

Research Note

Characterization of main grapevine varieties of Albania and Kosovo based on molecular data

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Introduction: Since antiquity in Albania and Kosovo several grapevine varieties of quality have been grown. During the last decade enlargement of the production area and study of agronomical and molecular characteristics of main varieties are considered important tasks in both countries, where traditional methods for their identification were used to investigate their morphological characteristics (SHUNDI and OSJA, 2004; SUSAJ *et al.* 2003), and the climatic conditions related to areas suitability for grapevine cultivation were investigated as well (KORONICA *et al.* 2005, CENA 2005). Microsatellite profiles were also obtained for several varieties from Albania according to LADOUKAKIS *et al.* (2004). Nevertheless, numerous varieties are named locally and some are even not studied. The overall objectives of this study were the identification of the main local grapevine germplasm of Albania and Kosovo by obtaining their microsatellite genetic profiles, and the assessment of the true-to-typeness of the *Vitis* genetic resources from Albania and Kosovo in order to define the extent of diversity in collections and provide unique identification to each variety. The results will be useful to establish the *Vitis* Database for Albania and Kosovo grapevine varieties in the near future.

Material and Methods: The genomic DNA was extracted from fresh leaves of 53 grapevine varieties from Albania and 18 from Kosovo as listed in the Table. Ten loci were studied in all accessions: VrZAG62, VrZAG67, VrZAG79, VVMD5, VVMD7, VVMD25, VVMD27, VVMD28, VVMD32, VVS2 (THOMAS and SCOTT 1993; BOWERS *et al.* 1996, 1999; SEFC *et al.* 1999) following the molecular methodology of IBANEZ *et al.* 2003. The capillary electrophoresis of the amplified products was completed in a 16-capillary Genetic Analyzer (Applied Biosystems), equipped with SAGA^{GT} software. Three cultivars

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Table

List of investigated grapevine varieties from Albania and Kosovo

Albania	Kosovo	Reference varieties
Kallmet i Todrit	Kec of Rahovec	Chardonnay
Tajke e kuqe	Melik of Rahovec	Pinot noir
Rrush roze	Vranc of Rahovec	Teleki
Gjyle	Thanz i kuq i Rahovec	
Puka	Thanz i zi i Rahovec	
Rrush i Shabes	Prokup of Rahovec	
I kuq i Balshajve	Kec of Gjakova	
Karuk	Melik of Gjakova	
Mete	Vranc of Gjakova	
I kuq i Hekalit	Thanz i kuq of Gjakova	
Kumbullor	Thanz i zi of Gjakova	
Durrsak i bardhe	Prokup of Gjakova	
Qelibar i bardhe	Kec of Prizren	
Koteke e bardhe	Melik of Prizren	
Sinanbel	Vranc of Prizren	
Rrush Burrëli	Thanz i kuq of Prizren	
Tajke e zeze	Thanz i zi of Prizren	
Rrush vere	Prokup of Prizren	
I bardhi cipeforte		
Stambollesh		
Gomaresh		
I rrubullaket i vone		
Krakie		
Debine e zeze		
Kasinjot		
Koteke e zeze		
Pulez		
Rrush Zhepove		
Rrush i Hodos		
Dimerak		
Kazarka		
Tajke e Licit		
Kallmet		
Meresnik		
Serine e bardhe		
Debine e Leskovikut		
Rrush kishe		
Laraciku		
Tajke e zeze Tirane		
Razaki e kuqe		
Shesh i bardhe		
Debine Permeti		
I bardhi cipeholle		
Tajke roze		
Sheshi i zi		
Vlosh		
Tajke e bardhe		
Korrith i bardhe		
Serine e zeze		
Debine e bardhe		

of the binning set of the Institute of Agrobiotechnology at CERTH (Greece) 'Pinot noir', 'Chardonnay', and 'Teleki' were used as reference samples. The microsatellite profiles were used for the statistical analysis of the genetic similarities via Ward's method for hierarchical clustering using JMP11 software.

Results and Discussion: The analysis of hierarchical clustering of microsatellite profiles presented in the Figure clarified a number of issues regarding Albanian and Kosovo grapevine varieties as follows: fifty-one and sixteen unique profile, respectively, for Albanian and Kosovo va-

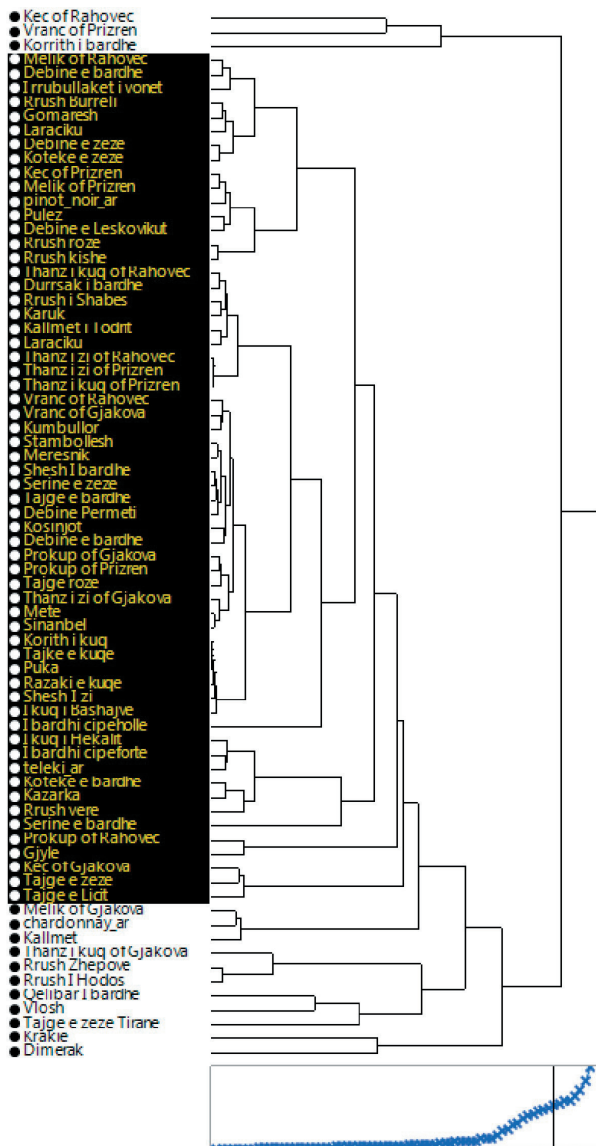


Figure: Dendrogram of similarity among microsatellite profiles of 71 grapevine accessions from Albania and Kosovo, constructed following Ward's method for hierarchical clustering.

varieties, were identified: synonymous varieties are probably three out of 53 Albanian varieties (the 'Korrih i kuq', 'Tajke e kuqe' and 'Puka'), and three out of 18 varieties of Kosovo ('Thanz i Zi of Rahovec', 'Thanz i Zi of Prizren', and 'Thanz i kuq of Prizren'); Varieties showing a high similarity with reference samples ('Chardonnay', 'Pinot noir' and

'Teleki') were as follows: four out of seventy one to 'Pinot noir' ('Kec of Prizren', 'Melik of Prizren', 'Pulez' from Kosovo and 'Debina e Leskovikut' from Albania), two to 'Chardonnay' ('Melik of Gjakova' and 'Kallmet' from Albania), and two to the Greek cultivar 'Teleki' ('I kuq i Hekalit', and 'I bardhi cipeforte', both from Albania). Regarding the clustering of the pool of varieties, there are two main clusters, which separate three varieties ('Kec of Rahovec', 'Vranc of Prizren' from Kosovo, and 'Korrih i bardhe' from Albania) from the rest; Within the pool of eighteen varieties from Kosovo, 'Kec of Rahovec', 'Vranc of Prizren', 'Prokup of Rahovec', and 'Thanz i Kuq of Gjakova', are the most distant. A probably misnomer is discovered for the varieties 'Thanz i Kuq' and 'Thanz i Zi' of Gjakova, with varieties of Rahovec and Prizren.

Conclusions: Based on the microsatellite loci, the Albanian and Kosovo accessions of grapevine show a great diversity. Only 6 synonyms were pointed out from a pool of 71, respectively three from Albania and three from Kosovo. Four varieties from Kosovo are separated as unique from the total pool of seventy one varieties. Two out of eighteen varieties from Kosovo are probably misnomers. Eight out of 71 varieties might be considered as close to reference samples from the genetic database of CERTH, Greece.

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JMP-Software: Statistical Discovery. <http://www.jmp.com>

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