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Recognition of Morphological Traits of Grapevine in Piranshahr and Sardasht

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ABSTRACT

Ancestors of current arable grapes were grapevine. This survey was conducted in the prosperous regions of Pardanan of Piranshahr and Qasem Rash of Sardasht in 2008. In Pardanan, 8 genotypes and in Qasem Rash, also 8 genotypes along with Rasheh grapes were studied. The results showed that all studied grapevine belong to Sylvestris Vitis Vinifear Spp. Abundance proportion of female grapes in comparison with males was 3:13. Most of apical growing point of the surveyed genotypes have accumulated torpid fuzzand three-labial laminas. The results of pollen-germination test showed that male genotypes had a high level of germinating while female genotypes had no germinations. In some of genotypes, symptoms of gall and signs of viral diseases were observed. The results of ELISA (enzyme-linked immunoabsorbent assay) test did not show any viral diseases.

Keywords: Grapevine; Morphological Characters; Rasheh.

INTRODUCTION

Grape family has at least 14 genuses and about 700 species [5] . The fruits in Vitis genus are only edible. This crop/product has been utilized in the edible usages, resin production, juice, concentration, pharmaceutical and fermentation since old ages [1]. According to FAO's statistics, global cultivable area of grapes in 2003 was 7,426 million hectares and total globally- produced grapes was about 60,687 million tons.

In Iran, cultivable area of grapes is more than 320,000 hectares and annual production is about 2.1 million tons[6]. West Azebiajan is one of the important realms of cultivating grapes in Iran with 50 genuses, 23000 hectares cultivable area and about 200,000 tons of grapes.

According to archeological studies, it has been proposed that domesticating of grapevine first occurred at two adjacent regions of Mesopotamia (including south of Anatoly, Syria, north of Lebanon, Kurdistan and west of Iran) and south of Caspian Sea in the second half of 4th millennium B.C. Grapes in Iran, which is as one of the occurrence and distribution centers of grapes through the world, are genetically and morphologically diversified. Evidently, various varieties of grapes are cultivated in the different regions thoroughly from north to south and from east to west of Iran[2]. West Azebiajan Province has got a high variation of current arable grapes and grapevine, the latter of which are found around Piranshahr and Sardasht. Recognizing and evaluating of various characters of these species are very important from the viewpoints of botany, gardening, genetics, and surveying genetic relationship of grapevine and current arable grapes in order to apply the results in breeding and farming and seedling certificate programs. In Piranshahr and Sardasht, there is a high-frequency variation of arable grapes species, some of which are recognized and assessed as Khosnav, Taefi, Sar Qoleh, Mam Beriameh, Angootake[3]. Based on this, this research was conducted to recognize and assess grapevine and relating them with the dominant variety, called Rasheh , (Sardasht Black) and recognizing the dominant traits of grapevine and transmitting them into cultivable varieties in different ways and maintaining germplasm of domestic species[4].

MATERIALS AND METHODS

During April-May, 2008, growing place of grapevine was recognized through repeated visits of jungles and humid places of Piranshahr and Sardasht and examining different zones. Based on the safety status of roads and the number of wild bushes, two woody places were selected in kilometer 28 of Pianshar on the main road of Piranshahr and Sardasht and Qasem Rash region at about kilometer 16 of Sardasht toward Iraq borderline. Then, bushes of grapevine were selected, number-assigned, and indicated by dye- spraying.

In Pardanan, eight genotypes of grapevine by PR1, PR2, …. , PR8 codes and in Qasem Rash, also, eight genotypes of grapevine by GH1, GH2, … , GH8 codes were surveyed. Using GPS, geographical coordinates of the exact occurrence of the vineries were determined. Then, numerous traits were measured and recorded in different phenological (the study of the influence of the climate on cyclical phenomena in plants and animals) stages of bushes based taxonomy of World Genes Bank. In this research, in order to survey the similarity and relationship between grapevine and current cultivated grapes, the old and commercially available variety of Rasheh (Sardasht Black) also was used, and all measured traits in farming variety of Rasheh were measured and recorded as the genotypes of grapevine's, too.

In order to classify the genotypes of grapevine based on botanical data, important traits with high heritability, which were indicated by asterisk in taxonomy, were used. These characters include form, the amount of anthocyanin, presence of lying or standing barbs, the color apical growing point and young leaves, dorsal and frontal color, presence of torpid or standing fuzzon the nodes and internodes, shape, size, and number of lamina lobes, the amount of anthocyanin of midrib of upper surface of mature leaves, indentation shape, the proportion of length to width of indentation of marginal ridge of laminas, sinusoid shape of petiole, congestion of torpid/lying or standing hairs/barbs/fuzz of inter-venae and over-venae, lower surface of lamina, gender of

flower, the length and width of cluster, the size and weight of grains, and the number of seeds available in each grain, the time of color changing of grains, full-maturity and ELISA test and germination of pollen, and surveying the symptoms of viral, etc.

RESULTS AND DISCUSSION

Grapevines are subspecies of Sylvestris Vitis Vinifear Spp. often grow in wet settings and at the riversides. They need a protector to climb in order to develop and produce fruits, which mainly depend on their prehearing trees as protector. One of their other characteristics of this genotype is that it is a polygamous plant.

Comparison of the measured traits between wild genotypes of Sylvestris and cultivable grapes of Rasheh variety

In all genotypes, apical growing point has an open form while in Roshah variety, this point is wide open. The amount of anthocyanin in Roshah variety is strong while there wasn't any anthocyanin in four of the genotypes studied, it was low in two of them, in another two of them, it was medium, in five of them, it was weak, and finally it was high in the last two, respectively. GH1 and GH4 genotypes and Roshah variety have medium torpid congestion of apical growing point and the amount of torpid fuzzin 13 genotypes was high but it was low just in GH2 genotype .there was a main difference in the amount of standing fuzz of apical growing point which was aggregated and in 12 of the genotypes studied was low, in two of them, it was medium, in one, very low, and in another one, it was high. Color of the dorsal part of internodes of Rashah variety and 13 genotypes studied was green and in 3 of them, it was green and red. Color of the frontal part of internodes in Roshah variety and in 9 genotypes studied was green and red, and in 7 of them, it was green. Color of the dorsal part of Rashah variety and 14 genotypes studied was green and in two, it was green and red. Color of the frontal part of Rashah variety and 12 genotypes studied, it is green and red and in 4 genotypes, it is green. The congestion of standing fuzz on nodes in Rashah variety as in 5 genotypes is low, in 4 genotypes, very low, 6 genotypes have no standing fuzz on nodes at all. The congestion of standing fuzz on internodes in Rashah variety as in 4 genotypes studied is low, in 3 genotypes, medium, in other 3 genotypes, very low, and 6 genotypes have no standing fuzz on internodes at all. The congestion of torpid fuzz on nodes in Rashah variety as in 3 genotypes studied is low, in 5 genotypes, very low, in 2 of them, medium, but in 1 genotype, PR4, the congestion of torpid fuzz on nodes is high and 4 of them have no torpid fuzzat all. The congestion of torpid fuzz on internodes in Rashah variety as in PR8 genotype is low, 9 genotypes have no torpid fuzz at all. 1 genotype has medium torpid fuz, in 3 of them, high and in 1, it is very low. Number of tendrils (clinging parts) in all genotypes was two or more. Length of tendrils in 11 genotypes was very short, in 5 genotypes, it is short, but in one, it is medium. The color of the surface of the young leaves in Rashah variety was coppery, and in 3 genotypes, it is green-bronzy, in 2, it is bronzy, in 3, it is green and red, and in 8, it is green. The congestion of torpid fuzz among the lower venae of the young lamina in Rashah variety is low, which has no similarity to the genotypes studied. In 6 genotypes, the congestion of torpid fuzz is high, in 2 genotypes, medium, in another 2, it is very low, in 1, it is too high while it is too low in 1 and in 4 genotypes, and there is no torpid fuzz at all. The congestion of standing fuzz among the lower venae of the young laminas in Rashah

variety as in 9 genotypes is low, in 2 genotypes, very low, and 5 genotypes have no standing fuzz among their lower venae of laminas at all. The congestion of torpid/lying fuzz over the main lower venae of the young lamina in Rashah variety as in 2 genotypes is low, in 2 genotypes, it is medium, in another 2, very low, in 1 , too low, in 6, high while 3 genotypes have no torpid fuzz over the main lower venae of the young lamina. The congestion of standing fuzz over the main lower venae of the young lamina in Rashah variety is low, which is similar to 6 genotypes studied, in 3 genotypes, it is very low, in 2 , high while 4 genotypes have no standing fuzz at all. The size of the mature lamina in Rashah variety is large as in 2 genotypes studied. In 11 genotypes, the size of the mature lamina is medium and in 3, it is small. The shape of the mature lamina in Rashah variety is circular that is only similar to PR2 genotype. In 12 genotypes, it is angular-border, in 3, it is pentagonal. Number of lobes of the mature leaves in Rashah variety is five as in 7 of the genotypes studied and the other 9 genotypes have three-lobed mature leaves. The amount of anthocyanin in mature leaves of Rashah variety as well as 4 genotypes was weak, in 2 genotypes' mature leaves, it is too weak, in 3, and medium while 6 genotypes' mature leaves have no anthocyanin at all. Interestingly, PR5 has too high anthocyanin in its mature leaves. The shape of indentation of the mature leaves is similar to none of the genotypes studied, which is convex in both sides while in 8 genotypes; it is a combination of a smooth side and a convex side, in 6 genotypes, it is composed of a convex side and a concave side, one genotype has both sides concaved and just one genotype has one concave indentation and one convex indentation. The length of indentation of mature leaves in Rashah variety id short as in GH8, the others ten genotypes have medium, three genotypes have short, one, too short and one, too long. The proportion of length to width of indentation of the mature leaves in Rashah variety as in 10 genotypes studied is medium. In 5 genotypes, small, and in one, it is too small. Sinusoid shape of stalk of mature leaves in Rashah variety is overlapping, which has no similarity to the studied genotypes. Among genotypes, in 7 of them, this shape is open, in 2, semi-open, in 2, closed, in 1, too open, and in 1, completely closed. Among 16 genotypes studied, 13 of them have indentations on their petiole sinuses while the other 3 ones have no indentations. Petiole sinuses are confined to stalk in mature leaves in Rashah variety as in 9 genotypes while in the other 7 genotypes it is not confined. Sinusoid shape of upper side of mature leaves in Rashah variety is slightly open that has no similarity with any genotypes studied. Among them, 14 genotypes have upper side of their mature leaves opened, in 1 genotype (GH6), closed while in PR7, the lobes are almost covering. The depth of upper side sinus of mature leaves in Rashah variety is slightly overlapping opposed to all genotypes studied. The depth of upper side sinus of mature leaves in 3 of genotypes is very deep, in 2, deep, in n1, too deep, in 6, shallow, in 1, very shallow and in 2, it is at the medium level. The congestion of torpid fuzz of inter-venae of lower part of mature lamina in Roshah variety is low as in GH8, and it is medium in 2 genotypes, very low in 4, very high in 1, and 8 genotypes have no torpid fuzzes. The congestion of standing fuzz of inter-venae of the lower part of mature lamina in Rashah variety is low as in 2 genotypes studied and it is very low in 3 genotypes, medium in 2 and 8 genotypes have no standing fuzzes. The congestion of torpid fuzz over the midrib of the lower part of mature lamina in Rashah variety is low as in 2 genotypes studied, it is very low in 4 genotypes, medium in 2, high in 1, and 6 remaining genotypes have no torpid fuzz at all. The congestion of standing fuzz over the midrib of the lower part of mature lamina in Rashah variety is low as in 2 genotypes studied, it is very low in 6 genotypes, and it is medium just in PR3 while 7 genotypes have no standing fuzz on their midribs. In comparison of the length of the petiole with the length of lamina, 15 genotypes have

their stalk leaves much shorter than their laminas. And only in one genotype, it is shorter. Among 16 genotypes studied, 3 have male flowers and the 13 remaining genotypes have female flowers. Finally, the fruits of Rashah variety is hermaphrodite (having both male and female reproductive organs).

The results of viral diagnostic test

Regarding existing symptoms on some genotypes (GH_8) which shoes a possible, not sure infectious state by viral diseases, but following ELISA test, it was cleared that these symptoms did not belong the viruses studied, which can probably be as the result of other viruses or viroids.

The results of pollen germination

The results of pollen germination showed that the pollen of the male genotypes had well-germinated while the females' pollen had no germination ability.

Total results of pests, diseases and stresses

Considering the examinations conducted on the genotypes studied and ELISA test, it has indicated that the above cited genotypes are resistant against environmental pests, diseases and stresses to a large extent, and have developed compatibility with their environment and are well-grown. However, in some genotypes, symptoms of infecting were observed suffered from Grapevine powdery *mildew*.

CONCLUSION

Through all conducted survey and examinations, It was indicated that:

1) Grapevines studied are subspecies of Sylvestris Vitis Vinifear Spp.
2) Many common morphological traits were observed among genotypes studied while no similarities were observed between the morphological traits of grapevine genotypes and current arable variety of Rasheh (Sardasht Black), so they were separated from each other in grouping.
3) These genotypes are polygamous as opposed to Rasheh (Sardasht Black) variety.
4) Pollens of male parent has a high potential to germinate while those of females have no this potential at all.
5) In surveying the genotypes of grapevine, symptoms of Grapevine powdery *mildew* and signs of lateral sharpness of leaves, brooming of the branches were observed especially in PR_8 and GH8. ELISA test was used to diagnose viruses and the test results showed that the genotypes of grapevine were not affected by ARMV viruses and were not whorled. Maybe the observed symptoms are attributed to other viruses or viroids which are not studied.

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