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NEW PROMISING CHERRY LAUREL (*PRUNUS LAUROCERASUS* L.) GENOTYPES IN TURKEY*

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Abstract

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Cherry laurel (*Laurocerasus officinalis* Reomer) is apparently native in some parts of the East Black Sea region. This study was conducted to determine promising cherry laurel genotypes of the East Black Sea Region in Turkey in 2005 and 2006. A modified weighted ranked method was used to evaluate the genotypes by using some yield and fruit characteristics such as yield per trunk diameter area, yield per tree, fruit weight, flesh/seed rate, appearance, taste, astringency, uniformity, total soluble solids, fruit number per cluster and earliness. The 61 K 04, 61 K 03, 28 K 02 and 28 K 10 genotypes were superior compared with the other genotypes in terms of the characteristics evaluated. The four promising genotypes from this study will be followed with new studies and registered as new cultivars in the near future for the world.

Key words: Prunus laurocerasus L., cherry laurel, genotypes, fruit characteristics, Turkey

Introduction

Cherry laurel belonging to the genus *Prunus* of Rosaceae family within Magnoliatae class is a typical evergreen plant. It is known as *Laurocerasus oficinalis* Roemer, *Prunus laurocerasus* (L.) Mill., *Cerasus laurocerasus* (L.) Mill. in *Prunoideae***.** It is native to Southeastern Europe, The Balkans, North Iran and the east regions of North Anatolia, Toros mountains in Southern Anatolia**,** the north and east of Marmara Region, Turkey and Caucasus. Cherry laurel (*Laurocerasus officinalis* Reomer) is apparently native in some parts of the East Black Sea region, which is also the origin of sweet cherry *(Prunus avium* L.) (Davis, 1972). Cherry laurel is mostly consumed as fresh or pickle by local people. In this region, cherry laurel genotypes have scattered into hazelnut and tea plantations and in the home garden.

The cherry laurel tree is a valuable ornamental plant for its attractive dark and evergreen leaves, and clusters of white flowers in the spring. As the cherry laurel fruit contains a great deal of minerals, it contains little amount of heavy metal (Islam, 2005). The fruit of the cherry laurel can easily be digested and is generally consumed fresh. It is used

**The study is a summary of the MSc thesis of Idris Macit*
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in making jam, pickle, pekmez, and cake; it is also eaten as dried and roasted. Its leaves are also useful for health (Alasavar et al., 2005; Islam, 2005).

Although usage of the cherry laurel is common in Turkey, there is no cherry laurel orchard since there is no standard cultivar. There has been no comprehensive cherry laurel breeding program on collecting, characterizing, and evaluating these resources in Turkey apart from a limited number of studies (Karadeniz and Kalkisim, 1996; Islam, 2002 and Islam and Vardal, 2009). For the precious studies, the plants with different ages at different locations under various growing conditions were investigated. For this reason, these studies are local studies and could not show real performance of the examined genotypes. In this study, we aimed to determine promising cherry laurel genotypes at the same orchard selected from the East Black Sea Region of Turkey.

Materials and Methods

This study was carried out at the Black-Sea Agricultural Research Institute in the Black Sea region in 2005-2006. The materials of this study consisted of 17 genotypes selected from the East Black Sea region of Turkey in 1999-2000. An experimental orchard with 3 plants propagated by cutting for each genotype was established in 1999-2000. The altitude of the experimental orchard was 4 m. The location of the orchard has temperate climate; the winters are not very cold, and the summers are warm with rare spring frosts. Annual rainfall is approximately 670-750 mm. The hottest months are July and August, whereas the coldest months are January and February. The soil texture of the experimental area was clay-loam. Its pH was 7.8, and soil organic matter was 4%.

The weighted-rankit method used in similar researches (Serdar, 1999; Serdar and Soylu 1999; Celikel et al., 2008 and Serdar et al., 2009) as proposed by Michelson et al. (1958) was employed for evaluating the genotypes in this study. In the experiment, 17 genotypes in 2005 and 12 of the 17 genotypes in 2006 were rated from good to bad for yield and some fruit characteristics by the modified weighted ranked method by us adapting to this study. The quantitative characteristics of the genotypes, such as yield per trunk diameter area (YTDA, $g.cm^{-2}$), yield per tree (YT, kg), fruit weight, fruit flesh/seed rates (FSR), total soluble solids (TSS), fruit number per cluster (FNC), and earliness, were determined. The qualitative fruit characteristics, such as fruit taste, fruit appearance, astringency, and fruit uniformity, were rated from a scale of 1-5 by a group of tester composed of 5 people. The relative value for each characteristic was calculated from these ratings (Table 1).

First and full flowering, end of flowering, and first and last harvest dates, some fruit, flower and leaf characteristics of four promising genotypes determined at the end of in 2006 were determined. Fruit characteristics, such as dimensions (width, length), shape, color, acidity (as equivalent of malic acid) from 15 fruits, seed weight from 30 seeds, and cluster weight and length from 10 cluster samples, were determined. Flower characteristics such as dimensions (width, length), pedicel length, pistil, and anther number from 15 flowers were determined. Leaf shape, dimensions, thickness, and stalk length of the genotypes were also measured.

Results and Discussion

Twelve of the 17 cherry laurel genotypes examined in 2005 had higher scores of the weighted ranked method. These 12 genotypes were also evaluated in 2006. Therefore, as result of this study, 4 genotypes, namely 61 K 04, 61 K 03, 28 K 02, and 28 K 10, were found to be superior to the others (Table 2).

The average yields per trunk diameter area (YTDA) of the examined genotypes varied from 30.0 to 270 g/cm^2 in 2005. These values of se-

lected genotypes were between 2.0 and 244 g/cm^2 in 2006 (Table 2). The yields per tree (YT) of the genotypes varied from 1.1 to 39.8 kg in 2005. These values of selected genotypes were between 0.3 and 25.0 kg in 2006 (Table 2). For four promising genotypes, namely 61 K 04, 61 K 03, 28 K 02, and 28 K 10, the average YTDA were between 45 and 150 g.cm^{-2} and YT were between 4.2 and 15.2 kg (Table 3). Generally, both YTDA and YT of the genotypes were low, even some genotypes did not yield in 2006. The low temperature in February in 2006 (Anonymous, 2006) in which flower clusters appeared had damaged the flowers. Bostan and Islam (2003) pointed out that yield of cherry laurel occurred surge for some years.

28 K 05 and 52 K 02 genotypes were also fruitless in 2006 because of likely low temperatures, so not evaluated and removed at the experiment.

Fruit weight of the genotypes varied from 1.8 to 4.4 g in 2005. These values of selected genotypes were between 3.1 and 5.2 g in 2006 (Table 2). Fruit weights of the genotypes were higher in 2006 than in 2005 because the number of examined genotypes was less in 2006 than in 2005. Average fruit weights of the 4 promising genotypes were between 3.5 and 4.8 g (Table 3). Islam and Vardal (2009) determined that fruit weight of cherry laurel genotypes in Rize were 2.6 and 5.7 g. Bostan (2001) examined pomological characters of 'Su'cherry laurel variety, of which, fruit weight was 4.89 g. In a study in Trabzon, Islam (2002) reported that fruit weight of cherry laurel was 4.80 g. Bostan and Islam (2003) determined that fruit weight of cherry laurels grown in Trabzon ranged from 2.06 to 6.79 g. Our results were similar to other research results carried out in the Black Sea Region.

Fruit flesh/seed rates (FSR) of the cherry laurels were between 3.99 and 9.82 in 2005 and between 3.17 and 5.78 in 2006 (Table 2). Average FSR of promising 4 genotypes varied from 5.2 to 7.8 (Table 3). Islam and Odabas (1996) determined that FSR of cherry laurel genotypes in Vakfikebir varied from 4.79 to 7.35. The 4 promising genotypes in our study had higher FSR than genotypes selected in Vakfikebir. Previous studies showed that FSR of genotypes of cherry laurels from Trabzon were between 4.8 and 16.5 (Bostan, 2001; Bostan and Islam, 2003). TSS content of the genotypes varied from 8.6 to 20.5 % in 2005 and from 7.8 to 19.5% in 2006 (Tables 2). TSS contents of the 4 promising genotypes varied from 14.0 to 17.0 % (Table 3). In studies carried out in Trabzon, TSS contents of cherry laurel genotypes were found to

Table 1
The selection criteria, their relative values (RV, %) and scores

Selection criteria	RV	Class intervals									
		I		II		III		IV		V	
		s	value	s	value	s	value	s	value	s	value
YTDA, g.cm^{-2}	15	5	223≤	4	175-222	3	127-174	2	79-126	1	≤78
YT, kg per tree	10	5	32.2≤	4	24.4-32.1	3	16.7-24.3	2	8.9-16.6	1	≤ 8.8
Fruit weight, g	15	5	3.6≤			3	2.7-3.5			1	≤2.6
FSR	10	5	8.68≤	4	7.51-8.67	3	6.34-7.50	2	5.17-6.33	1	≤5.16
Fruit taste	8	5	4.0≤			3	3.2-3.9			1	≤3.1
TSS, %	10	5	18.2≤	4	15.8-18.1	3	13.5-15.7	2	11.1-13.4	1	≤11.0
Astringency	7	5	3.6≤			3	2.4-3.5			1	≤2.3
Fruit appearance	8	5	3.8≤			3	2.6-3.7			1	≤2.5
Fruit uniformity	7	5	4.0≤			3	3.2-3.9			1	≤3.1
FNC	5	5	14.1≤			3	9.1-14.0			1	≤9.0
Earliness	5	5	B JU			1	16 JU-5 AU			3	A 16 AU

B: before, A: after, JU: July, AU: August, s: scores

Table 2
Selection criteria, their scores and total scores (s: score)

Genotypes	YTDA, g/cm^2	YT, kg	Fruit weight, g	FSR	TSS, %	FNC	Earliness	Fruit taste	Fruit appear-ance	Astrin-gency	Fruit uniformity	Total scores
2005												
28 K 03	80	8.2	2.2	6.33	15.9	10.0	28 July	2.6	1.6	1.2	2.6	
53 K 01	42	5.4	4.4	6.72	14.9	6.9	28 July	2.4	1.8	1.4	3.8	214 (10)
28 K 12	95	10.0	2.2	4.78	13.7	9.5	27 July	3.2	3.0	2.4	4.2	229 (8)
28 K 10	88	3.6	4.4	6.86	15.4	5.8	21 July	4.0	4.6	4.6	4.8	345 (2)
52 K 01	102	9.8	2.0	5.97	14.7	11.8	28 July	3.2	4.8	3.6	3.8	255 (6)
28 K 07	270	39.8	3.7	8.53	13.5	8.1	21 July	4.2	2.6	4.6	2.8	386 (1)
61 K 01	86	5.3	2.5	4.36	8.6	11.6	21 July	2.6	2.2	3.4	2.2	
61 K 03	56	5.4	3.5	6.41	14.0	9.2	07 July	3.2	3.4	3.2	2.2	246 (7)
52 K 02	170	19.8	3.2	7.13	14.7	6.9	21 July	3.4	3.4	3.4	3.6	280 (5)
28 K 02	72	9.4	3.3	9.82	14.7	4.1	28 July	4.6	3.6	3.4	4.2	280 (5)
61 K 05	49	5.8	2.2	4.55	17.8	7.6	05 Aug	2.4	1.4	1.6	2.2	
61 K 02	95	7.5	1.8	3.99	17.1	8.5	21July	2.2	1.6	1.2	4.0	
28 K 06	147	17.8	2.5	7.53	20.5	18.9	28 July	4.8	3.6	4.6	3.6	330 (3)
28 K 05	185	17.7	2.8	6.71	15.8	8.7	21July	4.2	2.6	4.4	3.4	345 (2)
61 K 04	133	8.7	2.8	6.44	14.6	10.7	28 July	3.2	3.4	4.4	3.4	304 (4)
53 K 04	30	1.1	2.8	7.87	15.3	12.0	28 July	2.2	1.8	1.8	2.6	
28 K 08	40	2.4	2.7	5.55	9.5	8.7	07 July	3.4	3.6	4.0	2.6	220 (9)
2006												
28 K 07	2	0.3	4.7	5.06	7.8	13.7	13 July	4.2	2.6	4.6	2.8	
28 K 10	107	4.8	5.2	4.90	13.0	8.0	18 July	4.0	4.6	4.6	4.8	305 (3)
28 K 06	23	3.1	3.1	4.88	17.8	13.0	18 July	4.8	3.6	4.6	3.6	
61 K 04	89	6.4	4.2	4.21	18.2	12.0	27 July	4.6	3.4	4.4	3.4	315 (1)
28 K 02	18	2.6	3.9	5.78	19.2	9.3	18 July	4.4	3.6	3.4	4.2	310 (2)
52 K 01	17	1.8	3.4	4.61	19.5	8.0	01 Aug	4.0	4.8	3.6	3.8	
61 K 03	244	25.0	3.8	4.05	14.0	9.4	18 July	3.0	3.4	3.2	2.2	310 (2)
28 K 12	5	0.6	4.1	3.65	15.5	10.1	18 July	3.2	3.0	2.4	4.2	
28 K 08	224	15.3	3.1	3.54	9.2	12.9	03 July	3.6	3.6	4.0	2.6	
53 K 01	41	5.6	3.9	3.17	15.0	15.3	01 Aug	4.0	1.8	1.4	3.8	

be between 13.5 and 26.7% (Bostan, 2001; Bostan and Islam, 2003). TSS contents of the promising genotypes in our study were similar to those of the other studies in the Black Sea region.

Fruit taste, fruit appearance, astringency, and fruit uniformity were rated with a scale of 1-5. Scores of the evaluated genotypes in 2005 and 2006 were given in Table 2. Fruit number per cluster (FNC) of the genotypes varied from 4.1 to 18.9 in 2005 and from 8.0 to 15.3 in 2006 (Table 2). Average FNC of the 4 promising genotypes varied from 6.7 to 11.4 (Table 3). In studies carried out in Trabzon, FNC of the genotypes was found to be between 7.8 and 22.9 (Bostan, 2001; Islam, 2002 and Bostan and Islam, 2003). FNC of the genotypes in our experiment was slightly lower. This case might occur because of the fog and cold weather during the flowering period of cherry laurel in our experimental area.

Earliness of the tested genotypes varied from July 7 to August 5 in 2005 and from July 3 to August 1 in 2006 (Table 2). First harvest dates of the genotypes selected were from July 13 to 28 over an average of 2 sessions (Table 3). Bostan and Islam (2001) reported that first harvest dates of the cherry laurel genotypes was July 5, most genotypes were

Table 3
Yield and some fruit, flower and leaf characteristics of the promising genotypes (average for 2005 and 2006)

Characteristics	The promising genotypes			
	61 K 04	61 K 03	28 K 02	28 K 10
Yield				
per trunk diameter area, g	111.0	150.0	45.0	97.5
per tree, kg	7.6	15.2	6.0	4.2
fruit number per cluster	11.4	9.3	6.7	6.9
Fruit				
Weight, g	3.5	3.7	3.6	4.8
Width, mm	19.6	18.4	18.2	20.9
Length, mm	21.1	19.1	19.6	22.1
Shape	Conic	Conic	Round	Conic
Color	Red	Black	Red	Red-Black
Acidity, %	0.18	0.10	0.13	0.16
Seed weight, g	0.37	0.47	0.31	0.56
Flesh/seed rate	5.3	5.2	7.8	5.9
Total soluble solids, %	16.4	14.0	17.0	14.2
Cluster				
Weight, g	20.9	30.5	13.3	26.5
Length, cm	9.3	7.7	6.6	8.8
Flower				
Width, mm	12.2	13.7	13.2	15.8
Length, mm	8.0	12.4	10.3	12.8
Pedicel length, mm	2.6	3.1	2.1	3.2
Pistil number	1	1	1	1
Anther number	19.6	18.8	20.4	20.1
Leaf				
Width, cm	3.6	4.6	4.9	5.5
Length, cm	13.7	15.5	9.9	14.3
Shape	Lanceolate	Lengthily elliptic	Ovate	Elliptic
Thickness, mm	0.31	0.32	0.37	0.32
Stalk length, cm	1.13	1.27	0.89	1.25
Earliness	28 July	13 July	23 July	20 July
First flowering	07 April	19 March	20 March	05 April
Full flowering	15 April	12 April	10 April	14 April
The end of flowering	03 May	24 April	21 April	24 April
The first harvest	27 July	18 July	18 July	18 July
The last harvest	21 August	21 August	01 August	27 July

harvested in July and August in Trabzon. The values of the present study were similar to these dates. Islam and Odabas (1996) determined that the harvest dates of cherry laurel genotypes growing in Vakfikebir were between June 25 and September 15. The values of the present study were similar to these dates. In addition, fruit, cluster, flower, and leaf characteristics, flowering and harvest dates of the 4 promising genotypes were given in Table 3.

Conclusion

We also determined some characteristics of the cherry laurel in the experimental area of the Black Sea Agricultural Research Institute and selected the genotypes that had the best qualities for the examined characteristics. We will attempt to propagate these selected genotypes in future studies. The promising genotypes with new studies will be

followed and registered as new cultivar in the near future. In addition, the genotypes could be used as the raw material for breeding programs. Hence, the cherry laurel will continue to survive and produce better quality fruits in new environments.

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