

## RESPONSE OF POLLEN GERMINATION AND POLLEN TUBE GROWTH OF SOUR CHERRY GENOTYPES TO TEMPERATURE

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**Abstract:** The aim of this study was to determine the influence of genotype, environmental factors across three consecutive years (2022–2024), and incubation temperature (17°C and 20°C) on *in vitro* pollen germination and pollen tube length in sour cherry, as well as to monitor flowering phenology during the same period. Six cherry genotypes were used: two cultivars created in the Republic of Serbia (“Sofija” and “Šumadinka”), one introduced cultivar (“Érdi Bötermö”), one autochthonous cultivar (“Feketička”) and two promising genotypes (“GV-6” and “GV-10”). The flowering phenophase was recorded as the beginning, full and end of flowering. To determine germination and pollen tube length, pollen was collected and sown in Petri dishes on an agarose-sucrose nutrient medium and incubated at the two temperatures for 24 h. The obtained results demonstrated that flowering time varied between years in terms of date and duration. *In vitro* pollen germination ranged from 3.16% to 53.75%, while pollen tube length ranged from 225.6 µm to 960.2 µm. Significant differences were recorded between most sour cherry genotypes for both pollen germination and tube length. Differences between years were also significant, while incubation temperatures did not significantly affect the evaluated traits. The significant influence of many interactions, as established by analysis of variance, indicates that the response of genotypes to environmental conditions was different, which could be explained by differences in their stability. Knowledge of pollen germination and pollen tube growth plays a crucial role in understanding the value of a cultivar as a pollinator, both for commercial cultivation and breeding.

**Key words:** *Prunus cerasus*, flowering phenophase, *in vitro* pollen germination, pollen tube length.

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## Introduction

Sour cherry (*Prunus cerasus* L.) is a unique fruit crop that is cultivated worldwide in many regions across the temperate zone due to its distinctive tart flavour and versatile uses. In the Republic of Serbia, sour cherry is one of the most important fruit species in terms of harvested area, production and economic value (Milošević et al., 2022), and together with raspberry, it represents one of the most important exporting fruits (Lukić et al., 2015). In this regard, several sour cherry breeding programmes are currently underway in Serbia to develop superior cultivars.

In fruit trees, successful pollination accompanied by effective fertilization is critical for optimising both the high quality and quantity of fruit yield. Nonfunctional or poor pollen production is a limiting factor for fertilisation (Uzun et al., 2018). Moreover, when growing self-incompatible or partially self-compatible genotypes, such as certain sour cherry cultivars, one of the most important factors for successful production is the appropriate varietal design of the orchard. In addition to compatibility with the main cultivar and overlapping flowering time, a pollinating cultivar should have good pollen quality (Nikolić et al., 2012). Therefore, knowledge of the viable pollen percentage and germination capacity is very important when choosing and selecting the appropriate polleniser (Nyéki et al., 2008). Understanding pollen functional ability is also important in breeding programmes, as it influences the prediction of hybrid formation (Davarynejad et al., 2008).

To be an effective pollen donor, a cultivar/genotype must have high-quality pollen. Pollen germination and tube growth rates are the most important characteristics related to pollen quality and effective pollination. Due to its allopolyploid nature and irregularities in microsporogenesis, sour cherry is characterised by lower pollen germination compared to other diploid species in the genus *Prunus* (Cerović, 1991; Fotirić Akšić et al., 2016). In order to determine the actual amount of viable pollen, germination tests are necessary (Bolat and Pirlak, 1999). Parfitt and Ganeshan (1989) examined the validity of seven pollen viability tests in *Prunus* species and found that the *in vitro* germination test on agarose–sucrose medium had the highest degree of validity and a high correlation for pollen viability assessment.

Pollen performance is clearly affected by genetic factors and represents one of the important criteria for determining the genotypes (Rakonjac et al., 2025). In addition to genetic factors, the percentage of pollen germination and tube growth are also influenced by environmental and management factors such as climate, mutagens, fertilisers, herbicides, and pesticides (Uzun et al., 2018; Corneanu et al., 2021). Temperature is one of the most important environmental factors that could affect pollen performance (Hedhly et al., 2005). Interest in the effect of

temperature on reproductive biology has increased due to the global rise in temperature, which impacts different stages of the reproductive process, such as the flowering phenophase (Osterman et al., 2024) and pollen germination and pollen tube growth (Fotirić Akšić et al., 2014; Irenaeus and Mitra, 2014; Feldmane et al., 2017; Beltrán et al., 2019).

Considering the importance of understanding the pollen functional ability from both commercial cultivation and breeding perspectives, the aim of this study was to evaluate the influence of environmental factors and incubation temperature on pollen germination and pollen tube length in six sour cherry genotypes under *in vitro* conditions.

### Material and Methods

The study investigated the flowering phenophase and the functional ability of pollen in six sour cherry (*Prunus cerasus* L.) genotypes including two cultivars recognised in the Republic of Serbia (“Sofija” and “Šumadinka”), one introduced cultivar (“Érdi Bötermö”), one autochthonous cultivar (“Feketička”), and two promising genotypes (“GV-6,” and “GV-10”). The experiments were carried out at the experimental farm of the Faculty of Agriculture, Belgrade, “Radmilovac” (“Feketička” and “Šumadinka”) and at the experimental site of the Fruit Research Institute, Čačak, “Ljubić” (“Érdi Bötermö”, “Sofija”, “GV-6,” and “GV-10”). Standard cultural practices (pruning, fertilisation, pest, and disease control) were applied in the orchards.

During the examination period (January–April, 2022–2024) the mean, minimum and maximum air temperatures were monitored at the nearest meteorological stations to evaluate the influence of the climate on the studied properties. Based on these data, mean, minimum, and maximum monthly temperatures, as well as the number of frosty days, were calculated. The blooming period was determined based on the beginning, full and end of flowering (growth stages 61, 65 and 69, respectively, according to the BBCH scale) (Meier, 2018). As indicators of the functional ability of pollen, *in vitro* germination (%) and tube growth ( $\mu\text{m}$ ) were studied.

To collect pollen samples, flower buds of each genotype were taken from the branches at the late balloon stage and transferred to the laboratory. Anthers were removed from the flower buds, transferred to Petri dishes, and dried at room temperature (24–48 h) until pollen was released. Pollen from each genotype was placed in three Petri dishes (three replicates) on a nutrient medium containing 0.7% agar and 15% sucrose. The dishes were then transferred to “FOC 225I” incubators (Velp Scientifica, Usmate, Italy) and maintained at two temperatures (17°C and 20°C). After 24 hours of incubation, pollen germination and tube growth were stopped by adding formaldehyde. For each replication, at least 300 pollen grains

were counted to determine the germination percentage. Pollen was considered germinated when the pollen tube length exceeded the diameter of the pollen grain. For pollen tube growth assessment, 20 randomly selected pollen tubes per replicate were measured. Observations were made using a Leica DM2000 light microscope with a Leica DFC320 digital camera and a Leica IM 100 image processing software.

The experiment was set up as a three-factorial (genotype, temperature and year) design. For the *in vitro* pollen germination, as the values were expressed as percentages, an arcsine square-root transformation was applied prior to analysis. The data were statistically analysed by analysis of variance (ANOVA) at the 0.05 and 0.01 significance levels, and the Tukey's test for post hoc comparison at the 0.05 significance level, using the statistical software package STATISTICA, version 8 (StatSoft, Inc., Tulsa, OK, USA). Based on the expected mean squares from the three-factorial ANOVA, the variance components were calculated and expressed in % (Annicchiarico, 2002).

## Results and Discussion

A similar trend in the values of mean, minimum and maximum air temperatures, as well as the number of frosty days, was recorded at Radmilovac and Ljubić in all three years (Table 1), which confirms that both sites are within typical fruit-growing areas of the Republic of Serbia.

Table 1. Air temperatures for the period January–April at the Belgrade and Čačak sites (2022–2024).

Climatic parameter	Year	Belgrade				Čačak			
		January	February	March	April	January	February	March	April
Mean air temperature (°C)	2022	2.8	7.6	7.2	12.5	1.1	4.3	5.4	10.8
	2023	4.9	3.9	9.0	10.3	3.9	3.5	8.4	9.7
	2024	2.6	9.7	10.6	14.6	2.1	9.1	10.7	14.2
Minimum air temperature (°C)	2022	-8.8	-0.8	-5.4	0.8	-13.0	-3.4	-7.3	-1.2
	2023	-0.9	-9.2	-3.8	-0.6	-1.4	-8.7	-2.9	-1.2
	2024	-9.9	-4.8	-0.8	-1.2	-9.0	-3.4	-0.2	-0.3
Maximum air temperature (°C)	2022	6.1	18.5	23.0	25.5	14.5	15.2	23.0	25.8
	2023	16.9	19.0	24.1	23.0	16.0	21.6	23.6	23.6
	2024	18.6	20.6	28.6	30.4	19.4	20.9	28.9	30.4
Number of frosty days	2022	17	1	9	0	23	11	20	2
	2023	5	12	6	4	10	15	7	3
	2024	21	4	1	1	19	3	1	1

Source: Data from meteorological stations on “Radmilovac” experimental farm of the Faculty of Agriculture, Belgrade and experimental site “Ljubić” of the Fruit Research Institute, Čačak.



*In vitro* pollen germination ranged from 2.42% in the “Érdi Bötermö” cultivar at 20°C in 2024 to 53.75% in the “GV 10” genotype at 17°C in 2023 (Table 2). “Šumadinka” exhibited the smallest variation in pollen germination across experimental variants (36.97%–44.53%), while “Sofija” showed the largest variation (6.57%–52.27%). This indicates that the response of these two cultivars to environmental conditions was different, which could be explained by differences in their stability.

Table 2. Pollen germination (%) of six sour cherry genotypes at 17°C and 20°C (2022–2024).

Genotype	17°C				20°C			
	2022	2023	2024	Average	2022	2023	2024	Average
Érdi Bötermö	18.76	22.69	3.16	14.87	21.45	22.71	2.42	15.52
Feketička	15.54	29.62	24.43	23.20	14.77	29.53	19.50	21.27
GV-6	17.10	27.25	13.50	19.28	16.18	31.98	14.44	20.87
GV-10	34.10	53.75	22.10	36.65	39.82	48.38	29.92	39.37
Sofija	22.15	52.27	6.57	27.00	18.41	48.26	6.57	24.41
Šumadinka	36.97	44.53	38.03	39.84	43.74	44.09	38.25	42.03
Average	24.10	38.35	17.97	26.81	25.73	37.49	18.52	27.25

Source: Authors' own research.

The minimum pollen tube length (225.6 µm) was observed in the cultivar ‘Érdi Bötermö’ at 17°C in 2024, while the maximum length (960.2 µm) was recorded in “Šumadinka” at 17°C in 2022 (Table 3). Opposite trends were observed with respect to incubation temperatures. Namely, four genotypes (“Érdi Bötermö”, “Feketička”, “GV 6” and “Šumadinka”) had higher pollen tube lengths at 17°C, whereas in the other two genotypes (“GV 10” and “Sofija”), higher values were recorded at 20°C.

Table 3. Pollen tube length (µm) of six sour cherry genotypes at 17°C and 20°C (2022–2024).

Genotype	17°C				20°C			
	2022	2023	2024	Average	2022	2023	2024	Average
Érdi Bötermö	767.1	576.7	225.6	523.1	657.3	601.2	265.0	507.8
Feketička	833.6	735.2	535.2	701.3	725.4	801.9	556.4	694.6
GV-6	701.7	498.7	286.0	495.5	478.1	668.5	301.4	482.7
GV-10	523.0	355.8	240.5	373.1	629.5	545.9	401.7	525.7
Sofija	361.7	362.0	253.4	325.7	472.0	573.1	285.3	443.4
Šumadinka	960.2	716.5	585.2	754.0	878.2	686.4	312.9	625.8
Average	691.2	540.8	354.3	528.8	640.1	646.2	353.8	546.7

Source: Authors' own research.

A high percentage of germinated pollen does not necessarily correlate with a high growth rate of pollen tubes. This phenomenon has been previously observed in different fruit trees (Bolat and Pirlak, 1999; Miaja et al., 2000; Sharafi, 2011; Stosser et al., 1996), indicating that these two traits are genetically independent.

Table 4. Mean squares (MS) and variance components (%) from three-factorial ANOVA for pollen germination and pollen tube length.

Source of variation	df	<i>In vitro</i> pollen germination		Pollen tube length	
		MS	%	MS	%
Genotype (G)	5	1,897.35**	34.3	29,8605.4**	23.2
Year (Y)	2	3,606.14**	36.3	95,7885.8**	44.0
Temperature (T)	1	5.20ns	0.0 <sup>a</sup>	8,647.4ns	0.0
G × Y	10	366.05**	22.9	32,613.8**	6.0
G × T	5	21.94ns	0.5	46,884.9**	8.3
Y × T	2	13.96ns	0.0	57,388.1**	4.5
G × Y × T	10	24.07*	1.8	12,639.7*	4.4
Error	72	10.58	4.3	5,384.6	9.7

<sup>ns</sup> not significant, \*  $p < 0.05$ , \*\*  $p < 0.01$ , <sup>a</sup> negative values expressed as 0.

Source: Authors' own calculations.

As shown in Table 4, the ANOVA results indicate a significant effect of genotype and year, but no significant effect of temperature on the variability of pollen germination and pollen tube length. In addition, a significant influence of the G × Y and G × Y × T interactions on pollen germination was observed. For pollen tube length, all possible interactions were also significant.

Variance components analysis (Table 4) showed that year (36.3%), genotype (34.3%) and their interaction (22.9%) contributed most to the total variability of *in vitro* pollen germination. The variability of pollen tube length was mainly determined by year (44.0%) and genetic differences among sour cherry genotypes (23.2%). The remaining sources of variation accounted for less than 10% of the total variability of these traits.

Taking into consideration all three years and both incubation temperatures, it was shown that “Šumadinka” (40.9%) and “GV-10” (38.0%) had significantly the highest pollen germination, while “Érdi Bötermö” (15.2%) was characterised by the lowest pollen germination value (Figure 2). According to previous studies, the *in vitro* pollen germination in sour cherry was found to range between 7% and 70% (Milutinovic et al., 1998), 24%–49% (Bolat and Pirlak, 1999), 29%–65% (Davarynejad et al., 2008), 19%–67% (Szpadzik et al., 2008), 43%–62% (Milatović and Nikolić, 2014) and 32.7%–57.4% (Feldmane et al., 2017). The results obtained in the present study were in accordance with the above-mentioned results. Regarding the years, the highest average pollen germination was recorded

in 2023 (37.9%), followed by 2022 (24.9%) and 2024 (18.2%). Radičević et al. (2021) also reported a significant influence of the year on pollen germination in the studied sour cherry cultivars.

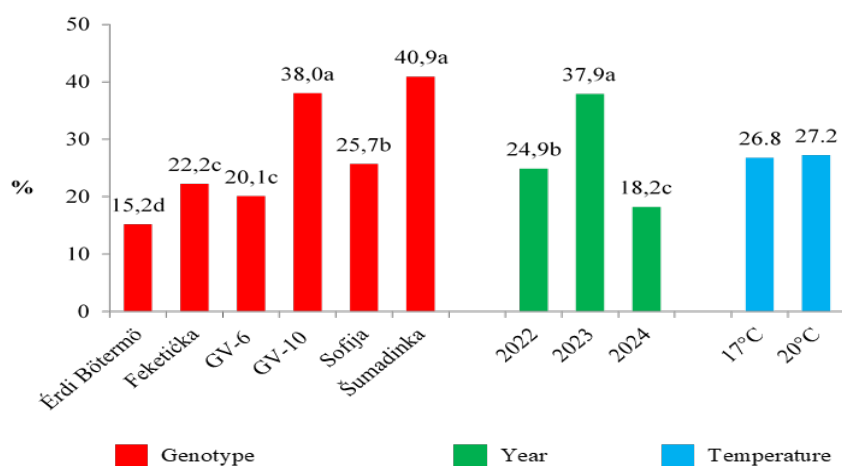


Figure 2. Mean values for the main factors (genotype, year and temperature) for *in vitro* pollen germination (%). Different letters indicate statistically significant differences ( $p < 0.05$ ) according to the Tukey's test.

Source: Authors' analysis.

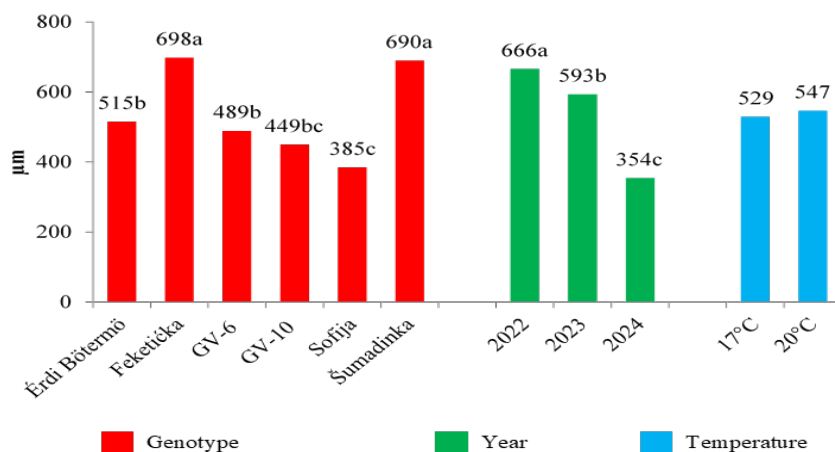


Figure 3. Mean values for the main factors (genotype, year and temperature) for pollen tube length (µm). Different letters indicate statistically significant differences ( $p < 0.05$ ) according to the Tukey's test.

Source: Authors' analysis.

Pollen tube growth showed a similar trend to that of pollen germination with respect to the main factors (Figure 3). This trait was modified not only by the genotype but also by weather conditions during the winter and spring periods of the study years. On average, “Feketička” (698  $\mu\text{m}$ ) exhibited the longest pollen tubes, whereas “Sofija” (385  $\mu\text{m}$ ) had the shortest. Pollen tube length in 2023 (593  $\mu\text{m}$ ) was significantly higher than in 2024 (354  $\mu\text{m}$ ), but significantly lower than in 2022 (666  $\mu\text{m}$ ).

Several studies on the effect of temperature on sour cherry pollen germination have been published (Cerović and Ružić, 1992; Nenadovic-Mratinic, 1996; Pirlak, 2002; Hedhly et al., 2004; Milatović and Nikolić, 2014). According to these studies, the maximum pollen germination percentage and pollen tube length were obtained at a temperature of around 20°C. In our study, the absence of significant differences in pollen germination and tube length due to incubation temperature confirmed that both tested temperatures were within the optimal range.

### Conclusion

The study contributes to the understanding of the factors influencing flowering phenology and pollen quality in sour cherry genotypes, which is essential for improving breeding programmes and optimising cultivation conditions. The obtained results show that both genetic factors and air temperatures influenced the flowering time. Frost conditions in March 2022 delayed flowering across all genotypes, while high temperatures in March/April 2024 caused explosive flowering. There was a wide variation in terms of pollen germination and pollen tube length. Variation in these characters was determined not only by genotype but also strongly influenced by environmental factors. Incubation temperatures (17°C and 20°C) did not significantly affect pollen germination or tube length, confirming that these temperatures were within the optimal range. Due to low pollen quality, “Érdi Bötermö”, “Feketička” and “GV 6” were unlikely to achieve satisfactory yield after self-pollination and probably required appropriate pollinators for optimal fruit set.

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## References

- Annicchiarico, P. (2002). Genotype × environment interactions: challenges and opportunities for plant breeding and cultivar recommendations. FAO Plant Production and Protection Paper No. 174, FAO, Rome.
- Beltrán, R., Valls, A., Cebrián, N., Zornoza, C., García Breijo, F., Reig Armiñana, J., Garmendia, A., & Merle, H. (2019). Effect of temperature on pollen germination for several *Rosaceae* species: influence of freezing conservation time on germination patterns. *PeerJ*, 7, e8195.
- Bolat, I., & Pirlak, L. (1999). An investigation on pollen viability, germination and tube growth in some stone fruits. *Turkish Journal of Agriculture and forestry*, 23(4), 383–388.
- Cerović, R. (1991). Citogenetičke osobine višnje u odnosu na polen. *Genetika*, 23(3), 247–258.
- Cerović, R., & Ružić, Đ. (1992). Pollen tube growth in sour cherry (*Prunus cerasus* L.) at different temperatures. *Journal of Horticultural Science*, 67, 333–340.
- Corneanu, M., Mineață I., & Golache I. E. (2021). Pollen viability and germination capacity of sweet cherry cultivars in the climate conditions of Romanian Northeastern area. *Lucrări științifice seria horticultură*, 64(2), 37–42.
- Davarynejad, G. H., Szabó, Z., Nyéki, J., & Szabó, T. (2008). Phenological stages, pollen production level, pollen viability and in vitro germination capability of some sour cherry cultivars. *Asian Journal of Plant Sciences*, 7, 672–676.
- Feldmane, D., Ruisa, S., Pole, V., Butac, M. M., & Militaru, M. (2017). Fruit set of several sour cherry cultivars in Latvia influenced by weather conditions before and during flowering. *Proceedings of the Latvian Academy of Sciences. Section B. Natural, Exact, and Applied Sciences*, 71(3), 178–183.
- Fotirić, Akšić, M., Cerović, R., Ercišli, S., & Jensen, M. (2016). Microsporogenesis and meiotic abnormalities in different 'Oblacinska' sour cherry (*Prunus cerasus* L.) clones. *Flora*, 219, 25–34.
- Fotirić, Akšić, M., Rakonjac, V., Nikolić, D., Čolić, S., Milatović, D., Ličina, V., & Rahović, D. (2014). Effective pollination period in 'Oblačinska' sour cherry clones. *Genetika*, 46(3), 671–680.
- Hedhly, A., Hormaza, J. I., & Herrero, M. (2005). Influence of genotype – temperature interaction on pollen performance. *Journal of Evolutionary Biology*, 18(6), 1494–1502.
- Hedhly, A., Hormaza, J. I., & Herrero, M. (2004). Effect of temperature on pollen tube kinetics and dynamics in sweet cherry, *Prunus avium* (*Rosaceae*). *American Journal of Botany*, 91, 558–564.
- Irenaeus, K. S. T., & Mitra, S. K. (2014). Understanding the pollen and ovule characters and fruit set of fruit crops in relation to temperature and genotype-a review. *Journal of Applied Botany and Food Quality*, 87, 157–167.
- Lukić, M., Marić, S., Radičević, S., Milošević, N., Đorđević, M., & Laposavić, A. (2015). Current condition and prospects of fruit growing in the Republic of Serbia. *Journal of Mountain Agriculture on the Balkans*, 18(3), 541–573.
- Meier, U. (2018). Growth stages of mono- and dicotyledonous plants: BBCH monograph. *Open Agrar Repository*, 16.

- Miaja, M. L., Radicati, L., Porporato, M., Caramiello, R., Fossa, V., & Vallania, R. (2000). Morpho-physiological observations on pollen of sour cherry (*Prunus cerasus* L.) cultivars. *Acta Horticulturae*, 514, 311–320.
- Milatović, D. P., & Nikolić, D. T. (2014). The effect of temperature on pollen germination and pollen tube growth of sour cherry cultivars. *Journal of Agricultural Sciences*, 59(1), 45–52.
- Milošević, N., Glišić, I., Radičević, S., Marić, S., Đorđević, M., Milošević, T., Rakonjac, V., & Barać, G. (2022). An overview of Serbian autochthonous genotype selection in *Prunus* genus. *Journal of Pomology*, 56, 69–77.
- Milutinovic, M., Rakonjac, V., & Nikolic, D. (1998). Functionality of pollen and fruit set in sour cherry cultivars. *Acta Horticulturae*, 468, 591–594.
- Nenadovic-Mratinic, E. (1996). The influence of temperature, sucrose concentration and time on pollen germination and pollen tube growth in sour and sweet cherry. *Acta Horticulturae*, 410, 443–448.
- Nikolić, D., Rakonjac, V., & Fotirić-Akšić, M. (2012). The effect of pollenizer on the fruit set of plum cultivar Čačanska najbolja. *Journal of Agricultural Sciences*, 57(1), 9–18.
- Nyéki, J., Soltész, M., & Szabó, Z. (2008). Morphology, biology and fertility of flowers in temperate zone fruits. Academic Publisher, Budapest.
- Osterman, J., Mateos-Fierro, Z., Siopa, C., Castro, H., Castro, S., & Eeraerts, M. (2024). The impact of pollination requirements, pollinators, landscape and management practices on pollination in sweet and sour cherry: A systematic review. *Agriculture, Ecosystems & Environment*, 374, 109163.
- Parfitt, D. E., & Ganeshan, S. (1989). Comparison of procedures for estimating viability of *Prunus* pollen. *HortScience*, 24(2), 354–356.
- Pirlak, L. (2002). The effects of temperature on pollen germination and pollen tube growth of apricot and sweet cherry. *Gartenbauwissenschaft*, 67, 61–64.
- Radičević, S., Ognjanov, V., Marić, S., & Barać, G. (2021). The effect of genotype and temperature interaction on pollen performance in the pistils of autochthonous sour cherry cultivar 'Feketička'. *Zemdirbyste-Agriculture*, 108(3), 271–278.
- Rakonjac, V., Nikolić, D., Čolić, S., Glišić, I.S., Đorđević, M., Popovska, M., & Radičević, S. (2025). Investigation of pollen morphology and viability of sweet and sour cherry genotypes by multivariate analysis. *Microscopy research and technique*, 88(1), 42–52.
- Sharafi, Y. (2011). *In vitro* pollen germination in stone fruit tree of *Rosaceae* family. *African Journal of Agricultural Research*, 6(28), 6021–6026.
- Stosser, R., Hartman, W., & Anvari, S. F. (1996). General aspects of pollination and fertilization of pome and stone fruits. *Acta Horticulturae*, 423, 15–22.
- Szpadzik, E., Jadczyk-Tobjasz, E., & Łotocka, B. (2008). Preliminary evaluation of pollen quality, fertility relations and fruit set of selected sour cherry cultivars in polish conditions. *Acta Agrobotanica*, 61, 71–77.
- Uzun, A., Pinar, H., Gun, E., Yaman, M., & Yilmaz, S. (2018). Assessment of pollen quality of some apricot and cherry cultivars. *Current Trends in Natural Sciences*, 7(13), 292–296.

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## KLIJAVOST POLENA I DUŽINA POLENOVE CEVČICE KAO POKAZATELJI UTICAJA TEMPERATURE NA GENOTIPOVE VIŠNJE

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### R e z i m e

Cilj ovog istraživanja bio je da se utvrdi uticaj genotipa, faktora spoljašnje sredine tokom tri uzastopne godine (2022–2024) i temperature inkubacije (17°C i 20°C) na klijavost polena *in vitro* i dužinu polenovih cevčica kod višnje, uz istovremeno praćenje fenofaze cvetanja. Kao material korišćeno je šest genotipova višnje i to: dve sorte stvorene u Republici Srbiji („Sofija” i „Šumadinka”), jedna introdukovana sorta („Érdi Bötermö”), jedna autohtona sorta („Feketička”) i dve perspektivne selekcije („GV-6” i „GV-10”). Fenofaza cvetanja je prikazana kroz početak, puno i kraj cvetanja. Da bi se utvrdila klijavost i dužina polenove cevčice, nakon ekstrakcije, polen je zasejan u Petrijeve posude na agarozno-saharoznu hranljivu podlogu i inkubiran na dve različite temperature tokom 24 h. Dobijeni rezultati su pokazali da je vreme cvetanja variralo između godina kako u pogledu datuma tako i u pogledu dužine trajanja. Klijavost polena *in vitro* kretala se od 3,16% do 53,75%, dok se dužina polenove cevčice kretala od 225,6 µm do 960,2 µm. Ispoljene razlike između većine genotipova višnje bile su statistički značajne za klijanje polena i za dužinu polenovih cevčica. Takođe, razlike su bile značajne i između godina, dok temperature inkubacije nisu značajno uticale na varijabilnost ovih osobina. Značajan uticaj mnogih interakcija ustanovljen na osnovu analize varijanse ukazuje da je odgovor genotipova na uslove sredine bio različit, što se može objasniti razlikama u njihovoj stabilnosti. Poznavanje klijavosti polena i rasta polenovih cevčica ima ključnu ulogu u razumevanju vrednosti sorte kao oprašivača i sa aspekta komercijalnog gajenja i sa aspekta oplemenjivanja.

**Ključne reči:** *Prunus cerasus*, fenofaza cvetanja, klijavost polena *in vitro*, dužina polenove cevčice.

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