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EXPRESSION OF THE MAIN AMPELOGRAPHIC CHARACTERISTICS OF SEVEN AUTOCHTHONOUS GRAPEVINE CULTIVARS GROWN IN DIFFERENT REGIONS OF ALBANIA

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ABSTRACT

Albania is a well-known country of origin of the several autochthonous or indigenous grapevine ecotypes and cultivars, and the wild grapevine. The aim of the study was the ampelographic characterization of seven autochthonous cultivars selected and cultivated over centuries in different locations of central and northeastern Albania. The study was conducted during 17 years (2005-2022), but the study of each cultivar in each location was conducted for three consecutive years to reach the right conclusions. The representative sample of each cultivar was composed of 10 vines, labeled and marked throughout the study period, on 10 leaves for the mature leaf characteristics, and so on. Observed results showed that some characteristics seem to be similarly expressed, while some others were differently expressed. Similarities were shown for the openness of the tip of the young shoot (OIV-001), shoot attitude (before tying) (OIV-006), the number of lobes of the mature leaf (OIV-068), must yield (ml juice/100 g berries) (OIV-233), total acidity (tartaric acid) of must (g/L) (OIV-506), time of budburst (OIV-301), and time of full bloom (OIV-302), while the other characteristics were evaluated differently. These cultivars and ecotypes continue to dominate the varietal structure of Albania's vineyards and pergolas and serve as a very important factor in the development of viticulture and winemaking, as well as in the development of rural tourism, the basis for very high-quality wines for the local market and foreign tourists, who seek for specific Albanian products.

Keywords: Albania, ampelographic, characteristics, descriptor, evaluation, phenology, rural tourism.

INTRODUCTION

Albania is a Mediterranean country with a very special location of the origin and development of viticulture. It extends between 39º38'S (Konispol) and 42º39'N (Vermosh), and between 19º16'W (Sazan Island) and 21º4'E (Vernik in Korça). The favorable Mediterranean climate, geographic position, terrain and soil, as well as the ancient tradition of vineyard cultivation in Albania, has contributed to the creation, adaptation, sustainability, preservation and dissemination of a large number of autochthonous ecotypes and varieties, (Susaj and Susaj, 2022; Susaj and Susaj, 2018), as well as *Vitis sylvestris* (Kullaj *et al.*, 2013; Susaj *et al.*, 2005).

The total area of Albania is 2875000 ha, from which 695520 ha or 24.2% are agricultural land and 2179000 ha or 75.8% are forests, pastures, etc. According to INSTAT (2022), the total vineyard area in 2021 was 11057 ha, about 50% of the 1990s, where ≈3500 ha (≈30%) are planted with autochthonous grapevine varieties, and the total vineyard area is planned to be about 20000

ha in 2030, followed by the improvement of grapevine variety structure and production. According to the classification of the EU winegrowing regions and location of *Vitis sylvestris*, Albania belongs to Region C, with three sub-regions (Wine and Vine, 2023), with different climate characteristics, extending from the western coastal lowland areas and hilly plains to the highest mountainous areas, up to 1100-1300 m elevation in the south and 400-700 m elevation in the northern areas (Susaj and Susaj, 2022).

The most common autochthonous ecotypes and varieties of Albania are: "Shesh i Bardhë", "Shesh i Zi", "Cëruja", "Valteri", "Kallmet", "Manakuq", "Vranac", "Vlosh", "Pulës", "Debina e Bardhë", "Debina e Zezë", "Serina e Bardhë", "Serina e Zezë", etc. (Susaj and Susaj, 2015; Susaj *et al.*, 2005), Mavrud, etc., which belong to different wine growing regions of the country, where they express higher environmental adaptability, higher productivity, and are more resistant to pests and diseases compare to several introduced cultivars.

According to Jancis Robinson, a British wine critic, journalist, and wine writer, "*Indigenous varieties thrive in their native region, as well as producing local, distinctive wines*" (Financial Times, 2018). The products deriving from the autochthonous grapevine varieties, such as wine, brandy, *raki*, vinegar, etc., and their by-products are highly demanded by the market and are a promising tool for the development of "*homemade*" rural (agro)-tourism. The special taste, flavor, nutritional values, denomination, and typicality of those products considerably vary on the climate and soil characteristics, as well as in the tradition of specific regions.

Jones (2015) reports that in viticulture and wine production, *climate is arguably the most critical aspect in grape ripening to achieve optimum characteristics to produce a given wine style.* To understand the climate's role in growing wine grapes and wine production we must consider: the weather and climate structure of the region, the climate's suitability to different wine grape cultivars, the climate's seasonal and long-term variability, the influence of climate change on the structure, suitability, and variability of climate in the region.

Every traditional wine-growing region in the EU that values its reputation has its *indigenous* grapevine varieties – plants to which we ascribe *indigenousness*. In addition, when a variety is *indigenous*, the wine made from it is *indigenous* too. Autochthonous grapevine varieties and wines have qualities we would like to share with the others: *originality, unrepeatability, exceptionality, and uniqueness.*

Wong (2017) reports that Sicily's native/indigenous grape varieties are gaining a new lease on life as delicious, light, dry wines because they are likely the very origin of Italy's wine culture. Indigenous grape movements have affected every wine-growing country in Europe, bringing about a diversity of varieties and styles previously unknown to the modern wine drinker (Wiatrak, 2020). According to the international understanding of the selection of varieties, the term "autochthonous/indigenous varieties" usually refers to those varieties that have arisen only in a particular area and have existed there from time immemorial, their genome originates from the local environment, and where grape and wine are being produced and vines are being cultivated. Most often, these varieties cannot be found on the international market.

Who on Earth has heard of the white wine "Cëruja", "E Bardha e Beratit", "Shesh i Bardhë", red-rosé wine from "Valteri" or "Manakuq", or red wine from red grape cultivars like "Kallmet", "Shesh i Zi", "Vlosh", "Debinë e Zezë", "Serin i Zi" and "Pamid" out of or a specific region in Albania, Zelèn out of Slovenia, or Bonardo out of a specific region in Italy, for example? If you look through the wine section in the supermarket, you will be surprised if you do not find different "international" varieties, such as Chardonnay, Cabernet Sauvignon, Merlot, Pinot Grey, and so

on, which dominate the European market, coming from different countries (California, Chile, Australia, New Zealand, South Africa, and Argentina).
In recent years, there has been a tendency and an increased demand for wines produced by indigenous and local grapevine cultivars and ecotypes. Producing special and high-quality wines by indigenous Albanian cultivars and varieties seems to be the most competitive way for Albania, rather than high-quality wines by international grapevine cultivars for the sustainable development of rural tourism (Susaj and Susaj, 2018).
Since 2019, the Albanian Government has started the implementation of the project "The Integrated Program for Rural Development – 100 Villages Program", focused on the economic development of rural areas, taking into consideration especially the sustainable rural tourism. The main objective of the project is: "*The economic development through the diversification of economic activities, such as the improvement of tourism potential in rural areas, agro-tourism and rural tourism, investments in improvement of commercial services, investments in the production of traditional rural products ...* " (MBZhR, 2018), where some of the most important products are products and by-products coming from the indigenous grapevine varieties, such as the table (fresh) grape, wine, *raki,* vinegar and other by-products.
Garofalo *et al.* (2015) report that autochthonous varieties pose their yeast/bacterium combinations which can be used for vinifications as starter culture for other varieties, while Bokulich *et al.* (2014) clearly demonstrated that microbial biogeography of wine grapes is affected by cultivar, vintage, and climate.
Description of *Vitis* varieties and species through morphological characteristics has been the subject of many studies by eminent specialists for a long time. In order to avoid the risks of mistakes and errors resulting from the multiplicity and heterogeneity of existing lists of distinctive characteristics, International Office of the Vine and Wine (OIV, 2001), the International Union for the Protection of New Varieties of Plants and Biodiversity (UPOV, 2008), formerly known as the International Plant Genetic Resources Institute (IPGRI, 1997) have harmonize the descriptive characteristics. In Albania, have been several studies of grapevine cultivars characterization, such as Kallmet (Susaj *et al.,* 2013/a; Susaj, *et al.,* 2012/a), Black Shesh (Susaj and Susaj, 2014), Manakuq (Susaj et al., 2013/b) "Red Tajga of Burrel" (Susaj *et al.,* 2012/b), White Shesh (Duhanaj *et al.,* 2022), "Cëruja" (Susaj *et al.,* 2008), etc.

MATERIAL AND METHODS

The aim of the study was the ampelographic characterization of seven autochthonous cultivars selected and cultivated for centuries in different locations of central and northeastern Albania.
The study was conducted for 17 years (2005-2022), and the study of each cultivar in each location was conducted for three consecutive years to reach the right conclusions. The study was carried out in a representative sample, chosen randomly, constituted by 10 marked vines cultivated as vineyards or pergolas and tents, depending on the ecotypes or the cultivar's requirements.
Observations, measurements and evaluations of characteristics were based on codes, and levels of the International Descriptors of Grapevine (IPGRI, 1997; UPOV, 2008, OIV, 2001).
Ampelographic and ampelometric characterization was focused on 33 main characteristics, of which four young shoot characteristics, one young leaf characteristic, three flower characteristics, seven mature leaf characteristics, five bunch characteristics, five berry characteristics, four phenological characteristics, and four fungal resistance characteristics.

- Characterization of the young shoot, young leaf, and flower characteristics was performed

during flowering in ten shoot tips, each year. Young shoots and young leaves were evaluated for the openness of the tip, anthocyanin coloration of the tip, the density of prostrate hairs on the tip and shape, the color of the upper side of the blade (4th leaf), etc.

- Flower and inflorescence characteristics were evaluated for the sexual organs (flower type), and insertion of the first inflorescence. and the number of inflorescences for the shoot. Flower characteristics were observed and evaluated on 10 shoots at full flowering period.
- Characterization of the mature leaf characteristics was performed in a representative sample of 10 intact mature leaves, taken from the first node over the last bunch of shoots for each vine at full flowering period.
- Characterization of the bunch characteristics was performed in the full ripening period, in a representative sample of 5 kg bunches, at the full grape maturity, 2-3 days before harvest.
- Characterization of the berries characteristics was performed at grape harvest in a representative sample of 100 berries taken randomly from the middle part of 10 bunches.
- Characterization of chemical and technological characteristics of grapes were based on data analysis of the must yield (ml juice/100 g berries), total soluble solids (TSS) or sugar content (%), total acidity (TA, g/l) of must, which were performed on a sample of 30-50 kg fully-ripen grape without pedicels, crushed and centrifuged at 3000 rpm. Technological analyses were carried out in the field, at the Lab of the Department of Horticulture at the Agricultural University of Tirana, or at "Zadrima" Winery in Lezha.
- Thirty years' of temperature data were obtained from the publications of the Hydro-Meteorological Institute and measurements in each vineyard. The three-year study period to carry out each cultivar's characterization was considered necessary and sufficient to reach correct conclusions about the unchanged characteristics and the average level of appearance of other characteristics that change depending on the state of the plant and environmental conditions.

RESULTS AND DISCUSSIONS

Characterization, description, and identification of grape varieties, knowledge of their behavior about a specific environment, etc., have immense importance for the sciences of ampelography and viticulture. Since 2005, research has been launched to describe and characterize the autochthonous cultivars and ecotypes in the central and northeastern parts of Albania.
Ampelographic characterization of seven autochthonous cultivars and ecotypes (Kallmet, Black Shesh, White Shesh, Red Tajga, White Tajga, Cëruja, and Manakuq) was based on the Descriptors of Grapevine of OIV (2001), UPOV (2008) and IPGRI (1997). Characterization of the main quantitative (QN) and qualitative characteristics (QL) of seven autochthonous grapevine cultivars and ecotypes (Kallmet, Black Shesh, White Shesh, Red Tajga, White Tajga, Cëruja, and Manakuq) in different locations of the central and north-eastern Albania through several years showed that some characteristics seem to express similarly, while some other characteristics showed high variability.

1.1.Expression of the main characteristics of the young shoot and the young leaf

Observation and evaluation of the young shoot, young leaf and young shoot showed that:

- *Openness of the tip of the young shoot* (OIV-001) was evaluated as fully open (5) for all

seven cultivars and/or ecotypes under study (Table 1).

- *Intensity of anthocyanin coloration of prostrate hairs on the tip of the young shoot* (OIV-003) was evaluated by 1 (absent or very weak) for "Kallmet", 3 (weak) for "Black Shesh", "White Shesh" and "Cëruja", and 5 (medium) for "Red Tajga of Burrel", "White Tajga of Burrel" and "Manakuq".
- *Density of prostrate hairs on the tip of the young shoot* (OIV 004) was evaluated by 3 (sparse) for "White Tajga of Burrel", 7 (dense) for "Kallmet", "White Shesh", "Cëruja" and "Manakuq", and 9 (very dense) for "Red Tajga of Burrel" (Table 1).
- *The attitude of the young shoot (before tying)* (OIV-006) was evaluated by 3 (semi-erect) for all cultivars under study (Table 1).
- *The color of upper side of the blade (4th leaf) of the young leaf* (OIV-051) was evaluated by 3 (green with anthocyanin spots) for "Kallmet", "Black Shesh", "White Shesh", "Cëruja", "Red Tajga of Burrel", and "White Tajga of Burrel", while it was evaluated by 4 (light copper red) for "Manakuq".

1.2. Expression of the main characteristics of the flower and inflorescence

- *Sexual organs of the flower* (OIV-151) was evaluated by 3 (fully developed stamens and fully developed gynoecium – hermaphrodite flowers) for "Black Shesh", "White Shesh", "Cëruja" and "Manakuq", while it was evaluated by 4 (refluxed stamens and fully developed gynoecium – functionally female) for "Kallmet", "Red Tajga of Burrel" and "White Tajga of Burrel" (Table 1).
- *Insertion of 1st inflorescence* (OIV 152) was evaluated by 2 (insertion at 3rd and 4th node) for "Black Shesh", "White Shesh", "Red Tajga of Burrel" and "White Tajga of Burrel", and 3 (insertion from the 5th node) for "Kallmet", "Cëruja" and "Manakuq".
- *Number of inflorescences per shoot* (OIV – 153) was evaluated by 2 (1.1 to 2 inflorescences per shoot) for Kallmet", "Black Shesh", "White Shesh", "Red Tajga of Burrel", "White Tajga of Burrel" and "Manakuq", while it was evaluated by 3 (2.1 to 3 inflorescences per shoot) for "Cëruja" (Table 1).

Table 1. Expression of the main characteristics of the young shoot, young leaf and young shoot, flower and inflorescence (three-year mean values).

№	Evaluated characteristics	OIV Code	Evaluation level						
			Kallmet	Black Shesh	White Shesh	Cëruja	Red Tajga	White Tajga	Manakuq
I	**Young shoot, young leaf and shoot characteristics**								
1	Young shoot: Openness of tip	001	5	5	5	5	5	5	5
2	Young shoot: Intensity of anthocyanin coloration of prostrate hairs on tip	003	1	3	3	3	5	5	5
3	Young shoot: Density of prostrate hairs on tip	004	7	9	7	7	9	3	7
4	Shoot: Attitude (before tying)	006	3	3	3	3	3	3	3
5	Young leaf: Color of the upper side of the blade (4th leaf)	051	3	3	3	3	3	3	4
II	**Flower and inflorescence characteristics**								
6	Flower: sexual organs	151	4	3	3	3	4	4	3

7	Inflorescence: insertion of 1st inflorescence	152	3	2	2	3	2	3	3
8	Inflorescence: number of inflorescences per shoot	153	2	2	2	3	2	2	3

1.3. Expression of the main characteristics of the mature leaf

- *The size of the blade of the mature leaf* (OIV-065) was evaluated by 5 (medium) for all cultivars and ecotypes, except the "Red Tajga of Burrel" ecotype which was evaluated by 7 (large). The size of the blade is a quantitative characteristic that depends on cultivation practices, climate and soil conditions, etc.
- The shape *of the blade of the mature leaf* (OIV-067) was evaluated by 3 (pentagonal) for all cultivars and ecotypes, except "Manakuq" where it was evaluated by 4 (circular).
- *The number of lobes of the mature leaf* (OIV-068) was evaluated by 3 (five lobes) for all cultivars and ecotypes.
- *The color of the upper side of the blade of the mature leaf* (OIV-069) was evaluated by 3 (pale green) for "Kallmet", 5 (medium green) for "Black Shesh", "White Shesh", "White Tajga of Burrel" and "Cëruja", while for "Red Tajga of Burrel" and "Manakuq" was evaluated by 7 (dark green).
- *Shape of lateral teeth of the mature leaf* (OIV-076) was evaluated by 2 (both sides straight) for "Red Tajga of Burrel" and "White Tajga of Burrel" ecotypes, 3 (both sides convex) for "Kallmet" and "Cëruja", 4 (one side concave, one side convex) for "Manakuq", and 5 (mixture of both sides straight and both sides convex) for "Black Shesh" and "White Shesh".
- *Degree of opening/overlapping of petiole sinus of the mature leaf* (OIV-079) was evaluated by 3 (open) for "Kallmet", "Black Shesh", "Cëruja", "Red Tajga of Burrel", "White Tajga of Burrel" and "Cëruja", 5 (closed) for "Manakuq", and 7 (overlapped) for "White Shesh".
- *The length of vein N1 of the mature leaf* (OIV - 601) was evaluated by 5 (medium) for "Black Shesh" and "Manakuq", and 7 (long) for the other cultivars and ecotypes. This characteristic depends on cultivation practices, climate and soil conditions, etc. (Table 2).

1.4.Expression of the main characteristics of the bunch

- *Bunch length* (peduncle excluded) (O-202) was evaluated by 5 (medium, about 160 mm) for "Cëruja" and "Manakuq", 7 (long, about 200 mm) for "White Tajga of Burrel", and 9 (very long, about 240 mm and more) for "Kallmet", "Black Shesh", "White Shesh" and "Red Tajga of Burrel".
- *Bunch density* (OIV-204) was evaluated by 5 (medium, densely distributed berries, pedicels not visible) for "Kallmet", "Red Tajga of Burrel" and "White Tajga of Burrel", 7 (dense, berries not readily movable) for "White Shesh" and "White Shesh", and 9 (very dense, berries pressed out of shape) for "Black Shesh" and "Cëruja".

Table 2. Expression of the main characteristics of the mature leaf (three-years mean values)

№	Evaluated characteristics	OIV Code	Evaluation level						
			Kallmet	Black Shesh	White Shesh	Cëruja	Red Tajga	White Tajga	Manakuq
III	**Mature leaf characteristics**								
9	Size of blade	065	5	5	5	5	7	5	5
10	Shape of blade	067	3	3	3	3	3	3	4
11	№ of lobes	068	3	3	3	3	3	3	3
12	Color of the upper side of blade	069	3	4	5	5	5	5	7
13	Shape of lateral teeth	076	3	5	5	3	2	2	4
14	Degree of opening / overlapping of petiole sinus	079	3	3	9	3	3	3	5
15	Mature leaf: length of vein N1	601	7	5	7	7	7	7	5

- *Bunch shape* (OIV-208) was evaluated by 1 (cylindrical) for "Cëruja" and "Manakuq", 2 (conical) for "Kallmet", "Black Shesh", "White Shesh", and 3 (funnel-shaped) for "Kallmet", "Red Tajga of Burrel" and "White Tajga of Burrel".
- *Single bunch weight* (OIV-502) was evaluated by 3 (low, about 300 gr) for "Kallmet", "Black Shesh", "Cëruja", "White Tajga of Burrel" and "Manakuq", 5 (medium, about 500 gr) for "White Shesh", and 7 (high, about 700 gr) for "Red Tajga of Burrel". This characteristic depends on cultivation practices, climate and soil conditions, etc.
- *Yield per m2 or hectare* (kg, kv, or tons per hectare) (OIV-504) was evaluated by 5 (medium) for all cultivars and ecotypes, except "Red Tajga of Burrel" which was evaluated by 7 (high). Yield depends on cultural practices, climate and soil conditions (Table 3).

1.5. Expression of the main characteristics of the berry

- *Berry: shape (OIV-223)* was evaluated by 2 (round or globose) for "Kallmet", "Black Shesh", "White Shesh", "Cëruja" and "Manakuq", and 7 (ovoid) for "Red Tajga of Burrel" and "White Tajga of Burrel".
- *Berry: skin color (without bloom) (OIV-225)* was evaluated by 1 (green-yellow) for "White Shesh", "Cëruja" and "White Tajga of Burrel", 3 (red) for "Red Tajga of Burrel" and "Manakuq", 5 (dark red-violet) for "Kallmet", and 6 (blue-black) for "Black Shesh".
- *Berry: must yield (ml/100 g fresh grape) (OIV-233)* was evaluated by 5 (medium, about 65-75% or 65-75 ml juice/ 100 g berries) for all cultivars and ecotypes under study.
- *Sugar content of must (%) (OIV 505)* was evaluated by 3 (low, about 15%) "Red Tajga of Burrel" and "White Tajga of Burrel", 5 (medium, about 18%) for "Black Shesh", "White Shesh" and "Cëruja", and 7 (high, about 21%) for "Kallmet" and "Manakuq".
- *Total acidity of must* (g/L) (OIV 506) was evaluated by 3 (low, about 6 g/L) for all cultivars and ecotypes under study (Table 3).

Table 3. Expression of the main characteristics of the bunch and berry (three-years mean values)

№	Evaluated characteristics	OIV Code	Evaluation level						
			Kallmet	Black Shesh	White Shesh	Cëruja	Red Tajga	White Tajga	Manakuq
IV	**Bunch characteristics**								
16	Bunch length (peduncle excluded)	202	9	9	9	5	9	7	5
17	Bunch density	204	5	9	7	9	5	5	7
18	Bunch shape	208	3	1	2	1	3	2	1
19	Single bunch weight	502	3	3	5	3	7	3	3
20	Yield per m2 (kg/vine)	504	5	5	5	5	7	5	5
V	**Berry characteristics**								
21	Berry shape	223	4	2	4	4	7	7	4
22	Berry: color of skin (without bloom)	225	5	6	1	1	3	1	3
23	Must yield (ml juice/100 g berries)	233	5	5	5	5	5	5	5
24	The sugar content of the must (%)	505	7	5	5	5	3	3	7
25	Total acidity (tartaric acid) of must (g/L)	506	3	3	3	3	3	3	3

1.6. Expression of the main phenological characteristics

- *The time of budburst* (OIV-301) was evaluated by 5 (medium late) for all the cultivars and ecotypes under study (Table 4).
- *The time of full bloom* (OIV-302) was evaluated by 5 (medium late) for all the cultivars and ecotypes under study (Table 4).
- *Time of beginning of berry ripening (veraison)* (OIV-303) was evaluated by 5 (medium late) for Kallmet, Black Shesh, White Shesh and Cëruja, 7 (late) for Red Tajga and White Tajga, and 3 (early) for Manakuq (Table 4).
- *Time of full physiological maturity of the berry* (OIV-304) was evaluated by 3 (early) for Manakuq, 5 (medium late) for Kallmet, Black Shesh, White Shesh and Cëruja, 7 (late) for Red Tajga and White Tajga (Table 4).

The observed data are similar to Pearce and Coombe (2005) who have reported that the period from budburst to blooming seems to be the same for all grapevine cultivars in specific climatic conditions, while there are very clearly expressed differences for the period from blooming to grape maturity. The sum of the active temperatures (SAT, ^{o}C) (sum of average daily temperatures above 10°C, which is the base temperature of the vine) (Curtis *et al.*, 2023) can be accounted for using the formulae:

$$SAT\ °C = \Sigma\ (Ti - Tb),$$

where Ti is the average daily temperature (°C) and Tb is the base temperature of 10°C. The sum of the active temperatures (SAT, ^{o}C) must be 900^{o}C for early ripening grape cultivars, 1500^{o}C for medium ripening grape cultivars, and 2000^{o}C for late ripening grape cultivars.

The period from budburst to full bloom to beginning of berry ripening (veraison) seems to be the same, while the period from beginning of berry ripening (veraison) to full ripening (full physiological maturity of the berry) differs cultivars from early (Manakuq) to medium late (Kallmet, Black Shesh, White Shesh and Cëruja) to late ripening cultivars (Red Tajga and White Tajga).

1.7. Resistance to the main fungal diseases on leaf and cluster

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- *The degree of resistance* to *Plasmopara viticola* in the leaf (OIV-452) was evaluated by 5 (medium resistant) for Kallmet, Black Shesh, White Shesh, Red Tajga and White Tajga, and 7 (high resistant) for Cëruja and Manakuq (Table 4).
- *The degree of resistance* to *Plasmopara viticola* in the cluster (OIV-453) was evaluated by 5 (medium resistant) for Kallmet, Black Shesh, White Shesh, Red Tajga and White Tajga, and 7 (high resistant) for Cëruja and Manakuq (Table 4).
- *Degree of resistance* to *Botrytis cynerea* in the leaf (OIV-456) was evaluated by 5 (medium resistant) for Black Shesh, White Shesh, Red Tajga, White Tajga and Manakuq, and 7 (high resistant) for Kallmet and Cëruja (Table 4).
- *Degree of resistance* to *Botrytis cynerea* in the cluster (OIV-459) was evaluated by 5 (medium resistant) for Black Shesh, White Shesh, Red Tajga, White Tajga and Manakuq, and 7 (high resistant) for Kallmet and Cëruja (Table 4).

Table 4. Expression of the main phenological characteristics and the resistance to fungal diseases

№	Evaluated characteristics	OIV Code	Evaluation level						
			Kallmet	Black Shesh	White Shesh	Cëruja	Red Tajga	White Tajga	Manakuq
VI	**Phenological characteristics**								
26	Time of budburst	301	5	5	5	5	5	5	5
27	Time of full bloom	302	5	5	5	5	5	5	5
28	Time of beginning of berry ripening (veraison)	303	5	5	5	5	7	7	3
29	Time of full physiological maturity of the berry	304	5	5	5	5	7	7	3
VII	**Resistance to fungal diseases**								
30	Leaf: Degree of resistance to *Plasmopara viticola*	452	5	5	5	7	5	5	7
31	Cluster: degree of resistance to *Plasmopara viticola*	453	5	5	5	7	5	5	7
32	Leaf: Degree of resistance to *Botrytis cynerea*	456	7	5	5	7	5	5	5
33	Cluster: degree of resistance to *Botrytis cynerea*	459	7	5	5	7	5	5	5

Autochthonous grapevine cultivars and ecotypes showed a medium to high and very high resistance to fungal diseases, such as *Plasmopara viticola, Botrytis cynerea*, etc., in leaves and clusters, which are very important in their dissemination all over the country.

CONCLUSIONS

The autochthonous grapevine varieties are one important component of sustainable local rural tourism in Albania. Albanian autochthonous grapevine varieties and wines have qualities we would like to share with others: originality, unrepeatability, exceptionality, and uniqueness.
Qualitative characteristics of each cultivar have remained unchanged over the years, as they depend on genetic inheritance, while quantitative characteristics showed high variability, as they depend on cultivation practices, climate, and soil conditions of a specific area.

The autochthonous grapevine cultivars and ecotypes must continue to dominate the varietal structure of Albania's vineyards and pergolas to serve as a very important factor in the development of viticulture and winemaking, as well as in the development of sustainable rural tourism since these cultivars are the basis for the production of very high-quality wines and are sought after by the local market and foreign tourists, who seek for specific Albanian products. Their special taste, flavor, nutritional values, denomination, and typicality of those products considerably vary on the climate and soil characteristics, as well as in the tradition of specific regions.

The autochthonous grapevine cultivars and ecotypes dissemination should be based on the sum of the active temperatures (SAT, ^{o}C) or the sum of average daily temperatures above 10°C, which is the base temperature of the vine. Each autochthonous grapevine cultivar or ecotype must be disseminated in areas where it fulfills a specific amount of SAT, which is specific for each location. The sum of the active temperatures (SAT, ^{o}C) must be 900oC for early ripening grape cultivars, 1500oC for medium ripening grape cultivars, and 2000oC for late ripening grape cultivars.

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