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Determination of Performances of Domestic Walnut Varieties Obtained by Selection and International Commercial Varieties in Gaziantep Region

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Abstract

This experimental study was conducted to determine the best adaptable walnut varieties to Gaziantep province and to advise growers to grow them, which would be the new ones. Adaptation parcel was financially supported by TUBİTAK between 2008-2011 where was taken place in Ahmet Münir Bilgen experimental area, belonged to Pistachio Research Station, and was composed of Bilecik, Chandler, Howard, Maraş-12, Maraş-18, Midland, Serr and Şen-1 walnut varieties, planted 7x7 m distances, with 4 replicates and 3 trees in each replicates, according to randomized block desing in the year of 2008. Phenological and pomological evaluatings were done and tree vigour and habitus susceptibilities against antrachnose and bacterial blights of varieties were also evaluated. The study has been supported by TAGEM and has still being conducted by Pistachio Research Station management. As a consequence of results, Pedro was middle-late and Chandler was late in leafing time. However, in the view of time of leaf fall, Maraş-12 and Maraş-18 were the earliest varieties. Midland had the best tree vigour. Observing the habitual growth of varieties, while Pedro had only spreading, the others had semi-upright growth.In the measuring trunk diameters, Şen-1 and Midland in rootstock thickness and Şen-1, Chandler and Midland in over cultivar thickness had the highest level. Only Howard and Pedro had male catkins. In the viewing of female flowering time, the earliest flowering was in Howard and latest flowering was in Chandler. Pomological analysis didn't obtain except Midland and Pedro due to lack of obtained fruits. All over the observing years, Antrachnose and bacterial blights didn't damage much more to the varieties, controlled with chemicals easily; thus any susceptibilities weren't observed on those varieties

Keywords: Walnut, Gaziantep, varieties

Seleksiyonla Elde Edilmiş Yerli Ceviz Çeşitleri Ve Uluslararası Ticari Çeşitlerin Gaziantep Yöresinde Performanslarının Belirlenmesi

Özet

Çalışma, Gaziantep yöresine en uygun ceviz çeşitlerini belirleyerek, çeşit önerisinde bulunabilmek ve söz konusu çeşitleri bölge çifçisine kazandırmak amacıyla başlatılmıştır. Adaptasyon parseli 2008-2011 yılları arasında TÜBİTAK tarafından desteklenerek, Antefıstığı Araştırma İstasyonu Müdürlüğü Amet Münir Bilgen İşletmesinde; Bilecik, Chandler, Howard, Maraş-12, Maraş-18, Midland, Pedro, Serr ve Şen-1 çeşitleri ile 4 yinelemeli olarak ve her yineleme de 3 ağaç olacak şekilde, 7 x7 m dikim aralığında "Tesadüf Blokları Deneme Deseni" ne göre kurulmuştur. Çalışmada fenolojik ve pomolojik değerlendirmeler yapılmış, çeşitlerin gelişme, habitus özellikleri, antroknoz ve bakteriyel yanıklık durumları incelenmiştir. Araştırma, TAGEM tarafından desteklenmekte olup, Antepfıstığı Araştırma İstasyonu Müdürlüğünce halen yürütülmektedir. Yapraklanma zaman sınıflamasında Pedro orta geç, Chandler ise geçci olmuştur. Yaprak döküm sınıflamasında en erken Maraş-12 ve Maraş-18'de olmuştur. Ağacın gelişme kuvveti açısından Midland çeşidinde çok kuvvetli olduğu gözlenmiştir. Ağaçların büyüme habitüsleri bakımından; Pedro çeşidi yayvan, diğerler çeşitler yarı dik büyüme göstermiştir. Gövde çap ölçümünde; Şen-1 ve Midland çeşitleri, anaç çapı ölçümlerinde, Şen-1, Chandler ve Midland çeşitleri en yüksek değerleri vermiştir. Erkek püskül sadece Howard ve Pedro çeşitlerinde oluşmuştur. Dişi çiçeklenme tarihleri bakımından; en erken çiçeklenme Howard çeşidinde, en geç çiçeklenme ise Chandler çeşidinde görülmüştür. Midland ve Pedro çeşitlerinden yeterli meyve alınmış ve pomolojik analiz yapılmıştır. Tüm yıllarda antraknoz ve

bakteriyel yanıklığın önemli ölçüde zarar oluşturmamış olup, yapılan uygulamalarla kontrol edilebilmiş, dolayısıyla çeşitler düzeyinde dayanıklılık yada hassasiyet oluşumu gözlenmemiştir.

Anahtar Kelimeler: Ceviz, Gaziantep, Çeşitler

Introduction

Walnut is a native plant for starting the south of Karpat Mountain to East Europe and Turkey, including of Iraq, east part of Iran and backside of the Himalayan Mountains countries. While Vavilov pointed out the origin center of walnut was Middle Asia and Near East, Okmanchi added Moldova as seconder origin center, as well. One of the widely grown walnut growing countries is Turkey (Akça, 2005).

Looking through to walnut production in the world, China takes place at the first with the production of 799 thousands ton, US is in the second biggest producer country with 369 thousands ton production and Iran is the third with 216 thousands ton. Turkey ranks in the fourth with the 165 thousands ton production.

Due to generative production made by seeds in walnut, Turkey took a bridge country role to other countries (Şen, 1998; Germain, 1986). Moreover, in the view of having tree assets, production and breeding material, Turkey has taken advantage in contrast other walnut producer countries. On the other hand, there are some problems on marketing and production which is not made standard cultivars (Beyhan, 2005)..

Although, Turkey ranks fort he fourth in the walnut production, in the export and production has not been in the desired level. Besides, 1,5-2 million seedlings have been planted in each year, production has not been increased in the same way. One of the reasons of this situation is not taken into consideration adaptation ability of cultivars to each different ecological conditions.

It is aimed to determine the adaptation ability of 9 foreign and domestic walnut cultivars to Gaziantep region. It is also aimed to making true cultivar advise to the growers, promoting growers to make orchard, contribute to national economy via increasing the production.

Materials and Methods

Adaptation area was composed of Bilecik, Chandler, Howard, Maraş-12, Maraş-18, Midland, Pedro, Serr and Şen-1 cultivars. Experimental plot was designed 4 replicates including 3 trees in each replicates with the totaly randomised in 2008.

Phenological observation was made in growing period in spring every year, time of leaf bud burst, sprouts time in the trees, polen dispersing and female flower receptive period was determined, male catkins and female flowers were counted. Moreover, 5% leaf-fall-date was also observed.

Upside of 5 cm from grafting point, shoot diameter, downside of 5 cm from grafting point, rootstocks diameter were measured. Growth habitus and tree vigour were determined.

Results

Phenological Observations

Regarding leaf set on the trees comparing to Chandler, Maraş-12 was 18 days, Maraş-18 and Serr were 17 days, Howard and Şen-1 were 13 days, Bilecik was 12 days, Midland was 11 days and Pedro was 5 days earlier than Chandler. On classification of leaf-set time Maraş-12, Maraş-18 and Serr were medium-early, Howard,Şen-1, Bilecik and Midland were medium, Pedro was medium-late and Chandler was late. Leaf-set time of Şen-1 and Bilecik were earlier than Pedro in this study which was gertined parallel results with Aktuğ Tahtacı et al. (2011 a).

Looking through leaf-fall dates on varieties, comparing to Chandler, Maraş-12 and Maraş-18 were 9 days, Hardley was 8 days, Şen-1 was 7 days, Midland was 5 days, Howard was 3 days, Bilecik was 4 days, Pedro was 3 days and Serr was 4 days later Chandler

When the results were classified, Maraş-12 and Maraş-18 were medium, Şen-1, Midland, Howard and Bilecik were medium-late, Chandler and Pedro were late and Serr was very late. Aktuğ Tahtacı et al(2011 a). reported that Bilecik was later than Şen-1 and Pedro on leaf-fall date (Table 1) *Growing of Cultivars*

Tree vigorur of cultivars was classified as Bilecik, Maraş-12 and Maraş-18 were weak, Howard and Pedro were medium, Chandler, Serr and Şen-1 were strong, Midland was very strong. Habitual growth of cultivars, was evaluated as Pedro was spreading and the others were Semi-Upright .

When Şen-1 and Midland were much bigger the weakest growing was seen Serr(because of planted in 210) and Maraş-12 in the case of trunk diameter on cultivars. Further more, regarding of rootstocks diameter measuring, Şen-1, Chandler and Midland took the biggest growth and Serr was the lowest trunk diameter growth others took place among them (Table 2.

Table1 Leaf Set and Leaf Fall data of cultivars (2011)

Cultivars	Time of Leaf Set		Class of leaf set time[1]	Time of Leaf Fall		Class. of Time of Leaf Fall
Bilecik	09.04.	13.04.	Medium	13.11.	15.11.	Medium to late
Chandler	21.04.	24.04.	Late	16.11.	18.11.	Late
Howard	08.04.	11.04.	Medium	14.11.	18.11.	Medium to late
Maraş-12	03.04.	06.04.	Eary to medium	8.11.	10.11.	Medium
Maraş-18	04.04.	07.04.	Eary to medium	8.11.	13.11	Medium
Midland	10.04.	15.04.	Medium	12.11.	14.11.	Medium to late
Serr	04.04.	06.04.	Eary to medium	19.11.	20.11.	Very late
Şen-1	08.04.	11.04.	Medium	10.11.	13.11.	Medium to late
Pedro	16.04.	19.04.	Medium to late	18.11.	20.11.	Late

[1]Evaluations was made according to Chandler variety

).

Table 2 Tree vigour and habitual growth of cultivars (2011)

Cultivars	Trunk diameter	Rootstocks diameter	Tree vigour	Habitual Growth
Bilecik	84,42±3,57	111,18±4,28	Weak	Semi-Upright
Chandler	88,18±3,02	113,53±2,01	Strong	Semi-Upright
Howard	76,76±5,66	96,87±3,04	Medium	Semi-Upright
Maraş-12	69,81±1,37	94,89±2,86	Weak	Semi-Upright
Maraş-18	70,62±3,41	96,81±2,97	Weak	Semi-Upright
Midland	89,89±2,50	112,63±7,25	Very strong	Semi-Upright
Serr	34,94±1,67	49,35±1,77	Strong	Semi-Upright
Şen-1	97,30±4,74	115,80±2,14	Strong	Semi-Upright
Pedro	80,31±4,76	106,84±7,59	Medium	Spreading

Table 3. Flowering data for cultivars (2011)

Cultivars	Number of Male Catkins	Number of Female Flowers	Date of Male Catkins		Date of Female Flowers		Time of male flowering compared to female flowering
Bilecik	--	4,50	--	--	19.04.	26.04.	-
Chandler	--	32,67	--	--	10.05.	14.05.	--
Howard	1,00	8,79	01.05.	03.05.	15.04.	29.04.	Protogyny
Maraş-12	--	9,00	--	--	17.04.	22.04.	-
Maraş-18	--	5,00	--	--	18.04.	24.04.	-
Midland	--	38,42	--	--	26.04.	6.05.	-
Serr	--	--	--	--	----	----	-
Şen-1	--	5,00	--	--	25.04.	28.04.	-
Pedro	1,75	25,25	22.04.	29.04.	26.04.	12.05.	Protandry

Flowering of Varieties

Catkins were comprised just only on Howard and Pedro. Regarding female flowering time, when the earliest flowering was seen on Howard, latest flowering was on Chandler (Table 3.)

Disease observation

Antrachnose and bacterial blight disease were observed in the experimental area. Due to absent of fruit in 2008, 2009, and 2010 damages caused by disease couldn't be evaluated in 2011 fruithing was only seen on Midland and Pedro cultivars, there was no damages on them.

In terms of antrachnose, same symptoms were seen on Maraş-12 and Maraş-18, but it wasn't serious for them. Chemical applications controlled the disease well. Bacterial blight was not seen 2008 and 2010. But in 2009 blight was seen on all cultivars except Chandler and the lesion size was the biggest on Maraş-18 with 17,58 mm the

smallest one was on Maraş-12 with the size of 1,08 mm. After first symptoms were seen on cultivars, chemical was used to control the disease and it was nof effected cultivars seriously. İn 20011 the disease was occurred on Bilecik, Chandler, Maraş-12, Maraş-18 and Midland at the starting level but after chemical usage, bacterial blight was controlled (Table 4.).

Generally for Gaziantep location climatic conditions are not favorable for disease and some diseases didn't effect walnut so much and it is concluded that they can be easily controlled.

Table 4. Identified antrachnose damage on varieties

Cultivars	2008	2009	2010	2011	
	Leaf (mm)	Leaf (mm)	Leaf (mm)	Leaf (mm)	Fruit
Bilecik	--	--	--	-	--
Chandler	--	--	--	-	--
Howard	--	--	--	-	--
Maraş-12	--	--	--	1	--
Maraş-18	--	--	--	1	--
Midland	--	--	--	-	--
Serr	--	--	--	-	--
Şen-1	--	--	--	-	--
Pedro	--	--	--	--	--

Table 5. Identified bacterial blights damage on varieties

Cultivars	2008	2009	2010	2011	
	Leaf (mm)	Leaf (mm)	Leaf (mm)	Leaf (mm)	Fruit
Bilecik	--	11,08	--	1	--
Chandler	--	--	--	1	--
Howard	--	8,58	--	-	--
Maraş-12	--	1,08	--	1	--
Maraş-18	--	17,58	--	1	--
Midland	--	2,25	--	1	--
Serr	--	8,5	--	-	--
Şen-1	--	1,42	--	-	--
Pedro	--	8,83	--	-	--

Discussion

In the case of classification of the leaf forming time, Maraş-12, Maraş-18 and Serr took in the group of middle-early; Howard, Şen-1, Bilecik, Midland were middle; Pedro was middle-late and Chandler was late. In the classification of leaf falling,

Regarding tree vigour, Bilecik, Maraş-12 and Maraş-18 were weak; Howard and Pedro cultivars were middle; Chandler, Serr and Şen-1 were strong and Midland was highly strong. While, Pedro was

spreaded, others were half perpendicular shaped habitus.

In trunk diameter, Şen-1 and Midland gained the highest number, the weakest growth was seen in Serr and Maraş-12. Others took place among those. Şen-1, Chandler and Midland were the highest value in rootstocks diameter, while Serr was the lowest. Others took place among those.

Male inflorescence was only formed in Howard and Pedro. In the time of Female inflorescence time, the earliest flowering was on Howard, the latest one was seen in Chandler cultivar.

Consequently, because of having relatively low relative humidity, Gaziantep has suitable places for walnut growing without disease risk. For 4 years observations, bacterial and fungal diseases haven't been impotance to make resistancy test and can be easily controlled. Analysis on yield made by only on Pedro and Midland varieties. Adaptation studies should be go on to make decision which cultivars are suitable to the Southeast Anatolian Region.

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