

## Determination of Some Pomological and Chemical Characteristics of Wild Plums Grown in Kayseri Ecology

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**Abstract** – Plum is an important fruit whose consumption has been increasing in recent years. The importance of plum is due to the organic acids, polyphenolic substances, and vitamins it contains. This study was carried out to determine some pomological and chemical properties of wild plums collected from Kayseri province between 2022-2023. Pomological characteristics of selected plum genotypes; Fruit width, fruit length, fruit weight, fruit height, fruit stalk length, seed weight, flesh firmness, and chemical properties; pH is the amount of soluble solid content (SSC), titratable acidity (TA). Considering the pomological characteristics of the wild plum genotype examined in the study, the highest fruit weight is 20.5 g, fruit length is 37.6 mm, fruit width is 22.3 mm, fruit height is 23.1 mm, fruit stalk length is 6.58 mm, seed weight is 0.99 g. and fruit flesh firmness 1.19 kg/cm<sup>2</sup> chemical properties were found as pH 3.76, TA 0.85%, SSC 8.75%

**Keywords** –Wild Plum, Pomological, Chemical, Biodiversity, Kayseri

### I. INTRODUCTION

Anatolia is the cradle of fruit growing culture in the world; It is an important gene center and natural spreading area of many fruit species, especially plum, apricot, cherry, hawthorn, apple, pear, hazelnut, almond, walnut, chestnut, fig, pomegranate, grape, and olive [1;2]. The richness and diversity of plant genetic resources in our country; is due to the fact that our country has very different and advantageous ecological conditions and the richness of Anatolia's past history [3]. When we examine the systematic place of the plum, which is in the class of stone fruits, it is a temperate climate fruit species belonging to the *Prunus* genus and *Prunophora* subgenus of the *Rosales* family, the *Rosaceae* family, the *Prunoideae* subfamily. Anatolia is one of the most important regions of the world in terms of plant diversity and many fruits continue to exist naturally [4]. Although most of the fruits have been cultivated, there are still some that grow wild in the

natural environment. Although it is known that about 2000 species grow naturally in the world [5], most of these fruits are processed and consumed with traditional methods [6]. One of the fruits that grow wild in many places is undoubtedly the plum. Plum fruit, which grows wild in our country, is consumed as table, drying, and jam, and can also be used as a natural food dye [7]. Plum fruit is consumed in the treatment of many diseases such as cancer, cardiovascular diseases [8], and so on [9]. It is known to be beneficial in blood circulation and digestive problems, in the prevention of some types of cancer, diabetes, and obesity, as well as containing low fat and significant carbohydrates, vitamins, and minerals. Plum fruit, which has a high potassium content and a low sodium content, also has a beneficial effect on the prevention of cardiovascular diseases. It is known to have a low-density cholesterol-lowering effect due to its pectin content [10]. To date, the composition of plum species [11; 12; 13; 14; 15] and its evaluation [16;

17; 18; 19; 20; 21] and most of the studies done in our country have been about aquaculture [22; 23; 24]. This study was carried out to determine some pomological and chemical properties of naturally grown wild plum genotypes collected from the ecology of the Pınarbaşı district of Kayseri province between 2022-2023.

## II. MATERIALS AND METHOD

### *Fruit Samples*

Fruit samples belonging to the wild plum genotype were collected from the Pınarbaşı district of Kayseri province. The samples were brought to the laboratory in an ice bowl and stored in a refrigerator at 40 °C. Pomological characteristics of selected plum genotypes; fruit width, fruit length, fruit weight, fruit height, fruit stalk length, seed weight, fruit flesh firmness, and chemical properties; pH, soluble solid content (SSC), and titratable acidity (TA) were analyzed.

### *Fruit Weight, Soluble solid content, pH, and Titratable Acidity*

Weighing for each genotype was carried out on 20 fruits and fruit samples were weighed on a digital balance sensitive to 0.05 g. The soluble solid content (SSC) of the fruits was determined with the help of a Mettler-Toledo 30 P digital refractometer at 22°C, and the acidity values were determined according to Cemeroglu (1992) using the titrimetric method. 10 ml of juice was made up to 100 ml with distilled water and titrated with 0.1 N sodium hydroxide (NaOH) until pH 7.0. The titration acidity obtained was calculated as % malic acid [25].

### *Statistical Analysis*

In the study, all analyzes were repeated 3 times and SPSS 16.0 statistical analysis package program was used to evaluate the data obtained after the experiment. Differences between groups were determined by Duncan Multiple Comparison Test at P<0.05 significance level (SPSS, 2007).

## III. DISCUSSION

Some of the pomological properties such as fruit width, fruit length, pH, soluble solid content and titratable acidity (TA) values of the samples belonging to the genotypes are given in Table 1 and Table 2. There were statistically significant differences in these parameters. Fruit shapes of plum genotypes were determined as long, cylindrical and round.

Table 1. Pomological Characteristics of wild plum genotypes

Genotypes	Fruit width (mm)	Fruit length (mm)	Fruit weight (g)	Fruit height (mm)	Fruit stalk length (mm)	Seed weight (g)	Fruit flesh firmness (kg/cm <sup>2</sup> )
1	22,3	37,6	20,5	23,10	6,58	0,99	1,19
2	18,92	27,13	13,50	12,59	4,92	17,13	0,50
3	19,72	23,18	16,30	20,23	5,72	23,18	0,30
4	19,58	27,30	13,29	19,75	3,58	17,30	0,29
5	18,56	27,76	13,48	20,72	3,56	17,76	1,08

Considering the pomological characteristics of the wild plum genotype examined in the study, the highest fruit weight is 20.5 g, fruit length is 37.6 mm, fruit width is 22.3 mm, fruit height is 23.1 mm, fruit stalk length is 6.58 mm, seed weight is 0.99 g. and fruit firmness were found in genotype 1 with 1.19 kg/cm<sup>2</sup>. Ertekin et al. (2006) determined the phenological and pomological characteristics of 'Stanley' and 'Frenze 90' cultivars in Antalya conditions. According to the results of their study, they determined that the fruit width and fruit length values of the 'Frenze 90' cultivar were 47.70 mm-58.33 mm [26]. Subaşı (2013), in his study in Isparta province, determined the fruit weights of plum varieties between 32.79 g (Burmosa) and 83.70 g (Angeleno), fruit firmness between 3.51 (Formosa) - 9.11 (Angeleno) and titratable acidity value of 1.941%, soluble solid content. also determined the amount of content as 17.33% [27].

Avan (2015), in the study he conducted on Japanese group plums (Red Beauty, TC Sun, Autumn Giant) in Kahramanmaraş province, determined that the fruit weight was between 40.61 g-71.45 g, and the flesh firmness was between 15.71-6.36. According to the results of the chemical analysis, he stated that the pH values were between 2.86-3.44 and the amount of soluble solid content was between 14.53-19.60% [28]. Kuba (2015), in his study, carried out in 2010 and 2011 to determine the naturally grown plum genotypes in the Van region and to determine the biological diversity in the region, the fruit weight of the genotypes examined as a result of the analysis was 3.96-25.59 g, the fruit diameter was 17.99-31.22 mm, the fruit length was 18.36- 35.86 mm, fruit height 18.37-33.32 mm, seed weight 0.38-1.45 g, fruit volume 4.00-32.00 cm<sup>3</sup>, titratable acidity in fruit juice 0.83-2.81%, pH 3.66-4.40, soluble solid content amount (SSC) 8.00% He determined that it was between -19.25 [29]. Doğan (2017), in his study conducted in the province of Tokat in 2016, observed the total amount of soluble solid content between 11.30% and 18.46% and the amount of titratable acidity in the range of 7.80 g/l-17.13 g/l. In addition, the average fruit weight was determined between 13.21 g-52.42 g [30]. Yaşar (2019), in his study, carried out to determine the phenological, pomological, and morphological characteristics of blackberry genotypes naturally grown in Iğdır ecological conditions between 2017-2018, fruit weight was 37.77-80.31 g, fruit width was 39.06-50.40 mm. , fruit length 36.04-65.08 mm, fruit height 25.70-53.19 mm, core weight 0.50-1.33 g, flesh firmness 2.8-6.44 kg cm<sup>-2</sup>, titer He stated that the acidity is between 0.71-1.74%, the SSC is between 11.2-17.7% and the pH is between 3.01-3.54 [31].

Table 2. Chemical characteristics of wild plum genotype

Genotype	pH %	TA %	SSC %
1	3,76	0,85	8,75
2	3,09	0,50	5,00
3	2,89	0,68	5,78
4	3,01	0,74	6,02
5	3,12	0,77	6,98

Looking at Table 2, the chemical properties of wild plum genotypes were found to be pH 3.76, TA 0.85%, SSC 8.75%. Abacı et al. In a study carried

out by in 2014, they determined the nutritive values of plums by determining the soluble solid content (SSC), pH, and titratable acidity. According to the results they obtained, the genotype with the highest SSC content and the lowest acidity (0.98%) was "Cancur" (13.9%), while the genotype with the lowest SSC content (11%) and the highest acidity (2.06%) was "Wild Plum". They determined that [5].

Yıldız (1996), found that the SSC content of some plum varieties grown in the Aegean Region varies between 9.39% and 24.45% [32], Contessa et al. (2013), on the other hand, reported that SSC contents in some plum genotypes were between 14.8% and 16.7% [33]. Abacı et al. (2014) determined the acidity as the highest (2.06%) and pH (4.00) ratio [5]. It has been reported that the titratable acidity ratios of some plum fruits vary between 0.92% and 2.34%, and the pH varies between 3.20 and 4.00 [32]. Dönmez and Çopur (1997) determined the SSC values of the plums grown around İnegöl as 11.2%, the total acid amount as 0.56%, and the pH value as 3.65 [34]. Çevik and Bilişli (2002) determined that some of the plum cultivars grown in Turkey had a range of SSC content of 12.5%-17.6%, acidity between 0.91-1.70%, and pH between 3.20-4.00 [35]. In the study in which 15 local plum cultivars grown in Van and its environs were examined, it was determined that the SSC content of the cultivars was 13.37-19.56%, the titration acidity was between 0.45-2.81% and the pH value was between 3.00-3.78 [36]. Yıldız (1996), who examined 11 plum cultivars adapted to the Aegean Region in terms of chemical composition and nutritional value at the Aegean Agricultural Research Institute, determined that as the average of all varieties, soluble solid content 15.55 mg, titratable acidity 15.79mg/100 g [32]. Ozkarakas et al. (2006), according to the results of their studies on 21 plum types of 'Papaz', 'Havran', Can plum cultivars grown in the Menemen region, the amount of soluble solid content (SSC) varied between 7.40% and 11.61%, and the highest in Can plums. reported low 'priest' plums [37]. Civil (2009), in his study in the Eğirdir region, determined the pH value as 3.71, the amount of titratable acidity as 0.89% and the amount of soluble solid content as 17.17% for the Angeleno variety [38]. Nunes et al. (2009), in their study on the fruit of the 'Greengage' plum variety in the

northeast of Portugal, stated that the amount of soluble solid content, titratable acidity, and pH values were highest in the Cano region [39].

#### IV. CONCLUSION

In light of the findings obtained from this study, it is seen that there are quite different results in terms of fruit and quality characteristics of the plum genotypes grown naturally in the Kayseri region. Considering that these genotypes show this performance in conditions where modern fruit-growing techniques and cultural processes are not done or done less, it is thought that better results can be obtained under cultural and maintenance conditions [31]. According to the results obtained in the study carried out, it is considered important to protect these genotypes as genetic resources by grafting on suitable rootstocks, and to follow the yield and fruit quality characteristics without interruption by performing adaptation studies under the same environmental conditions as standard plum varieties.

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