



Quality attributes of promising apricot (*Prunus armeniaca*) introductions for north-western Himalayan region*

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The apricot (*Prunus armeniaca* L.), popularly known as *khubhani*, belongs to family Rosaceae. It is grown mainly in Kashmir valley, Ladakh, Kargil and few pockets of Jammu Division. Apricot in Leh and Kargil are mainly used for drying and sold at premium price ranging from 200 to 400/kg and kernel is an important source of cooking oil, leaves used as fodder for sheep and goats. The desirable characters of apricots are large size (> 60 g/fruit), attractive appearance (a bright blush over bright orange or cream), free stone, firm flesh, good quality with resistance to skin cracking and preharvest drop and uniform ripening, small pit, high sugar content (Layne *et al.* 1995). Jammu and Kashmir endowed with unique climate which results in availability of apricot from May – September from different apricot growing zones. The apricot is considered to be drought resistant species since its trees thrive well in areas with low atmospheric humidity. Austria and Slovenia records highest productivity 53.39 and 21.35 t/ha respectively in the world (FAO 2006). However, India registered 3.01 tonnes/ha which are very low as compared to world average (6.28 tonnes/ha). The foremost reason of low productivity are traditional planting density, no canopy management, pruning and training, seedling and traditional varieties of poor yield and quality. Though lot of varieties are in cultivation in Kashmir valley, but an ideal and attractive, appealing and high-yielding bigger sized cultivars which fetch fair price and have wide spectrum of availability.

The present experiment was carried out at Division of Pomology, SKUAST-K, Shalimar, Srinagar. Bud wood of cultivars namely Castle Bright, Orgrand, Harcot, New Castle and Bebeco were obtained from Advanced Centre for Horticulture Development, Govindpura Farm, Ramban,

Jammu, were budded on seedling rootstocks of apricot and finally five budded plants of each cultivars were planted at 4m × 4 m in square system in the field. Trees were trained in Open Centre leader system. The plants were pruned regularly in the dormancy phase. Fertilization, irrigation, weeding, hoeing and other cultural and plant protection measures employed uniformly, vegetative growth and fruit quality parameters were recorded for the two consecutive years, i.e. 2007 and 2008. Trunk girth, branch girth and shoot diameter were recorded with the help of digital vernier caliper, tree height, tree spread and annual shoot extension growth were measured with the help of measuring tape. Fruit yield/tree was recorded on entire fruit harvest basis, however fruit length and breadth were measured with digital vernier caliper. Total soluble solids was recorded with the help of hand refractometer. Total sugars and reducing sugars content of fruit were estimated following the standard method described by A O A C (1990). Titrable acidity was determined by titrating against 0.1 N. NaOH, ascorbic acid content of fruit was determined by using 2,6 dichlorophenol indophenol dye method (Rangana 1977). The experiment was laid out in the randomized block design with three replications and one plant per unit. Pooled data were analyzed statistically and used for the interpretation of the results.

It is obvious from the Table 1 that significant variation was recorded among the cultivars. Orgrand registered maximum tree height (2.02 m), followed by New Castle (1.98 m) whereas, least height (1.77 m) was observed in Bebeco. Trunk girth was registered maximum (66.17 mm) in Castle Bright closely followed by Orgrand (66.13 mm) and least was observed in Harcot (41.95 mm) which was statistically at par with Bebeco. Annual shoot extension was recorded highest (199.33 cm) in New Castle, whereas significantly lowest extension growth (83.00 cm) was recorded in Bebeco, similar trend in shoot diameter was also observed. Significantly maximum shoot diameter (12.36 mm) was noted in Harcot which was statistically at par with

*Short note

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Table 1 Quality attributes of promising apricot introductions (mean data for two years)

Parameter	Castle Bright	Orgrand	Harcot	New Castle	Bebeco	Mean	SE (mean diff.)	LSD (5%)
Trunk girth (mm)	69.17	66.33	41.95	66.08	42.69	57.24	1.94	4.32
Branch diameter (mm)	40.96	35.09	27.51	34.42	27.61	33.12	2.70	6.01
Annual shoot length (mm)	136.67	144.67	101.30	199.33	83.00	133.0	12.27	27.35
Shoot diameter (mm)	9.53	11.31	12.36	12.00	9.46	10.93	1.05	2.34
Tree spread (m)	2.07	2.21	1.79	2.43	2.60	2.22	0.09	1.08
Yield (kg/tree)	2.65	1.98	4.86	5.10	0.55	2.63	0.47	4.72
Fruit weight (g)	32.33	44.91	36.60	19.43	28.23	33.50	2.02	4.70
Fruit number/tree	87.67	60.00	130.67	165.33	19.33	64.20	13.64	31.46
Fruit length (mm)	36.85	45.00	41.31	31.06	36.58	38.36	2.23	5.16
Fruit breadth along check (mm)	41.06	44.50	40.14	30.26	28.00	36.70	0.84	1.94
Fruit breadth along suture (mm)	36.73	36.00	36.41	29.00	34.13	34.45	1.41	3.30
TSS Brix	12.90	12.83	15.60	14.43	14.80	14.11	0.67	1.55
Acidity (%)	2.01	0.85	1.95	2.13	0.96	1.58	0.06	0.44
Ascorbic acid (mg/100g)	7.33	12.23	5.30	6.53	12.57	8.79	0.33	0.78
Reducing sugar (%)	0.98	1.89	0.95	1.78	0.88	1.49	0.10	0.23
Total sugar (%)	4.40	4.63	5.26	4.80	2.12	4.24	0.27	0.63
Non reducing sugars (%)	4.19	2.92	3.23	3.00	2.01	3.06	0.18	0.43
Stone weight (g)	1.80	2.34	4.40	2.83	4.60	3.19	0.19	0.44
Stone length (mm)	21.56	20.59	24.21	27.88	27.54	24.33	0.97	2.22
Stone breadth (mm)	18.22	19.85	23.80	20.49	20.53	20.52	0.44	1.03
Stone thickness (mm)	9.92	10.01	5.60	14.13	10.58	10.05	0.29	0.70
Kernel weight (g)	0.84	1.55	1.50	0.82	0.85	1.11	0.15	0.34
Kernel breadth (mm)	9.16	8.85	12.89	9.81	11.46	10.50	0.31	0.72
Kernel length (mm)	12.17	17.30	17.79	12.66	18.24	15.63	0.53	1.08
Kernel thickness (mm)	5.60	7.60	4.85	4.79	4.40	5.44	0.21	0.49
Fruit colour	Yellow	Yellow	Yellow	Yellow	Yellow			
Kernel taste	Bitter	Sweet	Sweet	Bitter	Bitter			
Stone type	Free	Free	Free	Free	Free			
Fruit appearance	Attractive yellow colour with red blush	Attractive, yellow colour beaked	Major portions red blushed and beaked	Bright yellowish colour	Green with yellow blush			

Orgrand and New Castle, whereas least diameter (9.46 mm) was registered in Bebeco and the values were statistically at par with Castle Bright and Orgrand. Cultivar Bebeco exhibited more vigor (2.60 m) however, least tree spread (1.79 m) was noted in Harcot. Significant variation in fruit yield, fruit weight and fruit number/tree were recorded among the evaluated cultivars. Yield and fruit number/tree was recorded highest in New Castle 5.1 kg and 165.33 fruit/tree respectively, whereas, fruit weight was highest (44.91 g) in Orgrand. Negative correlation noted between fruit number and fruit weight, increasing fruit number influenced negatively on fruit weight, i.e. size. The number of fruit was highest in New Castle but the weight was lowest (19.43 g). Cultivar Bebeco had least yield and fruit number/tree (0.55 kg and 19.33, respectively). Cultivar Orgrand had maximum fruit length (45 mm) and fruit breadth (44.50 mm), whereas least fruit length (31.06 mm) was noted in New Castle and breadth

(28.00 mm) in Bebeco. Highest total soluble solids (15.60 Brix TSS) were recorded in Harcot followed by Bebeco (14.80 Brix), 'Orgrand' had 12.83 Brix TSS, which was lowest among the evaluated cultivars. Acidity was found highest (2.13%) in New Castle whereas lowest acidity (0.85%) was noted in Orgrand which was statically at par with Harcot and Bebeco (0.95% and 0.96%, respectively). Ascorbic acid was registered highest in Bebeco (12.57 mg/100 g) which was statistically at par with Orgrand (12.23 mg/100 g). Reducing sugar was statistically at par in Orgrand, Harcot and New Castle. Total and non reducing sugars were found to be highest (5.26% and 4.19%) in Harcot and Castle Bright respectively. Stone weight was found maximum (4.60 g) in Bebeco, whereas least (1.80 g) in Castle Bright. Stone length and stone thickness was found highest in New Castle followed by Bebeco, whereas minimum stone length (20.59 mm) was noted in Orgrand and stone breadth (18.22 mm) in

Castle Bright but stone thickness was minimum (5.6 mm) in Harcot. Kernel weight (1.55 g) was found to be maximum in Orgrand, which was statistically at par with Harcot, whereas very thin kernel (0.82 g) was recorded in New Castle which statistically do not differ with Bebeco and Castle Bright. Kernel breadth was maximum (12.89 mm) in 'Harcot' and least (0.85 mm) in Orgrand. Kernel length (18.24 mm) was higher in Bebeco and least (12.17 mm) in Castle Bright which was statistically at par with New Castle. An attractive yellow colored fruits with red blush over more than 50 % surface was found in Castle Bright with yellow flesh, bitter kernel and free stone. Fruits of Orgrand were very attractive and beaked, appealing yellow flesh and sweet kernel. 'Harcot' fruit surface was almost red blushed slightly beaked, and yellow flesh, sweet kernel and free stone. The physico-chemical quality of 'New Castle' is in consonance with the findings of Mehta *et al.* (2006) and Anonymous (2009) recorded similar observations on fruit quality and stone characters at CITH, Srinagar.

SUMMARY

New Castle yields 5.1 kg/tree with highest number of fruits/tree but least fruit length and breadth, whereas maximum fruit weight (44.91 g), fruit length and breadth but least TSS was noted in cultivar Orgrand. Highest total soluble solids and lowest ascorbic acid content was found in Harcot, whereas Bebeco has highest ascorbic acid content. Maximum reducing and total sugars were in Harcot but highest non reducing sugar (4.19 %) and minimum stone weight (1.80 g), stone breadth (18.22 mm) was noted in Castle Bright. Highest

kernel weight (1.55 g), kernel thickness (7.60 mm) and least kernel breadth (8.85 mm) with sweet and free kernel was noted in Orgrand. However, minimum reducing sugar, non reducing sugars and kernel thickness was noted in Bebeco most attractive fruit colour was noted in Castle Bright and Orgrand. On the basis of the observation New Castle, Orgrand, Harcot produced most attractive bigger sized fruits with moderate to higher total soluble solids, ascorbic acid, acidity, sugar, stone size, kernel weight along with high yield. All the cultivars were found suitable for cultivation under Kashmir valley condition.

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