



Viticulture Biodiversity in Van Province[#]

Ruhan İlknur Gazioglu Şensoy*, Adnan Doğan, Cüneyt Uyak, Nurhan Keskin

Department of Horticulture, Faculty of Agriculture, Van Yuzuncu Yil University, 65080 Van, Turkey

ARTICLE INFO

[#]Bayburt, 27-29 September 2017 / organized in Turkey '1st International Organic Agriculture and Biodiversity' is presented as an abstract at the congress.

Review Articles

Received 18 August 2017

Accepted 12 March 2018

Keywords:
Biodiversity
Grape
Genotype
Van
Viticulture

*Corresponding Author:

E-mail: rigazioglu@yyu.edu.tr

ABSTRACT

Viticulture preserved its significance from the past to the present that have been ruled in all civilization the region of Van. The presence of carbonized grape seeds in the remains of the Early Iron Age tombs and cities gives information about the history of grape cultivation in Van and its vicinities. However, many of the local varieties described by the elderly are now unfortunately not seen in large areas. Some of the genotypes are no longer encountered, while many genotypes are observed in a few vineyards with a few vines. The grape genetic resources except Erciş variety in the region are threatened with extinction. In spite of many ecological factors that restrict crop production in the region, vineyard has existed for thousands of years and urgent precautions have to be taken to protect this genetic heritage bearing grape landraces close to standard genotypes. The region has been investigated by many researchers for many years and the determined local varieties have been investigated in detail in terms of morphological and pomological characteristics, chemical contents and nutrients and defined in terms of molecular or ampelographic aspects in different studies. With this review, it is aimed to recover the knowledge of these genotypes in a single study in using scientific studies made up to this day in the region. So that it is aimed to lead the steps to be taken in the establishment of a gene pool composed of these local varieties which are under the risk of extinction is increasing day by day. The study also includes information on local adaptations of some standard grape cultivars that have been planted in previous years.

Türk Tarım – Gıda Bilim ve Teknoloji Dergisi, 6(5): 513-519, 2018

Van İli Bağcılığında Biyoçeşitlilik

MAKALE BİLGİSİ

Derleme Makale

Geliş 18 Ağustos 2017

Kabul 12 Mart 2018

Anahtar Kelimeler:

Biyoçeşitlilik
Üzüm
Genotip
Van
Bağcılık

*Sorumlu Yazar:

E-mail: rigazioglu@yyu.edu.tr

ÖZET

Bağcılık kültürü, Van yöresinde geçmişten günümüze hüküm süren bütün medeniyetlerde önemini korumuştur. Erken Demir Çağına ait mezar ve şehir kalıntılarında karbonlaşmış üzüm çekirdeklerine rastlanmıştır. Van ve çevresinde üzüm yetiştiriciliğinin geçmişi hakkında bilgi vermektedir. Ancak yaşlıların tanımladığı çok sayıda mahalli çeşit, günümüzde ne yazık ki geniş alanlarda görülememektedir. Genotiplerin bir bölümüne artık rastlanmazken, birçok genotip ise çok az sayıda omca ile birkaç üzüm bağında gözlemlenmektedir. Yörede Erciş üzüm çeşidi dışındaki üzüm gen kaynaklarımız, yok olma tehlikesiyle karşı karşıyadır. Bölgede bitkisel üretimi sınırlayan birçok ekolojik faktöre karşın varlığını binlerce yıldır sürdürmüş ve aralarında standart üzüm özelliği taşıyan genotiplerin de bulunduğu bu genetik mirasın korunması için acil önlemler alınması gerekmektedir. Yöre uzun yıllardır birçok araştırmacı tarafından taranmış, belirlenmiş olan mahalli çeşitler, farklı çalışmalarda moleküler düzeyde ya da ampelografik açıdan tanımlanmış, morfolojik ve pomolojik özellikleri, kimyasal içerikleri ve besin öğeleri yönüyle incelenmiştir. Bu çalışma ile yörede bu güne kadar yapılmış bilimsel çalışmalardan yararlanılarak bu genotiplere ait bilgilerin tek bir çalışmada toparlanması hedeflenmiştir. Her geçen gün yok olma tehlikesi ile yüz yüze olan bu mahalli çeşitlerden oluşmuş gen havuzunun kurulması konusunda atılacak adımlara öncülük edilmesi hedeflenmektedir. Ayrıca çalışma, önceki yıllarda dikimi gerçekleştirilmiş bazı standart üzüm çeşitlerinin yöreye adaptasyonları konusunda da bilgiler içermektedir.

DOI: <https://doi.org/10.24925/turjaf.v6i5.513-519.1550>

Introduction

Viticulture has been performed in all regions of Turkey, which ranks fourth among the world's vineyards, except the Eastern Black Sea coastline having annual rainfall of 1000 mm and high parts of Eastern Anatolia (Uysal, 2015). Turkey, which is the native land of grape, has more than 1,200 grape varieties. However, only about 50-60 of them are economically prevalent and widely available (Anonymous, 2015). The tendency towards to the modern grape varieties having high economic value causes to diminish the local grapes varieties gradually and to completely lose some of the genetic resources. To prevent the loss of these genetic resources and our cultural heritage, efforts to identify and protect the local grape genotype and variety are of great importance. Despite the collections of vineyards, which were established from the ampelographic studies conducted to determine the existing grapevine potential and the results of these studies, all of the grape varieties in our country could not be analysed and some of the grape varieties disappeared (Çelik and Karanis, 1998). Studies on the determination of grape genetic resources, which started with the ampelographic studies and continued with the use of biochemical markers, have continued with the use of DNA markers (Güteryüz and Köse, 2003; Tekdal and Sarlar, 2016).

Province Van, which is surrounded by high mountains in the Lake Van Basin, has a 1725 m elevation with 38° 28' latitude and 43° 21' longitude, has terrestrial climate that is predominantly humid; the temperature difference between night and day is considerably high; The winter season is usually snowy, while the summers have a dry climate. Tuşba, İpekyolu, Erciş, Gevaş, and Edremit towns of Van Provinces are warmer and rainier than the inner regions because they are located on the shores of Lake Van (Anonymous, 1971). In one of the oldest centres for Viticulture, the majority of local grape genotypes faces the danger of extinction today. In addition to the fact that the climatic conditions not suitable for all grape varieties, parallel to the rapid population growth, the opening of the grape production areas for urban reconstruction permit, not to rejuvenate the old vineyards having no economic efficiency, and the decreasing the number of small producers interested in viticulture are among the reasons for genetic richness that has existed for thousands of years to come to an extinction stage. Moreover, it is also important that the viticulture is not efficiently passed on to the new generations. Grape and viticulture is an indispensable value for Van region from its history. Therefore, studies to be carried out in the region are of great importance in terms of protecting the grape genetic population and preventing the destruction of a cultural heritage with

historical support (Gazioğlu Şensoy and Tutuş, 2017). Although there are many local grape varieties in the Van region, genotypes other than Erciş grape variety, which has a high economic impact on the local market, are in danger of being extinct. These genotypes are represented by very few vineyards with one or two vine stocks. For this reason, in order to prevent the disappearance of grape biodiversity in Van region and to ensure the continuity of this existing genetic heritage, some researches have been carried out within the scope of individual projects or studies at the ampelographic or molecular level by some researchers to determine the existing varieties and their properties, and some standard varieties have been applied to the locality adaptation. However, the gathering of existing works; the identification of these identified genotypes should be made at the molecular level as soon as possible and the inclusion those in the national collection are very important for the region and country

Ampelographic Studies in the Region

In order to determine grape (*Vitis vinifera* L.) biodiversity in Van Province central towns and villages, some researches have been carried out within the existing grape germplasm and the determined genotypes were identified with the code numbers of OIV, UPOV and IBPGR "Grape Identifiers" in order to identify their ampelographic characteristics.

Kelen and Tekintaş (1991) and Kelen, (1991) have determined 11 grape varieties, one red, three black and seven white, in order to determine the ampelographic characteristics of grape varieties grown in Van province. Erciş Grape (Van Grape), which is the most widely cultivated varieties of grape varieties and whose name comes from the region, has been reported and emphasized as a hopeful variety.

Some other grape varieties were identified in the studies for the identification of the ampelographic characteristics of the grape varieties in Van province central towns and villages (Ersayar et al., 2011) and Edremit town (Ersayar, 2011) (Figure 1-11)

In Kilic et al. (2011)'s study, the ampelographic characteristics of Karagoz, Siirt, Yeşil üzüm, Artos, Dilber, Ağa and Erek grapes cultivated in Gevaş town of Van province were determined (Figure 12-18). In another study carried out at the ampelographic level in the Gevaş town, some other local varieties, "Tüylü yaprak", "İnce kabuk" and "Beyaz topak", were identified. The genotype "İnce Kabuk" was morphologically hermaphrodite-physiological female and the other genotypes were hermaphrodite (Kelen and Tekintaş, 1991).



Figure 1 Siyah Erciş



Figure 2 Keçimemesi



Figure 3 Niğde



Figure 4 Beyaz Üzüm



Figure 5 Al Üzüm



Figure 6 Şırnak



Figure 7 Reşadiye



Figure 8 Tayifi



Figure 9 Siyah Bedar Karaboğa



Figure 10 Beyaz Mersin



Figure 11 Beyaz Batman



Figure 12 Karagöz



Figure 13 Siirt



Figure 14 Yeşil üzüm



Figure 15 Artos



Figure 16 Dilber



Figure 17 Ağa



Figure 18 Ereğ

Molecular Studies on Grape Genotypes in Van Province

The adaptation of some grape cultivars to Van ecological conditions and the identification of some local grape vine genotypes with RAPD molecular markers were performed in Van Province (Gazioğlu Sensoy, 2008; Gazioğlu Sensoy and Balta 2011) and physical and chemical properties of 20 local genotypes and six standard varieties were determined. Moreover, RAPD molecular markers have been studied for differences among the genotypes to determine genetic relatedness. As a result of the study, it was determined that Erciş and Gevaş genotypes are generally in different groups with the samples belonging to standard varieties. Furthermore, the genetic diversity observed in Gevaş and Erciş genotypes (Figure 19-42) was found to be higher than the standard varieties

Studies on the Rootstocks and Standard Grape Varieties Adaptation in Van Province

Although Van and its surroundings have not yet suffered from the loss of grape phylloxera, this pest is a potential danger for Van province. For this purpose, in a study carried out in order to determine the adaptation ability of the grapevine rootstocks to the Van ecological conditions, 5BB, 1103P, 420A and Rupestris du Lot reported to give the best results in terms of pruning wood weights; 5BB reported to give the best results in terms of number of bud cuttings; 5BB, 420A and 41B rootstocks were reported to give the best results in terms of lignification level. Moreover, according to the characteristics of the phenological period, there was a difference of 4-19 days between rootstocks (Kelen et al., 2001).

In another study, the grape variety-rootstock relationship were taken into consideration in Van-ecological conditions, the rootstocks of 420A, 110R, and 99R were tried for different standard varieties in Van ecological conditions and there was no adaptation problem for ecology. When the variety-rootstock relationship is considered, Sultani Seedless gave positive result with the 110R rootstock, but Muscat Hamburg, Cardinal and Yalova İncisi gave positive result with the 420A rootstock (Gazioğlu Sensoy, 2008; Gazioğlu Sensoy and Balta 2010).

There was also adaptation study for the standard grape varieties in Van Province (Gazioğlu Şensoy and Balta 2010). Sultani Seedless, Muscat Hamburg, Cardinal, Royal, Hatun Parmağı and Yalova İncisi varieties were planted and the ability of adaptation to the Van ecological conditions from the 4th year of the planting was observed for three years. Sultani Seedless, Muscat Hamburg, Cardinal and Yalova İncisi varieties have been recommended for viticulture in the region, but Royal and Hatun Parmağı varieties were not recommended for the region because of their late maturation even though positive results are obtained in terms of plant growth and yield.

In addition, various projects made by the Provincial Directorate of Food, Agriculture and Livestock for the revitalization of the vineyard with Cardinal, Muscat Hamburg, Sultani Seedless and Yalova İncisi, Royal and other bare rooted bud cuttings belonging to Şilfoni, Ağın Beyazı, Kış Kırmızısı and Öküzgözü varieties, were carried out in different plantations in Van province (Anonymous, 2011); and favourable results have been observed, particularly in the fields nearby to Lake Van shoreline.

Clusters, leaves and grape images of Erciş genotypes



Figure 19 Kırmızı Keçimemesi



Figure 20 Kırmızı Keçimemesi



Figure 20 Beyaz Keçimemesi



Figure 22 Erciş Üzümü (C1)



Figure 23 Erciş Üzümü (C2)



Figure 24 Erciş Üzümü (C3)



Figure 25 Erciş Üzümü



Figure 26 Göküzüm



Figure 27 Göküzüm



Figure 28 Siyah Kışmış



Figure 29 Beyaz Kışmış



Figure 30 Kızıl Üzüm



Figure 31 Koyun Gözü



Figure 32 Koyun Gözü

Conclusion

For Van province urgent measures must be taken in order to prevent the loss of this genetic diversity, each of which is a different value; These grape genotypes, each of which is a genetic value, have to be identified at the molecular level in detail in order to identify synonyms and antonyms, and to include these gene sources in the national collection. Although there are several local grapevine varieties, the local Erciş grapevine variety is the common cultivar in Lake Van Basin, and among the commercial cultivars, Sultani Seedless gave positive result with the 110R rootstock, and Muscat Hamburg,

Cardinal and Yalova Incisi gave positive result with the 420A rootstock. Local varieties should not be judged solely on the economic front, and it is important to consider that these genetic resources, which have reached to daylight due to natural selection, may also be found place in breeding studies with their different characteristics. Identification of the phytochemicals contained in these local varieties; the determination of their resistance to different stress conditions will also reveal the importance of our gene sources.

Clusters, leaves and grape images of Gevas genotypes



Figure 33 Gevas-1



Figure 34 Gevas-2



Figure 35 Gevas-3



Figure 36 Gevas-4



Figure 37 Gevas-5



Figure 38 Gevas-6



Figure 39 Gevas-7



Figure 40 Gevas-8



Figure 41 Gevas-9



Figure 42 Gevas-10

References

- Anonymous. 1971. Van Gölü Havzası Toprakları. Köy İşleri Bakanlığı Toprak Su Genel Müdürlüğü No: 197
- Anonymous. 2011. Van Bitlis ve Hakkari İleri Meyve Yetiştiriciliği Çalıştay Raporu. 5-6 Aralık 2011.
- Anonymous. 2015. Manisa Bağcılık Araştırma Enstitüsü Müdürlüğü, Sofralık Üzüm Yetiştirmeye Yönelik Kültürel Uygulamalar, <http://arastirma.tarim.gov.tr/manisabagcilik/Belgeler/genelbagcilik/Kaliteli%20sofralik%20uzum%20yetiştiriciligi%20fadime%20ates.pdf> (Erişim Tarihi:07.11.2015).
- Çelik H, Karanis C. 1998. Amasya'da Yetiştirilen Bazı Üzüm Çeşitlerinin Ampelografik Özelliklerinin Saptanması Üzerine Bir Araştırma. 4. Bağcılık Sempozyumu Bildirileri, 20-23.
- Ersayar F. 2010. Van Merkez ve Edremit İlçelerinde Bağ Varlığının Tespiti ve Yetiştirilen Üzümlerin Tanımlanması (Yüksek lisans tezi, basılmamış). YYÜ, Fen Bilimleri Enstitüsü, Van.
- Ersayar F, Kazankaya A, Doğan A, Uyak C. 2011. Van İli Merkez İlçe ve Köylerinde Yetiştirilen Bazı Üzüm Çeşitlerinin Ampelografik Özelliklerinin Belirlenmesi. Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 1(2): 23-33.
- Gazioğlu Şensoy Rİ. 2008. Bazı Üzüm Çeşitlerinin Van Ekolojik Şartlarına Adaptasyonunun Belirlenmesi ve Van Yöresine Ait Bazı Yerli Asma Formlarının RAPD Markörleriyle Tanımlanması. YYÜ Fen Bilimleri Enstitüsü, Doktora Tezi, 127 s., Van.
- Gazioğlu Şensoy Rİ, Balta F. 2010. Bazı üzüm çeşitlerinin Van ekolojik şartlarına adaptasyonu. Yüzüncü Yıl Üniversitesi Tarım Bilimleri Dergisi, 20(3): 159-170.
- Gazioğlu Şensoy Rİ, Balta F. 2011. Van Yöresine Ait Bazı Yerli Asma Formlarının Tespiti ve RAPD Markörleriyle Tanımlanması. Iğdır Üniversitesi Fen Bilimleri Enstitüsü Dergisi, 1(3) 41-56.
- Gazioğlu Şensoy Rİ, Tutuş A. 2017. Tarih Boyunca Van İli ve Çevresinde Bağcılık Kültürü. Van Yüzüncü Yıl Üniversitesi Fen Bilimleri Enstitüsü Dergisi. 22 (1): 56-63.
- Gülyüz M, Köse C. 2003. Olur (Erzurum) İlçesi'nde yetiştirilen üzüm çeşitlerinin ampelografik özellikleri. Journal of the Faculty of Agriculture, 34(3): 205-209.
- Kelen M. 1991. Van İli Bağcılığı ve Burada Yetiştirilen Üzüm Çeşitlerinin Ampelografik Özellikleri Üzerinde Araştırmalar (Yüksek lisans tezi, basılmamış). YYÜ, Fen Bilimleri Enstitüsü, Van.
- Kelen M, Cangi R, Doğan A. 2001. Bazı Amerikan asma anaçlarının Van ekolojik koşullarına adaptasyon yeteneklerinin belirlenmesi üzerine bir araştırma, SDÜ Fen Bil. Ens. Dergisi, 5(2): 125-132.
- Kelen M, Tekintaş E. 1991. Van ili bağcılığı. Yüzüncü Yıl Üniversitesi Ziraat Fakültesi Dergisi. Cilt :1, No :1: 182-188
- Kılıç MF, Doğan A, Kazankaya A, Uyak C. 2011. Gevas (Van)'da Yetiştirilen Üzüm Çeşitlerinin Ampelografik Özelliklerinin Belirlenmesi Üzerine Bir Araştırma. Iğdır Üniversitesi. Fen Bilimleri Enstitüsü Dergisi, 1(1): 23-31.
- Tekdal D, Sarlar S. 2016. Yerel asma genetik kaynakları ve önemi. Bağbahçe Bilim Dergisi, 3(3): 20-26.
- Uysal H, 2015a. Önemli Bazı Tarımsal Ürünlerin Gelecek Eğilimlerinin Belirlenmesi Sofralık Üzüm, 2011/2015. T.C. Gıda Tarım ve Hayvancılık Bakanlığı Tarımsal Araştırmalar ve Politikalar Genel Müdürlüğü Manisa Bağcılık Araştırma Enstitüsü Müdürlüğü, Manisa.