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# Determination of Ampelographic Characters of Some Natural Foxy Grape (*Vitis labrusca* L.) Types Grown in Northern Turkey (Ordu and Giresun Province)

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**Abstract:** This study was carried out during 2001- 2003 in order to determine ampelographic characters of the *Labrusca* type (*Vitis labrusca* L.) grapes grown in Ordu and Giresun province in Northern Turkey. Forty seven ampelographic characters of 11 Natural Foxy grape types were described in accordance with the international norms. The number of lobes and the shape of blade in mature leaf were determined as Three lobes, Pentagonal or Wedge-shaped, respectively. The sexes of flowers at types were Hermaphrodite character. The bunch sizes were Very Small and the shape of bunches was Cylindirical or Conic and Winged. The size of berry and its shape were Middle and Large in size and Round in shape. The skin color of the types was Dark Red-Violet, Red-Grey or Blue-Black and the flesh had no color. The particular flavor was Foxy as typical characters of *Vitis labrusca* species. The time of ripening was generally late. The single bunch weight, the berry must yield and the total acid changed between 67.5 and 157.4 g, 14.5 and 17.50%; 4.70 and 6.80 g $L^{-1}$, respectively.

**Key words:** Turkey, foxy grape, *Vitis labrusca* L. Ampelography, IPGR

## INTRODUCTION

Grapevine (*Vitis vinifera* L.) is grown in all parts of the European and Mediterranean region where the summer is sufficiently warm for grapes to ripen. Turkey having the most suitable ecological condition for viticulture, is an important grape growing country (3, 600 000 Mt, in 2004) and it has the oldest viticulture, many grape cultivars and types. Grape cultivars belonging to *Vitis vinifera* could grow economically in Turkey (Fidan, 1985; Celik *et al*., 1998; Anonymous, 2005).

Grapes tolerate to a wide range of soils, but good water drainage is essential. A site exposed to full sun is best for viticulture. The berries of *V. vinifera* cultivars in Black Sea region in Northern Turkey generally doesn't ripen well because this region usually has heavy rainfall in spring and autumn and less sunny day in vegetation period. Thus, the traditional viticulture with vinifera cultivars in this area has not been grown due to climatic condition (wide of fungal disease, low fertility, poor quality, late of ripening) (Celik *et al*., 1998; Celik, 1998, 2004).

Ordu and Giresun provinces are located on the 41th latitude at Black Sea coast belt in Northern Turkey. In this region hazelnut has been grown as monoculture. *Vitis labrusca* vines have been grown with pergola system, wrapped on tree or building in this province. Native foxy grapes have grown with synonym names as Isabella, Black Grape, Aromatic Grape and Strawberry Grape in this region. These grapes have foxy flavor, thick and slip skin, aromatic characteristics and have been consumed as table, marmalade, pickle, berry juice for local requirements (Apan *et al*., 1986; Celik, 2004). According to the researches, the foxy grapes grown in this region are also resistant to fungal diseases (Apan *et al*., 1986; Celik, 2004). By now, the detailed ampelographic characters of Natural foxy grape types grown in this region have not been determined. Characterizing the diversity of local populations may allow a more useful application of these materials in breeding programs.

*Vitis labrusca* and French-American hybrid grapes are grown on limited acreages in United States. *Labrusca* type grapes have been also found in colder regions of Eastern Europe. These species have relatively

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low sugar, low acid, low pH, soft pulp with thick skin, few moderate-size berries per bunch. Labrusca type grapes are the best suited for fresh, grape juice and jelly consumption. Fruit flavors are described as foxy or like passion fruit. Labrusca grapes are generally more resistant than Vinifera cultivar against to fungal diseases (Winkler *et al*., 1974; Weaver, 1976; Celik, 2004).

Ampelography is a science of identifying grapevines: species, hybrids and varieties (Oraman, 1963; Morton, 1979; Fidan, 1985). Ampelographic studies have been made since the 17th century in the world and the characters of many grapes have been determined by different researchers in various countries (Kara, 1990; Schneider and Manini, 1994; Martinez and Perez, 1999; Braykov *et al*., 2002; Zahedi *et al*., 2002; Russo *et al*., 2004). Determination of grape characters has been based on Descriptor for Grapevine (*Vitis* sp.). prepared by International Board of Plant Genetic Resources (IPGR) in 1983, but latest list has been developed in collaboration with the Office International de la Vigne et du Vin (OIV) and International Union for he Protection of New Varieties of Plants (UPOV) in 1997 (Anonymous, 1983, 1997).

The ampelographical studies in Turkey were firstly made by Oraman (1937) and these studies have been carried out by different researchers for about sixty years (Fidan, 1976; Odabas, 1984; Marasalı, 1986; Agaoglu *et al*., 1989; Kara, 1990; Kelen and Tekintas, 1991; Gursoz, 1993; Ecevit *et al*., 1997; Melek and Celik, 2005). The objective of this study was to determine the ampelographic characters of some Natural Foxy grape (*V. labrusca* L.) types grown in Ordu and Giresun province in Northern Turkey in accordance with the international norms.

## MATERIALS AND METHODS

This study was carried out period that from bud break until ripening stage in Ordu and Giresun provinces in Northern Turkey during the 2001-2003. In this trial native *Vitis labrusca* vines grown with pergola system and climbed up on tree or building in this region were used as plant material. Trial vines have been grown on own rooted and un-grafted grapevines.

Total 27 Natural Foxy types (9 types in Ordu, 5 types in Unye, 3 types in Fatsa, 7 types in Persembe, 2 types in Piraziz and 1 type in Bulancak ) have been investigated, but the ampelographic characters of 11 types selected are given in this study. In ampelographic descriptions, the young shoot, the adult leaf, the bunch, the berry and the seeds characters of *Vitis labrusca* types were determined. On the other hand, the main parameters of the must were analyzed at harvest. Ampelographic characters of vines were determined in according to Descriptors For Grape prepared by IPGR (Anonymous, 1997). Scale values prepared by Kara (1990) were used in valuation of visual characters. The size of blade was determined using the methods of Uzun and Celik (1999).

## RESULTS

The ampelographic characters described of 11 Natural Foxy types are presented in Table 1. The forms of tip in the young shoots at all of the Foxy types were observed as Closed. The density of anthocyanin colouration of tip at all types was Absent. The density of prostrate hairs on tip showed differences according to types. The density of prostrate hairs on tip in 52 Ordu Centre 03, 52 Ordu Centre 08, 52 Persembe 02, 52 Fatsa 03 and 52 Unye 05 types was observed as Dense. It was observed as Medium for other types. The shoot habit was determined as Semi Drooping at 52 Unye 02 type and horizontal in other types. The number of consecutive tendrils at all types was three and more (Table 1).

Mature leaves had Three lobes and Pentagonal or Wedge-shaped. The mature leaves from the point of view the size of blade were classificated as Small (8 types) and Middle (3 types). The general shape of petiole sinus of 11 Natural Foxy types was V shape and Open or Very Open. The density of prostrate hairs between veins of mature leaves in trial types was Middle, Dense or Very Dense (Table 1).

The shoot lengths of internodes changed between 8.1 cm (52 Unye 02) and 18.4 cm (28 Bulancak 01). The sex of flowers at types was Hermaphrodite character. The bunch sizes was determined as Very Small and the density of berry was loose, Middle and dense; the shapes of bunch were Cylindrical or Conic and Winged (Table 1).

The size of berry was determined as Middle and Large. Fifty two Centre 07 type had the smallest berry (1.91 g) while 52 Centre 08 type had the biggest berry weight (3.49 g). The shape of berry at all of the types was Round shape. The size of berry was Medium in 52 Ordu Centre 09, 52 Persembe 01 and Persembe 02 types, but other types were Low in size. The skin color of investigated types were Dark Red-Violet, Red-Grey or Blue-Black; the flesh has no color; the juiceless of flesh was Juicy; The particular flavor was Foxy typical characters of *Vitis labrusca* species. Similarly, the percentage of berry set changed between 14.90% (52 Ordu Centre 09) and 50.20% (28 Piraziz 02). The time of ripening was generally late. The single bunch weight, the berry must yield and the total acid changed between 67.5 and

Table 1: The some ampeleographic characters determinated of natural foxy grapes (*V. labrusca* L.) Types grown in Northern Turkey (Ordu and Giresun Province)

| | The code names and numbers of types | | | | | |
|---|---|---|---|---|---|---|
| Ampeleographic characters | 52 Ordu 08 | 52 Ordu 08 | 52 Ordu 09 | 52 Persembe 1 | 52 Persembe 2 | 52 Persembe 7 |
| **Young shoot:** Form of tip | Closed | Closed | Closed | Closed | Closed | Closed |
| Density anthocyanin colouration of tip | Absent | Absent | Absent | Absent | Absent | Absent |
| Density of prostrate hairs on tip | Dense | Dense | Medium | Dense | Dense | Medium |
| Density of erect hairs on tip | Medium | Very sparse | Very sparse | Very sparse | Very sparse | Very sparse |
| Shoot habit | Horizontal | Horizontal | Horizontal | Horizontal | Horizontal | Horizontal |
| Colour of dorsal side of internode | Green and red striped | Grs | Green | Grs | Grs | Grs |
| Colour of ventral side of internode | Green | Green | Green | Green | Green | Green |
| Colour of dorsal side of node | Green and red striped | Grs | Green | Grs | Grs | Grs |
| Colour of ventral side of node | Green and red striped | Green | Green | Grs | Grs | Grs |
| Length of tendrils (cm) | Short | Short | Short | Short | Short | Short |
| No. of consecutive tendrils | Three and more | Three and more | Three and more | Three and more | Three and more | Three and more |
| **Mature leaf:** Size of blade | Small | Small | Middle | Small | Small | Middle |
| Shape of blade | Pentagonal | Wedge-shaped | Pentagonal | Pentagonal | Pentagonal | Pentagonal |
| No. of lobes | 3 | 3 | 3 | 3 | 3 | 3 |
| Colour of upper blade | Green | Dark green | Light green | Dark green | Green | Dark green |
| General shape of petiole sinus | Open | Very open | open | Very open | Open | Open |
| Shape of petiole sinus | V | V | V | V | V | V |
| Shape of upper lateral sinus | Open | Open | Open | Open | Open | Open |
| Density of prostrate hairs between veins between veins | Dense | Dense | Middle | Dense | Dense | Dense |
| Length of blade petiole | Short | Very short | Short | Short | Very short | Very short |
| Growth of axillary shoots | Strong | Strong | Strong | Strong | Medium | Strong |
| Growth of lateral shoots | Weak | Strong | Medium | Strong | Strong | Medium |
| Shoot length of internode (cm) | Short (9.6 ) | Short (9.1) | Short (10.8) | Short (11.9) | Short (10.2) | Short (10.3) |
| Sex of flower | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite |
| **Bunch:** No. of bunch per cane | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 | 2-3 |
| Bunch size ($cm^2$) | Very small | Very small | Very small | Very small | Very small | Very small |
| Density of berry | Middle | Middle | Loose | Loose | Dense | Loose |
| Berry number | Few | Few | Few | Few | Few | Few |
| Shape of bunch | Cylindrical | Conic and weight | Conic and weight | Conic and weight | Cylindrical | Conic and weight |
| Percentage of berry set (%) | Low (20.44) | Low (22.71) | Very low (25.1) | Very low (14.9) | Low (15.0) | Low (37.0) |
| **Berry**: Size of berry | Middle | Large | Middle | Large | Large | Middle |
| Shape of berry | Round | Round | Round | Round | Round | Round |
| Skin colour | Dark red -violet | Dark red -violet | Red-grey | Blue-black | Blue black | D.R.V |
| Density of bloom layer | Very dense | Very dense | Very dense | Very dense | Very dense | Very dense |
| Flesh colour | Colorless | Colorless | Colorless | Colorless | Colorless | Colorless |
| Juiceness of flesh | Juicy | Juicy | Juicy | Juicy | Juicy | Juicy |
| Berry uniform | Uniformless | Uniformless | Uniformless | Uniformless | Uniform | Uniform |
| Particular flavour | Foxy | Foxy | Foxy | Foxy | Foxy | Foxy |
| Single berry weight (g) | Low | Low | Medium | Medium | Medium | Low |
| **Seed**: Presence of seed | Well developed | Well developed | Well developed | Well developed | Well developed | Well developed |
| 100-seed weight (g) | 5.86 high | 4.62 medium | 6.09 high | 6.57 very high | 5.63 high | 4.91 medium |
| Ripening time | Late | Late | Late | Late | Late | Late |
| Single bunch weight (g) | 112.0 | 93.6 | 67.5 | 73.1 | 157.4 | 94.5 |
| Berry must yield (mL/100 g) | 69.3 | 66.3 | 70.5 | 68.0 | 67.5 | 66.2 |
| 100 berry weight (g) | 278 | 250.5 | 357.6 | 324.0 | 303.0 | 294.0 |
| Sugar content of must (%) | 15.6 | 15.8 | 16.5 | 16.7 | 16.9 | 17.0 |
| Total acid ($g\ L^{-1}$) | 6.8 | 4.7 | 6.2 | 5.7 | 6.8 | 5.9 |

| | The code names and numbers of types | | | | |
|---|---|---|---|---|---|
| Ampeleographic characters | 52 Ofatsa 03 | 52 Unye 02 | 52 Unye 05 | 28 Bulancak 01 | 28 Piraziz 02 |
| **Young shoot**: Form of tip | Closed | Closed | Closed | Closed | Closed |
| Density anthocyanin colouration of tip | Absent | Absent | Absent | Absent | Absent |
| Density of prostrate hairs on tip | Dense | Medium | Dense | Medium | Medium |

Table 1: Continued

| Ampeleographic characters | The code names and numbers of types<br>52 Ofatsa 03 | 52 Unye 02 | 52 Unye05 | 28 Bulancak 01 | 28 Piraziz 02 |
|---|---|---|---|---|---|
| Density of erect hairs on tip | Very sparse | Very sparse | Very sparse | Medium | Medium |
| Shoot habit | Horizontal | Semi drooping | Horizontal | Horizontal | Horizontal |
| Colour of dorsal side of internode | Grs | Grs | Grs | Grs | Grs |
| Colour of ventral side of internode | Green | Green | Green | Green | Green |
| Colour of dorsal side of node | Grs | Grs | Grs | Grs | Grs |
| Colour of ventral side of node | Grs | Grs | Grs | Grs | Grs |
| Length of tendrils (cm) | Short | Very short | Very short | Medium | Short |
| No. of consecutive tendrils | Three and more | Three and more | Three and more | Three and more | Three and more |
| **Mature leaf**: Size of blade | Small | Small | Small | Middle | Small |
| Shape of blade | Wedge -shaped | Pentagonal | Pentagonal | Pentagonal | Pentagonal |
| No. of lobes | 3 | 3 | 3 | 3 | 3 |
| Colour of upper blade | Dark green | Dark green | Dark green | Dark green | Dark green |
| General shape of petiole sinus | Very open | Very open | open | open | open |
| Shape of petiole sinus | V | V | V | V | V |
| VShape of upper lateral sinus | Open | Open | Open | Open | Open |
| Density of prostrate hairs between veins | Dense | Very dense | Very dense | Dense | Middle |
| Length of blade petiole | Short | Very short | Very short | Very short | Short |
| Growth of axillary shoots | Medium | Medium | Medium | Strong | Strong |
| Growth of lateral shoots | Weak | Weak | Medium | Medium | Medium |
| Shoot length of internode (cm) | Short (11.2) | Short (8.1) | Short (11.1) | Long (17.2) | Long (18.4) |
| Sex of flower | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite | Hermap -hrodite |
| **Bunch**: No. of bunch per cane | 2-3 | 2-3 | 3-4 | 2-3 | 2-3 |
| Bunch size ($cm^2$) | Very small | Very small | Very small | Very small | Very small |
| Density of berry | Dense | Middle | Middle | Dense | Loose |
| Berry number | Few | Few | Few | Few | Few |
| Shape of bunch | Cylindrical | Conic and weight | Conic and weight | Cylindrical | Conic and weight |
| Percentage of berry set (%) | Low (36.0) | Low (16.0) | Low (43.0) | Low (36.7) | Medium (50.2) |
| **Berry**: Size of berry | Large | Large | Middle | Middle | Middle |
| Shape of berry | Round | Round | Round | Round | Round |
| Skin colour | D.R.V | D.R.V | Blue-black | D.R.V | D.R.V |
| Density of bloom layer | Very dense | Very dense | Very dense | Very dense | Very dense |
| Flesh colour | Colorless | Colorless | Colorless | Colorless | Colorless |
| Juiceness of flesh | Juicy | Juicy | Juicy | Juicy | Juicy |
| Berry uniform | Uniformless | Uniformless | Uniformless | Uniformless | Uniformless |
| Particular flavour | Foxy | Foxy | Foxy | Foxy | Foxy |
| Single berry weight (g) | Low | Low | Low | Low | Low |
| **Seed**: Presence of seed | Well developed | Well developed | Well developed | Well developed | Well developed |
| 100 - seed weight (g) | 4.23 medium | 4.57 medium | 5.03 medium | 5.33 high | 5.46 high |
| Ripening time | Late | Late | Late | Late | Late |
| Single bunch weight (g) | 80.4 | 76.9 | 132.5 | 107.6 | 83.1 |
| Berry must yield (mL/100 g) | 66.4 | 67.5 | 68.0 | 65.6 | 61.7 |
| 100 berry weight (g) | 219.1 | 260.5 | 273.0 | 259.0 | 257.5 |
| Sugar content of must (%) | 15.8 | 18.0 | 15.0 | 14.5 | 17.5 |
| Total acid ($g\ L^{-1}$) | 6.5 | 6.0 | 6.7 | 5.8 | 6.5 |

157.4 g, 14.5 and 17.50%; 4.70 and 6.80 g $L^{-1}$, respectively. Fifty two Centre 09 type was sensitive fungal disease (powder mildew, downy mildew) as compared to other types. But, the berry must yield of this type was high and its berry color was green.

## DISCUSSION

The form of tip in the young shoot of all types was determined to be Closed, Similarly, to Kara (1990) and Melek and Celik (2005) reported that tip form in the young shoots of Native Foxy grapes was Closed. The color of tip was generally Absent. Color of tip is very important character for determination of differences among the grape varieties (Morton, 1979). Moreover, this character may vary in relation to light (Kara, 1990; Anonymous, 1997). The shoot habit was determined to be Horizontal in trial types, except for 52 Unye 02. Kara (1990) informed that Natural Foxy cultivars have grown to be Semi Drooping of the shoot habit. In this study, only one tip

(52 Unye 02) had Semi Drooping shoot habit. As to be in all labrusca species, the number of consecutive tendril was Three and More (continuous) in all types. *Vitis labrusca* has continuous tendrils, in which case there is a tendril or flower cluster opposite every leaf (Winkler *et al*., 1974; Weaver, 1976; Celik *et al*., 1998, Celik, 2004).

The leaves of all tips had three lobes and shape of blade in mature leaf was Pentagonal or Wedge-shaped. Similarly, Kara (1990) reported that the Native Foxy grapes have three lobes and pentagonal shape blades. Nevertheless, Melek and Celik (2005) reported that in addition to Pentagonal shape it was observed Cordate and Circular shape blade. The size of blade was determined to be Small (8 types) and Middle (3 tips). Morton (1979) noted that the size of blade changed according to soil fertility, growing vigor, training system and ecological condition. Oraman (1972) informed that the size of blade characters may be affected from clon, location and direction. The density of prostrate hairs between veins of mature leaves in types investigated in this study was Middle, Dense or Very Dense. Labrusca grapes have generally Dense or Very Dense prostrate hairs between veins (Winkler *et al*., 1974; Celik, 1998). The length of blade petiole was classificated as Very Short and Short. These results are in agreement with other reports for Natural Foxy grapes (Kara, 1990; Melek and Celik, 2005). The shoot lengths of internode were changed between 8.1 and 18.4 cm. Similarly, Morton (1979) reported that the shoot lengths of internodes changed from 6 to 20 cm in labrusca species. The flowers sexes at types were Hermaphrodite character. In several studies, it was stated that there were hermaphrodite flowers at Isabella grapes (Kara, 1990; Melek and Celik, 2005).

The bunch sizes were determined to be Very Small and the density of berry was loose, Middle and dense. The shapes of bunch were Cylindrical and Conic and Winged. Bunch size may be affected with soil type, fertilizing, fall, irrigation, training system, blossom, berry set, hormone substance application and seasonal condition (Morton, 1979). The results concerned with the bunch were similar to the findings of Melek and Celik (2005).

The particular flavour was Foxy, that is typical characters of *Vitis labrusca* species. The other characters (shape of berry, size of berry, skin color, flesh color, juiciness of flesh) determined related to berry were similar to the findings of previous studies (Kara, 1990; Melek and Celik, 2005).

The time of ripening of Foxy types was late. Several researchers stated that the time of ripening was affected by number of bunch per cane, cultivars, pruning, viruses, altitude, fertilizing, irrigation and effective heat summations (Oraman, 1972, Winkler *et al*., 1974; Weaver *et al*., 1976).

The berry must yield and the total acid changed according to Foxy types. The must yield and total acid have been affected from climatic condition (Winkler *et al*., 1974; Weaver, 1976), seed existence in berry, (Fidan *et al*., 1971) and changes according to cultivar (Oraman and Eris, 1975).

These results are in agreement with other reports related to properties and ampelographic characters of Foxy grapes (Winkler *et al*., 1974; Weaver, 1976; Kara, 1990; Melek and Celik, 2005).

In the result of this experiment, these Native Foxy 11 types with different ampelographic characters have been found to be promising for labrusca viticulture in the coastal Northern Turkey having high humidity and excessive fall around a year.

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## REFERENCES

Agaoglu, Y.S., H. Celik and E. Gokcay, 1989. Brief ampelographic characters of indigenous grapevine cultivars subjected to clonal selection in Turkey. Fifth International Symposium on Grape Breeding. 12-16 Sep.1989. İn St. Martin FR Germany, pp: 8.

Apan, H., F. Odabas and S.M. Sen, 1986. The possibilities developing and case of Horticulture Agriculture of Black Sea Region. The Symposium on 140th year of Agric. Educ. Ondokuzmayis Univ. Agric. Fac. 14: 36-67, (In Turkish).

Anonymous, 1983. Descriptors for grape. IBPRG Secretariat. Rome.

Anonymous, 1997. Descriptors for grape. IPGR secretariat. Via dele Sette Chiese 142 00145 Rome. Italy.

Anonymous, 2005. www.Fao.usda.gov/htp/circular.

Braykov, D., V. Roychev and P. Potyanski, 2002. Ampelographic characteristics of the seedless vine cultivars Kiskmish Luchisti and Vanessa Seedless. II. Agrobiological and technological characteristics, Lozarstvo i Vinarstvo Bulgaria, 3: 18-23

Celik, H., Y.S. Agaoglu, Y. Fidan, B. Marasalı and G. Soylemezoglu, 1998. General Viticulture. SUN FİDAN A.Ş. Professional Books Series: No. 1, pp: 253 (In Turkish).

Celik, H., 2004. Grapes Growing. Pazar Agriculture Associaton, Education Publication No: 2, pp: 121 (In Turkish).

Celik, S., 1998. Viticulture (Ampeloloji). Cilt: I., Anadolu Printing Office, 11: 426 (In Tukrish).

Ecevit, M.F., A. Akin and Z. Kara, 1997. An ampelographic study on some grape cultivars grown in Akoren, Guneysehir and Hadim disatricts of the Konya province. Bahce- J. Yalova Atatürk Central. Hortic. Res. Ins., 26: 3-1.

Fidan, Y., M.S. Tamer and A. Eriş, 1971. A Study on the viniculture of Güdül county, development possibilities and ampelogrphic characters of important grape cultivars. Ankara Univ. Agric. Fac., 21: 495-524.

Fidan, Y., 1976. The studies on the ampelographic characters of standard tablegrape cultivars grown in research vine of Horticulture Department of Ankara University. Ankara Univ. Agric. Fac., pp: 590.

Fidan, Y., 1985. Private Viticulture. Ankara Univ. Agric. Fac.: 930. Lesson Book, No. 265 (Turkish).

Gursoz, S., 1993. The study on viniculture of Southeast area in Turkey and ampelographic characters of grape cultivars grown in Sanliurfa province, the determination of yield and quality components. II. National Horticulture Congress., Cilt., 2: 504-508.

Kara, Z., 1990. Studies on determined of ampeleographic characters of grape cultivars grown in Tokat. Ankara Univ. Graduate School of Natural and Applied Sciences (Ph.D Thesis) (In Turkish) pp: 318.

Kelen, M. and F.E. Tekintas, 1991. The studies on ampelographic characters of grape cultivars grown in Ercis and province. Yuzuncu Yil Univ. Agric. Fac., 1, No.1, pp: 110-128s.

Marasalı, B., 1986. The studies on determination of some native standard grape cultivars grown in Ankara province. M. Sc. Thesis, Natural and Applied Sciences Institute, Ankara University.

Martinez, M.C. and J.E. Perez, 1999. The forgotten Vineyard of the Austrias princedom and ampelographic descripton of its grapevine cultivars (*V. vinifera* L.) Am. J. Enol. Vitic., 51: 370-378.

Melek, N. and H. Celik, 2005. The ampelographic characters of some Isabella grape (*Vitis labrusca* L.) types grown in Sinop. Sixth Viticulture Symposium. 19-23 September, Tekirdag (In Publish and Turkish).

Morton, L.T., 1979. Practical Ampelography (Traslated and Adapted From P. Galet) Cornell Univ. Press. Ithaca and London.

Odabas, F., 1984. The Studies on viniculture of Igdır plain and the ampelographic characters of grape cultivars grown in Igdır plain. Ankara Univ. Publ. No. 591.

Oraman, M.N., 1963. Ampelografi. Ankara Univ. Agric. Fac. Publ., No.154 (In Turkish).

Oraman, M.N., 1972. The Technique of Viticulture- II. Ankara Univ. Agric. Fac. Publ., No. 470 (In Turkish).

Oraman, M.N. and A. Eris, 1975. The ripening tests in Cavus, Hafizali and Karagevrek grape cultivars. Ankara Univ. Agric. Fac., 24: 1-2.

Oraman, N., 1937, Ankara country viniculture and ampelography of grape cultivars grown in Ankara. High Agric. Ins. Publ., No. 61.

Russo, G., L.D. Andra, V. liuzzi and G. Alviti, 2004. Comparison of three black grapes vines: Malvasia Nera, Negro Amaro and Primitivo. Acta Hortic. (ISHS) 26th Intl. Hortic. Cong., 640: 243-248.

Schneider, A. and A.F. Manini, 1994. Guide to identifying the grapevine. Bonarda Piomentese, Hortic. Abst., 64: 2569.

Uzun, S. and H. Celik, 1999. Leaf area prediction models (UZCELİK-1) for some horticultural plants. Tr. J. Agric. For., 23: 645-650.

Weaver, R.J., 1976. Grapes growing. University of California, Davis.

Winkler, A J., J.A. Cook, W.M. Kliewer and L.A. Lider, 1974. General Viticulture. Univ. California Press. Berkeley, pp: 710.

Zahedi, B., M. Saneie and A. Vezvaei, 2002. Identification of grapevine cultivars in Khorram Abad (Lorestan) Symposium. Viticulture and Oenology Living with Limitations. August 12, Toronto Canada, S05-pp: 50.