

Performance of Apricot (*Prunus armeniaca* L.) Varieties for Growth, Yield and Quality Traits

A. K. Shukla*, K. K. Pramanick*, J. Kumar*, Santosh Watpade* and Jitender Verma*

ABSTRACT: An investigation was carried out to evaluate the performance of (20 year old) apricot varieties for growth, yield and quality parameters at Indian Agricultural Research Institute, Regional Station, Shimla. For the purpose ten cultivars viz., Suffaida Oblonga, St. Ambroise, New Castle, Kaisha, Charmagaz, Shipely Early, Nugget, Nari Kinnaur, Kaisha Kinnaur, Charmagaz Kinnaur were selected. Based on observation during 2013 and 2014 the tree height varied from 2.5 m-5.75 m with maximum in Suffaida Oblonga (5.75 m) and minimum in Nugget (2.5 m). Tree girth recorded maximum in Charmagaz (98.5 cm) and minimum in Nugget (30.5 cm) rest were in between these two. Canopy spread (east-west and north south) was found maximum in Charmagaz (7.00 m and 6.80 m) and minimum in Nugget (2.25m and 2.45m). Fruit weight varied from 18.5g to 45.86g with maximum in St. Ambroise (45.86g) similarly fruit pulp was also maximum in Charmagaz (42.05 g). Fruit length varied from 2.86 cm to 4.83 cm with maximum in St. Ambroise (4.83 cm) similarly average fruit width was also maximum in St. Ambroise (4.33 cm). Fruit yield varied from 5.5 kg to 32.18 kg with maximum in Kaisha (32.18kg) minimum in Nugget (5.5 kg). Total Soluble Solids (TSS) was found maximum in Charmagaz (21.11° brix) with minimum in Nugget (14.12° brix). Reducing sugar content was reported maximum in Kaisha Kinnaur (7.21%) and minimum was recorded in Suffaida Oblonga (4.82%). Similarly, non-reducing sugar content in was significantly highest in cultivar New Castle (9.24%) and lowest found in Kaisha Kinnaur (6.89%) rest were in between.

Key word- Apricot, Evaluation, Varieties, Growth, Yield and quality.

INTRODUCTION

Apricot (*Prunus armeniaca* L.) belongs to family Rosaceae, is believed to have originated in the Tien-Shan Mountains, in Central Asia, from where it was disseminated both east and westward. Apricot is a diploid species and cultivated in Mediterranean climates worldwide. It is rich source of vitamin-A and C. Apricot is an attractive, delicious and highly nutritious fruit being cultivated in temperate climates of all the continents of the world. In India it is commercially grown in Jammu and Kashmir, Himachal Pradesh, Uttarakhand and to a limited extent in North-eastern hill region. Most of the cultivars grown in the country are of European origin, the flowering of which start from late March to early April and harvesting of fruit continue upto second week of June depending on climatic conditions. The yield and quality of apricots are tremendously affected by stage of maturity at which fruits are harvested. Its fruit develop maximum flavour and are very delicious

when ripened on the tree but such fruits cannot be transported to distant markets because of their poor shelf life. Flowering varies within the cultivar depending on prevailing weather conditions. The apricot fruit has double sigmoidal growth pattern, having a retarded growth period at the time of pit hardening (Salunkhe *et al.*, 1968). Fruits harvested in advance of ripening do not attain full taste. So far, limited information is available about varietal suitability and performance of apricot based on field experimentation for temperate agro-ecosystem of Himachal Pradesh. Keeping in view the present study was carried out to assess the performance of different cultivars under temperate ecosystem.

MATERIALS AND METHODS

The study was carried out at Horticultural Research Farm of Indian Agricultural Research Institute, Regional Station, Shimla. The experimental trees of ten cultivars viz., Suffaida Oblonga, St. Ambroise, New

* Indian Agricultural Research Institute, Regional Station (CHC), Amartara Cottage, SHIMLA-171004 H.P., E-mail: akshuklahort@gmail.com

Castle, Kaisha, Charmagaz, Shipely Early, Nugget, Nari Kinnaur, Kaisha Kinnaur, Charmagaz Kinnaur with uniform age were selected. The uniform management practices with respect to nutrition and irrigation were adopted for all the cultivars. The grafted plants of apricot cultivars were transplanted in the field at 4 m apart under square system of planting. To assess the vigour of different cultivars the growth parameters like plant height, canopy spread, tree girth, yield attributing traits like fruit length, breadth, fruit weight and fruit yield/tree, quality parameters viz; pulp weight, stone weight, acidity, TSS, reducing and non reducing sugar were recorded during 2013 and 2014 and presented based on pool data. At the time of fruit harvest thirty fruits from each plant collected randomly for physico-chemical analysis. Size of fruit was recorded with the help of vernier calliper. TSS was determined with the help of hand refractometer. Titrable acidity was estimated against N/10 NaOH. Sugar content was recorded as per the standard procedure (A.O.A.C.1998). The soil of experimental site is sandy loan with gravel having low fertility status and poor water holding capacity. Meterological parameters like temperature, rainfall and relative humidity were also recorded during fruiting period for interpretation of experimental results. Single tree of each cultivar constituted an experimental unit and each cultivar was replicated four times. For statistical analysis RBD design was followed.

RESULTS AND DISCUSSION

Growth, blooming and fruit set parameters

Data on plant vigour of different varieties were recorded to observe the relative growth behaviour of these varieties under uniform management situation.

Data pertaining to plant height (Fig. 1) revealed that it was significantly higher in Suffaidda Oblonga (5.75 m) followed by Charmagaz (5.60 m), Kaisha Kinnaur (5.38 m) with minimum in Nugget (2.50 m), while plant height of other cultivars were in between. Tree girth was varied from 0.30 m to 0.98 m with maximum in Charmagaz (0.98 m) and minimum in Nugget (0.30 m). Canopy spread in East-West direction vary from 2.25 m to 7.0 m with the maximum spread (7.0 m) in Charmagaz followed by in Suffaidda Oblonga (5.55 m), Kaisha Kinnaur (5.53 m) and minimum was recorded in Nugget (2.25 m). Canopy spread in North-South direction was also maximum in Charmagaz (6.80 m) followed by Kaisha Kinnaur (6.48 m), Suffaidda Oblonga (6.0m) with the minimum in Nugget (2.45 m). In totality, the variation in tree growth in different varieties which may be attributed to genetic feature of individual variety in fruit crops (Bhat *et al.*, 2013 and Shukla *et al.*, 2009). Leaf initiation (table 1) in apricot starts soon after completion of dormancy which varied from 8th March ((Shipley Early) to 20th March (Charmagaz). Blooming period in apricot depends on weather conditions however, Shipley Early bloomed in between 15th March to 18th March followed by Charmagaz (18th March -21th March), whereas in Kaisha Kinnaur and Charmagaz Kinnaur flowering started on 20th March and completed on 24th March rest cultivars bloomed in between. Fruit set completed in Shipley Early between 24th March-28th March and in St. Ambrose fruit set started on 1st April and completed on 3rd April. Though, variation in bloom and fruit set period is varietal character but these parameters may be influenced by overall climatic factor and rainfall pattern in particular region (Shukla *et al.*, 2008).

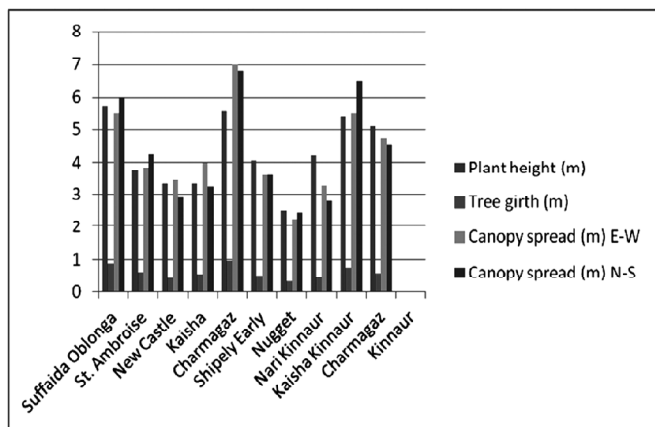


Figure 1: Vegetative growth parameters

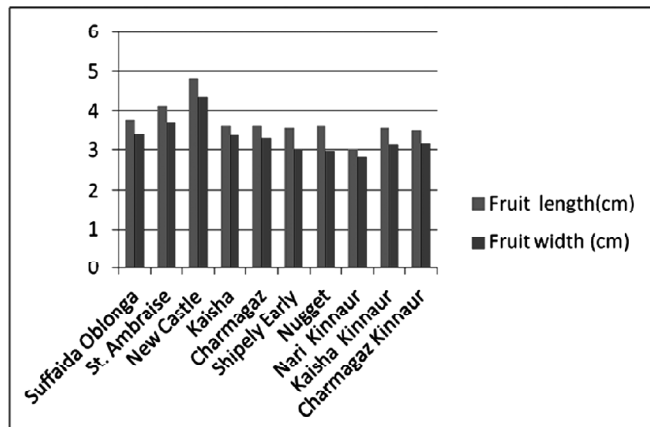


Figure 2: Fruit size of apricot varieties

Yield Parameters

The data presented in Fig. 2 indicated that fruit length and breadth was maximum in New Castle (4.83 cm and 4.33 cm) followed by St Ambroise (1.12 cm and 3.72 cm), Suffaida Oblonga (3.78 cm and 3.45 cm) where as minimum was found in Nugget (2.97 cm and 2.33 cm). Similarly, the fruit weight (Fig 3) was maximum in St. Ambroise (45.86 g) followed by Suffaida Oblonga (42.16 g), Charmagaz Kinnaur (41.21 g) and minimum in Nugget (20.07 g). Pulp weight was also recorded maximum in St. Ambroise (42.08 g) followed by Suffaida Oblonga (38.92g), Charmagaz kinnaur (37.43 g) and minimum in Nugget (17.74 g). Stone weight was found lowest in Nugget (2.33 g) where as maximum stone weight recorded in Charmagaz (4.32 g). The highest pulp/stone ratio varied from 7.11 to 12.01 with maximum in Suffaida oblonga (12.01) and minimum in Charmagaz (7.11). The maximum fruit yield (Table 1) was significantly higher in Kaisha (20.11 t/ha) followed by Nari Kinnaur (15.85 t/ha), Kaisha Kinnaur (14.51 t/ha) and minimum in Nugget (3.44 t/ha). Variation in yield

parameters in different varieties were also reported by Saroj *et al.*, 2008 in bael

Quality parameters

Data presented in Fig 4 indicated that TSS was recorded maximum in Nari Kinnaur (17.21%) closely followed by Kaisha Kinnaur (17.16° brix), Charmagaz Kinnaur (15.98° brix) and minimum in Kaisha (14.10° brix). Acidity in fruit was recorded highest in Charmagaz (1.51%) and minimum in Nari Kinnaur (0.99%) rest were in between. TSS/Acidity ratio (Table 1) varied from 9.32 to 17.56 with maximum in Nari Kinnaur (17.56) and in New Castle (9.32). Reducing sugar content was reported maximum in Kaisha Kinnaur (7.21%) followed by Charmagaz Kinnaur (6.53%), Shipley Early (6.40%) however minimum was recorded in Suffaida Oblonga (4.82%). Similarly non-reducing sugar content in was significantly highest in cultivar New Castle (9.24%) and lowest found in Kaisha Kinnaur (6.89%) rest were in between. Taste and flavour in apricot is mainly depends on sugar and acid blending (Salunkhe *et al.*, 1968). The variation in quality attributes in apricot

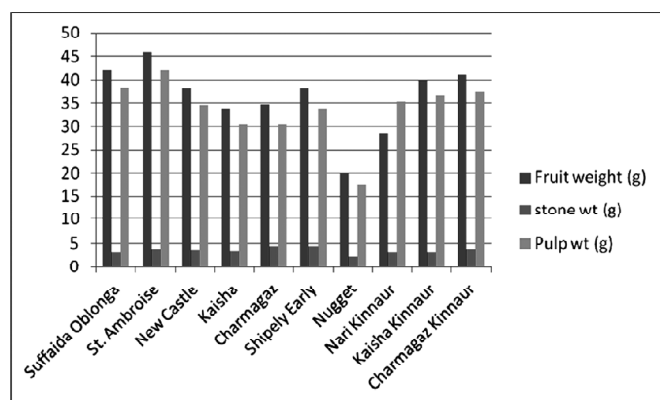


Figure 3: fruit characters of apricot varieties

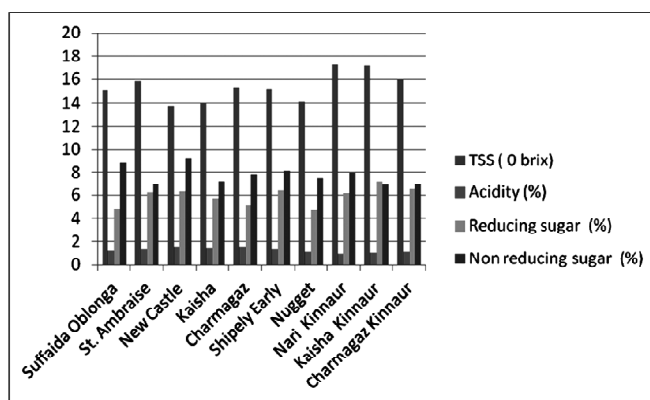


Figure 4 Quality parameters of apricot varieties

Table1
Performance of apricot cultivars for flowering, fruit set and yield

S.No.	Germplasm	Date of leaf initiation	Blooming period	Date of Fruit set	Stone/pulp ratio	Fruit yield (kg/tree)	TSS/acidity ratio
1.	Suffaida Oblonga	15 th March	20 th March-22 th March	1 st April-3 rd April	12.01	16.78	12.29
2.	St. Ambroise	18 th March	20 th March-24 th March	28 th March-31 th March	11.13	12.35	11.65
3.	New Castle	08 th March	18 th March-24 th March	31 st March-3 rd April	9.44	20.11	9.32
4.	Kaisha	9 th March	18 th March-24 th March	27 th March-30 th March	8.99	32.18	9.86
5.	Charmagaz	20 th March	18 th March- 21 th March	24 th March-28 th March	7.11	15.68	10.14
6.	Shipely Early	8 th March	15 th March-18 th March	27 th March-31 th March	7.86	15.14	11.28
7.	Nugget	18 th March	24 th March- 21 th March	31 st March-3 rd April	7.61	5.50	12.59
8.	Nari Kinnaur	18 th March	20 th March-24 th March	27 th March-31 th March	10.93	25.36	17.56
9.	Kaisha Kinnaur	15 th March	20 th March-24 th March	27 th March-31 th March	11.43	23.21	15.89
10.	CharmagazKinnaur	16 th March	20 th March- 24 th March	1 st April-3 rd April	9.90	14.56	14.39
	CD (P = 0.05)	—	—	—	1.98	3.35	2.52

cultivars have been also reported by Bhat *et al* (2013), Joshi *et al*, 1990.

REFERENCES

- A.O.A.C., (1998), Official methods of analysis, 16th edition, Association of Official Analytical Chemists, Washington, D.C.
- Bhat M. Y., Bilal A. Padder, Imtiyaz A Wani, F. A. Banday, Hafiza Ashan, M.A. Dar and Abida Lone, (2013), Evaluation of apricot cultivars based on physico-chemical characteristics observed under temperate conditions, *International J. Agric. Res.*, **3**(5): 535-537.
- Joshi S. M., Adhikari K. S., Seth J. N., Divakar B. L., (1990), Comparative study of biochemical changes in new apricot hybrid, ChaubattiaMadhu and in its parents during maturity and post harvest storage, *Progressive Horticulture*, **20**(3-4): 246-252.
- Salunkhe D. K., Deshpande P. B., Do S.Y., (1968), Effects of maturity and storage on physical and biochemical changes in peach and apricot fruits, *J. Hortic. Sci.*, **43**: 235-242.
- Shukla Arun K., Singh D., and Shukla Anil K., (2009), Performance of aonla cultivars under arid region of India, *Indian J. Agric. Scs.*, **79** (11): 849-852.
- Shukla Arun, Shukla Anil K., and Saroj P. L., (2008), Performance evaluation of aonla for flowering in arid region, *Progressive Horticulture*, **40**(2): 126-130.
- Saroj P. L., More T. A., and Singh U. V., (2008), Performance of bael cultivars under hot arid ecosystem of Rajasthan, *Indian J. Agric. Scs.*, **78**(12): 1071-74.