

Short Communication

Determination on quality characteristics of some important Japanese plum (*Prunus Salicina* Lindl.) cultivars grown in Mersin-Turkey

Levent Son

Department of Horticulture, High School of Mut, University of Mersin33600, Mut-Mersin, Turkey.
E-mail: levent@mersin.edu.tr.

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This experiment was conducted in Mut-Mersin from 2008 to 2009 to determine the phenological and pomological characteristics of 'Angeleno', 'Autumn Giant', 'Bella Di Barbiano', 'Black Amber', 'Black Beauty', 'Black Diamond', 'Fortune', 'Globe Sun', 'Obilnaja', 'October Sun', 'Original Sun', 'President', 'Queen Rosa' and 'T.C Sun' Japanese plum (*Prunus salicina* Lindl) cultivars. In the experimental years, flowering periods, harvesting date, fruit dimensions, fruit weight, seed weight, flesh/seed ratio, total soluble solid contents (TSS%) and acidity were determined. Fruit weight (g) ranged from 46.71 g (Obilnaja) to 91.26 g (Black Diamond). Among the cultivars tested, 'Black Diamond', 'Queen Rosa' and 'October Sun' had the biggest fruits. Date of full bloom ranged from 13 March for 'Black Diamond' to 4 April for 'T. Sun'. From the results of this research the following conclusions were determined: 1) Fruit maturation were earlier on 'Black Beauty' and 'Obilnaja' cultivars than the other cultivars. 2) In terms of fruit weights 'Black Diamond', 'Queen Rosa', 'October Sun' and 'Autumn Giant' were bigger than the other cultivars.

Key words: Japanese plum, fruit quality, fruit weight

INTRODUCTION

Prunus cerasifera, *P. domestica*, *P. institia* and *P. salicina* Lindl are widely grown plum species in the world. European plums (*P. domestica*) and Japanese plums (*P. salicina*) are more important in terms of commercial production (Ozbek, 1978). Japanese plums are very successful in the Mediterranean region of Turkey. 'Santa Rosa' and 'Formosa' cultivars are grown for many decades (Ozguven and Kuden, 1993). Plums are temperate zone fruits but they are widely grown throughout the world from the cold climate of Siberia to the subtropical conditions of the Mediterranean region. The total plum production of Turkey is 240874 MT. Turkey has 9197316 plum trees in 2007 TUIK (2008). Askin and Koyuncu (1992) carried out a selection study in the province of Van in Eastern Turkey, collected different types of local varieties and determined some characteristics of them. 'Firenze 90' plum cultivar was found superior than 'Stanley' from the point of view of phenological and pomological characteristics in Antalya (Ertekin et al., 2006). Until the year 2000, 'Santa Rosa' and 'Formosa' were the plum cultivars most popular in the Mediterranean region of Turkey. But nowadays, many

growers prefer new Japanese plum cultivars such as 'Black Beauty', 'Black Amber' and 'Black Diamond'. These new Japanese plums have more persistent spurs, and more numerous flowers than 'Santa Rosa' and 'Formosa'. Japanese plums are the most common fresh eating plums in Turkey. They are larger and firmer and primarily grown for fresh market. That is why most of the growers prefer new Japanese plums. The development of new, more desirable cultivars has promoted growers in Mut-Mersin to seek information on adaptation of such cultivars. Mut, a small town in the Mersin province of western Turkey, it is the most important apricot growing center in the Mediterranean region of Turkey. The present studies were carried out with the aim to determine the high-quality Japanese cultivars for the Mut-Mersin area.

MATERIALS AND METHODS

The experiment was carried out between 2008 and 2009 in Mut-Mersin, on 3 year-old 'Angeleno', 'Autumn Giant', 'Bella Di Barbiano', 'Black Amber', 'Black Beauty', 'Black Diamond',

Table 1. Average date of full bloom (DOFB) and date of maturity of Japanese plum cultivars in Mersin, Turkey (2008-2009)^z.

Cultivar	DOFB	Date of fruit maturity
Black Diamond	13 March	14 July
Black Beauty	15 March	15 June
Obilnaja	17 March	16 June
Black Amber	18 March	16 July
Globe Sun	18 March	21 August
Bella Di Barbiano	19 March	27 July
Fortune	21 March	15 July
Queen Rosa	21 March	15 July
Angeleno	22 March	5 September
Original Sun	26 March	23 August
Autumn Giant	27 March	30 August
President	3 April	23 August
October Sun	4 April	20 August
T.C Sun	4 April	3 September

^zn = 6 trees for each cultivar

'Fortune', 'Globe Sun', 'Obilnaja', 'October Sun', 'Original Sun', 'President', 'Queen Rosa' and 'T.C Sun' Japanese plum trees budded on Myrobalan rootstock. Soil texture is sandy loam, medium in organic matter, with neutral pH, no soluble salt problem and sufficient total nitrogen and exchangeable phosphorus (Abkae 2004). Trees were trained to a vase shape and spaced 5 m apart (400 trees ha⁻¹). In the trial there were 6 trees from each Japanese plum cultivar. A total of 84 trees were used in the experiment. For each Japanese plum cultivar the date of full bloom was recorded at the time as 90% of the flowers were open, and the date of harvest maturity was determined by visual observations and color changes (from green to red and black). Fruit sizes were measured by using digital calipers. Fruits and seeds were weighed for each cultivar. Flesh/seed ratios was calculated from flesh weight/seed weight for each cultivar. Total soluble solids (TSS) of the fruit juice were determined by hand refractometer. Titratable acidity (malic acid) was calculated by titrating fruit juice with 0.1 N NaOH.

A randomized experiment was designed with 6 trees from each cultivar, and 2 trees were treated as a replicate. Ninety randomly selected fruits with 3 replications were sampled from each Japanese plum cultivar for fruit quality testing when the fruit changed from green to black. Data were analysed with Tukey's test using COSTAT software Duzgunes (1963).

RESULTS AND DISCUSSION

The mean DOFB was earlier for 'Black Diamond', 'Black Beauty' and 'Obilnaja' than the other cultivars (Table 1). The latest flowering cultivars were 'President', 'October Sun' and 'T.C Sun'. These results corresponds with that obtained by Caliskan et al. (2006), who reported similar results for 15 plum cultivars at Erdemli, Turkey. Also our results are supported by Balik (2004), who indicated that 'Black Beauty' was an early blooming cultivar. Time of maturity of the plum cultivars ranged from the middle of June to the first week of September (Table 1). 'Black Beauty' and 'Obilnaja' ripened earliest, on 15-16 June, both a month before any of the other cultivars. These

findings are in accord with those of other studies done in different ecological regions of Turkey (Balik, 2004; Caliskan, 2006). 'Autumn Giant', 'T.C Sun' and 'Angeleno' were the latest ripening cultivars and matured in the first week of September (Table 1). Ozakman et al. (1995) studied with 34 Japanese plum cultivars in Izmir, and reported that ripening dates ranged from 7 June to 13 September. In this study, time of maturity ranged from the middle of June to the first week of September. These different findings are most likely attributed to the characteristics of different species of fruit. Also the differences in data may be the result of different ecological conditions.

In the present study, for fruit weight, 'Black Diamond', 'Queen Rosa' and 'October Sun' were superior than the others. These data agree with the results of Caliskan et al., (2006). Fruit weight ranged from 46.71 g (Obilnaja) to 91.26 g (Black Diamond). The smallest fruits were obtained from 'Obilnaja', 'Original Sun' and 'T.C Sun' (Table 2). These findings are in accordance with the results of adaptation studies carried out in different areas (Balik, 2004; Caliskan et al., 2006). In a previous study, Karamursel et al. (2007) reported that fruit weight of 'President' cultivar was 57.04 g. In the present study, the fruit weight of 'President' was determined as 63.79 g. Different soil and climatic conditions and management practices could be the reason for differences. Flesh/seed ratio was the greatest in 'Black Amber' cultivar. It was followed by 'Autumn Giant' and 'Black Diamond'. The lowest ratio was obtained from 'President' (Table 2), confirming previous work (Balik, 2004; Caliskan et al., 2006). In conclusion, on the basis of fruit quality 'Black Diamond', 'Queen Rosa', 'October Sun' and 'Autumn Giant'; for the earliness 'Black Beauty' and 'Obilnaja' were found to be the most suitable cultivars for the Mediterranean Region of Turkey.

Table 2. Fruit quality characteristics of Japanese plum (*P. salicina* L.) cultivars (average of years 2008-2009)² (TSS, total soluble solids).

Cultivar	Fruit width (mm)	Fruit height (mm)	Fruit weight (g)	Seed/flesh ratio	Firmness	TSS (%)
Angeleno	49.86 b	44.13 fg	67.09 c	35.93 g	9 b	14.93 c
Autumn Giant	50.59 b	52.63 b	89.34 a	52.92 b	7.55 cd	13.2 ef
Bella Di Barbiano	42.09 cd	40.15 h	65.23 cd	42.49 e	10.56 a	16.26 b
Black Amber	50.48 b	45.46 ef	65.14 cd	55.48 a	8 c	12.53 g
Black Beauty	52.16 b	48.51 d	83.35 b	40.06 f	7.02 de	11.93 h
Black Diamond	56.09 a	50.89 c	91.26 a	52.58 b	5.56 f	13.46 de
Fortune	50.68 b	52.47 b	82.58 b	42.46 e	7.54 cd	13.66 d
Globe Sun	49.78 b	52.24 bc	81.99 b	48.39 c	6.56 e	16.06 b
Obilnaja	40.72 d	40.07 h	46.71 g	30.78 h	6.51 e	12.13 h
October Sun	49.91 b	55.94 a	91.18 a	44.21 d	4.53 g	14.93 c
Original Sun	43.56 cd	43.8 g	53.41 f	31.17 h	8.69 b	16.13 b
President	44.49 c	51.18 bc	63.79 d	24.14 i	7.36 d	17.73 a
Queen Rosa	56.52 b	51.81 bc	91.24 a	38.78 f	5.65 f	11.53 i
T.C Sun	43.27 cd	46.67 e	58.35 e	36.96 g	7.26 d	13.13 f
Mean	2.97	1.56	2.38	1.6	0.59	0.33

²Means within a column not followed by a common letter are significantly different by Tukey-Kramer HSD, $P \leq 0.05$

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