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Research Article

Evaluation of morphological diversity promised Russian grapevine in Iran

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Abstract

Aim of study: The introduction of new varieties and its adaptation is one of the breeding programs.The aim of this study was to compare 50 qualitative and 8 quantitative traits of Russian grape cultivars at Grape Vineyard.

Area of study: Research Station grade1 Takestan, Qazvin, Iran

Material and method: Evaluation of 50 quality traits of grapes was done in 2014, 2015 and 2018 Study qualitative traits of the grape are in the growth stages of the grape tree, which are: bud, young shoot, young leaf, current year shoot, flower, full leaf, fruit and woody branch.Whole leaf with 16 traits and fruit with 14 traits had the highest traits and bud with 2 traits had the least traits.

Results: In the study of quantitative traits, spike(n) traits, yield, maturity fruit, soluble solids (Tss), acidity (Ph), total acid (Ta), seed(n) and seed(w) were measured. Analysis of variance showed that the effect of cultivar on all traits was slightly significant. Anapiski Ramphi and Epozoski Ramphi had the highest yield (34370 and 30980 kg / tod,).

Research highlights: Due to the fact that the performance attribute is indexed compared to other attributes, the Epozoski Ramphi cultivar, which has the highest value compared to other cultivars, is selected.

Keywords: Adaptation; Russian grape; Growth; Qualitative traits; Cultivars; Quantitative traits

Abbreviations

TSS: Total Soluble Solids; Ph: Acidic solutions; TA: Total Acidity

Introduction

Grapes are one of the most cultivated crops in temperate regions, and after citrus and bananas, they have the highest cultivation area among fruit trees. Iran is one of the primary areas for grape cultivation, so it is important to study the diversity of Iranian grapes and the presence of key genes. The evaluation of genetic resources and the determination of their relationships can be done by evaluating morphological traits. But morphological traits are not able to detect cultivars, especially cultivars with close phenotype. Because these traits are influenced by the environment on the one hand, and on the other hand, the grape variety should be evaluated for several years (Ramezani et al. 2007). In general, there are two different theories about the history of grapes. Some believe that grapes were used by humans even before the advent of cereals and were wild and abundant in forests. Early humans used grape leaves and fruits. Grapes contain vitamins A, B and C and contain elements of magnesium, calcium, iron, phosphorus, potassium and albumin (Chervin et al. 2012).

Organic acids, sugars and aromatic compounds in fruit flesh, anthocyanin compounds, tannins, flavonols and aromatic compounds in fruit flesh, anthocyanin compounds, tannins, flavonols and aromatic compounds in the skin, and tannins and oils in the seed Grapes have made the plant extremely important in nutrition and medicine, and extracts from pulp from grape processing have also been used in the manufacture of various medicinal products and dietary supplements(Eyduran, 2015).

Others estimate the history of grapes to be about 6,000 to 7,000 years. Grape growing in Asia Minor began around 2000 to 2500 BC and was started by immigrants from the Mediterranean Sea and developed into the Balkans (Dehgani and Gannaee arani, 2016).

The plant grape belongs to the family vitaceae and the genus Vitis, with most of the commercial varieties being species (V.Vinifera) (www. sciencedirect.com).

Grapes are the most important fruit in the world and Iran in terms of production. The plant that produces grapes is called a hair or vine, and it is a shrub with full flowers that depend on the genus Tak Sanan. There are about 60 species of vines that

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are found throughout the northern hemisphere, especially in cold regions. Commercial vines belong to three groups (European, American, and Muscadine), of which the European type is more important. Iranian hair is of European type, whose main homeland is West Asia and Southern Europe (Khosh-Khui et al. 1997).

Order to recognize and stabilize the most important commercial cultivars of Iranian grapes (Fakhri, Peykani Kashmar, Khoshnavo, White Beard, Red Beard, White Willow, Shahroudi, Sixty Brides, Rubies, Asgari, Red Willow and Breast ewe) in two years Selection and registration of traits according to the instructions of distinction, uniformity and stability of grapes (spcrl, 2007) took place in two places, Qazvin province (Takestan, first-class grape research station) and West Azerbaijan province (Urmia, Dr. Nakhjavan station). The experiment was conducted in two provinces in uniform environments. Scoring and demonstration of established traits on the grape cultivars studied according to the distinction, uniformity and stability of grapes.

It showed that there was too much diversity in these traits. The results of comparing the means of quantitative traits of cultivars in Qazvin province and in West Azarbaijan province showed that each of the quantitative traits of grape cultivars are not able to distinguish and recognize cultivars from each other and some traits play an important role in recognizing grape cultivars (Nejatian, and Doulati Baneh, 2016).

Rasoli et al, 2012 used two indirect selection methods based on morphological traits and application of stress treatment to select grape tolerant grape tolerant cultivars. In this method, the grape genotypes were first screened based on morphological traits related to the drought tolerance threshold and then the selected cultivars were selected as a pilot design.

Today, indigenous grape varieties have good taste and good quality, but their sensitivity and weakness against live and non-living stresses increase the cost of production. Therefore, in modern vineyards, these cultivars are less used in creating new vineyards. Due to the importance of Iran's grape industry in the future, it is necessary to organize research on the needs of grape producers and consumers, which is completely dependent on grape correction and introduction of cultivars. It is new to corrective methods (Rasoli and Dolati Baneh, 2016).

Hardie, 2008 examined the biological traits and compatibility of grapevine and found that flowering time, pruning system, yield, ripening time and fruit composition are important characteristics in grape adaptation.

Pommer et al. (1995) also evaluated 199 genotypes at the Agricultural Research Station (Jundia) in Brazil in terms of horticultural and phenological characteristics from 1991 to 1993 and used the niagra Rosado cultivar as the standard cultivar to compare the vegetative cycle from pruning to harvest. They did quantitative and qualitative traits can be measured using global IBPGR in phenological stages.

Markers are commonly used to study genetic diversity in different plants, such as morphological markers (Kumar, 1999). In many cases, there are cultivars that differ in terms of crop and physiological traits but are similar in morphological traits. Morphological traits are easily recognizable and controlled by a gene and are used as genetic markers, but these markers have disadvantages and limitations, as well as benefits, such as the wide range of control genes. The author named phenotypic traits that are among the first markers (Moosazadeh et al, 2014).

Examining the morphological features is the first step in describing and classifying the cultivars of a set (Badner et al, 2000).

Finally, the results of the study of Russian grape cultivars at Takestan Grape Station showed that Zenbil 13-366 and Ljana cultivars were superior to other cultivars and had high adaptability based on yield components in this region.

Materials and Methods

Study site

The study was carried out at the first-class vineyard of Takestan Grape Research Station, which is located 3 km from Takestan city 36°3' 2" North Width" 49° 40' 51" East and its height is 1250 meters above sea level, with humid climate and loamy soil texture.

Study qualitative traits

In the present study genetic diversity of 72 Russian grape cultivars and genotypes at Grape Vineyard Research Station the Qazvin Agricultural and Natural Resources Research Center was evaluated using 50 traits quality in 2014,2015 and 2018. The experimental design used was a completely randomized block with three replications. White willow (commercial and dominant cultivar) was used as a control. The cultivation system used in the area was Kurden (a two-sided floor) with a planting distance of 2.5 x 2.5 m and the number of plants per experimental unit was two. Data were collected during the fruit ripening in August. In this study, preliminary selection and screening of genotypes were performed based on morphological, fruiting and fruit characteristics (Erner and Shomer, 1995). According to the IBPGR, 72 Russian grape cultivars have 50 morphological quality traits, which we will describe below.

Growth stages of grapes: 1) Growth of buds 2) Young branches 3) Young leaves 4) Branches of this year 5) Flowers 6) Fruits 7) Wooden branches (Erner & Shomer, 1995; Chervin et al, 2012).

Growth of the bud: Starting time from swelling to bursting buds

Young branch: In the young branch, the following traits are observed: 1) tip opening rate 2) Flattening shape 3) The anthocyanin color of the lying tip of the crust 4) The tip of the crust of the tip.

Young leaves: In young leaves, the following traits are observed: 1) the surface of the surface of the surface 2) the thickness of the fluff Main veins on the underside of the flattening.3) Cortical constriction standing on the main veins at the bottom of the flattening.

Figure 1 Specifications of first-class vineyard station takestan.

Table 1: Result of analysis of variance and mean square for studied traits of rusian grape cultivars.

Source of variation	df	Spike(n)	Yield	Maturity	Tss	Ph	Ta	Seed(n)	Seed(w)
Block	2	467.782**	52932631.268**	168.394**	8.119**	0.129**	$0.047^{n.s}$	$291.588^{n.s}$	0.750**
Cultivar	71	1219.325**	111104706.108**	931.448**	22.911**	0.200**	3.846**	5596.168**	6.471**
Error	142	75.984	10447864.631	0.060	0.689	0.029	0.164	718.212	0.146
C.V.(%)		30.53	23.85	0.15	4.73	6.66	9.73	30.75	14.29

**:Significant at the 0.01 probability levels,respectively.
Ns:Not-significant

Table 2: Comparison of mean traits on cultivars.

Genotype/cultivar	Spike(n)	Yield	Maturity	Tss	Ph	Ta	Seed(n)	Seed(w)
Ramphi Tcxa	27.67I-R	10.630K-N	153.3I	21.40B	2.21M-Q	3.83M-T	154.3A-F	0.84Y
Epozoski Ramphi	54.00G-C	30980A-B	153.3I	17.93F-M	2.59C-N	4.50G-P	95.33F-N	4.67D-G
Kishmish Ramphi Azos	85.67A	13790G-N	167.3J	21.50B-D	2.27K-Q	5.40D-H	55.33K-N	1.48T-Y
Ukranski Ramphi	32.33G-O	2047A	167.3J	17.67F-O	1.98P-Q	7.33A	146.3A-I	2.89K-O
X45	10.67O-S	8228M-N	167.3J	16.37J-T	2.61C-N	5.03E-K	34.00N	3.37H-M
Anapiski Ramphi	37.67F-N	34370A	167.3J	17.60F-O	3.02A-C	1.73W	150.0A-H	4.84D-E
voromonk	36.33F-N	9575L-N	202.3A	15.00R-W	2.35H-P	4.20J-R	53.00K-N	1.37T-Y
Rizatmat	19.67M-S	12660G-N	174.3E	20.20C-E	2.80B-H	2.23V-W	198.3A	1.48T-Y
Kara Palvan	21.33M-S	19850D-H	142.3J	17.37G-P	2.82B-G	3.43P-U	82.67H-N	7.13A
Babo Zakir	8.33P-S	10060K-N	167.3J	21.37B-D	3.19A-B	3.40Q-U	66.67K-N	5.76B-C
muromts	4.00S	7688M-N	193.3B	16.43J-S	2.42E-P	4.73F-N	35.33N	4.75D-F
Tchol Yaprak	69.67A-C	19500D-J	184.3C	18.90E-G	1.88Q	4.40H-Q	49.67L-N	3.59H-L
Bogatyur	23.67L-S	12100G-N	167.3J	26.93A	2.59C-N	3.47P-U	124.3B-K	1.81Q-Y
Goudovng Pendji Kentski	16.33N-S	12750G-N	142.3J	12.63X	2.43E-O	6.33B-D	119.7B-M	2.88K-P

Similar letters have no significant and non-similar letters have significant difference

Branch of the current year: In the branch of this year, the following traits are observed: 1) Growth habit 2) The color of the back part between the node 3) The color of the abdominal part between the node 4) The color of the back of the knot 5) The color of the abdominal part of the knot 6) Among the nodes 7) Number of consecutive ivy 8) Ivy length.

Flower: The grapevine expressions are from inflorescence to the end of flowering.

Full leaf: In the full leaf, the following traits are observed: 1) Flattening size 2) Flattening shape 3) Cross section 4) Lacing Flatbed surface 5) Lobe number 6) Upper lateral cavity depth 7) Upper cavity arrangement between the folds 8) Shrinkage arrangement in the adjacent vertebrae 9) Cutting end to the main ventricles 10) Tent length 11) Length ratio Tooth width 12) Tooth shape 13) Anthocyanin color of the main vein on the surface of the flattening 14) Cork density lying between the main veins on the underside of the flattening. 15) The crust density standing

on the main veins on the surface 16) petiole length compared to middle vein.

Fruit: The following traits are observed in the fruit: 1) Bean start time 2) Cluster size 3) Cluster density 4) Cluster tail length 5) Cubes size 6) Cube shape 7) Cuboid skin color 8) Ease of separation from pedal 9) The thickness of the cabbage skin 10) Meat Anthocyanin color 11) Meat firmness 12) Juicy meat Meat 13) Special taste of the cab 14) Formation of cube seeds.

Wooden Branch: In the wooden branch, the following traits are observed: 1) the main color of the wooden plank 2) the flatness of the wooden plank.

Statistical analysis of data

After taking attribute notes and recording data in Excel software, various statistical analyzes such as ANOVA and Duncan's comparison were performed. SPSS software was used for this purpose.

Results

Quantitative traits russian grape

Analysis of variance (Table 1) showed that spike(n) affected by cultivar was at 1% probability level and CV value spike(n) was 30.53%. The highest spike(n) (85.67) was observed in Kishmish Ramphi Azos. Other varieties had significant differences and Muromts cultivar with 4.00 number the highest and the lowest spike(n) among the tested cultivars (Table 2). Thol yaprak genotype (69.67) after Kishmish Ramphi Azos had.Cultivars also differed significantly in yield and CV value yield is 23.85%(table1). Anapiski Ramphi and Epozoski Ramphi had the highest yield (34370 and 30980 kg / tod) and the lowest yield (2047 kg / tod) was obtained in Ukranski Ramphi (Table 2).

The results of the experiment show that the yield index is the same in the selection of cultivars for cultivation (Table2). The effect of cultivar on fruit maturity was significant at 1% probability level and with minimum CV value 0.15% (Table 1).Comparison of means showed that the cultivars tested had significant differences in maturity fruit and can be used in evaluation and selection of cultivars (Table 2).

The total soluble solids(tss) showed a significant difference at the 1% probability level and CV value 4.73%(Table 1). The variation of total soluble solids ranged from 12.63% in Goodvng Pendji Kanteski to 26.93% in Bogatyor (Table 2).Kishmish ramphi azos genotype with 21.50% after Bogatyor have the highest coefficient. There is a significant difference in ph at the probability level of 1% and with CV value 6.66% (Table 1). The range of acidity varied from 1.88% in Tachol Yaprak cultivar to 3.19% in Babo Zakir cultivar with significant difference (Table 2).

There were no significant differences in total acid(ta) between different replicates, only between the cultivars at 1% level.There were significant differences. For total acid, there was no significant difference between replicates, only significant difference at 1% level between cultivars and with CV value 9.73 (Table 1). The range of total acid variations ranged from 1.73 in Anapiski Ramphi to cultivar 7.33 Ukranski Ramphi(Table 2).

There were no significance differences in seed(n) between different replicates, only between the cultivars at 1% level, the highest percentage with is the variable with the highest coefficients of variation(30.75%)in the case of seed(n) (Table 1). Rizatmat and Ramphi Tcxa cultivars had the highest seed(n) in comparison with the other cultivars with 198/3 and 154/3, respectively (Table 2).

According to the results of analysis of variance, the effect of cultivar on seed(w) was significant at 1% level of probability and with CV value 14.29%(Table 1) And had the lowest seed(w), respectively (Table 2).

The final results of Table (2) indicate that each of the cultivars studied was in one or more traits, especially the index and the best, and the yield traits had the greatest diversity index among the other traits and the other traits were related to the yield. To obtain the desired traits.

Discussion

Nicolaescu et al, 2015**,** studied the flexibility of spike(n) grape trait.

Arno et al. (2011) conducted studies on performance traits and reported that there was a relationship between grape yield and grape quality.

Martinez-Casanovas et al. (2012) They examined the trait of fruit maturity and announced that there is a relationship between fruit maturity and grape growth and development.

Soluble total solids(tss) are associated with grape quality and market ability (Swan poal, 2007; Rasoli et al, 2012).

Swan Poal et al (2007) investigated the titrable total acid(ta) content and reported that it is used to control the quality and desirability of grapes.

(Walker et al, 2008) examined seed(n) grapes and reported that seed(n) grapes had a high diversity.

(Lisek et al., 2014) examined seed(w) and showed that they were effective in grape quality.

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