Asian Journal of Plant Sciences

ISSN 1682-3974

science alert

ANSInet
an open access publisher
http://ansinet.com

Asian Journal of Plant Sciences 5 (2): 373-377, 2006
ISSN 1682-3974

Determination of Ampelographic Characters of Some Natural Foxy Grape (*Vitis labrusca* L.) Types Grown in Northern Turkey (In Trabzon Province)

[1]Rustem Cangi, [2]Huseyin Celik, [2]Ferhat Odabas and [3]Ali Islam
[1]Department of Horticulture, Faculty of Agriculture,
Gaziosmanpasa University, Tokat, Turkey
[2]Department of Horticulture Science, Faculty of Agriculture,
Ondokuzmayis University, Samsun, Turkey
[3]Department of Horticulture Science, Faculty of Ordu Agriculture,
Black Sea Technical University, Ordu, Turkey

Abstract: This study was carried out during 2003- 2004 in order to determine ampelographic characters of the *Labrusca* type (*Vitis labrusca* L.) grapes grown in Trabzon province in Northern Turkey. Detailed ampelographic characters of 10 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, Wedge-shaped or Cordate, respectively. The sexes of flowers at types were Hermaphrodite character. The bunch sizes were generally 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, Rose-Red, Red or Blue-Black. 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 82.6 and 335.0 g, 13.0 and 16.0%; 3.29 and 10.0 g L^{-1}, respectively.

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

INTRODUCTION

Grape culture began in Asia Minor, in the region between and to the south of the Black and Caspian Seas. Wild grapes of the Old World (*Vitis sylvestris*, Vitaceae) are indigenous to the south Caspian belt, Turkey and the Balkans and were widely distributed in the northern Mediterranean area including the Black and Caspian Seas (Winkler *et al*., 1974; Weaver, 1976; Zohary and Spiegel, 1975; Smart and Simmonds, 1995; Reisch and Pratt, 1996). Turkey having the most suitable ecological condition for viticulture and it has the oldest viticulture, many grape cultivars and types (Winkler *et al*., 1974; Weaver, 1976; Fidan, 1985; Celik *et al*., 1998). 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 (Fidan, 1985; Celik *et al*., 1998; Celik, 1998).

One American species, *V. labrusca*, known as the fox grape, was rapidly domesticated while others were hybridized with *V. vinifera* to develop Phylloxera-resistant rootstocks. Labrusca grapes are generally more resistant than Vinifera cultivar against to fungal diseases. These species have relatively low sugar, low acid, low pH, soft pulp with thick skin, few moderate-size berries per bunch (Winkler *et al*., 1974; Weaver, 1976; Celik, 2004).

Trabzon province are located on the latitude 41°00 N and longitude 039°43 E at Black Sea coast belt in Northern Turkey. *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 (Celik, 2004; Apan *et al*., 1986; Cangi, 1999; Melek and Celik, 2005). 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.

Corresponding Author: Dr. Rustem Cangi, Department of Horticulture, Faculty of Agriculture, Gaziosmanpasa University, Tokat, Turkey

Ampelography is a science of identifying grapevines: species, hybrids and varieties (Fidan, 1985; Oraman, 1963; Morton, 1979). 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; Martinez and Perez, 1999; Braykov *et al*., 2002). Determination of grape characters has been based on Descriptor for Grapevine (*Vitis* spp.) prepared by International Board of Plant Genetic Resources (IPGR). The 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, 1997).

The objective of this study was to determine the ampelographic characters of some Natural Foxy grape (*V. labrusca* L.) types grown in Trabzon province in Northern Turkey in accordance with the international norms.

MATERIALS AND METHODS

This research was carried out period from the bud break until ripening stage in Trabzon province in Northern Turkey during the 2003-2004. 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.

The lenght of growth periods in Trabzon province were 265 days; effective heat summations is 1865 degree-days above 10°C, average temperature 14.4°C and average precipitation 1173 mm in Trabzon province (Celik *et al*., 1998).

Total 32 natural foxy types have been investigated in Trabzon Province, but the ampelographic characters of 10 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 AND DISCUSSION

The ampelographic characters described of 10 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 and prostrate hairs of tip showed differences according to types. The density of prostrate hairs on tip at 61Trabzon Centre 06, 61 Trabzon Centre 07, 61 Surmene 02 and 61 Surmene 03 types was observed as Medium. It was observed as Very Sparse or Sparse for other types. The number of consecutive tendrils at all types was Continuous and the lengths of tendril were Short or Medium. The shoot habit was determined as Semi-erect at 61 Trabzon Centre 03, 61 Akcaabat 01 and 61 Surmene 02 types and Semi drooping or horizontal in other types (Table 1).

Kara (1990) and Melek and Celik (2005) stated that the form of tip in the young shoots of Native Foxy grapes was Closed. 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). *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; Cangi, 1999; Kara, 1990). Kara (1990) informed that Natural Foxy cultivars had grown Semi Drooping of the shoot habit. The results of according to young shoot and tendril were similar to the findings of previous many reports (Winkler *et al*., 1974; Weaver, 1976; Celik, 2004; Cangi, 1999; Melek and Celik, 2005; Kara, 1990).

Mature leaves had Three lobes and Pentagonal, Cordate or Wedge-Shaped. The mature leaves from the point of view the size of blade were classificated as Small (5 types) and Medium (5 types). The general shape of petiole sinus of 10 Natural Foxy types was V shape and Open, Very Open or Slightly Open. The density of prostrate hairs between veins of mature leaves in trial types showed differences according to types. The colour of upper blade was Green or Dark Green. The sex of flowers at types was Hermaphrodite character (Table 1).

Kara (1990) reported that the Native Foxy grapes have three lobes and pentagonal shape blades. Nevertheless, Melek and Celik (2005) reported that they were observed Cordate and Circular in addition Pentagonal shape of blade in Native Foxy grapes. Morton (1979) noted that the size of blade changed according to soil fertility, growing vigour, traning system and ecological condition. Moreover the size of blade was affected from differences within cultivars. Oraman (1972) informed that the size of blade characters may be affected from clon, location and direction, too. Labrusca grapes have generally Dense or Very Dense prostrate hairs between veins (Winkler *et al*., 1974; Celik, 1998; Cangi, 1999). In several studies, it was stated that there were hermaphrodite flowers at Isabella grapes (Melek and Celik, 2005; Kara, 1990). These results are in agrement with other reports for foxy grapes (Cangi, 1999; Melek and Celik, 2005; Kara, 1990).

Table 1: The some ampeleographic characters determinated of Natural Foxy Grapes (*V. labrusca* L.) Types Grown In Trabzon Province (Northern Turkey)

	The code names and numbers of types				
Ampeleographic characters	61 Trabzon centre 03	61 Trabzon centre 04	61 Trabzon centre 06	61 Trabzon centre 07	61Akcaabat 01
Young shoot: form of tip	Closed	Closed	Closed	Closed	Closed
Density anthocyanin colouration of tip	Weak	Weak	Medium	Very weak	Very weak
Density of prostrate hairs on tip	Sparse	Very sparse	Medium	Medium	Very sparse
Density of erect hairs on tip	Absent	Absent	Medium	Absent	Absent
Colour of dorsal side of internode	Green and red striped	Green and red striped	Green and red striped	Green	Green and red striped
Colour of ventral side of internode	Green	Green	Green and red striped	Green	Green
Density of erect hairs on internode	Absent	Absent	Absent	Absent	Absent
Density of prostrate hairs on internode	Medium	Medium	Sparse	Sparse	Very Sparse
Number of consecutive tendrils	Continuous	Continuous	Continuous	Continuous	Continuous
Length of tendrils (cm)	20.06 (Medium)	14.9 (Short)	13.3 (Short)	17.14 (Short)	15.8 (Short)
Shoot habit	Semi-erect	Semi-drooping	Semi-drooping	Semi-drooping	Semi-erect
Mature leaf: Size of blade	117.6 (Small)	115.2 (Small)	137.1 (Small)	131.7 (Small)	123.7 (Small)
Shape of blade	Wedge-shaped	Pentagonal	Wedge-shaped	Wedge	shaped
Number of lobes	3	3	3	3	3
Colour of upper blade	Dark green	Green	Dark green	Green	Dark green
Density of prostrate hairs between veins	Very dense	Dense	Dense	Very dense	Dense
Density of erect hairs between veins	Very sparse	Absent	Absent	Absent	Very sparse
General shape of petiole sinus	Very open	Open	Open	Open	Open
Shape of petiole sinus	V	V	V	V	V
Length of blade petiole	8.0 (Short)	9.9 (Short)	9.9 (Short)	9.2 (Short)	7.9 (Short)
Sex of flower	Hermaphrodite	Hermaphrodite	Hermaphrodite	Hermaphrodite	Hermaphrodite
Bunch: Bunch size (cm^2)	59.34	84.12	86.4	71.5	59.0
Number of bunch per cane	2-3	3-4	3-4	3-4	3-4
Single bunch weight (g)	82.6 V. (Low)	136.7 (Low)	147.6 (Low)	148.5 (Low)	123.6 (Low)
Shape of bunch	Conic and Winged	Cylindrical	Conic and Winged	Cylindrical	Cylindrical
Length of peduncle	3.03 (Short)	3.10 (Short)	3.25 (Short)	2.70 (V. Short)	2.62 (V. Short)
Density of berry	Loose	Dense	Middle	Dense	Dense
Berry number	34.3	54.3	56.3	53.3	53.9
Berry: Shape of berry	Round	Round	Round	Round	Round
Size of berry	258.7	342.9	221.6	399.2	3331.8
Berry uniform	Uniformles	Uniform	Uniformles	Uniformles	Uniformles
Skin colour	Rose-red	Dark red-violet	Dark red-violet	Dark red-violet	Blue-black
Particular flavour	Foxy	Foxy	Foxy	Foxy	Foxy
Juiceness of flesh	Juicy	Juicy	Juicy	Juicy	Juicy
Flesh colour	Colorless	Colorless	Colorless	Colorless	Colorless
100-seed weight (g)	4.85 (High)	4.89 (High)	4.2 (Medium)	4.9 (High)	5.2 (High)
100 berry weight (g)	236.5 (low)	381.5 (Medium)	211.5 (Low)	297.5 (Low)	304.5 (Medium)
Ripening time	Late	Late	Late	Late	Late
Berry must yield (mL/100 g)	Medium	Medium	Medium	Medium	Little
Sugar content of must (%)	18.0	15.2	13.8	15.3	17.7
Total acid (g L^{-1})	10.1	8.71	9.1	6.03	6.03

Table 1: Continued

	The code names and numbers of types				
Ampeleographic characters	61 Yomra 04	61 Arakli 03	61 Surmene 02	61 Surmene 03	61 of 02
Young shoot: form of tip	Closed	Closed	Closed	Closed	Closed
Density anthocyanin colouration of tip	Weak	V.ery weak	Weak	Medium	Very weak
Density of prostrate hairs on tip	Very Sparse	Sparse	Medium	Medium	Sparse
Density of erect hairs on tip	Absent	Absent	Absent	Absent	Absent
Colour of dorsal side of internode	Green and red striped	Green	Green	Green	Green
Colour of ventral side of internode	Green	Green	Green	Green	Green
Density of erect hairs on internode	Absent	Absent	Absent	Absent	Absent
Density of prostrate hairs on internode	Medium	Very sparse	Very sparse	Very sparse	Very sparse
Number of consecutive tendrils	Continuous	Continuous	Continuous	Continuous	Continuous
Length of tendrils (cm)	18.12 (Medium)	11.14 (Short)	14.3 (Short)	16.5 (Short)	19.2 (Medium)
Shoot habit	Horizontal	Horizontal	Semi-erect	Horizontal	Horizontal
Mature leaf: Size of blade	170.7 (Medium)	175.4 (Medium)	166.6 (Medium)	179.9 (Medium)	165.4 (Medium)
Shape of blade	Pentagonal	Cordate	Cordate	Wedge-shaped	Wedge-Shaped
Number of lobes	3	3	3	3	3
Colour of upper blade	Green	Dark green	Dark green	Dark green	Dark green
Density of prostrate hairs between veins	Sparse	Medium	Medium	Medium	Absent
Density of erect hairs between veins	Absent	Absent	Absent	Absent	Absent

Table 1: Continued

Ampeleographic characters	The code names and numbers of types 61 Yomra 04	61 Arakli 03	61 Surmene 02	61 Surmene 03	61 of 02
General shape of petiole sinus	Very open	Slightly open	Very open	Open	Open
Shape of petiole sinus	V	V	V	V	V
Length of blade petiole	10.08 (Short)	7.13 (Short)	7.14 (Short)	12.60 (Medium)	12.02 (Medium)
Sex of flower	Hermaphrodite	Hermaphro	Hermaphrodite	Hermaphrodite	Hermaphrodite
Bunch: Bunch size (cm^2)	234.9	108.7	64.95	214.9	126.5
Number of bunch per cane	1-2	1-2	1-2	3-4	1-2
Single bunch weight (g)	212.6 (Low)	132.4 (Low)	302.0 (Medium)	335.0 (Medium)	139.0 (Low)
Shape of bunch	Conic and winged	Cylindrical	Cylindrical	Conic and winged	Conic and winged
Length of peduncle	4.1 (Short)	2.86 (V. Short)	4.25 (Short)	6.45 (Medium)	5.17 (Short)
Density of berry	Dense	Dense	Middle	Dense	Middle
Berry number	76.9	85.0	64.4	104.0	65.5
Berry: Shape of berry	Round	Round	Round	Oblate	Oblate
Size of berry	324.5	261.3	237.7	286.6	263.0
Berry uniform	Uniform	Uniform	Uniform	Uniform	Uniformless
Skin colour	Red	Blue-black	Blue-black	Dark red-violet	Dark red-violet
Particular flavour	Foxy	Foxy	Foxy	Foxy	Foxy
Juiceness of flesh	Juicy	Juicy	Juicy	Juicy	Juicy
Flesh colour	Slightly-cl.	Colorless	Colorless	Colorless	Colorless
100 - seed weight (g)	6.22 (High)	5.27 (High)	5.21 (High)	5.76 (High)	5.23 (High)
100 berry weight (g)	372.54 (Medium)	284.26 (Low)	343.9 (Medium)	340.8 (Medium)	331.07 (Medium)
Ripening time	Late	Late	Late	Late	Late
Berry must yield (mL/100 g)	High	Little	Medium	Medium	High
Sugar content of must (%)	13.0	13.0	14.5	14.2	14.5
Total acid (g L^{-1})	5.29	3.29	3.48	5.03	4.62

The size of berry was determined as Middle and Large. Sixty one Trabzon Centre 06 type had the lowest berry (2.12 g) while 61 Trabzon Centre 04 type had the most heavy berry weight (3.82 g). The shape of berry was generally Round shape. The skin color of investigated types were Dark Red-Violet, Rose-Red, Red or Blue-Black; the flesh color was generally colorless; the juiceless of flesh was Juicy; The particular flavor was Foxy typical characters of *Vitis labrusca* species. The time of ripening was generally late. The berry must yield and the total acid changed between 13.0 and 18.0%; 3.29 and 10.0 g L^{-1}, respectively.

In several studies were noted that the size of berry was Middle and Large, the shape of berry was "Round", the juiceless of flesh was "Juicy (Cangi, 1999; Melek and Celik, 2005; Kara, 1990). The particular flavor was Foxy, typical characters of *Vitis labrusca* species. The characters determined related to berry were similar to the findings of previous studies (Cangi, 1999; Melek and Celik, 2005; Kara, 1990). 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 (Winkler *et al*., 1974; Weaver, 1976; Oraman, 1972). The must yield and total acid have been affected from climatic condition seed existence in berry and according to cultivar (Winkler *et al*., 1974; Weaver, 1976; fidan, 1985).

In the result of this study, ampelographic characters like young shoot, bunch, berry, mature leaf and seed of Foxy grapes types grown Trabzon province of Northern Turkey were determined. These Native Foxy 10 types with different ampelographic characters have been found to be promising for labrusca viticulture in the coastal Northern Turkey having high humidty and excessive fall around a year.

ACKNOWLEDGEMENT

This Project was supported by Tubitak (TOGTAG-2736) and Black sea University Research Foundation 2002.119-1.3.

REFERENCES

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

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 University Agric. Fac. (In Turkish), 14: 36-67.

Braykov, D., V. Roychev and 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.

Cangi, R., 1999. A study on determined ampeleographic characters of some grape cultivars grown in ordu National Horticulture Congress. Ankara, 1009-1013. S. (In Turkish), pp: 14-17.

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

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

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

Fidan, Y., 1985. Private Viticulture. Ankara Univ. Agric. Fac. Publications No., (In Turkish), pp: 930.

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

Melek, N. and H. Celik, 2005. Determination of ampeleographic characters of Isabella (*Vitis labrusca* L.) grown in Sinop and Province. VIth Viticulture Symposium. 19-23 September, Tekirdag (In Press, In Turkish).

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

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: 4:370-378.

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

Oraman, M.N.,1972. The technique of Viticulture- II. Ankara Uni. Agric. Fac. Pub., No. 470, (in Turkish).

Reisch, B.J. and C. Pratt, 1996. Grapes. In: J. Janick and J.N. Moore (Eds.), Fruit Breeding. Wiley, New York, pp: 297-369.

Smartt, J. and N.W. Simmonds, 1995. Evolution of Crop Plants. 2nd Edn. Longman Scientific and Technical. Essex, England.

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. Department of Viticulture and Enology, University of California, Davis.

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

Zohary, D. and P. Spiegel-Roy, 1975. Beginning of fruit growing in the old World. Science, 187: 319-327.