

DETERMINATION OF AGRONOMIC CHARACTERISTICS OF SOME PLUM (*Prunus domestica* L.) GENOTYPES GROWING IN KAYSERİ REGION

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ABSTRACT. Türkiye is among the rare countries where most fruit species are naturally and economically grown. This study carried out in 2022 on the plum, among these fruits, aimed to determine the differences between the genotypes depending on the leaf and fruit characteristics of 6 different plum genotypes naturally grown in Kayseri. In the leaf parameters examined in the study, leaf length changed from 44.29 mm to 69.48 mm, leaf width between 25.21 mm and 35.07 mm, petiole thickness from 0.44 mm to 0.95 mm, and petiole length between 11.97 mm and 12.81 mm. On the other hand, genotype 4 produced higher values than the others in fruit length, fruit width, stone length, and stone width values. Wide variations were detected between genotypes in all parameters examined in the study, and it is thought that the results obtained may be guiding for new studies to be carried out, especially with these genotypes.

Keywords: Kayseri, plum, leaf, fruit

INTRODUCTION

Türkiye is among the rare countries in terms of fruit growing. More than 85 species can be grown economically and naturally throughout the country. Most of these fruit species consist of deciduous species [1]. In addition, with the latest developments, most subtropical and tropical fruit species can be grown in our country [2].

Plum is one of the economically grown fruits in Türkiye, which has many species and varieties [3]. Plums grown in Türkiye are *Prunus cerasifera* (Cherry plums), *P. domestica* (European plums), and *P. salicina* (Japanese plums) species [4]. Plum is among the fruits important for human health due to its rich B vitamins, potassium, magnesium, and minerals. In addition, it is used by consumers for various purposes (benefits of the heart, digestion, etc.) due to its antioxidant, phenolic, and flavonoids [5].

Plant gene resources contain an important potential in determining genetic diversity, and the diversity of hereditary information in the gene pool of the species it belongs to reveals the richness of that species [6]. For this reason, the country needs to research and develop every plant species we have. Very important contributions can be made from genetic materials by revealing and using plant species that have economic importance, especially plums [7].

This study aimed to determine agronomic characteristics depending on the leaf and fruit structures of 6 different plum genotypes naturally grown in Kayseri.

MATERIALS AND METHODS

This study was carried out on 6 different plum genotypes determined on the skirts of Ali Mountain in the Talas district of Kayseri province in 2022. Ali Mountain is a volcanic mountain formed because of the eruption of Erciyes Mountain. As an ecological feature, winters are cold and snowy, and summers are hot and dry. The soil structure is poor in organic matter and weak water-holding capacity [8].

The study included 20 leaves and fruits in the replication for each genotype. The study was conducted in 3 replications, with 60 leaves and fruits in each genotype. The values of the plum genotypes, such as leaf length, leaf width, petiole length and petiole thickness, fruit length, fruit width, seed length, and seed width, were determined with the help of a digital caliper. In addition, values such as Water-Soluble Dry Matter (WSDM), Acidity (%), and Ph in fruits were also investigated in the study [9, 10].

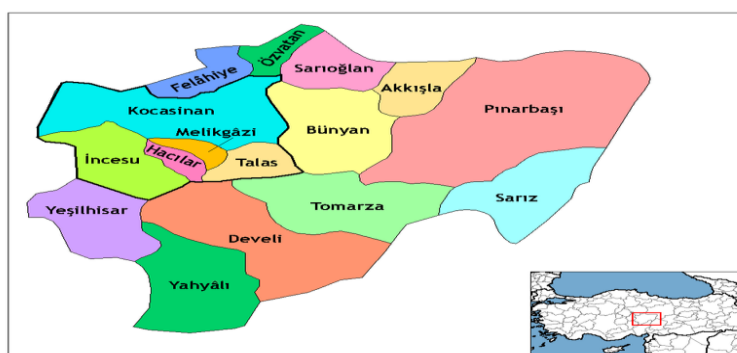


Fig 1. Map of Kayseri province (source: wikipedia.org)

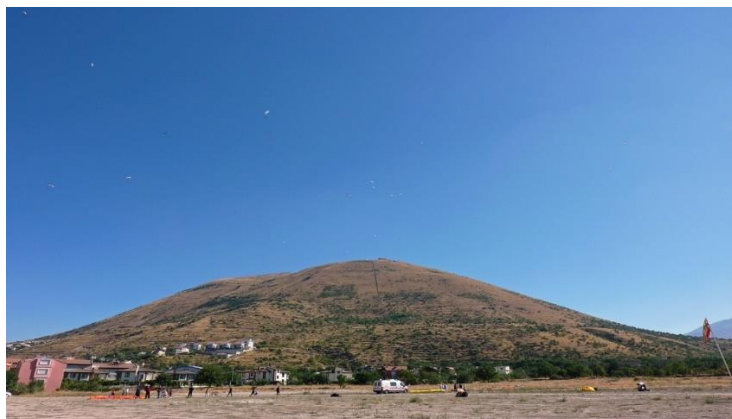


Fig 2. An image of Ali Mountain (source: wikipedia.org)

The study was carried out in 3 replications according to the randomized plot design. SPSS (Statistical Package for the Social Sciences) 15.0 package program was used to determine the difference between genotypes in the study, and the differences between the averages were analyzed according to the Duncan multiple comparison test. Study results were presented as mean and standard deviation, and all statistical analyses were performed at significance levels $p < 0.05$ and $p < 0.01$ [11].

RESULTS AND DISCUSSION

The leaf morphology values of the plum genotypes examined in the study are given in Table 1. There were statistically significant differences between genotypes in all parameters examined in terms of leaf characteristics. The petiole length of the genotypes ranged from 11.97±2.66 (Genotype 3) to 17.81±2.98 mm (Genotype 4); petiole thickness from 0.44±0.05 (Genotype 6) to 0.95±0.03 mm (Genotype 4); leaf length from 44.29±3.08 (Genotype 3) to 69.48±4.43 mm (Genotype 4); It was determined that the leaf width ranged from 25.21±1.88 (Genotype 3) to 35.07±2.03 mm (Genotype 4). Petiole length, petiole thickness, leaf length, leaf width mean values were determined respectively as 13.78±3.16 mm, 0.71±0.02 mm, 50.82±1.59 mm, 29.11±0.90 mm.

Some fruit and seed values of the plum genotypes evaluated in the study are presented in Table 2. In this context, fruit width is between 24.79±0.53 (Genotype 5) and 48.23±0.84 mm, (Genotype 4); fruit length varied between 23.32±0.39 (Genotype 5) and 55.86±0.72 mm (Genotype 4). Stone length from 11.80±0.72 mm (Genotype 1) to 29.71±0.43 mm (Genotype 4); stone width is between 8.65±0.82 (Genotype 1)-19.00±0.39 mm (Genotype 4). The mean values of fruit width, fruit length, stone length, and stone width were determined to be 33.01±0.97 mm, 32.06±1.42 mm, 16.67±0.78 mm, 12.30±0.44 mm, respectively.

Table 1. Some leaf morphology values of plum genotypes

Genotype Number	Petiole Length (mm)	Petiole Thickness (mm)	Leaf Length (mm)	Leaf Width (mm)
Genotype 1	14,04±2,12 ^b	0,67±0,04 ^b	48,87±2,19 ^b	28,25±1,41 ^{bc}
Genotype 2	13,80±2,46 ^b	0,74±0,05 ^b	49,53±2,38 ^b	33,47±2,34 ^{ab}
Genotype 3	11,97±2,66 ^b	0,74±0,06 ^b	44,29±3,08 ^b	25,21±1,88 ^c
Genotype 4	17,81±2,98 ^a	0,95±0,03 ^a	69,48±4,43 ^a	35,07±2,03 ^a
Genotype 5	12,03±3,02 ^b	0,70±10,07 ^b	46,93±1,75 ^b	25,31±1,84 ^c
Genotype 6	13,07±2,07 ^b	0,44±0,05 ^c	45,83±2,98 ^b	27,35±2,05 ^c
Mean	13,78±3,16	0,71±0,02	50,82±1,59	29,11±0,90

Table 2. Some fruit and stone values of plum genotypes

Genotype Number	Fruit Width (mm)	Fruit Length (mm)	Stone Length (mm)	Stone Width (mm)
Genotype 1	31,14±0,39 ^b	27,99±0,46 ^c	11,80±0,72 ^c	8,65±0,82 ^d
Genotype 2	30,58±1,15 ^b	27,21±1,02 ^c	15,07±0,19 ^b	12,04±0,14 ^b
Genotype 3	31,34±0,46 ^b	28,14±0,46 ^b	14,63±0,24 ^b	11,57±0,13 ^b
Genotype 4	48,23±0,84 ^a	55,86±0,72 ^a	29,71±0,43 ^a	19,00±0,39 ^a
Genotype 5	24,79±0,53 ^c	23,32±0,39 ^d	13,98±0,29 ^b	10,45±0,15 ^c
Genotype 6	31,97±0,38 ^b	29,83±0,25 ^b	14,83±0,31 ^b	12,07±0,13 ^b
Mean	33,01±0,97	32,06±1,42	16,67±0,78	12,30±0,44

The WSDM, Acidity and Ph values examined in the study are given in Table 3. Of these parameters, WSDM ranged from 16.30±0.15 (Genotype 4) to -20.66±0.17 (Genotype 1); acidity (%) from 0.19±0.01 (Genotype 3) to -0.36±0.01 (Genotype 5); The Ph varies from 3.12±0.32 (Genotype 4) to 3.69±0.08 (Genotype 6). The mean values of WSDM, acidity, and Ph were determined as 18.77±0.32, 0.25±0.15, and 3.39±0.05, respectively.

Table 3. WSDM, Acidity and Ph values of plum genotypes

Genotype Number	WSDM	Acidity (%)	Ph
Genotype1	20,66±0,17 ^a	0,28±0,01 ^b	3,35±0,46 ^{bc}
Genotype2	19,06±0,23 ^b	0,24±0,01 ^b	3,44±0,51 ^{ab}
Genotype3	19,00±0,11 ^b	0,19±0,01 ^c	3,44±0,95 ^{ab}
Genotype4	16,30±0,15 ^d	0,25±0,02 ^b	3,12±0,32 ^c
Genotype5	18,30±0,15 ^c	0,36±0,01 ^a	3,30±0,16 ^{bc}
Genotype6	19,33±0,17 ^b	0,19±0,02 ^c	3,69±0,08 ^a
Mean	18,77±0,32	0,25±0,15	3,39±0,05

In similar studies, [12] found the fruit width value of 32.82-47.41 mm in the data obtained in 2003, and 38.98-47.79 mm in the data obtained in 2004; The fruit length value was 32.55-47.45 mm in the data obtained in 2003, and 35.31-48.51 in the data obtained in 2004; The WSDM value was 15.63-22.13 in the data obtained in 2003, and 15.06-23.00 in the data obtained in 2004; In the data obtained in 2003, the acidity (%) value was 0.08-0.20; In the data obtained in 2004, it is 0.10-0.22; Researcher determined the Ph value between 2.62-3.30 in the data he obtained in 2003, and between 2.50-3.14 in the data he obtained in 2004. Kuba (2015) determined the core length between 11.31-21.76 mm, and Yaşar (2019) determined the core length between 15.33-23.80 mm and the core width between 13.10-16.83 mm [13, 14]. When the findings obtained by the researchers and the findings we obtained because of our study were evaluated together, similar results were obtained in terms of fruit width, fruit length, seed length, seed width, WSDM, and Ph values. In contrast, the acidity value was found to be higher in our study. The reason for the difference in the results of the current study can be explained by the difference in ecology and the genotypes used.

CONCLUSION

Consequently, this study determined agronomic characteristics depending on the difference in leaf and fruit characteristics in 6 different plum genotypes determined in Ali Mountain, located in the Talas district of Kayseri province. According to the study results, wide variations were detected between genotypes in leaf and fruit characteristics. Genotype 4 came to the fore in almost all the parameters examined. It is envisaged that the data obtained from the study can guide researchers at the point of protection and development of the species.

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