

Ampelographic Characterization and Sanitary Status of Grapevine Cultivar 'Prč bijeli' (*Vitis vinifera* L.)

Goran ZDUNIĆ ¹

Katarina HANČEVIĆ ¹

Barbara SLADONJA ²

Danijela POLJUHA ²

Danijela HARTL-MUSINOV ¹

Irena BUDIĆ-LETO ¹

Lovre BUČAN ¹

Ivan PEZO ¹

Summary

'Prč bijeli' is an old Croatian autochthonous grapevine cultivar (*Vitis vinifera* L.), which has not been ampelographically characterized in detail until now. Ampelographic description was performed following 52 morphological, 22 phyllometric and seven bunches dimension characteristics. 'Prč bijeli' showed acceptable yield and a must composition suitable for oenological purposes, with low acidity value and medium sugar content. The following synonyms were established: 'Ćimavica', 'Parč' and 'Muškat'. The results of sanitary analysis (ELISA test on four viruses) on twenty-seven vines revealed that 92.6 % samples were GLRaV-3 positive, while ArMV was not detected. Only one vine was free of the tested viruses.

Key words

Prč bijeli, autochthonous cultivar, ampelography, grapevine viruses

¹ Institute for Adriatic Crops and Karst Reclamation, Put Duilova 11, 21000 Split, Croatia

✉ e-mail: goran.zdunic@krs.hr

² Institute for Agriculture and Tourism, C. Hugues 8, 52440 Poreč, Croatia

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Introduction

'Prč bijeli' is a rare and almost forgotten Croatian autochthonous grapevine cultivar (*Vitis vinifera* L.). It is cultivated on the Island of Hvar (central Dalmatia), mostly in mixed plantations. It is used in the production of quality white wines to improve their aroma. The first written records of 'Prč bijeli' was published by Bulić (1949), who classified it as one of the muscat cultivars on the basis of its discrete muscat flavour. Recently, Mirošević and Turković (2003) also published its short ampelographic description. Benjak et al. (2005) analysed 'Prč bijeli' using molecular markers (RAPDs with eight primers and SSRs on eight loci) and proved it to be unique and different from all previously described Croatian cultivars. However, 'Prč bijeli' has not been ampelographically characterized in detail as well as many other old cultivars present in Dalmatia.

In the last few years, Croatia has implemented a project on making an inventory of autochthonous grapevine cultivars, and complete screening of their characteristics is being performed (Maletić et al., 1999; Pejić et al., 2000). Process of revitalization of some neglected cultivars with production potential, like 'Prč bijeli', has been started and is now being in progress.

In this work ampelographic characterization and sanitary analysis of 'Prč bijeli' were performed with the aim to preserve this cultivar from further extinction and enable its revalorisation.

Material and methods

Experimental vineyard was located near the town of Sućuraj, on the Island of Hvar. It was established in 1994 by green grafting technique using cuttings from the old surrounding vineyards. Vines were trained in gobelet style with distance of 1.20x1.0 m. Samples of ten vines were chosen for ampelographic evaluation using OIV descriptors (OIV 1983), modified by the Project GENRES 081 (2001) in the period from 2003 to 2005. Fifty-two descriptors from OIV list were utilized, embracing young shoot, mature leaf, inflorescence, bunch and berry morphology, and phenology. In 2004, additional 22 phyllometric and seven variables of bunches were measured.

Evaluation of sanitary status included 27 representative vines. They were in good vigour without visual symptoms of viral diseases. The presence of four viruses (*Grapevine Fanleaf Virus* (GFLV), *Arabis Mosaic Virus* (ArMv), *Grapevine Leafroll associated Viruses 1 and 3* (GLRaV-1 and GLRaV-3) was detected by *Enzyme-Linked Immunosorbent Assay* (ELISA) test (Boscia et al., 1997).

Results and discussion

General characteristics: Beside standard cultivar name – 'Prč bijeli', some synonyms derived from characteris-

tic muscat flavour were recorded ('Ćimavica', 'Parč' and 'Muškat'). The centre of origin of 'Prč bijeli' is the Island of Hvar (Bulić, 1949), although there is a possibility of its early introduction from the Mediterranean area where Muscat cultivars ("Apiane") have been numerous and well known since ancient times (Molon, 1906). The highest production of 'Prč bijeli' was at the end of 19th century (Anić, 2000) but nowadays it is endangered.

Must composition of 'Prč bijeli' (average results from the period 2003-2005) was as follows: sugar 84°Oe (OIV505-5), total titratable acids 4.3 g/L (OIV-506-3) and pH value 3.71 (OIV508-7). Average yield per vine was 2.3 kg (OIV504-5). Time of bud burst was between 12 and 15 March (OIV301-5), full flowering 24 and 30 May (OIV-302-5), veraison 15 and 20 July (OIV303-5) and full maturity between 15 and 20 September (OIV304-5).

Ampelographic description: *Young shoot*: opened shape of the tip (OIV001-7); absence of anthocyanin coloration on prostrate hairs of the tip (OIV003-1); none density of hairs of the tip (OIV004-1). *Young leaf*: green colour of the upper side with very sparse density of prostrate hairs between veins at the lower side (OIV051-1, OIV053-1). *Shoot*: semi-erect attitude (OIV006-3); green colour of dorsal and ventral sides of internodes (OIV007-1, OIV008-1); absent distribution of the anthocyanin coloration on the bud scales (OIV015-1-1, OIV015-2-1); medium fertility of basal buds (OIV-155-5) and medium vigour of shoot growth (OIV351-5). *Tendrils*: discontinuous distribution on the shoot (OIV016-1). *Inflorescence*: hermaphrodite type of flower (OIV151-3). *Mature leaf*: pentagonal shape of blade with five lobes (OIV067-3, OIV068-3); absent anthocyanin coloration of the main veins on the upper side of the blade (OIV070-1); weak goffering of blade (OIV072-3); rolled profile (OIV074-5); weak blistering of the upper side (OIV075-3); rectilinear shape of teeth (OIV076-2); V-shape of base of petiole sinus and slightly open (OIV079-3, OIV080-3); no teeth in the petiole sinus (OIV081-1-1); petiole sinus limited by veins on both sides (OIV081-2-3); no teeth at the base of the upper leaf sinuses (OIV083-2-1); none or very weak density of prostrate hairs between and on the main veins (lower side) (OIV084-1, OIV087-1); very little resistance to *Plasmopara* and *Oidium* (OIV452-1, OIV455-1). The measurements showed the relative equalized form and size of the leaves (Table 1). *Bunch*: short (OIV202-3); dense (OIV204-7); very short peduncle (OIV206-1); narrow conical shape (OIV208-2); 1-3 wings (OIV209-2); weight of single bunch 227.96 g (OIV502-3); little resistance to *Botrytis* (OIV459-3). *Berry*: roundish (OIV223-2); green-yellow (OIV225-1); flesh not colored (OIV230-1) and medium firm (OIV235-5); Muscat flavour (OIV236-2); seeds fully developed (OIV241-3); weight of single berry 2.19 g (OIV503-3). Results of bunch dimension analysis are shown in Table 2.

Table 1. Phyllometric data of 22 leaf parameters of 'Prč bijeli' measured on 10 mature leaves

Code OIV	Characteristic	Mean	Cv (%)
1000	Area of leaf (cm ²)	192.0	21.37
1001	Length of leaf (mm)	183.9	9.35
1002	Width of leaf (mm)	177.4	8.81
1003	Length of petiole (mm)	98.4	35.77
601	Length of vein N1 (mm)	130.2	8.87
602	Length of vein N2 (mm)	114.0	7.35
603	Length of vein N3 (mm)	81.6	11.02
604	Length of vein N4 (mm)	52.0	13.49
605	Length from petiole sinus to upper leaf sinus (mm)	75.7	15.52
606	Length from petiole sinus to lower leaf sinus (mm)	63.3	15.43
607	Angle between N1 and N2 measured at the first ramification (°)	52.5	7.81
608	Angle between N2 and N3 measured at the first ramification (°)	48.4	9.76
609	Mature leaf: angle between N3 and N4 (°)	74.1	9.25
610	Angle between N3 and the tangent between petiole point and the tooth tip of N5 (°)	85.3	9.57
612	Length of teeth N2 (mm)	15.3	16.19
613	Width of teeth N2 (mm)	14.4	15.52
614	Length of teeth N4 (mm)	11.7	13.44
615	Width of teeth N4 (mm)	14.1	16.02
616	Number of teeth between the tooth tip of N2 and the tooth tip of the first secondary vein of N2	6.5	14.95
617	Length between the tooth tip of N2 and the tooth tip of the first secondary vein of N2 (mm)	59.3	10.58
664	Length of vein N5 (mm)	26.5	16.85
665	Vein N3, length from petiole sinus to vein N4 (mm)	10.7	16.69

Table 2. Dimension of bunches data of seven parameters of 'Prč bijeli' measured on 10 bunches and 100 berries

Characteristic	Mean	Cv (%)
Bunch length (cm)	13.45	15.43
Bunch width (cm)	8.94	18.68
Bunch weight (g)	227.96	33.33
Berries weight (g)	219.05	33.84
Number of berries	124.70	25.84
Berry length (mm)	13.03	15.23
Berry width (mm)	13.42	14.21

Sanitary status: The high incidence of viruses in the field samples was revealed by ELISA test (Table 3). Only one (PRC18) out of 27 selected vines was free of the tested viruses. ArMV was not detected. The most common infection was with GLRaV-3 (92.6%) followed by GLRaV-1 (63%), which coincides with the results already obtained

Table 3. ELISA results of 27 vines of 'Prč bijeli' cultivar tested for the presence of *Grapevine Fanleaf Virus* (GFLV), *Arabid Mosaic Virus* (ArMV), *Grapevine Leafroll associated Virus 1 and 3* (GLRaV-1 and GLRaV-3).

Code of Vine	ArMV	GFLV	GLRaV-1	GLRaV-3
PRC 1	-	-	+	+
PRC 2	-	-	-	+
PRC 3	-	-	-	+
PRC 4	-	-	-	+
PRC 5	-	-	+	+
PRC 6	-	-	+	+
PRC 7	-	-	-	+
PRC 8	-	-	-	+
PRC 9	-	-	+	+
PRC 10	-	-	+	+
PRC 11	-	+	+	+
PRC 12	-	-	+	+
PRC 13	-	-	-	+
PRC 14	-	-	+	+
PRC 15	-	-	+	+
PRC 16	-	-	-	+
PRC 17	-	+	-	-
PRC 18	-	-	-	-
PRC 19	-	-	+	+
PRC 20	-	-	-	+
PRC 21	-	-	+	+
PRC 22	-	-	+	+
PRC 23	-	-	+	+
PRC 24	-	-	+	+
PRC 25	-	-	+	+
PRC 26	-	-	+	+
PRC 27	-	+	+	+

on other cultivars in Croatian viticultural regions (Poljuha et al., 2004; Zdunić et al., 2007). The occurrence of GFLV was confirmed in 11.1% of samples.

Conclusion

A detailed ampelographic description of Croatian autochthonous cultivar 'Prč bijeli' was done for the first time. This cultivar showed satisfactory production potential which will be further investigated and compared with other autochthonous Dalmatian cultivars in ampelographic collection.

Considering that only one vine (PRC18) was virus free and that frequency of virus infection was high (92.6% of GLRaV-3 positive samples), it would be essential to conduct complex procedure of clonal selection with a final goal of obtaining certified propagation material.

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