

AMPELOGRAPHIC VARIABILITY OF CROATIAN AUTOCHTHONOUS *V. VINIFERA* L. CULTIVARS

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ABSTRACT

The national collection of Croatian autochthonous grapevine cultivars was established in 2001. It contains 120 autochthonous grapevine cultivars from all over Croatia, although most of them come from Dalmatia region. So far 95 varieties have been described by using 39 OIV descriptors determining their ampelographic and basic commercial features. In order to estimate ampelographic variability and mutual difference between varieties in the collection comparison of OIV descriptor results has been made by using cluster analysis plus a dendrogram. A high degree of similarity has been found between some varieties, such as: Tanetova loza and Vlaška white; Prć & Žumić and Palagružonka white & Stradunska, as well as some others. The varieties which are in the dendrogram shown to have a high degree of similarity will be additionally tested by using genetic methods in order to determine if they are ~~also~~ genetically related or are even synonymous.

Key words: *V. vinifera* L., ampelografy, native cultivars

ZUSAMMENFASSUNG

Die nationale Kollektion kroatischer autochthoner Weinrebsorten wurde im Jahre 2001 gegründet. Dort werden autochthone Weinrebsorten aus ganz Kroatien aufbewahrt, jedoch stammt der Großteil aus dem Gebiet Dalmatiens. Einige Sorten dieser Kollektion sind auch heute noch von wirtschaftlicher Bedeutung, während andere außerhalb der Kollektion kaum existieren. Derzeit befinden sich in der Kollektion 120 Weinrebsorten. Die ampelographischen Charakteristiken dieser Sorten werden durch Verwendung von 39 OIV Deskriptoren festgestellt, um deren ampelographischen und grundlegenden wirtschaftlichen Charakteristiken erkunden zu können. Bisher wurden auf diese Weise 95 Sorten beschrieben. Es wurde ein Vergleich der Resultate der OIV Deskription durch Verwendung von Clusteranalyse sowie ein Dendrogramm erstellt, in welchem ersichtlich ist, in welchem Maße sich die Kollektionssorten auf Grund deren ampelographischen Charakteristiken voneinander unterscheiden. Es wurde eine hohe Ähnlichkeit zwischen einigen Sorten festgestellt, wie zum Beispiel von: Tanetova loza und Vlaška bijela, ferner zwischen Prć und Žumić sowie Palagružonka bijela und Stradunska, aber auch zwischen einigen anderen. Diejenigen Sorten, die in dem Dendrogramm eine hohe Ähnlichkeit aufweisen, werden zusätzlich durch genetische Methoden geprüft, um feststellen zu können, ob es sich um genetisch verwandte Sorten oder gar Synonyme handelt.

Schlüsselbegriffe: *V. vinifera*, ampelographie, autochthone Weinrebsorten

INTRODUCTION

Grapevine has been grown in Croatia since ancient times. This is especially through for Dalmatia winegrowing region where it was possible to find several hundred cultivars at the end of 19th century and most of them were considered to be autochthonous (Bulić, 1949). Today more than 80 native cultivars are registered in the official Croatian cultivar list, while an additional 50 rare genotypes remain underutilized, primarily due to the lack of good quality propagation material and the insufficient knowledge about their genetic and oenological potential.

National collection of native grapevine cultivars was founded in year 2001 at the experimental station of the Faculty of Agriculture University of Zagreb, "Jazbina". Most of the cultivars present in this collection were gathered during the project "Inventarisation and revitalization of native grapevine cultivars" financed by Ministry of science, education and sport from 2001 to 2006.

Nowadays most of these cultivars are not economically important and there is a serious threat of their extinction outside this collection. For all cultivars present in collection it is possible to produce initial planting material in case of interest for their commercial growing. Although for the most cultivars in collection it is not possible to make proper evaluation of their economically important characteristics because they originated from coastal region with different climatic condition, all cultivars are thoroughly described and small breeding program is being started within germplasm present in collection.

Ampelographic and genetic characteristics of some native grapevine varieties were subject of some earlier researches (Zdunić et. al. 2008, Maletić et. al. 1999, 2004.) but they did not included all of the cultivars present in National collection of native grapevine varieties.

The main goal of this research was to determine level of ampelographic variability between Croatian native grapevine varieties present in the collection.

MATERIALS AND METHODS

In this research 95 Croatian native grapevine cultivars from National collection of native grapevine cultivars have been included. Every cultivar in collection is represented with five vines that were propagated from one mother vine discovered during the inventarisation of Croatian winegrowing regions. Most of the cultivars originated from coastal region of Croatia but some of them have been found in continental region.

Collection is placed in Zagreb (continental region) with moderate climatic conditions. All of the cultivars are grafted on rootstock *V. berlandieri* x *V. riparia* SO4. Ampelographic description was performed in years 2007 and 2008. 39 OIV descriptors for grapevine qualitative traits (Tab. 1) have been chosen and hierarchical cluster analysis has been performed on dataset from 95 cultivars. Dendrogram was plotted using unweighted pair-group average method (UPGMA) with the Squared Euclidean distance.

Table 1 List of OIV descriptors used in his research

OIV	Descriptor
1	Young shoot: opening of the shoot tip
3	Young shoot: intensity of anthocyanin coloration of prostrate hairs on the shoot tip
4	Young shoot: density of prostrate hair on the shoot tip
6	Shoot: attitude (before tying)
7	Shoot: color of the dorsal side of the internodes
8	Shoot: color of the ventral side of the internodes
15-1	Shoot: distribution of anthocyanin coloration on the bud scales
15-2	Shoot: intensity of anthocyanin coloration on the bud scales
16	Shoot: Number of consecutive tendrils
51	Young leaf: color of upper side of blade (4th leaf)
53	Young leaf: density of prostrate hairs between main veins of lower side of blade (4th leaf)
67	Mature leaf: shape of blade
68	Mature leaf: number of lobes
70	Mature leaf: area of anthocyanin coloration of main veins on upper side of blade
72	Mature leaf: gossamer of blade
74	Mature leaf: profile of blade in cross section
75	Mature leaf: blistering of upper side of blade
76	Mature leaf: shape of teeth
79	Mature leaf: degree of opening/overlapping of petiole sinus
80	Mature leaf: shape of base of the petiole sinus
81-1	Mature leaf: presence of teeth in petiole sinus
81-2	Mature leaf: petiole sinus base limited by vein
83-2	Mature leaf: teeth in upper lateral sinus
84	Mature leaf: density of prostrate hairs between main veins on lower side of blade
87	Mature leaf: density of erect hairs on main veins of blade
151	Flower: sexual organs
153	Shoot: Number of bunches per fertile shoot
155	Shoot: Fertility of basal buds (buds 1-3)
202	Bunch: length
204	Bunch: density
206	Bunch: length of peduncle of primary bunch
208	Bunch: shape
209	Bunch: number of wings on the primary bunch
223	Berry: shape
225	Berry: color of skin
230	Berry: color of flesh
235	Berry: firmness of flesh
236	Berry: particular flavor
241	Berry: formation of seeds

RESULTS AND DISCUSSION

Dendrogram plotted using 39 OIV descriptors result on 95 cultivars is shown in fig. 1. It can be observed that cultivar Dobričić from island of Šolta and Frmentun (from island of Korčula) show highest level of difference from all the other cultivars. Rests of the cultivars are separated in two large clusters. The first cluster shows 6 pairs of cultivars with high level of similarity (98-99%). First three pairs that are showing difference at the level of 1% are Tanetova loza and Vlaška bijela (differs in 6 descriptors) and Palaruša viška and Žlahtina as well as Prč and Žumić (differs in 7 descriptors).

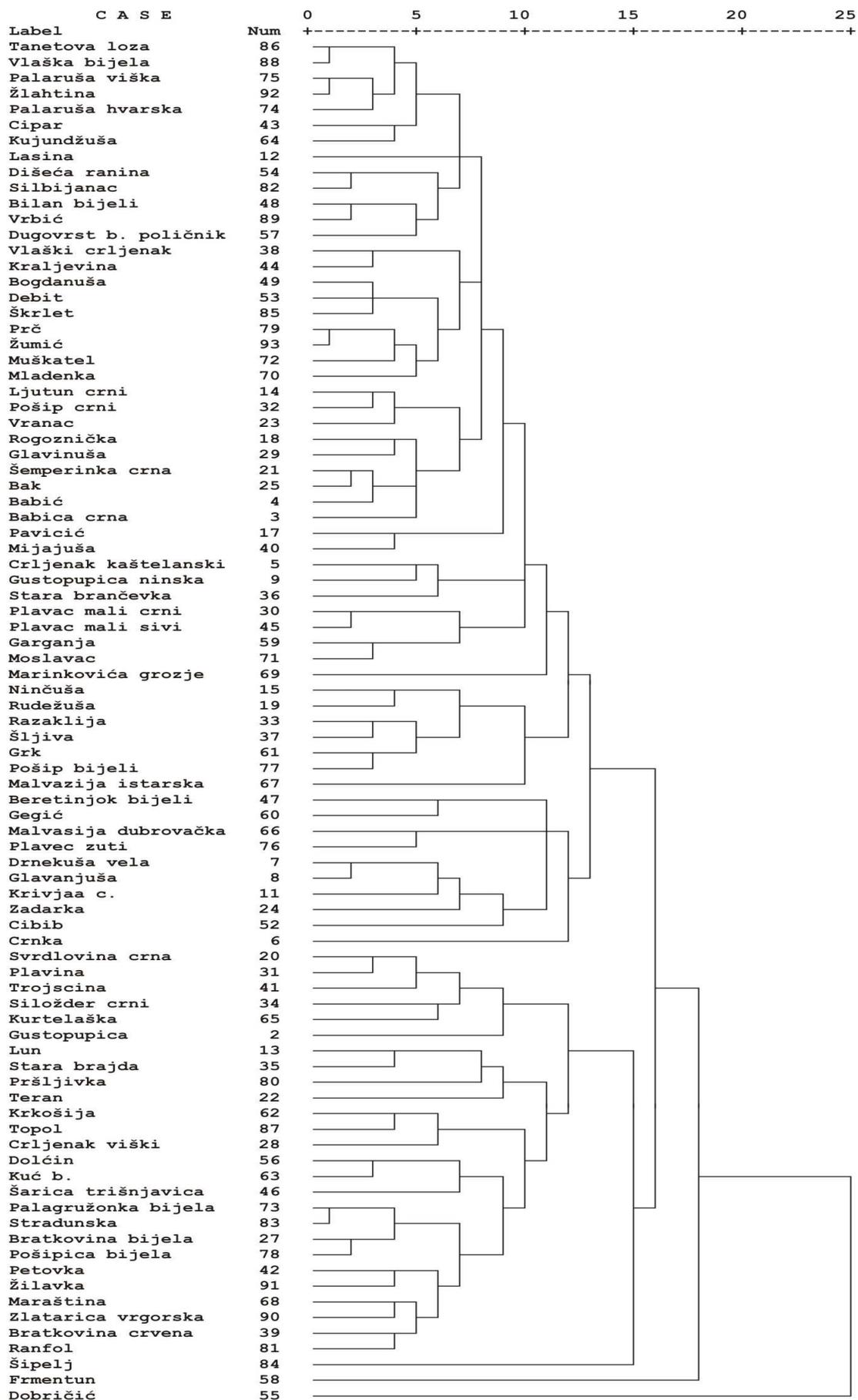


Figure 1 Dendrogram obtained from results of OIV description of grapevine cultivars in National collection of native grapevine cultivars in Jazbina (Zagreb)

In the first cluster cultivar pairs Dišeća ranina and Silbijanac, Bilan bijeli and Vrbić, Drnekuša vela and Glavanjuša (with differences in 10 descriptors), and Plavac mali crni and Plavac mali sivi (with differences in 8 descriptors) differs from each other at the level of 2%. Although Plavac mali sivi is actually a clone of Plavac mali crni with mutation in berry skin color from red to grey, some other differences, mostly regarding the level of anthocyanin coloration of shoot tip, shoot, and buds, can be observed, too. In second cluster only one pair of cultivars is showing difference at the level of 1% and one pair at the level of 2%. The highest similarity is present between cultivars Palagružonka bijela and Stradunska (differs in 6 descriptors) followed by cultivars Bratkovina bijela and Pošipica bijela (differs in 10 descriptors). Rest of the cultivars in both clusters is showing different levels of similarity but in all cases higher than the 4%.

Although high level of similarity between some cultivars has been obtained in this analysis we still cannot claim that they are synonymous without performing additional genetic analyses. Despite of that it is interesting to notice that for cultivar Plavac mali crni and its clone Plavac mali sivi no difference in microsatellite analysis using set of 10 SSR makers and five combination of primers in AFLP analysis has been obtained (Preiner, 2006) but they can be easily differs by simple ampelographic description (berry color).

CONCLUSION

Results of ampelographic description of cultivars in National collection in Zagreb and hierarchical cluster analysis show different level of similarity/difference between them. Morphologically most distinct varieties but also cultivars that are possible synonyms can be determined this way. For cultivar-pairs that show high level of morphological similarity additional genetic analyses will be performed.

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