

Selection of Native 'Cornelian' Cherries Grown in Turkey

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Summary

This study was conducted to select promising Cornelian cherry (*Cornus mas* L.) genotypes in an area situated in the Black Sea of Turkey. The population which consisted of native seedling trees were examined with respect to fruit characteristics for three years. Among genotypes, six genotypes were selected for industrial and fresh consuming. Based on mean values of three years, promising selections had 3.08 to 3.71 g fruit weight, 2.72 to 3.25 g fruit flesh weight, 3.71 to 4.77 mm flesh thickness, 6.10 to 7.58 flesh/seed rate, 2.87 to 3.12 pH, 14.15 to 16.29 % total soluble solids (TSS) and 2.00 to 2.65 % titrable acidity.

Introduction

Anatolia is among the center of origin of Cornelian cherry (*Cornus mas* L.), and has valuable native germplasm. Cornelian cherries are extensively grown in the coastal areas of Turkey (2,16). This fruit species that is a native plant of forest areas has not gained importance as much as other many fruit species. It is rich in vitamins and nutrients with attractive fruit color.

Known as a healing fruit species, Cornelian cherries are consumed as fresh and dried fruits as well as jam, dried pulp, marmalade and syrup, and processed into the juice (3,12,13). They are also used as an ornamental plant for landscape arrangements and a raw material in making cane. To support this usage there exists 1,135,000 Cornelian cherry trees that produce 12,900 ton of fruit (1).

Reports on Cornelian cherry fruit in Turkey are limited by studies of some areas and have released many promising genotypes. Eris et al. (5) described quality traits of 20 cultivars and genotypes, and reported as promising seven cultivars and three genotypes. Yalcinkaya ve Kaska (17) reported a considerable Cornelian cherry potential in Malatya and Elazığ provinces, and the pass areas of the southern and northern Anatolia.

Pirlak (10) conducted a selection study in Uzundere, Tortum and Oltu districts and identified nine genotypes for table production, two genotypes for industry and five

genotypes for table and industrial production. Kalkisim (7) reported three native genotypes suitable for jam and fruit juice industry from Vezirköprü, district of Samsun province. Türkoglu et al. (15) selected promising native Cornelian cherries, and described their traits for table and industrial production and landscape usage. In addition, many promising genotypes were also reported from some areas of the West Black Sea Region (18). From the Northern Ukraine, Klimenko (9) identified many promising native cornelian cherries that have large-fruited, small stones and good taste. Shaitan et al. (12) released some cultivars through breeding efforts in Ukraine.

Material and Method

The study was conducted in Görele district and its surroundings (Giresun, the East Black Sea) during 1998 and 2000. The analyses of collected fruits from selected genotypes were done in the Laboratory of Agricultural Faculty of Karadeniz Technical University. Pomological characteristics of selected Cornelian genotypes include fruit width (mm), fruit height (mm), fruit flesh thickness (mm), fruit weight (g) and stone weight (g). These characteristics were determined in randomly chosen 20 fruits from a 250 g fruit sample.

Colors of fruit skin and fruit juice visually. Titrable acidity (malic acid) was determined as percent by titration method.

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Total Soluble Solids (TSS %) were recorded with refractometer. The pH was determined pH meter. Fruit characteristics were evaluated based on the Weighted-Ranked Method (14). The total point of each genotype was recorded with multiplication of these values. The fruit weight of 20 fruits was based for point.

Results

In the year of trial (1998) 47 Cornelian cherry genotypes were examined with respect to fruit traits. Genotypes showed a range of 20.73 mm and 15.63 mm for fruit width, 15.84 mm and 12.91 mm for fruit height, 4.75 mm and 3.15 mm for fruit flesh thickness, 3.64 g and 2.15 g for fruit weight, 0.518 g and 0.312 g for stone weight and 7.94 and 4.21 for fruit flesh/stone rate.

Fruits of these genotypes contained 1.07-3.16% acidity, 11.04-18.30 TSS% and 2.92-3.60 pH. Except for a single genotype that has pink-colored fruit juice and orange-colored fruit skin, colors of fruit juice and fruit skin of all genotypes varied from light red to dark red. Based on both these points and other fruit characteristics such as yield, fruit size, fruit color, stone weight, genotypes to examine next year were chosen.

The results of 1999 included data of 17 genotypes (from 28 GR 02 to 28 GR 70) examined in 1998 and 9 new genotypes added in 1999, totally data of 26 genotypes.

All genotypes had fruit height between 21.23 mm 14.68 mm, fruit width between 15.37 mm 11.85 mm, fruit flesh thickness



Figure 1. Fruits of 28 GR 28 type.

between 5.46 mm 3.19 mm, fruit weight between 3.58 and 2.33 g, fruit flesh weight between 3.09 and 2.01 g, stone weight between 0.54 and 0.24 g and fruit flesh/stone rate between 8.35 and 4.41. On the other hand, they had 1.98-2.78% acidity, 2.76-3.42 pH and 12.73-18.50 TSS %. Fruit juice color and fruit skin color showed a change from light red to dark red.

The total points of all genotypes based on the Weighted-Ranked Method, were between 140 and 300. Those that have higher than 220 were chosen in order to assess the next year. 13 genotypes were selected from 26 genotypes.

The pomological data of the third year (2000) described 13 promising genotypes chosen in previous year. Genotypes had a range of 23.10 mm and 18.82 mm for fruit length, 15.83 mm 13.42 mm for fruit width and 5.05 mm and 3.10 mm for fruit flesh thickness, 3.93-2.59 g for fruit weight, 3.51-2.07g for fruit flesh weight, 0.573-0.354 g for stone weight and 8.30-3.97 for fruit flesh/stone rate.

Table 1. Some fresh fruit properties of promising native Cornelian cherries according to averages of 3 years.

Traits	Genotypes					
	28 GR 04	28 GR 28	28 GR 32	28 GR 34	28 GR 49	28 GR 70
Fruit weight (g)	3.71	3.49	3.39	3.54	3.08	3.36
Seed weight (g)	0.473	0.491	0.461	0.434	0.360	0.479
Flesh thickness (mm)	4.77	4.34	3.71	4.44	4.18	4.18
Fruit flesh weight (g)	3.25	3.00	2.93	3.11	2.72	2.88
Flesh/Stone Rate	6.94	6.11	6.35	7.23	7.58	6.10
TSS (%)	16.29	14.79	14.39	15.66	14.78	14.15
PH	3.12	3.08	2.95	3.09	2.87	2.97
Acidity (%)	2.00	2.12	2.54	2.61	2.65	2.50
Colour of juice	Red	Red	Red	Light red	Dark red	Light red
Colour of hull	Dark red	Dark red	Dark red	Dark red	Dark red	Red

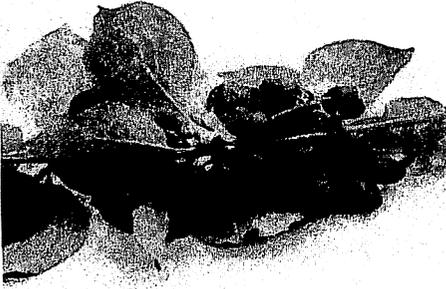


Figure 2. Fruits of Cornelian cherry.

With respect to technological traits, they had 1.47-3.69% acidity, 2.77-3.14 pH and 13.50-19.13% TSS. Their fruit juice colors and fruit skin colors ranged from light red to dark red.

Based on the Weighted-Ranked Method, six genotypes that have a total point of 280 and its higher were selected as promising. These were 28 GR 04, 28 GR 28, 28 GR 32, 28 GR 34, 28 GR 49 and 28 GR 70 (Table 1). Important fruit traits of these promising genotypes were presented in Table 1 and some Cornelian cherries were shown in Fig. 1, 2, 3, 4.

Discussion

At the end of this 3yr study, six promising genotypes were selected. Their fruit ripening times varied from 20 July to 5 August, and their fruit weight from 3.08 g to 3.71 g. The mean fruit weight was 3.43 g. Kalkisim (7), who examined native Cornelian cherries of Vezirköprü (Samsun)



Figure 3. Fruits of 28 GR 04 type.



Figure 4. Fruits of Cornelian cherry on tree.

district, reported that selected genotypes have mean fruit weight of 2.34 g. Eris and et al., (5) investigated native Cornelian cherries of grafted and seedling trees from Bursa district, and reported fruit ranging between 1.18 g and 6.54 g. Pirlak (10) carried out a selection study on native cornelian cherries in Uzundere, Tortum and Oltu districts (Erzurum), and determined fruit weight that varied from 2.19 g and 5.50 g. Pirc (11) reported that fruit weight varied between 3.8 to 10.2 g (Jolico), 5.5 to 7.2 g (Baum II) and 3.2 to 6.9 g (Baum III) in cultivar Cornelian cherries.

One of considerable fruit properties for Cornelian cherry breeding progress, fruit/stone index was between 6.10 and 7.58 for promising genotypes. This index was reported to be 2.05-7.42 in native Cornelian cherries of Bursa district (5), 6.43-9.75 for Uzundere, Tortum and Oltu district of Erzurum province (10) and 2.15-6.84 for Vezirköprü district (Samsun). Klimenko (9) reported this value between 4.68 and 8.09. On the other hand, researches conducted on different areas presented close values with regard to fruit/stone index.

As in many fruit species, the taste of Cornelian fruit is determined by sugar, acid and aromatic substances (6). Promising ones of this study had TSS% between 14.15 and 16.29. The TSS% was reported between 9.17 and 14.97 by Eris et al. (5), between 9.98 and 24.53 by Yalcinkaya and Kaska (17), between 11.80 and 23.05 by Pirlak (10) and between 11.4-17.5 by Kalk-

isim (7). Our findings regarding TSS% were similar to those of other studies.

The TSS content of six promising selections were between 2.00% and 2.65%. It was reported that this content is 2.29-2.44% for Cornelian cherries of İnegöl district (4) and 1.2-2.2% for Cornelian cherry fruits of Vezirköprü (7).

Görele district (Giresun) was reported to be rich in native Cornelian cherry genotypes (8). This study was conducted to more extensively examine all native Cornelian cherry germplasm of the district and revealed the germplasm potential of native Cornelian cherry by selecting six promising selections. Promising selections that require replicated trials for future cultivar breeding efforts were propagated by cutting.

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