | April 23$^{th}$ | June 18$^{th}$ |
| 'GV-15' | April 8$^{th}$ | April 22nd | June 16$^{th}$ |
| 'GV-13' | April 22$^{nd}$ | May 1$^{st}$ | June 16$^{th}$ |
| 'GV-16' | April 18$^{th}$ | April 29$^{th}$ | June 14$^{th}$ |
| 'GV-8' | April 23$^{th}$ | May 2$^{nd}$ | June 22$^{nd}$ |
| 'GV-7' | April 20$^{th}$ | May 2$^{nd}$ | June 25$^{th}$ |

Table 3. Fruit's morphometric characteristics of examined sour cherry genotypes (2020-2021, average)
*Tabela 3. Morfometrijske osobine ploda ispitivanih genotipova višnje (2020-2021, prosek)*

| Genotype (A) *Genotip (A)* | FW *MP* (g) | Height *Visina* (mm) | Width *Širina* (mm) | Thickness *Debljina* (mm) | Stalk length *Dužina peteljke* (mm) | Stone weight *Masa koštice* (g) | Stone share *Udeo koštice* (%) |
|---|---|---|---|---|---|---|---|
| 'GV-6' | 5.39 d | 17.47 d | 19.18 d | 19.19 c | 53.30 a | 0.42 cd | 7.82 d |
| 'GV-17' | 3.44 f | 14.27 e | 17.13 ef | 14.52 g | 25.75 c | 0.43 cd | 12.65 a |
| 'GV-10' | 7.87 a | 20.79 a | 25.44 a | 22.32 a | 48.19 ab | 0.43 cd | 5.41 e |
| 'GV-11' | 4.25 e | 14.95 e | 18.25 de | 15.28 ef | 29.55 c | 0.45 bc | 10.59 b |
| 'GV-14' | 5.95 c | 18.68 bc | 21.34 c | 18.27 d | 31.30 c | 0.41 d | 6.96 d |
| 'GV-15' | 6.70 b | 18.96 bc | 21.89 c | 19.93 bc | 32.00 c | 0.61 a | 9.18 c |
| 'GV-13' | 8.14 a | 19.60 b | 23.79 b | 20.06 b | 42.34 b | 0.49 b | 6.00 e |
| 'GV-16' | 5.88 c | 18.04 cd | 21.24 c | 17.60 d | 46.31 ab | 0.35 e | 5.88 e |
| 'GV-8' | 2.92 g | 14.77 e | 16.99 f | 15.46 e | 29.62 c | 0.34 e | 11.53 b |
| 'GV-7' | 2.85 g | 14.79 e | 17.09 f | 15.00 ef | 30.15 c | 0.27 f | 9.41 c |
| Year (B)/*Godina (B)* | | | | | | | |
| 2020 | 5.66 a | 17.63 a | 20.60 a | 18.38 a | 37.88 | 0.43 a | 8.21 b |
| 2021 | 5.02 b | 16.83 b | 19.86 b | 17.15 b | 35.82 | 0.41 b | 8.87 a |
| ANOVA | | | | | | | |
| A | ** | ** | ** | ** | ** | ** | ** |
| B | ** | ** | ** | ** | ns | ** | ** |
| A × B | * | ns | ns | ** | ns | ** | * |

Mean values followed by different letters within a column represent significant difference according to the Tukey's test (P = 0.05). * statistically significant difference at P = 0.05, ** statistically significant difference at P = 0.001, ns – non significant difference, FW – fruit weight/*Prosečne vrednosti u kolonama praćene različitim malim slovima statistički su značajno različite prema Tukey testu (P = 0.05). * statistički značajna razlika za P = 0,05, ** statistički značajna razlika za P = 0,001, ns – nije statisčki značajno, MP – masa ploda*

varied from 0.27 g in 'GV-7' to 0.61 g in 'GV-15', which is expected since stone weight values in sour cherry cultivars are between 0.3 and 0.6 g (Milatović et al., 2015). Rakonjac et al. (2010) examined 41 'Oblačinska' sour cherry genotypes and found a significant positive correlation between fruit and stone weight (0.76). Interestingly, 'GV-10' had the lowest stone share (5.41%) although its fruit was one of the largest among the examined genotypes.

Considering the fact that stalk length is an important factor for defining the type of harvest (i.e. cultivars with long stalk are suitable for manual harvesting, whereas short stalk enables mechanized harvesting) (Milatović et al., 2015), it is important to determine this trait. Long stalk (above 46 mm) was detected in 'GV-6', 'GV-10' and 'GV-16' and medium-long in 'GV-13'. Six other genotypes had short stalk, whose length was below 35 mm. According to the statistical analysis it can be seen that stalk length is a stable parameter during the growing season, dependent only on genotype (Table 3). The same was reported by Radičević et al. (2018) for commercial cultivars ('Heimanns Konserven Weichsel', 'Iskra', 'Nevena', 'Sofija') and some promising genotypes, including 'GV-6' and 'GV-10'.

Differences were found among the examined genotypes in terms of SSC, sugar and total acids content. SSC varied from 11.70% ('GV-8') to 17.30% ('GV-7') (Figure 1). A slightly higher value of this parameter (from 14.40 to 23.10%) was detected in autochthonous sour cherry genotypes originated from Hungary (Papp et al., 2010). The detected concentration of total sugars ranged from 8.28% ('GV-14') to 14.20% ('GV-7). As expected, the dominant sugars were inverted (glucose and fructose) and represented 85.59-95.03% of total sugars, whilst the sucrose content was relatively low in all examined genotypes (0.45-1.05%). In 21 cultivars grown in Poland, Sokól-Letowska et al. (2020) determined glucose as a dominant sugar with an average concentration of 4.54 g/100 g fresh weight (FW), followed by fructose (3.89 g/100 g FW), where-

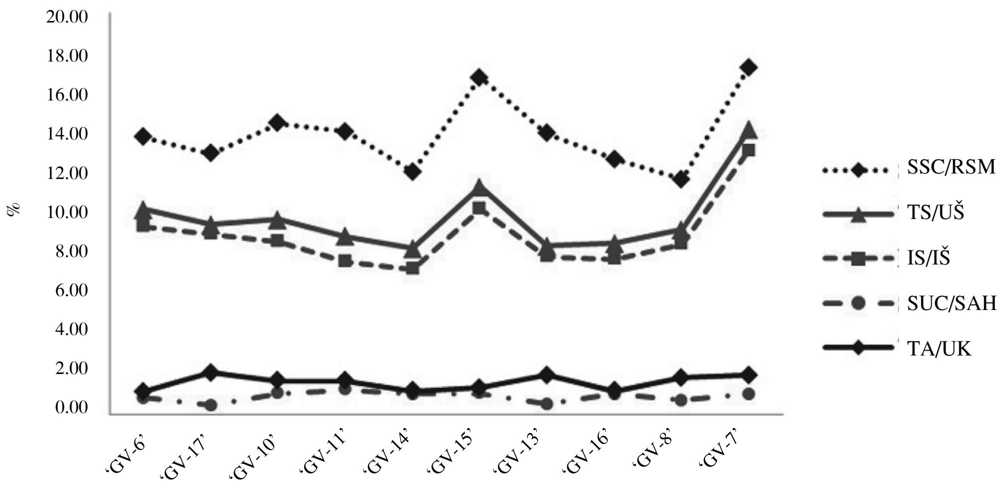


Figure 1. Fruit's chemical characteristics of examined sour cherry genotypes in 2021 (SSC – soluble solids content, TS – total sugars, IS – inverted sugars, SUC – sucrose, TA – total acids)
*Slika 1. Hemijske osobine ploda ispitivanih genotipova višnje u 2021. godini (RSM – sadržaj rastvorljive suve materije, UŠ – ukupni šećeri, IŠ – invertni šećeri, SAH – saharoza, UK – ukupne kiseline)*

as sucrose content was low and in some cultivars it was not detected at all. Papp et al. (2010) also found glucose as a predominant sugar in Hungarian sour cherry genotypes although higher concentrations were detected (6.06-9.08 g/100 g FW).

The content of total acids, i.e., titratable acidity, is crucial determinant of typical sour cherry taste since fruits with high sugar content and moderate level of acidity will be perceived the same as fruits with moderate sugar content and low acidity. TA ranged from 1.13 ('GV-6') to 2.08% ('GV-17'), depending on genotype. The obtained results are in accordance with the ones reported by Wojdylo et al. (2014), who examined 33 sour cherry cultivars and detected TA in the range 0.94-2.79%.

New sour cherry cultivars should satisfy consumers' demands, particularly in terms of desirable taste and appearance, as well as growers' demands. Furthermore, the market requirements, which mainly refer to the fruit's external characteristics, should be pleased. The most important traits for consumers' choice in sweet cherries are taste, colour and firmness, while fruit size and shape, as well as the presence of a stalk are irrelevant (Paunović et al., 2022). On the other side, Felföldi et al. (2011) marked flesh firmness, juiciness, sugar/acid ratio as the most important sour cherry properties alone, emphasizing that none of them was decisive alone regarding general impression. However, the cited authors stated that taste and outer appearance are the main determinants of general impression, i.e. consumer's acceptance of sour cherry cultivars. Thus, sensory characteristics are a crucial criterion in selection of genotypes. All examined genotypes, except 'GV-10' and 'GV-8', had dark red or brown red skin colour (Figure 2). However, since fruits of almost all genotypes were red-flashed with colored juice, they can be classified as 'morellos' (Table 4). Examined genotypes had pronounced juiciness and soft ('GV-17', 'GV-14', 'GV-15', 'GV-13') or medium firm fruit ('GV-6', 'GV-10', 'GV-11', 'GV-16', 'GV-8', 'GV-7').

*Productivity and tree vigour*. Yield is an important trait since it largely determines the profitability of sour cherry production and represents one of the most important objectives within sour cherry breeding programes (Schuster et al., 2017; Quero-García et al., 2019). All examined genotypes had satisfying yield and some of them can be considered as very fruitful ('GV-17', 'GV-10', 'GV-15', 'GV-13', 'GV-16', 'GV-17') (Fig. 3). Although fruitful, genotypes 'GV-10', 'GV-15', 'GV-13' and 'GV-16' also had large fruit. Medium to low vigour followed with an upright growth and fruit set primarily on spurs (Querro-Garcia et al., 2019) is a desirable characteristic among sour cherry cultivars since it enables intensive production. Examined genotypes differed in vigour, from very weak (‘GV-13’, ‘GV-15’, ‘GV-8’) to very strong (‘GV-10’, ‘GV-14’, ‘GV-16’) (Figure 2). According to all these findings, it can be concluded that some of the genotypes can be used for hybridization in order to combine the desired traits.


Figure 2. Fruit of examined sour cherry genotypes ‘GV-6’ (A) and ‘GV-10’ (B) (Source: A. Koricanac)
*Slika 2. Plodovi ispitivanih genotipova višnje ‘GV-6’ (A) i ‘GV-10’ (B) (Izvor: A. Koricanac)*

Table 4. Fruit’s organoleptic characteristics of examined sour cherry genotypes in 2021
*Tabela 4. Organoleptičke osobine ploda ispitivanih genotipova višnje u 2021. godini*

| Genotype *Genotip* | Colour of skin *Boja pokožice* | Colour of flesh *Boja mesa* | Colour of juice *Boja soka* | Firmness *Čvrstina* | Juiciness *Sočnost* | Acidity *Kiselost* |
|---|---|---|---|---|---|---|
| ‘GV-6’ | brown red *braon-crvena* | medium red *crvena* | dark red *tamnocrvena* | medium *srednje čvrsto* | strong *veoma sočno* | medium *srednja* |
| ‘GV-17’ | dark red *tamnocrvena* | dark red *tamnocrvena* | dark red *tamnocrvena* | soft *mekano* | medium *sočno* | high *visoka* |
| ‘GV-10’ | medium red *crvena* | pink *roze* | pink *roze* | medium *srednje čvrsto* | strong *veoma sočno* | low *niska* |
| ‘GV-11’ | brown red *braon-crvena* | dark red *tamnocrvena* | medium red *crvena* | medium *srednje čvrsto* | strong *veoma sočno* | low *niska* |
| ‘GV-14’ | medium red *crvena* | pink *roze* | medium red *crvena* | soft *mekano* | strong *veoma sočno* | low *niska* |
| ‘GV-15’ | dark red *tamnocrvena* | pink *roze* | dark red *tamnocrvena* | soft *mekano* | strong *veoma sočno* | low *niska* |
| ‘GV-13’ | dark red *tamnocrvena* | yellowish *žućkasta* | dark red *tamnocrvena* | soft *mekano* | strong *veoma sočno* | low *niska* |
| ‘GV-16’ | dark red *tamnocrvena* | dark red *tamnocrvena* | dark red *tamnocrvena* | medium *srednje čvrsto* | strong *veoma sočno* | low *niska* |
| ‘GV-8’ | medium red *crvena* | pink *roze* | dark red *tamnocrvena* | medium *srednje čvrsto* | strong *veoma sočno* | very high *veoma visoka* |
| ‘GV-7’ | brown red *braon-crvena* | dark red *amnocrvena* | dark red *tamnocrvena* | medium *srednje čvrsto* | strong *veoma sočno* | medium *srednja* |

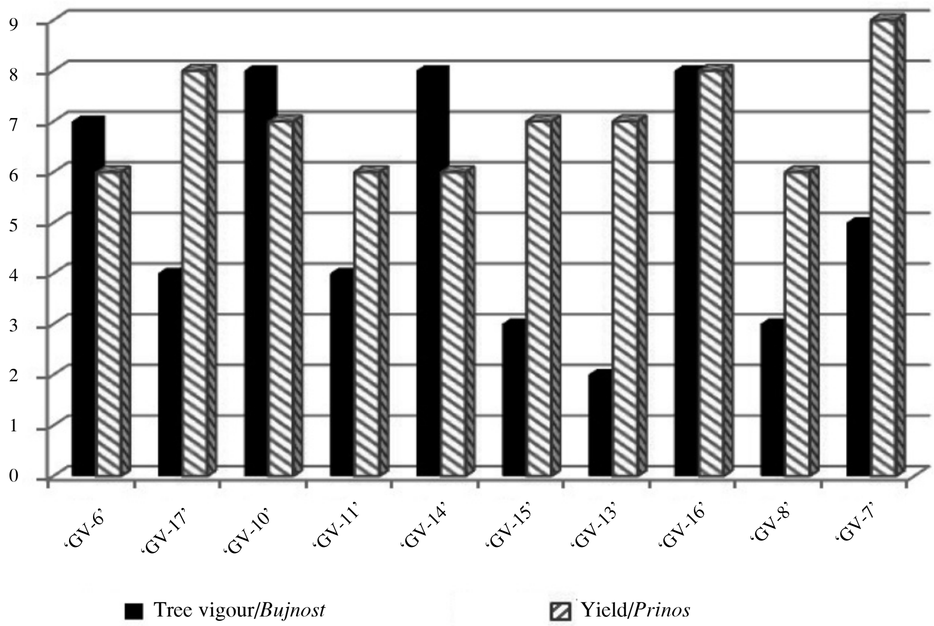


Figure 3. Tree vigor and yield of examined sour cherry genotypes (2020-2021, average)
*Slika 3. Bujnost i prinos ispitivanih genotipova višnje (2020-2021, prosek)*

*Resistance to cherry fungal diseases*. One of the main goals of sour cherry breeding programmes is disease resistance, primarily focused on cherry leaf spot, caused by *Blumeriella jaapii*, and brown rot, caused by Monilinia spp. (Radičević et al., 2018). Both fungal diseases can cause extremely large losses and endanger sour cherry production. Cherry leaf spot can cause severe leaf defoliation in the second half of the season; the disease weakens the trees and reduces bud differentiation (Holb et al., 2010). Although *Monilinia* spp. mainly causes blossom and spur blight, the fruit-rot phase can also significantly reduce sour cherry production. According to the prediction model developed by Larena et al. (2021) more than 11 days with relative humidity >80% in the critical period (March, April) results in 100% cherry brown rot at harvest. For the efficient control of these fungi in intensive sour cherry production, five to seven fungicide treatments, and during humid weather even more, should be performed during the season (Holb, 2009). Since chemical treatments are pollutants and increase production costs, identifying tolerant and/or resistant genotypes are nowadays extremely important. Field resistance of the examined sour cherry genotypes to cherry leaf spot and brown rot is shown in Figure 4.

In terms of resistance to cherry leaf spot, the best performance was observed in 'GV-6', 'GV-10' and 'GV-16', whereas moderate attack was observed in other examined genotypes. 'GV-10', 'GV-6' and 'GV-17' were the most resistant to *Monilinia* spp., with only minor attack registered. Interestingly, during the season 2013–2014, genotypes 'GV-6' and 'GV-10' exhibited the best resistance to *Blumeriella jaapii*, and genotype 'GV-10' also had minor symptoms of brown rot (Radičević et al., 2018). Similar results were also noticed for seasons 2016-2017 when in both genotypes, 'GV-6' and 'GV-10', symptom intensity was graded at 1.0 (Radičević et al., 2019). The obtained results in our study as well as the previously reported ones indicate that these two genotypes represent a great source of resistance to *Blumeriella jaapii* and *Monilinia* spp., the two most important pathogens in sour cherry production.

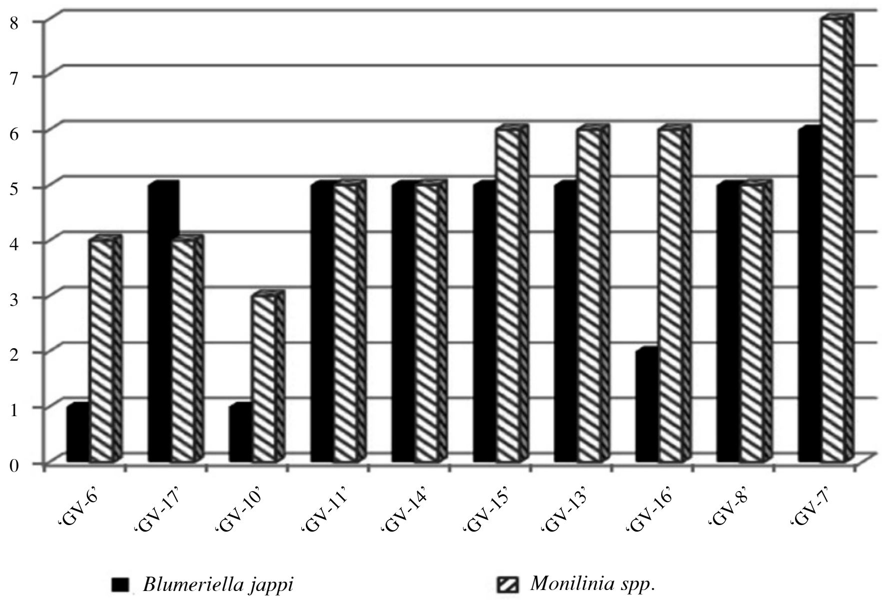


Figure 4. Field resistance of examined sour cherry genotypes to causal agents of diseases (2020-2021, average)
*Slika 4. Poljska otpornost ispitivanih genotipova višnje na prouzrokovače bolesti (2020-2021, prosek)*

## Conclusion

Having a long tradition in the collecting, evaluation and utilization of autochthonous fruit material with good agronomic properties, the Fruit Research Institute, Čačak makes efforts in the conservation of examined genotypes. Owing to desirable biological and productive traits (high fruit weight, long stalk, small stone share, high SSC, resistance to pathogens), 'GV-6' and 'GV-10' have potential for commercial production. Furthermore, they have already been used as parents in Fruit Research Institute, Čačak sour cherry breeding programme.

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## References

Felföldi J., Szabó T., Nyéki J., Szabó Z. (2011): Sensorial appraisal of sour cherries grown by environmental technology. International Journal of Horticultural Science, 17, 4/5: 27–30.

Holb I.J. (2009): Some biological features of cherry leaf spot (*Blumeriella jaapii*) with special reference to cultivar susceptibility. International Journal of Horticultural Science, 15, 1/2: 91–93.

Holb I.J., Lakatos P., Abonyi F. (2010): Some aspects of disease management of cherry leaf spot (*Blumeriella jaapii*) with special reference to pesticide use. International Journal of Horticultural Science, 16, 1: 45–49.

Larena I., Villarino M., Melgarejo P., De Cal A. (2021): Epidemiological studies of brown rot in Spanish cherry orchards in the Jerte valley. Journal of Fungi, 7: 203.

Meier U. (2018): Growth stages of mono– and dicotyledonous plants: BBCH Monograph. In: 'Open Agrar Repositorium', https://doi.org/10.5073/20180906-074619.

Milatović D., Nikolić M., Miletić N. (2015): Trešnja i višnja. Naučno voćarsko društvo Srbije, Čačak. (In Serbian)

Milatović D. (2023): Koštičave voćke. Naučno voćarsko društvo Srbije, Čačak. (In Serbian)

Milošević T., Milošević N. (2012): Fruit quality attributes of sour cherry cultivars. International Scholarly Research Network, ISRN Agronomy, Article ID 593981.

Papp N., Szilvássy B., Abrankó L, Szabó T., Pfeiffer P., Szabó Z., Nyéki J., Ercisli S., Stefanovits-Bányai E., Hegedus A. (2010): Main quality attributes and antioxidants in Hungarian sour cherries: identification of genotypes with enhanced functional properties. International Journal of Food Science and Technology, 45: 395–402.

Paunović G., Hajder Đ., Korićanac A., Pašalić B., Glišić I., Jovanović-Cvetković T., Cvetković M. (2022): Preferences in sweet cherry fruits among consumers in Serbia and Bosnia and Herzegovina. Horticultural Science (Prague), 49, 4: 189–196.

Quero-García J., Iezzoni A., López-Ortega G., Peace C., Fouché M, Dirlewanger E., Schuster M. (2019): Advances and challenges in cherry breeding. In: 'Achieving Sustainable Cultivation of Temperate Zone Tree Fruits and Berries', Lang G. (ed.), Burleigh Dodds Science Publishing Limited, Cambridge, UK.

Radičević S., Cerović R. (2015): Nove sorte višnje (*Prunus cerasus* L.) stvorene u Institutu za voćarstvo u Čačku. Voćarstvo, 49, 191/192: 115–121.

Radičević S., Cerović R., Lukić M., Paunović S.A., Jevremović D., Milenković S., Mitrović M. (2012): Selection of autochthonous sour cherry (*Prunus cerasus* l.) genotypes in Feketić region. Genetika, 44, 2: 285–297.

Radičević S., Cerović R., Marić S., Milošević N., Glišić I., Mitrović O., Korićanac A. (2018): Biological properties of sour cherry (*Prunus cerasus* L.) genotypes newly developed at Fruit Research Institute, Čačak. Journal of Pomology, 52, 202: 59–66.

Radičević S., Marić S., Cerović R., Milošević N., Paunović S.M. (2019): *In situ* characterization of some sweet and sour cherry autochthonous genotypes in West Serbia region. Acta Horticulturae, 1259: 81–90.

Rakonjac V., Fotirić Akšić M., Nikolić D., Milatović D., Čolić S. (2010): Morphological characterization of 'Oblačinska' sour cherry by multivariate analysis. Scientia Horticulturae, 125: 679–684.

Schuster M., Apostol J., Iezzoni A., Jensen M., Milatović D. (2017): Sour cherry cultivars and improvement. In: 'Cherries: Botany', Quero-García J., Iezzoni A., Pulawska J., Lang G. (eds), Production and Uses. CABI International, Wallingford, UK, pp. 95–116.

Sokól-Letowska A., Kucharska A.Z., Hodun G., Golba M. (2020): Chemical composition of 21 cultivars of sour cherry (*Prunus cerasus*) fruit cultivated in Poland. Molecules, 25: 4587.

Statistical Office of the Republic of Serbia Database (2023): https://data.stat.gov.rs/Home/Result/13050301-languageCode=sr-Cyrl.

Trajkovic´ J., Baras J., Miric´ M., Šiler S. (1983): Analize životnih namirnica, Faculty of Technology and Metallurgy of University of Belgrade, Belgrade. (In Serbian)

UPOV (2007): Guidelines for the conduct of tests for distinctness, uniformity and stability. Sour cherry (*Prunus cerasus* L.) and Duke cherry (*Prunus* × *gondouini* (Poit. & Turpin) Rehder). International Union for the Protection of New Varieties of Plants, Geneva, Switzerland. http: //www.upov.int/edocs/-tgdocs/en/tg230.pdf

Wojdylo A., Nowicka P., Laskowski P., Oszmianski J. (2014): Evaluation of sour cherry (*Prunus cerasus* L.) fruits for their polyphenol content, antioxidant properties, and nutritional components. Journal of Agricultural and Food Chemistry, 62: 12332–12345.

**ISPITIVANJE GENOTIPOVA VIŠNJE (*Prunus cerasus* L.) POREKLOM IZ REGIONA ZAPADNE SRBIJE**

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## Rezime

Autohtoni genotipovi različitih vrsta voćaka predstavljaju značajan izvor genetske varijabilnosti i vredan materijal za oplemenjivački rad. Institut za voćarstvo, Čačak ima dugogodišnju tradiciju u sakupljanju, evaluaciji i korišćenju autohtonog materijala različitih vrsta voćaka pa se u programu oplemenjivanja višnje, osim metode hibridizacije, koristi i selekcija iz prirodne populacije. Kako bi se ispitala pogodnost za komercijalno gajenje i/ili korišćenje u roditeljskim kombinacijama programa oplemenjivanja, ispitivane su biološke osobine deset genotipova višnje (GV-6, GV-7, GV-8, GV-10, GV-11, GV-13, GV-14, GV-15, GV-16, GV-17) izdvojenih na području Zapadne Srbije. Tokom dve godine (2020–2021), ispitivani su vreme cvetanja i zrenja, morfometrijske, hemijske i organoleptičke osobine ploda, bujnost stabala, prinos i poljska otpornost na uzročnike bolesti (pegavost lista trešnje i mrka trulež). Najveću prosečnu masu ploda imali su genotipovi GV-10 i GV-13 (?7,5 g), dok je najveća vrednost sadržaja rastvorljive suve materije utvrđena kod genotipa GV-7 (17,30%). Genotipovi GV-6 i GV-10 pokazali su najveću poljsku otpornost na patogene. Zbog poželjnih bioloških i produktivnih osobina (krupan plod, duga peteljka, mali udeo koštice, visok sadržaj rastvorljive suve materije, izražena otpornost na patogene, visoka i redovna rodnost), genotipovi GV-6 i GV-10 imaju potencijal za komercijalnu proizvodnju. Osim toga, navedeni genotipovi se već koriste u roditeljskim kombinacijama programa oplemenjivanja višnje Instituta za voćarstvo, Čačak.

**Ključne reči**: autohtoni genotipovi, morfometrijske osobine, šećeri, kiseline, senzorne osobine, poljska otpornost