International Academic Institute for Science and Technology

International Academic Journal of Science and Engineering
Vol. 3, No. 2, 2016, pp. 13-21.
ISSN 2454-3896

International Academic Journal of Science and Engineering

www.iaiest.com

Identification and assessment of local varieties of grapes with the method of Ampelography and Ampelometri, in the city of Kedar

Salman Afshari

Master of Science in Horticulture (pomology), Islamic Azad University of Abhar, Iran.

Abstract

In order to identify and evaluate local varieties of grapes, in the region of Khodabande (Kedar), a study was based on by the International Organization for Botanical Plant Genetic Resources (IBPGR) descriptor on marked native grape plants in grape vines. 100 morphological characters of different organs (shoot, buds, leaves, tendrils, inflorescences, flowers and fruits), the figures were evaluated in three replications, in different phenological stages (sleep, bud break, the growth of shoots and leaves, opening flower formation and fruit development, ripening and harvesting). Finally, 21 local grape varieties were identified and evaluated. The results showed a large morphological difference between varieties and all studied varieties, due to the general specifications, belong to vinifera species. Due to the special qualities of some of these varieties, we can use them in the development of commercial vineyards, Grape breeding and production of new varieties with new potential.

Keywords: Ampelography, morphological characters, Descriptor, phonology, vinifera species

Introduction

Iran is considered as the cradle of vine growing and grape native land. The theory that they believe, growing grapes for the first time was started in an area located between the Caucasus Mountains on the southern shores of the Caspian Sea and in the western highlands of Iran, is confirmed. In addition, the current number and varieties of vineyards in Azerbaijan areas, which have been developed over centuries, can also confirm this theory (Sadeghi-Behzad 1973).

Among the Iranian grape varieties, only optimal quality varieties, for consuming fresh, raisins and processing industries have attracted the gardeners' attention and the remaining varieties have less attention for cultivation. Conventional methods of identifying and distinguishing grape varieties are based on Ampelography (qualitative measurement) and Ampelometri (quantitative measurement) which are done with regard to the morphological differences between the varieties.

Vine with the scientific name of Vitis vinifera is from the family of vitaceae or Ampelidaceae and Vitis with 60 species is named 10,000 varieties. Vinifera species is the only species in Europe and the most important commercial species of vines.

Crispan (2003) has used two methods of Ampelography and analysis of molecular to identify two varieties of Italian grapes. However, the micro satellite markers have identified these two varieties very similarly, but Ampelography and Ampelometri studies have shown differences in leaf size, intermediate loop and leaf shape. All the studies show that the diversity of grape varieties is very high in the world and Iran. In addition, the province Zanjan and especially the city of Kedar have a high diversity of the grape crop. Identification and evaluation of their various characteristics, in terms of botany, gardening, and genetic and study the genetic relation of the grape crop for using in optimized agricultural, optimized racing and sapling certification programs are very important. Therefore, in order to recognize local varieties of grapes and determine their genetic diversity accurately, in the city of Kedar, this study was carried out.

English name is the grape and its scientific name is Vitis spp. Grape is from vitaceae family, it has more than 10 genera, which just vitis is eatable and is divided into two subgenus, Muscadin subgenus and Euvitis subgenus.

In general, commercial grapes are divided into four major categories that include:

1. Table grapes, which are used in order to eat fresh.

2. Raisin grape.

3. Sweet grape juice with consumption of alcoholic fermentation.

4. Berry that their juice is used for soda.

Botanical Profile of Vitis vinifera

In this genus, a small calyx with 5 teeth marked with five sepals, five petals in greenish at the base, 5 flags attached to the petals and with a circle of bar, with 5 more or less obvious ovary, usually with 1-2 chamber, each chamber contains 2 seeds, fruits and berries there is no trace of the chamber wall. Species of these plants are climbing shrubs and reliance of these plants is done with organs that are known as Ivy. Flowers are greenish or yellowish and due to the color of flags, ivy and decorate flower are in the front of the leaves. More than 30 species of this genus are more found in half warm and mild countries in the northern hemisphere.

Research background

In recent years, in Iran, by research and university centers, scattered actions are carried out to improve the identification of grape varieties, and to create a collection of grape varieties. In addition, by using IBPGR descriptor, the grapevines of Kordestan, Kermanshah, Khorramabad Lorestan, Central Region (Hazare, and Shara), Qazvin and Takestan, West Azarbaijan and Kashmar in Khorasan province have been identified. (Karami 1995.1996 and 2004, Haji Amiri 1996, Zahedi 1996, Zinanlu 1996, Madani 1994, Dadgar 1988, Alizadeh 1996, Mokhtarianpour 1996)

Zahedi (1996), by using different botanical characteristics, has identified the grape varieties in the Lorestan province.

Alizadeh (2004), through botanical characters with the study of 45 characters, has managed to gather 47 local grape varieties in West Azerbaijan province and varieties of Sachakh, red seedless ruby, trout Uzum, red

Khalili, black wart, and Gaznaday have a shorter flag than the pistil (the upside down flag) that they are useful in breeding programs.

Karami in 1995, with a preliminary study on the grapes in the province of Kurdistan and registering different morphological characters, has identified and collected several grape varieties.

In other areas of the country, by using this method, the grape varieties of Kurdistan (59), Kermanshah (52), Chaharmahal Bakhtiari (15), Khorasan (Kashmar, Neyshabur, Bojnoord and Ghoochan 143), Qazvin and Takestan (33), Khorramabad (23), Hamadan (28), Isfahan (5), Ardabil (MeshkinShahr 35), Fars province collection (162) and Qazvin were studied.

Luyssantyago et al. (2005), by using Ampelography method, have studied the possibility of the same varieties with different names, in several Spanish and Portuguese grape varieties, and have identified and reported five of these cases.

Today, with the use of DNA markers along with morphological data, enabling accurate identification of varieties is possible. Martinez et al. (2003) for the detection of local grape varieties in Argentina has used morphological markers (53 characters) and have compared the results obtained with the results of AFLP markers.

Syfek et al (1998), have studied 66 varieties of grape base in the collection of Austria by using 10 microsatellite markers. Dendrogram of the data from microsatellite has shown the separate bases from Vinfera grape species.

Rygnr et al (1998) in a study to identify the grape varieties and clones have used different molecular methods. They have reported that by using microsatellite markers, we could recognize the numbers, base and number of grape varieties, with the exception of color variations of clones belonging to a number.

Most wine producing countries, in order to protect genetic resources have identified and collected of varieties and have formed a collection (Tafazoli et al., 1995).

In 1983, the International Organization for Botanical plant genetic resources (IBPGR) has decided to formulate a comprehensive description and to use it for studying vine-graph. More than 150 characters are investigated in this description. (Site of Ministry of Agriculture, 2004).

In Iran, gathering grape varieties in some provinces, especially East and West Azarbaijan, Khorasan, Kurdistan, Qazvin, Arak, Kermanshah is done (Nejatian, 2006).

Hekmati (1990) has identified 31 varieties of grapes in Maragheh by using above description and has evaluated different characteristics such as vegetative, reproductive and phonology. Among the identified variants, there were obvious and many differences in fruits and cluster characteristics, timing of flowering and fruit ripening, flowering period and other traits.

Zinanlu (1993) has used description and measurement of 109 characters in different stages of vegetative and reproductive in the shrubs, and has identified and evaluated 33 local varieties of grapes in Qazvin and Takestan. These varieties were in different groups due to the large variety.

Haji Amiri (1992) has identified local grape varieties in Sahneh (Kermanshah) over two years, has measured, and recorded different characteristics.

Shur (1991) has studied and evaluated local grapes in Bojnoord and Ghoochan.

Also in other provinces such as Kurdistan, Chahar Mahal and Bakhtiari, Khorram Abad, Hamedan, Isfahan, Ardabil, Fars and Qazvin, grape varieties are studied and evaluated. (Karami, 1995)

199 genotypes in the Institute of Agriculture Research Station of Jondia in Brazil were investigated in terms of garden and photological characters in 1991-1993. (Pommer et al., 1995)

Materials and methods:

In order to identify and evaluate the morphological characteristics of local varieties of grapes in the city Khodabande (Kedar), a study was carried out in over two years by using the proposed descriptor of International Organization for Plant Genetic Resources (IBPG), on the mother plant of vineyards with a plaque in grape vines (dating back 10 to 100 years) of this city. In this study, about 100 morphological characteristics were studied in

different parts of the vineyards shrubs in three replications of each variety per garden (example 1a, 1b, 1c). Note-taking of vareities characters was done in different phonological growth stages including the stage of sleep, blooming buds, Hauberg and shoot growth, flowering, fruit formation and growth, before ripening, fruit ripening and harvest and during the fall, according to the grapevine descriptor and by using Ampleography and Ampelometri methods.

Results and discussion:

In the study that led to the identification of 21 genotypes in the city of Khodabande, 100 attributes were studied on any of the varieties, and the following results were obtained:

A: All the studied varieties are related to V. vinifera L species due to having the following characteristics.

1. The lack of transverse ridge on the side of the seed.

2. Non-consecutive Ivy.

3. The lack of Duckweed on wooden shoots.

4. The thin, smooth and shiny leaves with three, five and seven lobes.

5. Sticking the Peel to the pomace during fruit ripening.

6. The lack of taste for Labruska.

7. The absence of coordination.

8. The openness of the young shoots.

9. Molt in the shoots of 2 years and over.

10- Prominent nodes and diaphragm in knots.

11. Long clusters and berries that remain stuck on the tail of berries.

12. Cone-shaped seeds with the long or short tip.

B: By identifying quantitative and qualitative attributes, we can identify the best trade types, for fresh-market grapes, raisins and green grass, grape juice, canned, juice (DOWSHAB) and industrial use, and with specifying and promoting them, increase the performance of the product and increase the Gardners' income.

According to the 2-year study, which was conducted on the varieties of Kedar city, In general, the varieties can be classified in terms of trade and consumption in the society as follows:

1-Grapes that are for fresh consumption as follow:

Seedless raisins, Fakhri, Sahebi, Khalili, Asgari, Mesqaly, Ghareh Sachakh, Avang, Ghareh Asgari, Kooleh Chineh, Nafti, Tapeh Si Yasti, Yaghuti, Shahani.

2-Grapes that are for raisin production as follows:

Seedless raisins, Fakhri, Mirzaei, Qazvini, red raisins, Aq Uzum, Inge Amjgy.

3-Grapes that are for Dowshab juice include:

Qazvini and Gu Uzum

4. Grapes that are for the preparation of grape juice are as follows: All varieties, Asgari due to high juice is most suitable for the preparation of grape juice.

5. Grapes that have good storage properties include:

Seedless raisins, Fakhri, Sahebi, Ghareh Sachakh, Shahani

Quantitative and qualitative characters of vegetation at the stage before flowering

No Figure	1- Young Root					2- Young Leaf					
	1-1	1-2	1-3	1-4	1-5	2-1	2-2	2-3	2-4	2-5	2-6
	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code
1	7 Open	0 absence	0 absence	3 Thining	5 average	5 average	1 Very Poor	0 absence	0 absence	0 absence	0 absence
2	7 Open	0 absence	0 absence	1 very Thining	1 very Thining	1 green	1 Very Poor	0 absence	0 absence	0 absence	0 absence
3	7 Open	5 average	1 strip	3 Thining	3 Thining	1 green	3 Poor	1 very Thining	3 Thining	1 very Thining	5 average
4	7 Open	1 Very Poor	1 strip	0 absence	0 absence	1 green	3 Poor	1 very Thining	3 Thining	1 very Thining	5 average
5	7 Open	1 Very Poor	1 strip	5 average	3 Thining	1 green	3 Poor	1 very Thining	1 very Thining	3 Thining	3 Thining
6	7 Open	3 Poor	1 strip	1 very Thining	3 Thining	1 green	5 average	5 average	5 average	3 Thining	7condensing
7	7 Open	3 Poor	1 strip	1 very Thining	3 Thining	1 green	5 average	5 average	3 Thining	1 very Thining	7condensing
8	7 Open	7 strong	2 overall	7condensing	5 average	6 copper	7 strong	5 average	7condensing	5 average	9 Very condensing
9	7 Open	5 average	1 strip	5 average	5 average	5 yellow copper	5 average	3 Thining	5 average	5 average	9 Very condensing
10	7 Open	5 average	2 overall	5 average	5 average	5 yellow copper	7 strong	7condensing	5 average	5 average	9 Very condensing
11	7 Open	3 Poor	1 strip	5 average	3 Thining	2 green with bronze spots	3 Poor	3 Thining	3 Thining	1 very Thining	5 average
12	7 Open	1 Very Poor	1 strip	3 Thining	1 very Thining	1 green	1 Very Poor	3 Thining	3 Thining	1 very Thining	5 average
13	7 Open	5 average	1 strip	7condensing	7condensing	3 Yellow	3 Poor	3 Thining	1 very Thining	1 very Thining	5 average
14	7 Open	0 absence	0 absence	1 very Thining	1 very Thining	1 green	5 average	3 Thining	1 very Thining	3 Thining	3 Thining
15	7 Open	7 strong	2 overall	7condensing	5 average	6 Messi	5 average	3 Thining	3 Thining	3 Thining	3 Thining

1-1- Ends of shoots figure 2-1- The intensity of anthocyanin between the ends of shoots 3-1- Anthocyanins dispersion between the ends of shoots 4-1- Sleeping fluffs on the ends of shoots 5-1- Standing fluffs on the ends of shootes

16	7 Open	7 strong	2 overall	7condensing	5 average	5 yellow copper	5 average	5 average	5 average	5 average	7condensing
17	7 Open	9 very strong	2 overall	7condensing	7condensing	6 Messi	3 Poor	5 average	5 average	5 average	7condensing
18	7 Open	3 Poor	1 strip	7condensing	5 average	1 green	9 very strong	5 average	7condensing	3 Thining	7condensing
19	7 Open	0 absence	0 absence	5 average	3 Thining	1 green	1 Very Poor	1 very Thining	3 Thining	3 Thining	3 Thining
20	7 Open	0 absence	0 absence	3 Thining	1 very Thining	1 green	1 Very Poor	1 very Thining	3 Thining	1 very Thining	5 average
21	7 Open	3 Poor	1 strip	3 Thining	1 very Thining	3 Yellow	3 Poor	1 very Thining	1 very Thining	1 very Thining	5 average

2-1- Paint the upper level 2-2- Anthocyanin color intensity 3-2- Sleeping fluffs intercostal 4-2- Standing fluffs intercostal 5-2- Sleeping fluffs on intial veins (Inferior) 6-2- Standing fluffs on intial veins (Inferior)

Studied Vegetative qualitative and quantitative traits during the flowering period

No Figure	3- Green shoot											4- Ivies	
	3-1	**3-2**	**3-3**	**3-4**	**3-5**	**3-6**	**3-7**	**3-8**	**3-9**	**3-10**	**3-11**	**4-1**	**4-2(cm)**
	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code	Feature Code
1	1 very Thining	5 average	1 very Thining	5 average	7 half-fallen	0 absence	1 green	1 green	1 green	1 green	9 very strong	1 nonconsecutive	9 very long 35
2	3 Thining	5 average	3 Thining	5 average	5 Horizontal	1 Very Poor	1 green	1 green	1 green	2 green with red tape	7 strong	1 nonconsecutive	7 long 25
3	3 Thining	7condensing	3 Thining	7condensing	5 Horizontal	5 average	1 green	1 green	1 green	2 green with red tape	7 strong	1 nonconsecutive	7 long 24
4	5 average	7condensing	5 average	7condensing	3 half vertical	1 Very Poor	2 green with red tape	2 green with red tape	2 green with red tape	3 red	7 strong	1 nonconsecutive	5 average 20
5	5 average	7condensing	5 average	7condensing	5 Horizontal	1 Very Poor	1 green	1 green	1 green	1 green	7 strong	1 nonconsecutive	5 average 20
6	3 Thining	5 average	3 Thining	5 average	5 Horizontal	5 average	1 green	1 green	1 green	1 green	5 average	1 nonconsecutive	3 Short 14
7	5 average	7condensing	5 average	7condensing	3 half vertical	5 average	1 green	1 green	1 green	2 green with red tape	5 average	1 nonconsecutive	3 Short 15
8	7condensing	7condensing	7condensing	7condensing	3 half vertical	7 strong	3 red	3 red	3 red	3 red	5 average	1 nonconsecutive	1 very Short 8
9	7condensing	9 Very condensing	7condensing	9 Very condensing	7 half-fallen	7 strong	2 green with red tape	2 green with red tape	2 green with red tape	3 red	5 average	1 nonconsecutive	1 very Short 11
10	9 Very condensing	9 Very condensing	9 Very condensing	9 Very condensing	7 half-fallen	7 strong	2 green with red tape	2 green with red tape	2 green with red tape	3 red	5 average	1 nonconsecutive	3 Short 15
11	5 average	7condensing	5 average	7condensing	5 Horizontal	3 Poor	1 green	1 green	1 green	1 green	7 strong	1 nonconsec	5 average 19

												utive	
12	3 Thining	5 average	3 Thining	5 average	5 Horizontal	1 Very Poor	1 green	1 green	1 green	1 green	7 strong	1 nonconsecutive	5 average 20
13	3 Thining	5 average	3 Thining	5 average	7 half-fallen	1 Very Poor	1 green	1 green	1 green	2 green with red tape	7 strong	1 nonconsecutive	5 average 21
14	3 Thining	5 average	3 Thining	5 average	9 fallen	3 Poor	1 green	1 green	1 green	2 green with red tape	5 average	1 nonconsecutive	5 average 19
15	5 average	7condensing	5 average	7condensing	1 vertical	5 average	2 green with red tape	2 green with red tape	2 green with red tape	3 red	7 strong	1 nonconsecutive	1 very Short 10
16	7condensing	9 Very condensing	7condensing	9 Very condensing	3 half vertical	7 strong	3 red	3 red	3 red	3 red	5 average	1 nonconsecutive	3 Short 14
17	7condensing	9 Very condensing	7condensing	9 Very condensing	1 vertical	7 strong	3 red	3 red	3 red	3 red	3 Poor	1 nonconsecutive	1 very Short 10
18	7condensing	9 Very condensing	7condensing	9 Very condensing	9 fallen	5 average	1 green	1 green	1 green	2 green with red tape	5 average	1 nonconsecutive	1 very Short 11
19	1 very Thining	3 Thining	1 very Thining	3 Thining	3 half vertical	1 Very Poor	1 green	1 green	1 green	2 green with red tape	3 Poor	1 nonconsecutive	1 very Short 10
20	1 very Thining	3 Thining	1 very Thining	3 Thining	9 fallen	3 Poor	1 green	1 green	1 green	1 green	7 strong	1 nonconsecutive	9 very long 35
21	3 Thining	5 average	3 Thining	5 average	9 fallen	3 Poor	1 green	1 green	1 green	2 green with red tape	7 strong	1 nonconsecutive	9 very long 35

1-3- Standing fluffs on the nodes 2-3- Sleeping fluffs on the nodes 3-3- Standing fluffs on the internode 4-3- Sleeping fluffs on the internode 5-3- Condition (growth habit) 6-3- The color of anthocyanins buds 7-3- The color of back side of internodes 8-3- The color of ventral side of internodes 9-3- The color of back side of nodes 10-3- The color of ventral side of nodes 11-3- Growth power (shoots) (in cm)

4-1- Dispersion, on the shoots 4-2- Length (in centimeters)

References

Alizadeh, A.. 1996. Identification of grapes in West Azarbaijan province. Promotion Journal, extension programs and technical office,79 p.

Alleweldt, G., and Dettweilir, E. 1989. A model to differentiation Grapevine cultivar with to aid of morphological characteristics. Vitis Enological.1: 53-59.

Dadgar, A, 1988. Identification of grape varieties in Urmia. Master thesis. University of Tehran.

Hajji Amir, A. And M. Sanei Shariat Panahi. 1996. Identified
indigenous grape varieties in Kermanshah (Sahne). Seed and Plant Journal, Volume 12, Issue 4, p. 41-24

Karami, M. J. 1996, Identification and introducing the dry grapes << Khoshnav>> in Kurdistan and its importance of farming and genetic in planting vine. Abstract of the first Iranian Horticultural Sciences Congress. P. 173.

Madani, J. 1994. Identification of grapes in central region (Hazare and Shara). Master thesis. University of Tehran. Page 150

Mokhtarian, A. 1996. Identification and studying of local varieties of grapes in Kashmar. Abstract of the first Iranian Horticultural Sciences Congress. P. 155

Pommer, C. V., Ferri, C. P., Martins, F. P., Passos, I. R.S., Terra, M. M., and Pires, E. J.P.1995. Agronomic and phonological characterization of grape gynotype Kept in collection at Jundia, Brazil. Acta Horticulturae 523: 147-152.

Zahedi, B. And M. Sanei Shariat Panahi. 1996. Identification and study grape varieties of Khorramabad. Abstract of the first Iranian Horticultural Sciences Congress, p. 64.

Zinanlu, A and M. Sanei Shariat Panahi. 1996. Identification of local grape varieties in Qazvin region and Takestan. Abstract of the first Iranian Horticultural Sciences Congress. 59.