

AMPELOGRAPHIC AND GENETIC CHARACTERISATION OF GRAPEVINE GENETIC RESOURCES FROM OZALJ-VIVODINA REGION (CROATIA)

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Abstract:

Context and purpose of the study– Ozalj- vivodina region is small vine growing area (only about 100 hectares of vineyards), but with significant number of old, ancient vineyards planted between 50 and 100 years ago. Trend of abandoning or replanting ancient vineyards takes place for the last 30 years. This trend results in grapevine germplasm erosion because traditional varieties are replaced with well known international varieties. Few known traditional varieties are dominantly present in ancient vineyards together with many others of unknown identity. Historical data about prevalence and characteristic of varieties on this area are very poor. For this reason, we started a project with the purpose of identification, characterization and conservation of grapevine germplasm in this area.

Material and methods – Three years study (2016-2018) included ampelographic inventarization of ancient or abandoned vineyards in Ozalj-Vivodina area. A total of 61 samples (vines) were selected for further research and identification. Identification in situ include ampelographic description by standard set of OIV (Organization Internationale de la Vigne et du Vin) descriptors. Genetic identification was performed using nine microsatellites markers recommended by the European project GRAPEGEN06. Genetic profile of samples was compared by national and several international databases for possible matching between profiles or with other varieties.

Results – Based on microsatellite analysis of the 61 samples, 45 different genotypes were detected which were identified as follows: 18 genotypes did not match with any of the varieties from available databases; 6 genotypes were identified as traditional or native varieties from NW Croatia (Plavec žuti, Kozjak bijeli, Dišća Ranina, Moslavac (Furmint), Plemenka (Chasselas rouge), Graševina (Welschriesling); 8 genotypes were identified as rare autochthonous Croatian varieties from other wine regions; 7 genotypes represent common varieties from other European countries (Chardonnay, Pinot Blanc, Blaufraenkisch, Sauvignon Blanc, Rkatsiteli, Pamid, Chauch blanc; 5 samples represent a rare variety identified in other European countries (for example Gaensfuesser blau) and one genotype was identified as Belina starohrvatska (syn. Gouais Blanc). It is interesting that Gouais blanc was represented with six samples from five different locations even though it was not considered to be a traditional cultivar in this area. Ampelographic study shown that dominant genotypes have white coloured berry (33), followed by red (7) and rouge (2). Three genotypes had no clusters available during research. Three genotypes have specific muscat flavour and two have a female type of flower. This research shows that Ozalj-Vivodina as a small winegrowing area has rich grapevine germplasm preserved.

Keywords: Vitis vinifera, grapevine, varieties, genotype, ampelography, genetic identification, microsatellites

1. Introduction.

Ampelographic and genetic characterisation of grapevine genetic resources from Ozalj-vivodina region (Croatia)

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Context and purpose of the study

- Small region with significant number of old, ancient vineyards planted between 50 and 100 years ago and many variety of unknown identity.
- Historical data about prevalence and characteristic of varieties on this area are very poor.
- Rapid grapevine germplasm erosion because the process of abandoning or replanting ancient vineyards with well known international varieties takes place for the last 30 years.
- Purpose of study is identification, characterization and conservation of grapevine germplasm in this area.



V. vinifera, unknown GV1



V. Vinifera cv. Heunisch weiss



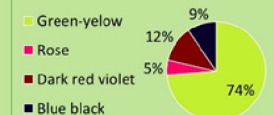
Results

- 18 genotypes did not match with any of the varieties from available databases.
- One genotype was identified as Belina starohrvatska (syn. Gouais Blanc, Heunich weiss). It is interesting that Gouais blanc was represented with six samples from five different locations even though it was not recognised by producers as a traditional cultivar in this area.
- Rare varieties unknown in Croatia: Gaensfusser and Battraube.

Material and methods

- Number of 61 samples (vines) were selected for research and identification.
- SSR genotyping was performed using a total of nine markers. Six SSR markers (VrZAG62, VrZAG79, VVMD5, VVMD7, VVMD27, VV52) recommended by OIV and three additional ones (VVMD25, VVMD28, VVMD32) selected during the GrapeGen06 project. PCR amplification, electrophoretic separation and sizing were performed as described in Žulj Mihaljević et al. (2013)¹. Standardization was taken by SSR profile of Pinot Noir.
- Morphological description of collected accessions was performed using 47 OIV descriptors for grapevine cultivars and Vitis species (OIV 2009)² that were selected within the GrapeGen06 project.

Colour of berry (O.I.V. 225)



Unique genotypes	Traditional local varieties	Traditional varieties from other Croatian wine regions	Rare varieties (recorded only in data bases or gen bank collections)
F 5, F 10, GB 183, GB 186, GV 1, GV 3, GVS, GV 183, GV 184, GV 186, OZ 2, OZ 3, PR 1, PR 2, PR 6, SH 7, SKV 2, V 182	Plavec žuti (VIVC 24539)** Kozjak bijeli (Coarna alba) (VIVC 2724) Dišća Ranina (Urbanitraube) (VIVC 12785) Moslavac (Furmint) (VIVC 14892) Plemenka (Chasselas rouge) (VIVC 17272) Graševina (Welschriesling) (VIVC 13217) Belina starohrvatska (Heunich weiss) (VIVC 5374)	Pršljivka (VIVC 24909) Lipovina (Harslevelue) (VIVC 5314) Teran (Terrano) (VIVC 12374) Draganeta (VIVC 26049) Bilan bijeli (Vitouska garganja) (VIVC 16017) Svjetljak (VIVC 24941) Stara aromatična belina (Lisztes feher) (VIVC 17061) Muškatal (VIVC 2455)	Gaensfusser (VIVC 586) Battraube (VIVC 1041) NN B-2 (Seerant06) Savagnin blanc (VIVC 17636) Unknown (Faculty of Agriculture University of Zagreb Seerant06 project, sample: Muškatal omiški)

**Database code in Vitis International Variety Catalogue (VIVC, www.vivc.de)

Conclusion

This research shows that Ozalj-Vivodina as a small winegrowing area has rich grapevine germplasm preserved. It is necessary to get intensive activity for preservation of ancient vineyards, make a local germplasm collection and further genetic research.



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References

- Žulj Mihaljević, M.; Simon, S.; Pejić, I.; Carka, F.; Kojić, A.; Gaši, F.; Tomić, I.; Jovanović Cvetković, T.; Maletić, E.; Preiner, D.; Božinović, S.; Cornea, V.; Maraš, V.; Tomić Mugoša, M.; Botu, M.; Popa, A.; Beleski, K. (2013). Molecular characterization of old local grapevine varieties from South East European countries. Vitis 52, 69-76.
- OIV; 2009: OIV descriptor list for grape varieties and Vitis species (2nd edition). O. I. V. (Off. Int. Vigne Vin), Dedon, Paris