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Performance of some exotic pear cultivars under temperate conditions of Kashmir

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ABSTRACT

Seven exotic varieties and two commercially grown cultivars of pear grafted on quince were evaluated for various physio-chemical characteristics for two years in the orchard of Department of Horticulture, Srinagar, Jammu and Kashmir. Among various physical characters, Red Anjou recorded maximum fruit length (6.88cm), fruit diameter (5.77cm), fruit weight (111.36g) and fruit volume (118.48cm^2), followed by Coscia for all these characters. No significant variation was recorded for L/D ratio among the pear cultivars. Maximum fruit firmness (20.77 lb/inch^2) was scored by Cosco-D. Coscia registered maximum TSS (14.04%) along with minimum acidity (0.30%) and highest TSS/acid ratio (46.80). Highest reducing sugar (7.92%) and total sugar (9.26%) was scored by Coscia, followed by William Bartlett as 6.77% of reducing sugar and 7.96% of total sugar. From the present study it is clear, that Red Anjou and Coscia performed well under Kashmir conditions and is suitable for commercial purpose.

Key words: Performance, exotic, pear, temperate, cultivars

INTRODUCTION

Pear is next only to apple amongst temperate fruits in acreage, production and varietal diversity. Due to its hardy nature, tolerance to wide range of soils, it needs less care and can grow under different agro-climatic conditions (Misger *et al*, 2009). It is successfully grown in both temperate and sub-tropical regions of J & K, Himachal Pradesh and Uttaranchal and sub-tropical regions of Punjab, Assam and South India as it can tolerate as low as – 26^{o}C during dormant period and as high as 45^{o}C during growing season (Anonymous, 2011). In Kashmir valley, the area under pear is 6644 ha with annual production of 31423 MT (Anon., 2012). Majority of cultivars grown in the valley are having characteristics like crispiness and hardiness in fruit texture, not acceptable to the consumers (Farooqui and Happa, 1990) besides being low yielding and susceptible to many pests and disease. Since the superior quality of pear cultivars are confined to the high hills of Kashmir valley, due to the availability of its high chilling requirements ranging from 500-1500 hours. Therefore an effort has been made to assess the performance of new high yielding exotic pear cultivars under Kashmir valley conditions.

MATERIAL AND METHODS

Eight-year-old seven exotic cultivars viz., Coscia, Red Anjou, Kaiser, Max Red Bartlett, Cosco-D, Passe Crassane and Decana along with the two commercially grown local varieties William Bartlett and Chinese Sandy Pear as control were used for the present investigation. The investigations were conducted in the orchard of Department of Horticulture, Rajbagh, Srinagar, J & K during 2005 and 2006. Nine trees of each cultivar having uniform size and vigour were selected randomly and all the trees were kept under similar cultural practices to ensure uniform growth. The experiment was laid out in the randomized block design with three replications for each treatment. Observations on different physical characters of fruit viz. fruit length, fruit diameter, L/D ratio, fruit weight, fruit volume, fruit firmness were recorded. Acidity was measured in terms of malic acid and TSS by using hand refractometer. Sugars were determined by standard methods (AOAC, 1990). Data collected on various parameters were statistically analyzed as per the procedure given by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

The perusal of pooled data of two years in Table 1 reveals significant variation with respect to all the fruit characters except L/D ratio. Maximum fruit length (6.88 cm) was recorded in Red Anjou, which was statistically higher among all the cultivars. While cv. Cosco-D registered the minimum fruit length (4.87cm). Red Anjou attained the maximum fruit diameter (5.77cm) which was statistically at par with Coscia, Kaiser, Max Red Bartlett, Decana and William Bartlett however; the minimum fruit diameter (4.31cm) was recorded for Chinese Sandy Pear. No significant variation was recorded for L/D ratio among the pear cultivars. All the pear cultivars exhibited oblong shape however; Red Anjou exhibited more conical form as compared to Passe Crassane and Cosco-D. Maximum fruit weight (111.36g) and fruit volume (118.48cm^3) was recorded in Red Anjou, followed by Coscia (107.40g and 115.63cm^3). Red Anjou was statistically superior to Coscia and other cultivars under study for fruit weight however; it was statistically at par with Coscia for fruit volume. The lowest fruit weight (64.15g) and fruit volume (78.70cm^3) was recorded in Cosco-D. The differences in these characters are largely due to varietal differences, environmental factors and the vigour of the trees. Earlier Lal and Singh (1979), Rathore (1982) and Shah (1997) also observed variations while evaluating pear cultivars. Cosco-D scored maximum fruit firmness (20.77 lb/inch^2) which was statistically at par with Passe Crassane (20.33 lb/inch^2). Minimum fruit firmness (10.29 lb/inch^2) was registered in Coscia. The firmness in pears varies with cultivars, climate and utilization of fruits (Westwood, 1978).

The total soluble solids (14.04%) recorded in Coscia was found maximum and statistically significant in comparison to all other cultivars, however, lowest was recorded in Chinese Sandy Pear (11.02%) (Table 2). Minimum acidity (0.30%) was recorded in Coscia, Max Red Bartlett and Cosco-D while the maximum acidity was exhibited by Red Anjou (0.42%). However, the differences among pear cultivars were non-significant for acidity. Rathore (1982), Farooqui and Happa (1990) and Sandhu *et al* (2002) also observed similar results with respect to total soluble solids and acidity. They also concluded that both low and high quality pear cultivars vary in acidity. Coscia exhibited highest TSS/acid ratio (48.80) which was statistically superior among all the cultivars whereas lowest TSS/acid ratio (28.26) was found in Red Anjou (Table 2). Maximum reducing sugar (7.92%) along with maximum non-reducing sugar (1.34%) and total sugar (9.26%) were registered in Coscia which was statistically higher among all the cultivars for reducing sugar and total sugar, however, for non-reducing sugar Coscia was statistically at par with Decana (1.29%). Minimum reducing sugar was recorded in Decana (5.71%) however, minimum non-reducing sugar (0.87%) and total sugar (6.92%) was scored by Cosco-D (Table 2). These variations in sugars may be due to the fact that the best dessert cultivars tend to have high total sugar content and the same is available in the form of fructose, glucose and sucrose (Griggs and Iwakiri, 1977).

During the course of studies, the fruits of Coscia pear cultivar were observed to be better in quality while

Table 1. Physical characteristics of fruits of exotic and indigenous pear cultivars

Cultivar	Fruit length (cm)	Fruit diameter (cm)	L/D ratio	Fruit weight (g)	Fruit volume (cm^3)	Fruit firmness (lb/inch^2)
Coscia	6.12	5.41	1.13	107.40	115.63	10.29
Red Anjou	6.88	5.77	1.19	111.36	118.48	11.21
Kaiser	6.02	5.34	1.14	102.38	108.55	11.57
Max Red Bartlett	5.82	5.11	1.13	84.63	95.18	14.10
Cosco-D	4.87	4.51	1.08	64.15	78.70	20.77
Passe Crassane	5.11	4.77	1.07	70.96	86.47	20.33
Decana	5.88	5.10	1.15	93.23	102.65	15.56
William Bartlett	5.60	5.04	1.11	84.79	93.23	11.27
Chinese Sandy Pear	4.98	4.31	1.15	71.14	84.16	16.02
CD (0.05)	0.65	0.98	NS	3.77	4.18	1.75

Table 2. Chemical characteristics of fruits of exotic and indigenous pear cultivars

Cultivar	TSS (%)	Acidity (%)	TSS/ acid ratio	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)
Coscia	14.04	0.30	46.80	7.92	1.34	9.26
Red Anjou	11.87	0.42	28.26	6.22	1.12	7.34
Kaiser	11.47	0.32	35.84	5.93	1.18	7.11
Max Red Bartlett	12.23	0.30	40.77	6.02	1.03	7.05
Cosco-D	12.17	0.30	41.40	6.05	0.87	6.92
Passe Crassane	11.35	0.31	36.61	6.02	0.96	6.98
Decana	11.83	0.31	38.16	5.71	1.29	7.00
William Bartlett	12.42	0.32	38.03	6.77	1.19	7.96
Chinese Sandy Pear	11.02	0.31	35.55	5.93	1.06	6.99
CD (0.05)	1.02	NS	0.25	0.30	0.13	0.20

Red Anjou cultivar were rated better in physical characters of fruits. It is concluded that Coscia performed best among all the exotic pear cultivars followed by William Bartlett and Red Anjou, under agro-climatic conditions of Kashmir valley while other cultivars did not show any promise.

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