

Research Note

Ampelographic study of *Vitis vinifera* L. varieties maintained in Shida Kartli (Georgia)

I. MDINARADZE, E. ABASHIDZE, R. CHIPASHVILI,
L. VASHAKIDZE and D. MAGHRADZE

Institute of Horticulture, Viticulture and Oenology, Agricultural
University of Georgia

Key words: Caucasus; ampelography; descriptors; autochthonous varieties; cluster analysis.

Introduction: The ampelographic study of Georgian autochthonous varieties has a long history. A number of scientific investigations have been done in the XX-XXI centuries (TABIDZE 1954, KETSKHOVELI *et al.* 1960, KIKACHEISHVILI 1963, RAMISHVILI 1986, TSERTSVADZE 1987, MAGHRADZE *et al.* 2012). In the last decades, grapevine phenotyping researches have been carried out by the application of various approaches (CERVERA *et al.* 2001, BODOR *et al.* 2013, HERZOG *et al.* 2014). However, characterisation and identification methods are still evolving. In fact, ampelographic descriptions of Georgian cultivars are improving.

The main task of this study was the characterization of grapevine accessions grown in the *ex-situ* collection at Skra experimental station (Skra, Gori district, Shida Kartli, Georgia). The major aim of this research was to obtain precise ampelographic data. Based on these results, it would be possible to improve the level of characterization with multiple traits. Of course, they will be useful data for identification purposes as well.

Material and Methods: **Plant materials:** The plant materials (young and mature shoots, young and mature leaves, flowers, berry and bunch) of 60 Georgian autochthonous accessions preserved in Skra Germplasm repository (FAO code of the collection is GEO015, it is located on 640 m a.s.l. of altitude and geographic location of 41°59'25.20" N; 44°00'03.93" E.) were described in 2013 in the framework of the COST action FA1003 project.

Ampelographic methods: The 48 OIV Descriptors (2007) selected and suggested in the framework of the COST project, have been applied for the accession characterization. The following descriptors were used in this study: OIV - 001, 003, 004, 006, 301 - young shoot; OIV - 007, 008, 016, 155-shoot; OIV - 051, 053 -young leaf; OIV - 067, 068, 070, 072, 074, 075, 076, 079, 080, 081-1, 081-2, 083-2, 084, 087, 094 - mature leaf; OIV 151 - flower; OIV - 202, 204, 206, 208, 209, 502, 504 -

bunch; OIV 220, 221, 223, 225, 231, 235, 236, 241, 303, 503 - berry; OIV 351 -growth vigour; OIV 505, 506, 508 - chemical composition.

After the visual evaluation, all the qualitative and quantitative traits have been turned in scores as suggested by the OIV protocol (2007).

Experimental data analysis: The data were analyzed by descriptive methods (mean, frequencies, percentage of distribution). The variables were standardized by correlation distance matrix (Pearson) and the hierarchical Cluster analysis (UPGMA) was performed for relationship determination between groups. The analysis was carried out by the software package SPSS v.20.0 (SPSS Inc., 2010).

Results and Discussion: The less informative descriptors for cultivar identification resulted to be OIV 001 and OIV 016 (Figure). No differences were found among the accessions because this trait is characteristic in *Vitis vinifera*, and it is variable only within the *Vitis* genus.

The most variable descriptors within the accessions were: OIV 081-2, OIV 084, OIV 087, OIV 094, OIV 155, OIV 204 and OIV 209. For each of these traits, the studied accessions were spread into four groups.

Some accessions appear to be recognizable by distinctive features characteristic of the cultivar. In particular, specific identification traits appeared to be: 'Asuretuli Shavi' - note 1 in OIV 209, 'Budeshuri Tetri' - note 1 in OIV 204, 'Dziganidzis Shavi' -note 5 in OIV 068, 'Grubela' - note 4 in OIV 076, note 9 in OIV 155, 'Djvari' - note 2 in OIV 080, 'Ktsia' - note 7 in OIV 220, 'Saperavi Budeshuriseburi' - note 4 in OIV 223 and note 5 in OIV 23, 'Shavkapito' - note 1 in OIV 223, 'Shavtita' - note 9 in OIV 202, 231 'Tavtsitela' - note 9 in OIV 079, 'Tkvlapa' - note 9 in OIV 204.

According to the cluster analysis, the investigated accessions were grouped into two main groups (Figure). Thus, the obtained groups are expected to be characterized by similar morphological features. High similarities were found between: 'Gorula' and 'Adreuli Tkelkana', 'Khikhvi' and 'Khikvi clone #430', 'Tsnoris Tetri' and 'Djvari'.

Conclusions: This research produced an available ampelographic characterization of the Georgian Grapevine varieties grown in the Skra germplasm repository. The accession distinctive features were determined. In this way, the scientific base for the development of an identification software has been prepared.

This study was done in the framework of the project "Conservation, Research and Breeding Usage of Local Grape Germplasm" of the Agricultural University of Georgia in 2012 and 2013. The article is a joint publication of the COST Action FA1003 "East-West Collaboration for Grapevine Diversity Exploration and Mobilization of Adaptive Traits for Breeding".

Correspondence to: Dr. I. MDINARADZE, Institute of Horticulture, Viticulture and Oenology, Agricultural University of Georgia, David Aghmashenebeli Alley, 13th km – 0159, Tbilisi, Georgia. E-mail: i.mdinaradze@agruni.edu.ge

BODOR, P.; BARANYAI, L.; LADÁNYI, M.; BÁLO, B.; STREVER, A.E.; ISZTRAY, Gy.D.; HUNTER, J.J.; 2013: Stability of Ampelometric Characteristics of *Vitis vinifera* L. cv. 'Syrah' and 'Sauvignon blanc' Leaves: Impact of Within-vineyard Variability and Pruning Method/Bud Load. S. Afr. J. Enol. Vitic. 34, 129-137.

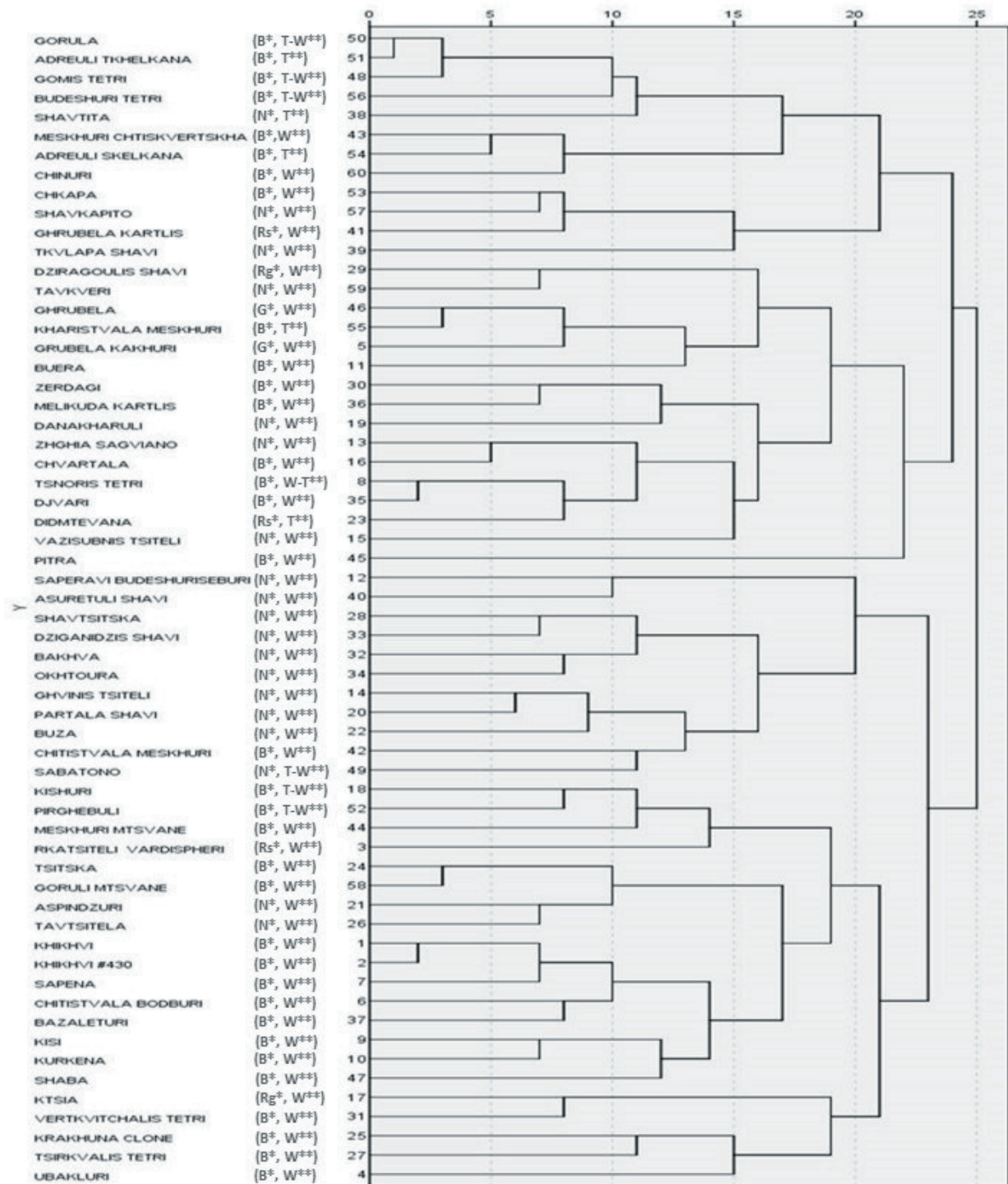


Figure: Hierarchical cluster analysis dendrogram showing the groups of the Georgian accessions according to the 48 OIV Descriptors. (Berry color: B - green-yellow, N - blue-black, G - grey, Rg - dark red violet, Rs - rose. Usage: W - wine, T - table, W-T - wine-table, T-W - table-wine).

CERVERA, M. T.; RODRIGUEZ, I.; CABEZAS, J. A.; CHAVEZ, J.; MARTINEZ-ZAPATER, J. M.; GABELLO, F.; 2001: Morphological and molecular characterization of grapevine accessions known as Albillo. *Am. J. Enol. Vitic.* **52**, 127-135.

HERZOG, K.; ROSCHER, R.; WIELAND, M.; KICHERER, A.; LÄBE, T.; FÖRSTNER, W.; KÜHLMANN, H.; TÖPFER, R.; 2014: Initial steps for high-throughput phenotyping in vineyards. *Vitis* **53**, 1-8.

KETSKHOVELI, N.; RAMISHVILI, M.; TABIDZE, D.; 1960: Saqartvelos ampelography (Ampelography of Georgia), 20-439. Publishing House of the Georgian Academy of Science, Tbilisi, Georgia.

KIKACHEISHVILI, R.; 1963: Qartlis vazis jishebis shescavlisatvis (For study of Grapevine Varieties of Kartli). Publishing House "Sabtchota Sakartvelo", Tbilisi, Georgia. 200-266.

MAGHRADZE, D.; RUSTIONI, L.; TUROK, J.; SCIENZA, A.; FAILLA, O.; 2012: Caucasus and Northern Black Sea Ampelography. *Vitis (Special Issue)*, 177-237.

O.I.V.; 2007: Descriptors for Grapevine Cultivars and *Vitis* Species. O.I.V. (Off. Int. Vigne Vin), Paris, France.

RAMISHVILI, M.; 1986: Ampelography (Ampelography). Publishing House Ganatleba, Tbilisi, Georgia.

TABIDZE, D.; 1954: Kakhitis vazis jishebi (Grapevine Varieties of Kakheti). Publishing house "Technika da shroma", Tbilisi, Georgia.

TSERTSVADZE, N.; 1987: Saqartveloshi gavrcelebuli vazis jishebis sarkvebi (Guide for Determining Grapevine Varieties Spread in Georgia). Publishing House of Inst. Hort., Vitic. Oenol., Tbilisi, Georgia.