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AMPELOGRAPHIC CHARACTERIZATION OF SOME CHASSELAS DORÉ ELITE CLONAL ACCESSIONS

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Abstract
Four elite clonal accessions of Vitis vinifera L., Chasselas doré variety were identified in a very old plantation, of 110 years, located in Valea Călugărească, on the St. Nicolas Monastery vineyard. The vines, grafted on the SO4 (Selection Oppenheim 4) rootstock, were planted in 2007 in the germplasm collection belonging to the Research and Development Institute for Viticulture and Enology, Valea Călugărească. The present study aimed to evaluate these elite clonal accessions from ampelographic point of view, in comparison with Chasselas doré variety.
Ampelographic characterization of genotypes was performed according to the descriptors ampelographic methodology, based on the specifications made in the OIV Descriptor List for Grape Varieties and Vitis species, Second Edition (2009). The shoot tips descriptions were made when they were approximately 10 to 30 cm in height and, in this stage, also, the first four distal leaves of young leaves were evaluated. Mature leaf descriptions were carried out between berry set and veraison. The clusters and berry characteristics were evaluated at maturity and woody shoots were analyzed after fall of the leaves. Ampelographic characterization was performed based on 59 descriptors, of which 43 for morphological characters and 16 for agro-biological attributes.

Keywords: ampelography, germplasm, grape cultivars, grapevine, morphological characteristic.

1. INTRODUCTION

The ampelographic characterization of vine varieties and species of Vitis is a basic methodology used for grapevine cultivar characterization (Alleweldt and Dettweiler, 1986; Agaoglu et al., 1989; Ecevit and Kelen, 1999; Martinez and Perez, 2000; Ates, 2011; Rotaru and Mustea, 2011; Popescu et al., 2015).
This methodology is complemented with aminoacid analysis (Asensio, 2002), and molecular markers analysis based mainly on microsatellites studies, for identification and characterization of grape cultivars. The International Organisation of Vine and Wine (OIV) provides a list of morphological descriptors and recommends the analysis of six microsatellite loci for cultivar identification (Zulini et al., 2005; OIV, 2009; Maletić et al., 2015; Drori et al., 2015, 2017).
In this study, ampelographic characterization based on the OIV Descriptor List for Grape Varieties and Vitis species of four Chasselas Doré elite clonal accessions was made in order to establish their characteristics, so the most valuable of them could be omologated in the future.

2. MATERIALS AND METHODS

This study was performed in the Dealu Mare vineyard, Valea Călugărească viticultural center, at ampelographic collection of the Research and Development Institute for Viticulture and Enology.

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The plant material used in this study consisted in four elite clonal accessions of *Vitis vinifera* L., Chasselas doré variety, which were obtained by propagation of 110 year old grapevines, identified in a plantation located in Valea Cãlugãreascã, on the St. Nicolas Monastery vineyard. The vines, grafted on the SO4 (Selection Oppenheim 4) rootstock were planted in 2007. The vines were spaced at 2.2 m x 1.2 m and pruned in bilateral cordon. The elite clonal accessions have been coded E1 19-4-2; E2 24-5-1; E3 25-5-1; E4 4-3-2.

Ampelographic characterization of genotypes was performed according to the descriptors ampelographic methodology, based on the specifications made in the OIV Descriptor List for Grape Varieties and Vitis species, Second Edition (2009), the notation being done through attribution of figures depending on the level of expression.

In total, 59 ampelographic descriptors were recorded, of which 43 for morphological characters and 16 for agro-biological attributes.

The observations concerning the shoot tip, tendrils, young leaf and young shoots were performed before the blossoming phenopase. The shoot tips descriptions were made when they were approximately 10 to 30 cm in height and, in this stage, also, the first four distal leaves of young leaves were evaluated. Mature leaf descriptions were carried out between berry set and veraison. Ten mature leaves were collected randomly from the middle third of 10 shoots (one sample/one plant) and evaluated for 15 phylometric traits. The clusters and berry characteristics were evaluated at maturity and woody shoots were analyzed after the fall of the leaves.

3. RESULTS AND DISCUSSIONS

The ampelographic characteristics of shoots, young and mature leaves that differentiate the genotypes taken into study are selectively presented in Table 1.

The rosette has a green redish color and is covered by squamas. The shoot tip is fully open and slightly covered with flat-lying hairs. The distribution of anthocyanin coloration on prostrate hairs of the shoot tip is overall at Chasselas doré, E2 24-5-1 and E3 25-5-1. No anthocyanin coloration on prostrate hairs of the shoot tip was observed in case of E1 19-4.2 and E4 4-3-2 elites.

The intensity of anthocyanin coloration on prostrate hairs of the shoot tip is very low at E1 19-4.2, E3 25-5-1 and E4 4-3-2 and medium to high at Chasselas doré and E2 24-5-1.

The density of prostrate hairs on the shoot tip is very low at E4 4-3-2, low at Chasselas doré and medium at E1 19-4.2; E2 24-5-1 and E3 25-5-1.

The shoot is horizontal before tying. The elite E3 25-5-1 has the color green, both on the dorsal and on the ventral sides of internodes. Elite E1 19-4-2 is green on the dorsal side of internodes and green and red on the ventral one. The other genotypes presented green and red, both on the dorsal and on the ventral sides of internodes.

The young leaf (4 th leaf) are glossy, with a corrugated limb, 5-lobed, with deep sinuses. The color of the upper side of blade is dark cooper redish at Chasselas doré, green yelowish at E4 4-3-2 and bronzed at the other elites. The density of prostrate hairs between main veins on lower side of blade is very low at Chasselas doré, low at E3 25-5-1 and medium to the other three elites. The erect hairs on main veins on lower side of blade are medium in density at all genotypes.

The mature leaf is of medium size with the exception of E3 25-5-1, which presented a big one. The blade is pentagonal shaped, with five, rarely three lobes. The teeth are small, with convex edges, slightly rounded. Tendrils are very long, green yellowish. Those on the top of the shoots have a green amber color.

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The upper lateral sinuses are deep, opened, slightly overlapped at Chasselas doré, E1 19-4.2 and E4 4-3-2.
The petiole sinus is opened or slightly overlapped, with the base braced or U shaped.
The flower is normaly hermaphrodite, on type 5, all the genotypes being self-fertile, with fully developed stamens and fully developed gynoecium.

Table 1. Ampelographic descriptors of shoots, young and mature leaves

OIV code	Characteristics	Notation of character		Expression of character				
				Chasselas dore	E1 19-4-2	E2 24-5-1	E3 25-5-1	E4 4-3-2
001	Young Shoot: aperture of tip	fully open	5	x	x	x	x	x
002	Young Shoot: distribution of anthocyanin coloration on prostrate hairs of tip	absent	1		x			x
		overall	3	x		x	x	
0.03	Young Shoot: intensity of anthocyanin coloration on prostrate hairs of tip	none or very low	1		x		x	x
		medium to high	5 - 7	x		x		
004	Young Shoot: density of prostrate hairs on tip	none or very low						x
		low		x				
		medium			x	x	x	
006	Shoot: attitude (before tying)	horizontal	5	x	x	x	x	x
007	Shoot: color of dorsal side of internodes	green	1		x		x	
		green and red	2	x		x		x
008	Shoot: color of ventral side of internodes	green	1				x	
		green and red	2	x	x	x		x
051	Young leaf: color of the upper side of blade (4 th leaf)	bronze	3		x	x	x	x
		copper-redish	4	x				
053	Young leaf: density of prostrate hairs between main veins on lower side of blade (4th leaf)	none or very low	1	x				
		low	3				x	
		medium	5		x	x		x
065	Mature leaf: size of blade	medium	5	x	x	x		x
		large	7				x	
067	Mature leaf: shape of blade	pentagonal	3	x	x	x	x	
		pentagonal-circular	3-4					x
068	Mature leaf: number of lobes	five	3	x	x	x	x	x
074	Mature leaf: profile of blade in cross section	plan	1	x	x	x	x	x
075	Mature leaf: blistering of upper side of blade	absent or very weak	1	x				
		weak	3		x	x	x	x
079	Mature leaf: degree of opening / overlapping of petiole sinus	open	3	x		x	x	x
		overlapped	7		x			
080	Mature leaf: shape of base of petiole sinus	U-shaped	1			x		
		brace-shaped	2	x			x	x
		V-shaped - orbiculare	3		x			

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082	Mature leaf: degree of opening / overlapping of upper lateral sinus	open	1	x	x	x	x	x
		slightly overlapped	1-3	x	x			x
084	Mature leaf: density of prostrate hairs between main veins on lower side of blade	none or very low	1	x	x	x	x	x
087	Mature leaf: density of erect hairs on main veins on lower side of blade	none or very low	1				x	x
		low	3	x	x	x		
094	Mature leaf: depth of upper lateral sinuses	medium - deep	5-7				x	x
		deep	7	x	x	x		
151	Flower: sexual organs	fully developed stamens and fully developed gynoecium.	3	x	x	x	x	x

The ampelographic characteristics of bunches and berries are selectively presented in Table 2.
The bunch has conical (Chasselas doré) or cylindro-conical (elite clonal accessions) shape. From the point of view of compactness, the grape is lax to medium (3-5 degree of expression) at Chasselas doré, lax at E1 19-4-2 and medium to the other elites.
Grapes are short to medium in size at Chasselas doré, with an average length (peduncule excluded) of 126 mm, with variations between 100 mm and 147 mm. At the clonal elites, the bunches have a smaller length (peduncle excluded) with 1.27% (E3) – 19.11% (E2) while the weight is higher with 14.43% (E2) – 66.15% (E3), due to the berries structure. The berries are bigger with a higher weight that exceeds the control with 27.18% (E1) – 46.15% (E4).
The berry is medium in size and have spherical shape at Chasselas doré, ellipsoidal shape at E1 19-4.2, E3 25-5-1 and E4 4-3-2 elites and obloid shape at E2 24-5-1. The average length of the bery is 14.04 mm at Chasselas doré, and between 15.60 and 16.70 at elites. The detachment of berry from pedicel is difficult.
The skin is firm, of a green yelowish tint, with an amber color on the sunny side. The flesh is very melting, white, slightly green, with abundant juices, with an agreable and plesant taste.
The sugar content of the must is medium (18%) at Chasselas doré and very high at the elite clonal accessions (over 30%).
Compared to Chasselas doré, the elite clonal accession E1 19-4.2 is highlighted, with a high degree of crunchy and a specific, slightly aromatic flavor.

Table 2. Ampelographic descriptors of bunches and berries

OIV code	Characteristics	Notation of character		Expression of character				
				Chasselas dore	E1 19-4-2	E2 24-5-1	E3 25-5-1	E4 4-3-2
202	Bunch: length (peduncle excluded)	short -medium	3-5	x				
		short	3		x	x	x	x
204	Bunch: density	loose-medium	3-5	x	x			
		medium	5			x	x	x
206	Bunch: length of peduncle of primary bunch	short	3	x	x	x	x	x
208	Bunch: shape	conical	2	x				
		cylindro-conical	1-2		x	x	x	x

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209	Bunch: number of wings of the primary bunch	1-2 wings	2	x	x	x	x	x
220	Berry: length	short -medium	3-5			x		
		medium		x	x		x	x
221	Berry: width	narrow-medium	3-5	x	x	x	x	x
223	Berry: shape	obloid	1			x		
		globose	2	x				x
		narow ellipsoid	4		x		x	
225	Berry: color of skin	green yellow	1	x	x	x	x	x
231	Berry: intensity of the anthocyanin coloration of flesh	none or very weak	1	x	x	x	x	x
235	Berry: firmness of flesh	slightly firm	2	x				
		very firm	3		x	x	x	x
236	Berry: particularity of flavor	none	1				x	
		other flavor than muscat, foxy or herbaceous	5	x	x	x		x
240	Berry: ease of detachment from pedicel	difficult	3	x	x	x	x	x
241	Berry: formation of seeds	complete	3	x	x	x	x	x

4. CONCLUSIONS

Based on the results presented in this study, some differences were observed among the investigated ampelographic characters. Characters such us the distribution of anthocyanin coloration on prostrate hairs of the shoot, the intensity of anthocyanin coloration on prostrate hairs of the shoot tip, color of dorsal and ventral side of internodes, shape of base of petiole sinus of mature leaf, density of erect hairs on main veins on lower side of blade varied among the cultivars. The weight of the bunches and berries, as well as the capacity of sugar accumulation during ripening greatly varied between Chasselas doré and the elite clonal accessions. Grapes are short to medium in size at Chasselas doré. At the clonal elites, the bunches have a smaller length with 1.27% (E3) – 19.11% (E2) while the weight is higher with 14.43% (E2) – 66.15% (E3), due to the berries structure. The berries are bigger with a higher weight that exceeds the control with 27.18% (E1) – 46.15% (E4).

The sugar content of the must is medium (18%) at Chasselas doré and very high at the elite clonal accessions (over 30%).

Compared to Chasselas doré, the elite clonal accession E1 19-4-2 is highlighted, with a high degree of crunchy and a specific, slightly aromatic flavor.

The elites will be further studied for confirming the genetic stability and to propose the most competitive for homologation.

5. ACKNOWLEDGEMENTS

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