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Ampelographic Identification of Grape Varieties Grown in Yüksekova (Hakkâri) Region

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Abstract: This study was conducted in 2011-2012 to determine ampelographic characteristics of the grape varieties grown in Yüksekova (Hakkâri) town and villages. Ampelographic characteristics of the varieties were determined based on "Descriptors for Grape" method developed by "International Board for Plant Genetic Resources" (IBPGR). It was determined that 12 grape varieties grown in Yüksekova region belonged to *Vitis vinifera* L. species. Berry skin color was 'Green yellow' in six varieties and 'dark red' in the other six varieties. Mean bunch weight of the varieties was "small" in Tırşık and Tritelk varieties, "big" in Besirane, Mirani, Öküzgözü and Reşmıv varieties and "Medium" in the others. The lowest bunch weight (193.50±17,78 g) was observed in Tritelk variety and the heaviest bunch weight (576.30±48.22 g) was observed in Öküzgözü variety. Average yield per grapevine varied between 3.79-6.08 kg, water soluble dry matter content (WSDM) varied between 11-19% and titratable acidity varied between 6,00-16.30 g/l. Flowers of all varieties were "hermaphrodite".

Keywords: Yüksekova (Hakkari), ampelography, identification, *Vitis vinifera* L., grape varieties

Yüksekova (Hakkari) Yöresinde Yetiştirilen Üzüm Çeşitlerinin Ampelografik Tanımlanması

Öz: Bu çalışma Yüksekova (Hakkari) ve köylerinde yetiştirilen üzüm çeşitlerinin ampelografik özelliklerini belirlemek amacıyla 2011-2012 yıllarında yürütülmüştür. Üzüm çeşitlerinin ampelografik özellikleri "International Board for Plant Genetic Resources" (IBPGR) tarafından geliştirilen "Descriptors for Grape" metoduna göre belirlenmiştir. Yüksekova yöresinde yetiştirilen 12 üzüm çeşidinin *Vitis vinifera* L. türüne ait olduğu belirlenmiştir. Tane kabuk rengi 6 çeşitte 'yeşil sarı' diğer 6 çeşitte ise 'koyu kırmızı' olarak tespit edilmiştir. Ortalama salkım ağırlığı Tırşık ve Tritelk çeşitlerinde 'küçük', Besirane, Mirani, Öküzgözü ve Reşmıv çeşitlerinde 'büyük', diğer çeşitlerde ise 'orta' olarak saptanmıştır. En düşük salkım ağırlığı Tritelk çeşidinde (193.50±17,78 g), en yüksek salkım ağırlığı ise Öküzgözü çeşidinde (576.30±48.22 g) belirlenmiştir. Asma başına ortalama verim 3.79-6.08 kg, suda çözünebilir kuru madde miktarı % 11-19, titreedilebilir asit miktarı 6,00-16.30 g/l değerleri arasında değişim göstermiştir. Tüm çeşitler de çiçek yapısı 'hermafrodit' olarak belirlenmiştir.

Anahtar Kelimeler: Yüksekova (Hakkari), ampelografi, tanımlama, *Vitis vinifera* L, üzüm çeşidi

1.Introduction

Plant genetic resources are the most valuable natural resources of the humans. They have an essential and significant place in meeting the basic needs of humans, especially the food demands. Such resources are ever depleting or under the danger of extinction because of pollution, climate change, continuous and improper uses, urbanization and etc. reasons (Anonymous 2010a). It is quite significant that these resources should be preserved for the present and future breeding programs. Basic targets of breeding programs can only be reached through proper preservation of currently available resources. Turkey has a special position with regard to plant gene sources. Among eight gen centers specified by Vavilov, Turkey is located at intersection of Near-east and Mediterranean gene centers (Ağaoğlu et al. 1995).

The country has a great plant genetic potential with regard to the location, thus it is also quite exposed to danger of extinction because of various negative factors (Anonymous, 2010a). In Turkey, currently a project, entitled as "National Plant Genetic Resources Collection and Preservation" is running (Söylemezoğlu et al. 2015).

Vitis species constitute a significant portion of world plant genetic resources. For the purpose of preservation of such a rich source, *Vitis* variety catalogue was created in 1993 with the cooperative works of international organizations to identify *Vitis* species, varieties, cultivars and genotypes (Maul 2008).

Number of varieties included in *Vitis* species is estimated to be around 6.000-11.000 (Bacilieri et al. 2010). Majority of these genetic materials are preserved in different gene banks to prevent their genetic erosion and to use them in various breeding programs (Uzun 2015).

With the works that have been carried out up to now, ampelographic identification of 1437 grapevine genotypes were performed and they were put under protection. On the other hand, molecular works carried out over these genotypes revealed the actual number of varieties as around 870 (Uzun 2015).

Despite the rich genetic diversity worldwide, genetic erosion on grape varieties have reached to worrisome levels because of increased international trade, small-scale production of varieties in several places, production of varieties with small number of clones, decrease in vineyard areas, disallow of limiting regulations for the production of traditional varieties. To prevent this genetic erosion, every country should put their local varieties and wild vineyards under protection on their own sites (Anonymous 2010b).

Several studies were performed on both culture grapevines and wild grapevines to put forth the rich grapevine gene potential of the world (Söylemezoğlu 2001; Güleryüz and Köse 2003; Pejıc and Maletic 2010; Casanova 2011; Eren 2012; Binay 2013; Eker 2015; Medınaradze et al. 2015; Gonzalez et al. 2016; Serhat 2016).

Yüksekova region is about to lose several grape varieties already adapted to the region because of recent changes in socioeconomic structure of the local people, urbanization, migration, terrorism and similar reasons.

The present study was conducted for the identification of grape varieties grown in Yüksekova region through international standards and in-situ identification of ampelographic characteristics of grapevine gene resources facing to extinction and to put these varieties under protection.

2. Material and Method

This study was conducted on local vineyards located in Yüksekova (Hakkari) central town, Esendere district, Greentaş, Gürkaynak and Tuğru villages of Dağlıca region in 2011–2012. Ampelographic identification of Besirane, Daufi, Ğatunok, Mercani, Mercegül, Mirani, Öküzgözü, Reşmıv, Savdani, Tırşık, Tritelk and Zerık grape varieties were identified. "Descriptors for Grape" were used for ampelographic identification of grape varieties (Anonymous 1983; 1997).

"Descriptors for Grape" have been used in several researches since they were published to provide method uniformity (Marasalı 1986; Demir 1987; Çelik 1990; Kara 1990; Altın 1991; Gürsöz 1993; Aktepe 1994; Çoban and Küey 2006; Güler 2007; Ünal 2000; Kılıç 2009; Uyak 2010; Binay 2013; Eker 2015). The classification developed by Kara (1990) was used for the identification of ripening times (OIV 304) of the varieties.

3. Results and Discussion

Ampelographic identifications for local grape varieties grown in Yüksekova region are provided in Table 1. Bunch and mature leaf images of the investigated varieties are presented in Figures 1-10.

Figure 1. Bunch and mature leaf images of Besirane (A) and Daufi (B) varieties
Şekil 1. *Besirane (A) ve Daufi (B) çeşitlerinin salkım ve olgun yaprak resimleri*

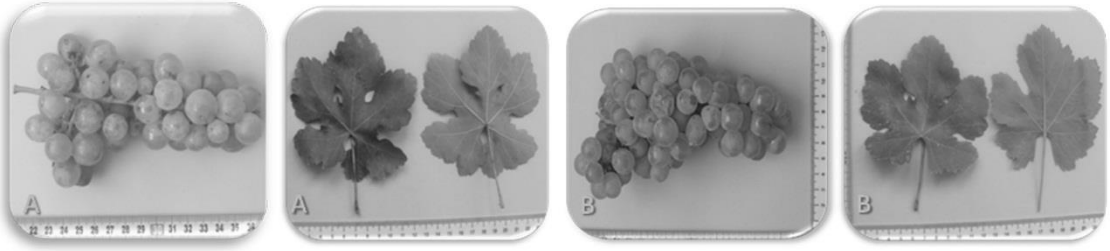

Figure 2. Bunch and mature leaf images of Ğatunok (A) and Mercani (B) varieties
Şekil 2. *Ğatunok (A) ve Mercani (B) çeşitlerinin salkım ve olgun yaprak resimleri*

Figure 3. Bunch and mature leaf images of Mercegül (A) and Mirani (B) varieties
Şekil 3. *Mercegül (A) ve Mirani (B) çeşitlerinin salkım ve olgun yaprak resimleri*

Figure 4. Bunch and mature leaf images of Öküzgözü (A) and Reşmıv (B) varieties
Şekil 4. *Öküzgözü (A) ve Reşmıv (B) çeşitlerinin salkım ve olgun yaprak resimleri*

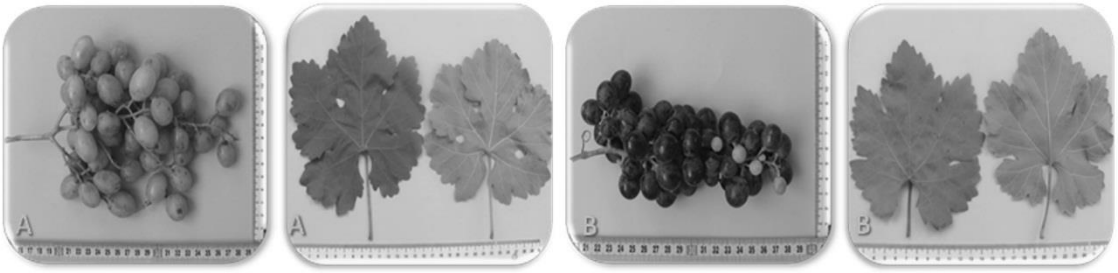

Figure 5. Bunch and mature leaf images of Savdani (A) and Tırşık (B) varieties
Şekil 5. *Savdani (A) ve Tırşık (B) çeşitlerinin salkım ve olgun yaprak resimleri*

Figure 6. Bunch and mature leaf images of Tritelk (A) and Zerık (B) varieties
Şekil 6. *Tritelk (A) ve Zerık (B) çeşitlerinin salkım ve olgun yaprak resimleri*

Several previous researchers reported that form of shoot tips (OIV 001) of *Vitis vinifera* L. species were open, number of consecutive tendrils over the shoot (OIV 016) was intermittent, there were not transversal ridges on dorsal side of seeds (OIV 244) and there were not lenticels over the shoots (OIV 104) (Kara 1990; Altın 1991; Kaplan 1994; Gürsöz 1993; Kara and Beyoğlu 1995; Diri 1996; Küçükhaskul 1996; Akkurt 1997; Dilli 1997; Çelik and Karanis 1998; Ecevit and Kelen 1999; Ünal 2000; Odabaş et al. 2002; Çoban and Küey 2006; Uyak 2010). These characteristics were observed in all of the investigated varieties and it was identified that all of the varieties belonged to *Vitis vinifera* L. species.

Distribution of anthocyanin coloration of shoot tip (OIV 002) was 'Absent' in two varieties, 'partial' in seven varieties and 'everywhere' in two varieties. Intensity of anthocyanin coloration of shoot tip (OIV 003) was 'absent' in two varieties, 'Very Poor' in three varieties, 'Poor' in three varieties, 'Medium' in three varieties and 'strong' in Daufi variety. Present findings about distribution of anthocyanin coloration and intensity in different classes comply with the findings of the previous researchers (Regner et al. 1999; Asensio et al. 2002; Santiago et al. 2007; Çelik et al. 2008).

Density of prostrate hairs on shoot tip (OIV 004) was 'Absent' in five varieties, 'Very sparse' in four varieties, 'sparse' in three varieties, 'Medium' in Gatunok and Tritelk varieties and 'Frequent' in Daufi variety. Density of erect hairs on shoot tip (OIV005) was not identified in any of the varieties. Occurrence of prostrate hairs and absence of erect hairs indicated that prostrate hairs were more significant in ampelographic identification of varieties. Such outcomes comply with the findings of previous researchers (Kara1990; Altın 1991; Ünal 2000; Kılıç 2009; Uyak 2010). Color of dorsal and ventral side of internodes and nodes (OIV 007, 008, 009, 010) was placed in almost every group. While the color of dorsal and ventral side of internodes and nodes was placed in the same group for 10 varieties, they were placed in different groups in two varieties. Such a case complies with the findings of Kara (1990); Altın (1991); Gürsöz (1993); Dilli (1997) and Uyak (2010).

While erect (OIV 011 and 012) and prostrate (OIV 013 and 014) hairs were absent at nodes and internodes of young shoots in six varieties, the density of hairs was 'Very sparse' in the other six varieties. Size of mature leaf is another significant parameter used in identification of grape varieties. Size of mature leaf (OIV 065) was 'small' in four varieties, 'Medium' in seven varieties and 'Large' in Savdani variety. Güler (2007) and Uyak (2010) classified mature leaf size of varieties they investigated in different classes. Size of mature leaf vary based on ecological conditions, development vigor and training system and may be different even within the same variety (Morton 1979). Oraman (1972) indicated that location and position of the vineyard may result in significant differences in leaf forms, bunch and berries of the grapevines. Color of the upper side of the mature leaf (OIV 069) was 'Green' in nine varieties, 'dark green' in two varieties and 'light green' in one variety. Since the color of the upper side of the mature leaf vary based on ecological conditions and nutrition programs, it was pointed out that this parameter was a significant one in variety separation in place (Anonymous 1983). Area of anthocyanin coloration of main veins on upper and lower side of mature leaf (OIV 070 and 071) was classified in different classes. Several

researchers also indicated different classes for anthocyanin coloration of main veins on upper and lower side of mature leaf (Ünal 2000; Kılıç 2009; Uyak 2010). Prostrate and erect hairs on main veins on upper side of mature leaf (OIV 088 and 089) were seen 'only over the petiole' in Daufi variety, they were absent in all the other varieties. Shape of blade of mature leaf (OIV 067) was 'wedged' in three varieties, 'pentagon' in six varieties, 'round' in two varieties, 'kidney' in Daufi variety; number of lobes (OIV 068) was 'five' in all varieties. It was indicated in previous studies that leaf shape and number of lobes were influenced by the ecological conditions the least and could be used as significant parameters in identification of varieties (Aktepe 1994; Gider 1995; Diri 1996). Flower sexual organs (OIV 151) were 'hermaphrodite' in 16 varieties and 'morphologic hermaphrodite physiologic hermaphrodite' in Zerik, Bozgolik and Hönüsü varieties.

Bunch length (peduncle excluded) (OIV 202) was 'Short' in three varieties, 'Medium' in eight varieties and 'long' in Besirane variety. Bunch density (OIV 203) was 'Medium' in seven varieties, 'dense' in three varieties and 'very dense' in Mercegül and Mercani varieties. Bunch characteristics largely vary with ecological conditions, training, pruning and cultural practices and thus they were indicated as secondary parameters to be sued in identification of the varieties (Morton 1979). Berry shape (OIV 223) was 'Short oval' in three varieties, 'round' in four varieties, 'long oval' in three varieties and 'slightly oblate' in Gatunok variety. It was reported that ecological conditions, cultural practices, pollinators and seeds had significant effects on berry shape and size (Fidan 1985; Barış and Gürnil 1991). Color of berry skin (OIV 225) was 'Green-sarı' in 12 varieties, 'red black' in five varieties and 'red' in two varieties. Berry bloom (OIV 227) was 'strong' in all varieties. Hot and dry climate of the region and rain-fed viticulture of the region resulted in 'strong' bloom layer over the berries. Juiciness of berry flesh (OIV 232) was 'juicy' in all varieties and berry must yield (OIV 233) was generally 'Medium". Altın (1991) indicated that juicy varieties had higher must yields. Such a report complies with the present findings. Since the local varieties are juicy and medium must yields, local people preferred to grow table grapes.

Time of physiological stage of full maturity of the berry (OIV 304) was generally 'Medium'. Fidan (1985) indicated that variety, total heat, location and position of the vineyard, grapevine age, training and pruning practices, soil structure and hormones had significant effects on maturity stage of berries.

Weight of single bunch (OIV 502) was 'small' in two varieties, 'Medium' in nine varieties and 'Big' in Reşmıv variety; single berry weight (OIV 503) was 'Medium' in 10 varieties, 'small' in two varieties. Sugar content of the must (OIV 505) was 'Medium' in four varieties, 'Low' in seven varieties; total acid content of must (OIV 506) was 'Low' in four varieties, 'high' in four varieties, "Medium" in two varieties and 'very high' in Triterk variety. Sugar content of the must (OIV 505) and total acid content of the must (OIV 506) vary with climate conditions, seeds in berry and variety (Winkler et al. 1974; Weaver 1976; Fidan;1985). Considering the fact that morphological characteristics greatly varied based on region, ecology, care practices, location and time, it was concluded that homonym or synonym statuses of the relevant varieties should also be identified with molecular techniques.

It was observed in this study that existence and intensity of anthocyanin in plant organs might be a significant criterion to be used in identification of the varieties. Since still local viticulture is practiced in the region and there is always a risk of phylloxera contamination, the works toward the preservation and protection of these varieties should be accelerated. Otherwise, it is inevitable to lose these varieties mostly because of phylloxera.

Table 1. Ampelographic identifications for investigated grape varieties
Çizelge 1. *İncelenen üzüm çeşitlerinin ampelografik tanımlaması*

OIV	BESİRANE	DAUFİ	GATUNOK	MERCANİ	MERCEGÜL	MİRANİ	ÖKÜZGÖZÜ	REŞMIV	SAVDANİ	TIRŞIK	TRİTELK	ZERİK
001	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open	3 Open
002	1 Partial	2 Everywhere	2 Everywhere	1 Partial	0 Absent	1 Partial	1 Partial	1 Partial	1 Partial	0 Absent	1 Partial	1 Partial
003	3 Poor	7 Strong	5 Medium	1 Very Poor	0 Absent	1 Very Poor	3 Poor	3 Poor	5 Medium	0 Absent	5 Medium	1 Very sparse
004	3 Sparse	7 Frequent	5 Medium	1 Very Poor	1 Very sparse	1 Very sparse	3 Sparse	0 Absent	1 Very sparse	1 Very sparse	5 Medium	3 Sparse
005	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	0 Absent
006	3 Sub-vertical	3 Sub-vertical	7 Semi-pendulous	7 Semi-pendulous	3 Sub-vertical	3 Sub-vertical	7 Semi-pendulous	7 Semi-pendulous	9 Pendulous	9 Pendulous	9 Pendulous	3 Semi-pendulous
007	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	1 Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	1 Green	2 Red-lined Green	2 Red-lined Green
008	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	1 Green	1 Green	1 Green	1 Green	2 Red-lined Green	2 Red-lined Green	1 Green	2 Red-lined Green	1 Green
009	3 Red-lined Green	3 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	1 Green	2 Red-lined Green	2 Red-lined Green
010	2 Red-lined Green	2 Red-lined Green	2 Red-lined Green	1 Green	1 Green	1 Green	1 Green	1 Green	2 Red-lined Green	1 Green	2 Red-lined Green	1 Green
011	1 Very sparse	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent
012	1 Very sparse	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent
013	1 Very sparse	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent
014	1 Very sparse	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent
015	5 Medium	1 Very Poor	5 Medium	3 Poor	1 Very Poor	1 Very Poor	3 Poor	1 Very Poor	5 Medium	1 Very Poor	5 Medium	1 Very sparse
016	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent	1 Intermittent
017	5 Medium (17.85±1.59)	5 Medium (18.04±1.90)	3 Short (14.59±1.26)	3 Short (13.70±1.63)	5 Medium (17.81±1.71)	5 Medium (17.61±1.75)	5 Medium (18.37±1.75)	3 Short (13.26±1.82)	5 Medium (17.61±1.45)	3 Short (12.73±1.86)	1 Very Short (9.19±1.44)	5 Medium (18.32±1.67)
051	2 Bronze dotted Green	1 Green	1 Green	2 Bronze doted Green	1 Green	2 Bronze doted Green	2 Bronze doted Green	2 Bronze doted Green	2 Bronze doted Green	2 Bronze doted Green	1 Green	2 Bronze doted Green
052	5 Medium	3 Poor	3 Poor	5 Medium	1 Very Poor	3 Poor	5 Medium	3 Poor	3 Poor	3 Poor	3 Poor	5 Medium
053	3 Sparse	3 Sparse	3 Sparse	1 Very Poor	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent
054	5 Medium	1 Very sparse	5 Medium	5 Medium	0 Absent	0 Absent	1 Very sparse	0 Absent	1 Very sparse	0 Absent	5 Medium	0 Absent
055	3 Medium	3 Sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent
056	3 Sparse	1 Very sparse	1 Very sparse	5 Medium	0 Absent	0 Absent	1 Very sparse	0 Absent	1 Very sparse	0 Absent	5 Medium	0 Absent
065	5Medium (200.4±26.81)	3 Small (136.4 ±23.61)	3 Small (146.0±.25.70)	3 Small (128.4±20.84)	5 Medium (170.8±22.59)	5 Medium (165.0±33.29)	5 Medium (206.2±42.60)	5Medium (164.8±36.18)	7 Large (257.4±51.26)	5Medium (175.7±25.66)	5 Medium (156.5±22.0)	3 Small (145.0±32.41)
066	5Medium (14.8±0.92)	3 Short (12.0±0.94)	3 Short (12.4±1.07)	3 Short (11.5±0.97)	3 Short (12.8±1.03)	3 Short (13.3±1.16)	5 Medium (14.5±1.58)	3 Short (13.6±1.07)	5 Medium (16.9±1.73)	3 Short (14.0±1.25)	3 Short (13.0±1.15)	3 Short (12.6±1.26)
067	3 Pentagon	5 Kidney	2 Wedged	2 Wedged	4 Round	3 Pentagon	2 Wedged	3 Wedged	3 Pentagon	3 Pentagon	3 Pentagon	4 Round
068	3Five	3 Five	3 Five	3 Five	3 Five	3 Five	3 Five	3 Five	3 Five	3 Five	3 Five	3 Five
069	5 Green	5 Green	5 Green	5 Green	5 Green	5 Green	7 Dark Green	7 Dark Green	5 Green	3 Light Green	5 Green	5 Green
070	3 Poor	1 Very Poor	0 Absent	0 Absent	3 Poor	0 Absent	0 Absent	1 Very Poor	1 Very Poor	0 Absent	0 Absent	1 Very Poor
071	3 Poor	1 Very Poor	1 Very Poor	0 Absent	1 Very Poor	0 Absent	0 Absent	1 Very Poor	0 Absent	1 Very Poor	0 Absent	1 Very Poor
072	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent
073	0 Absent	1 Only on petiole	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent		0 Absent	0 Absent	0 Absent
074	2 Almost smooth	5 Wavy	2 Almost smooth	2 Almost smooth	1 Smooth	2 Almost smooth	1 Smooth	1 Smooth	2 Almost smooth	2 Almost smooth	2 Almost smooth	2 Almost smooth
075	0 Absent	3 Poor	1 Very Poor	1 Very Poor	3 Poor	1 Very Poor	0 Absent	0 Absent	1 Very Poor	1 Very Poor	1 Very Poor	0 Absent
076	3 Both side convex	3 Both side convex	3 Both side convex	2 Both side smooth	2 Both side smooth	3 Both side convex	3 Both side convex -mixed	3 Both side convex -mixed	3 Both side convex	2 Both side smooth	3 Both side convex	3 Both side convex

Table 1. Ampelographic identifications for investigated grape varieties (continued)
Çizelge 1. *İncelenen üzüm çeşitlerinin ampelografik tanımlaması (devam)*

OIV	BESİRANE	DAUFİ	GATUNOK	MERCANİ	MERCEGÜL	MİRANİ	ÖKÜZGÖZÜ	REŞMIV	SAVDANİ	TIRŞIK	TRİTELK	ZERİK
077-1	3 Short (7.02±1.58)	3 Short (6.55±1.27)	3 Short (8.22±1.37)	3 Short (6.40±0.90)	3 Short (6.64±0.51)	3 Short (8.21± 1.34)	3 Short (7.17±1.57)	5 Medium (10.18±1.74)	3 Short (6.78±0.88)	3 Short (6.66±0.92)	3 Short (7.11±0.53)	3 Short (6.49± 0.41)
077-2	3 Short (7.67± 1.35)	3 Short (5.45±0.71)	3 Short (7.87± 1.38)	3 Short (6.23±0.85)	3 Short (6.08±0.35)	5 Medium (7.96±1.50)	3 Short (6.98± 1.40)	5 Medium (11.13±3.17)	3 Short (6.44±1.42)	3 Short (7.06±2.26)	3 Short (6.32± 0.55)	3 Short (5.76 ±0.99)
078-1	5 Medium (0.86±0.18)	5 Medium (1.02±0.14)	5 Medium (0.90±0.16)	5 Medium (0.90±0.10)	7 Long (1.01±0.06)	7 Long (1.10±0.16)	5 Medium (0.91±0.14)	5 Medium (0.89±0.07)	5 Medium (0.80±0.05)	7 Long (1.18±0.20)	5 Medium (0.93±011)	5 Medium (0.98±0.14)
078-2	5 Medium (0.85±0.13)	7 Long (1.05±0.21)	7 Long (0.98±0.15)	5 Medium (0.89±0.04)	7 Long (1.01±0.06)	7 Long (1.21±0.10)	7 Long (0.93±0.11)	7 Long (0.98±0.15)	5 Medium (0.74±0.13)	7 Long (0.98±0.19)	5 Medium (0.90±0.19)	5 Medium (0.86±0.15)
079	3 Open	3 Open	3 Open	3 Open	6 Slightly	3 Open	3 Open	5 Closed	7 Overlapping	4 Slightly Open	4 Slightly Open	6 Slightly
080	1 U	1 U	1 U	1 U	2 V	1 U	2 V	1 U	1 U	2 V	1 U	1 U
081	1 Absent	1 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	1 Absent	0 Absent	0 Absent	1 Absent
082	3 Slightly overlapping	3 Slightly overlapping	3 Slightly overlapping	1 Open	3 Slightly overlapping	3 Slightly overlapping	1 Open	3 Slightly overlapping	4 Highly overlapping	3 Slightly overlapping	3 Slightly overlapping	3 Slightly overlapping
083	1 U	1 U	1 U	3 Slightly	2 V	1 U	2 V	1 U	1 U	2 V		1 U
084	1 Very sparse	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	1 Very sparse	1 Very sparse	0 Absent	1 Very sparse	0 Absent	1 Very sparse	1 Very sparse
085	5 Medium	3 Sparse	3 Sparse	0 Absent	0 Absent	3 Sparse	3 Sparse	0 Absent	5 Medium	0 Absent	3 Sparse	3 Sparse
086	3 Seyek	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	3 Sparse	0 Absent	1 Very sparse	0 Absent	1 Very sparse	1 Very sparse
087	5 Medium	3 Sparse	3 Sparse	3 Very sparse	1 Very sparse	1 Very sparse	5 Medium	0 Absent	5 Medium	1 Very sparse	5 Medium	1 Very sparse
088	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent
089	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent
090	1 Very sparse	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	0 Absent	1 Very sparse
091	1 Very sparse	1 Very sparse	1 Very sparse	1 Very sparse	0 Absent	0 Absent	1 Very sparse	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent
092	3 Short (7.5±0.71)	3 Short (8.4 ±0.70)	3 Short (8.20±1.03)	3 Short (7.1±0.99)	3 Short (7.30±0.86)	3 Short (7.20±0.63)	3 Short (7.05±0.55)	3 Short (7.30± 0.67)	3 Short (7.10± 0.88)	3 Short (7.05±1.04)	3 Short (7.30±0.95)	3 Short (7.40 ±1.17)
093	3 Shorter (0.70±0.03)	3 Shorter (0.78±0.07)	3 Shorter (0.75±0.10)	3 Shorter (0.79±0.07)	3 Shorter (0.60±0.05)	3 Shorter (0.71±0.06)	3 Shorter (0.70±0.07)	3 Shorter (0.74±0.05)	3 Shorter (0.79±0.07)	3 Shorter (0.76±0.06)	3 Shorter (0.72±0.07)	3 Shorter (0.79±0.04)
151	3 Hermaphrodite	3	3	3	3	3	3	3	3	3	3	3
153	0 – 1 Bunch	1.1-2 Bunch	1.1-2 Bunch	1.1-2 Bunch	1.1-2 Bunch	1.1-2 Bunch	1.1-2 Bunch	2. 1.1-2 Bunch	1.1- 2 Bunch	1.1-2 Bunch	1.1-2 Bunch	1.1-2 Bunch
154	7 Big (297.5±37.40)	5 Medium (243.7±31.26)	3 Small (153.6±25.76)	5 Medium (219.08±28.14)	7 Big (263.1±52.12)	5 Medium (227.2±27.86)	5 Medium (210.8±26.74)	5 Medium (217.1±42.16)	5 Medium (227.2±40.15)	3 Small (160.10±43.20)	5 Medium (218.6±24.46)	5 Medium (248.0±32.55)
202	7 Long (22.5±1.96)	5 Medium (17.6±1.35)	3 Short (15.0±1.49)	5 Medium (17.55±1.17)	5 Medium (17.60±2.17)	5 Medium (16.80±1.40)	3 Short (15.80±1.03)	5 Medium (18.40±1.78)	5 Medium (16.6± 1.35)	5 Medium (17.90±2.38)	3 Short (15.80±0.92)	5 Medium (18.20±1.55)
203	5 Medium	5 Medium	5 Medium	9 Very frequent	9 Very frequent	7 Frequent	7 Frequent	7 Frequent	5 Medium	5 Medium	5 Medium	5 Medium
204	5 Medium	3 Low	3 Low	5 Medium	5 Medium	3 Low	5 Medium	5 Medium	3 Low	3 Low	5 Medium	5 Medium
206	5 Medium (6.86±0.92)	3 Short (3.11±0.32)	3 Short (3.85±0.54)	3 Short (2.76±0.71)	3 Short (3.35±0.54)	3 Short (3.40±0.84)	3 Short (4.81±0.61)	3 Short (4.24±0.37)	3 Short (4.42±0.61)	3 Short (3.86±0.34)	3 Short (4.84±0.50)	3 Short (3.80±0.56)
221-1	5 Medium (18.55±0.80)	7 Long (24.52±2.34)	5 Medium (19.33±1.54)	5 Medium (18.54±1.18)	5 Medium (20.46±0.96)	5 Medium (19.83±1.63)	5 Medium (21.55±2.05)	5 Medium (21.74±2.39)	5 Medium (22.16±3.08)	3 Short (11.60±2.15)	3 Short (11.49±0.45)	5 Medium (18.55±0.80)

Table 1. Ampelographic identifications for investigated grape varieties (continued)

Çizelge 1. *İncelenen üzüm çeşitlerinin ampelografik tanımlaması (devam)*

OIV Codes	BESİRANE	DAUFİ	GATUNOK	MERCANİ	MERCEGÜL	MİRANİ	ÖKÜZGÖZÜ	REŞMIV	SAVDANİ	TIRŞIK	TRİTELK	ZERİK
221-2	5 Medium (17.56±0.73)	5 Medium (14.57±1.96)	5 Medium (18.17±1.38)	5 Medium (17.23±0.93)	5 Medium (15.61±0.89)	5 Medium (15.67±1.06)	7 Wide (19.33±1.80)	5 Medium (17.43±1.91)	7 Wide (18.03±2.09)	1 Very narrow (10.20±)	1 Very narrow (9.30±0.52)	7 Wide (17.56±0.73)
222	2 Uniform	1 Highly uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform
223	9 Long Oval	8 Cylindrical	2 Slight Oblate	4 Short oval	4 Short oval	9 Long Oval	3 Round	4 Short oval	9 Long oval	3 Round	3 Round	3 Round
224	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round	2 Round
225	1 Green-Yellow	5Dark red purple	1 Green-Yellow	1 Green-Yellow	8Other(Dark Green)	1 Green-Sarı	5 Dark red purple	5Dark red purple	1 Green Yellow	5 Dark red purple	5 Dark red purple	1 Green Yellow
226	2 Uniform	1Not uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform	2 Uniform
227	5 Medium	7 Strong	7 Strong	3 Weak	5 Medium	5 Medium	7 Strong	5 Medium	5 Medium	5 Medium	5 Medium	5 Medium
228	5 Medium	5 Medium	3 Thin	3 Thin	3 Thin	5 Medium	5 Medium	5 Medium	5 Medium	7 Thick	5 Medium	5 Medium
229	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible	1 Slight visible
230-232	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	1 Slightly + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy	0 Colorless + Juicy
233	5 Medium (54.5±0.58)	5 Medium (54.50 ±1.29)	5 Medium (55.0±2.16)	5 Medium (56.0±1.41)	5 Medium (56.5±1.29)	5 Medium (56.0±1.41)	5 Medium (57.75±0.96)	3 Low (48.75±2.99)	3 Low (52.0±1.63)	5 Medium (55.75±1.71)	5 Ort a (55.75±2.06)	5 Medium (56.75±2.22)
234-236	5 Medium 0 Absent	5 Medium 0 Absent	5 Medium 0 Absent	1 Very Low 0 Absent	7 High 0 Absent	3 Low 0 Absent	5 Medium 0 Absent	5 Medium 0 Absent	5 Medium 0 Absent	5 Medium 0 Absent	5 Medium 0 Absent	5 Medium 0 Absent
238	3 Short (6.15±0.46)	3 Short (6.32±0.64)	3 Short (6.38±0.52)	1 Very Short (4.84±0.89)	3 Short (6.80±0.32)	1 Very Short (5.75±0.96)	3 Short (6.36±0.40)	3 Short (7.86±0.80)	3 Short (7.37±0.76)	3 Short (6.09±0.17)	5 Medium (10.53±0.64)	3 Short (7.10±1.04)
239-241	5 Medium 2 Exist	5 Medium 2 Exist	5 Medium 2 Exist	7 Easy 2 Exist	3 Hard 2 Exist	5 Medium 2 Exist	5 Medium 2 Exist	5 Medium 2 Exist	7 Easy 2 Exist	3 Hard 2 Exist	5 Medium 2 Exist	5 Medium 2 Exist
242-1	7 Long (7.07±0.77)	7 Long (7.21±0.59)	7 Long (6.33±0.34)	5 Medium (5.97±0.67)	5 Medium (6.05±0.67)	7 Long (6.48±0.41)	5 Medium (5.86±0.78)	7 Long (6.97±0.61)	7 Long (6.56±0.86)	3 Short (4.63±0.26)	3 Short (4.98±0.47)	5 Medium (6.32±0.79)
242-2	7 Wide (3.91±0.19)	7 Wide (3.84±0.35)	7 Wide (3.74±0.28)	7 Wide (3.52±0.37)	7 Wide (3.66±0.27)	7 Wide (3.63±0.20)	7 Wide (3.84±0.43)	7 Wide (3.86±0.22)	7 Wide (3.77±0.35)	3 Narrow (2.49±0.15)	5 Medium (2.92±0.41)	7 Wide (3.89±0.20)
243	5 Medium (43.73±4.91)	7 High (55.48±4.23)	7 High (48.57±5.99)	5 Medium (46.16±4.61)	5 Medium (33.56±1.85)	5 Medium (40.41±2.07)	5 Medium (40.71±2.07)	5 Medium (40.62±1.27)	5 Medium (41.79±2.09)	3 Low (29.92±1.47)	3 Low (28.42±1.54)	5 Medium (40.61±4.20)
244	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent	0 Absent
301	15.05.2012	10.05.2012	07.05.2012	05.05.2012	18.05.2012	10.05.2012	07.05.2012	08.05.2012	06.05.2012	08.05.2012	12.05.2012	11.05.2012
302	28.06.2012	20.06.2012	17.06.2012	10.06.2012	28.06.2012	20.06.2012	17.06.2012	18.06.2012	16.06.2012	18.06.2012	22.06.2012	21.06.2012
303	20.08.2012	15.08.2012	10.08.2012	01.08.2012	25.08.2012	15.08.2012	10.08.2012	12.08.2012	08.08.2012	12.08.2012	18.08.2012	16.08.2012
304	01.10.2012	24.09.2012	20.09.2012	12.09.2012	05.10.2012	24.09.2012	20.09.2012	22.09.2012	18.09.2012	22.09.2012	28.09.2012	25.09.2012
502	5 Medium (447.78±42.17)	5 Medium (310.62±22.58)	5 Medium (328.9±20.95)	5 Medium (346.86±27.95)	5 Medium (482.5 ±33.66)	5 Medium (485.64±33.36)	5 Medium (576.30±48.22)	7 Big (618.1±32.55)	5 Medium (497.4±43.03)	3 Small (250.44±20.12)	3 Small (210.2±18.63)	5 Medium (495.5±30.64)
503	5 Medium (3.51±0.58)	5 Medium (3.84±0.55)	5 Medium (3.14±0.26)	5 Medium (2.75±0.14)	5 Medium (2.86±0.28)	5 Medium (4.07±0.44)	5 Medium (4.53±0.47)	5 Medium (4.97±0.49)	5 Medium (4.52±0.56)	3 Small (2.58±0.32)	3 Small (1.61±0.23)	5 Medium (4.29±0.45)
504	5.17±0.80	5.03±0.90	4.73±0.85	4.69±0.81	4.82±0.52	4.61±0.94	6.08±0.74	4.86±0.68	5.01±0.68	3.76±0.76	3.53±0.50	4.80 ± 0.59
505	3 Low (%14)	5Medium (%19)	5Medium(%19)	5Medium (%17)	3 Low (%13)	3 Low (%16)	3 Low (%16)	3 Low (%15)	1 Low(%11)	5Medium (%18)	3 Low (%15)	3 Low (%16)
506	3 Low (7.30)	3 Low (6.00)	5Medium(10.30)	7 High (13.00)	7 High (12.00)	3 Low (6.80)	5Medium (8.50)	5Medium(7.70)	7 High (10.50)	7 High (12.10)	9Veryhigh(16.30)	3 Low (4.40)

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