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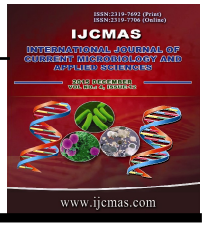

Original Research Article

Performance of Some Low Chill Peach, [*Prunus persica* (L) Batsch] Under Eastern Plateau Regions of India

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Keywords

Low chilling peach; Fruit quality traits; TSS; Phenology and tree characters

A B S T R A C T

Six peach cultivars viz; Flordasun, Flordaprince, No.22 , Pratap , Prabhat and Shan-e-Punjab were cultivated for evaluation purposes to come up with a suitable cultivar for commercial production under hill and plateau condition of Jharkhand province of India. The experiment was laid out in a randomized block design with 3 replications at ICAR-RCER, Research Centre Plandu, Ranchi in the year 2008-2009. The result revealed that the early bearing cultivars were Prabhat, Flordasun and Floridaprince gave potential yield on last week of March. The late bearing promising cultivar was Shan-e-Punjab which bears largest fruit (39.93g). Stone weight was the minimum in Florida Sun (2.86 g) which gave rise to highest pulp: stone ratio (6.382) followed by cv. Shan-e-Punjab (5.033). The maximum TSS was observed in cultivar Prabhat (17.96 ^{0}B) being comparable with Floridaprince (17.53^{0}B) and Floridasun(17.3^{0}B) statistically. The cultivar Pratap accounted for the maximum yield per tree (4years) 15 .85 kg but the maximum total sugar content of 13.5 per cent was found in the cv. Shan-e-Punjab. From the present study it is concluded that vigorous and spreading type peach cv. 'Shan-e- Punjab' was the best performer followed by Pratap and Prabhat under Eastern plateau and hill region of India for commercial cultivation.

Introduction

In the genus Prunus, Peach (*Prunus persica* L.) is a most important stone crop in India. It's flower has light pink colour with 5 petals brought forth in early spring before the leaves. The fruit has yellow or whitish flesh and some fruit contains pink colour around the stone possessing a delicate aroma. Skin of the fruit that is either velvety (peaches) or smooth (nectarines) in different cultivars due to single gene mutation (dominant to recessive). The flesh is very delicate and easily bruised in some cultivars, but is fairly firm in some commercial varieties, especially when green like July Alberta. The tree is rather small and mature tree grown up to 15 ft tall (Huxley, 1992). It is the most preferred and legendary fruit species among the stone fruits which is grown under low temperature in hilly areas of the temperate world. Due to stunning colors and high texture, peaches are generally used as table fruits. Introduction of new crops or crop cultivars provide an ample opportunity for crop diversification in a particular weather

condition to check economical feasibility for growing them commercially. It is one of the most important temperate fruit crop grown mainly in Jammu and Kashmir, Himachal Pradesh ,Punjab, Uttatrakhand , Nilgirihills, Jharkhand and North Eastern States **(**Kahlon *et al*., 1992; Josan *et al*., 1999) valued for its fresh and canned fruits. Now a day's peach has become pride to poor and marginal hilly farmers of sub-mountainous regions, plains of northern India and Southern hills (Chanana *et al*., 1992) and also in irrigated arid and plateau ecosystem. It is relatively performed well at an altitude ranging between 600-1000 m from msl. In recent times, it has been found that peach production has a declining trend mingled with a number of factors such as diseases, overdependence on a selective cultivars and global warming (Singh et al 2014). With advance of breeding efforts low chilling peach cultivars have been developed and their cultivation stretches from temperate regions to subtropical worlds (Kuden et al 2004). Keeping this in view some prominent low-chill peach genotypes were studied in this experiment to assess the performance with context to fruit quality characteristics and yield for commercial cultivation.

Materials and Methods

The present studies were carried out at ICAR-RCER, Research centre, Ranchi, during 2008-2009 on 4 years old junior adult bearing peach trees. Six peachcultivars namely, Flordaprince, Flordasun, Prabhat and Pratap No.22 and Shane-e-Punjab were evaluated for flowering, fruiting and fruit quality parameters.

The trees were planted at 5X5 M apart accommodating 400 plants/ha. The flowering behavior were noted for all the six cultivars visually. TSS of the fruits was estimated by Atago Digital refractometer with a scale of 0-32 ^{0} Brix, Titrable acidity, ascorbic acid were estimated by methods given by Rangana (1997). Data were subjected to ANOVA test for statistical analysis under randomized block design. Tree characters, flowering and harvestings dates were recorded in standard methods.

Results and Discussion

Growth and Flowering

Data recorded on flowering revealed that flowering initiation was earlier in Prabhat followed by Flordaprince, Flordasun . The cultivar Shan-e-Punjab was very late cultivar regarding flowering and harvesting whereas Pratap and No22 were mid season cultivars (Table3) harvested in second week of April.The period of flowering was varied from 30 days in all the cultivars between 10/2 to 27/2. Duration of flowering varied from 30 days (Shan-e-Punjab) to 42 days (Flordaprince). To some extent same trend of flowering behavior was observed by Josan *etal.* (1999), and Singh(1967) under Ludhiana conditions.

Nijjarand Khajuria (1979) also stated that biger fruits were harvested in Ludhiana condition as the weather was suitable to grow. But in Ranchi condition depleting of soil moisture from October onwards resulted in small but more TSS containing fruits. Regarding flowering , a peculiar habit was observed from Prabhat and Pratap giving two times flowering in a season likely at temperature decreasing down (Nov. last) and temperature rising up (2nd and 3rd week of Jan.) after dormancy. Therefore pratap pseudo showing earlier cultivar (fig-1) The cultivars Flordaprince, Flordasun, and Prabhat were earlier to attain maturity followed by Shan-e-Punjab harvested at last.

Fruit Physico-chemical Characters

Data on table -1 showed that the maximum average fruit weight of 39.93 g in Shan-e-punjab cultivar followed by Pratap(36.83g) were observed under Ranchi condition of India. Cultural practices like pruning and irrigation markedly increases the fruit size (Oluch et al,1993, Mcfadyen,1996 and Nyambo et al 2005). The grown up trees of our orchard is very young and unprunned.. Kanwar et al (2002) found that the peach cv. Valle Grande exhibited the highest fruit weight (88.8 g) followed by Earli Grande (87.2 g) under the climate of Punjab, India. In present study, stone weight was minimum in Florida Sun (2.86 g) which gave rise to highest pulp : stone ratio(6.382) followed by cultivar Shan-e-Punjab(5.033). The maximum TSS was observed in cultivar Prabhat (17.96 ^{0}B) being comparable with Florida Prince (17.53^{0}B) and Florida Sun (17.3^{0}B) (table-2).

Table.1 Physical Properties of Peach Fruits Grown under Subtropical Sub-Humid Region of Ranchi

Cultivars	Fruit Weight(g)	Fruit size (cm ^{2})	Skin weight(g)	Seed Weight(g)	Pulp Weight(g)	Pulp : seed Ratio
Pratap	36.86	12.33	6.33	6.08	24.45	4.018
Prabhat	35.83	12.63	4.43	7.62	19.40	2.544
Floridasun	23.60	11.87	1.41	2.86	18.30	6.382
Floridaprince	33.40	15.09	2.59	5.32	18.82	3.535
Shane-e-Punjab	39.93	20.27	3.21	5.60	28.19	5.033
No.22	33.33	16.72	2.29	4.96	19.19	3.864
CD at 5%	03.93	NS	1.69	1.19	02.99	1.25

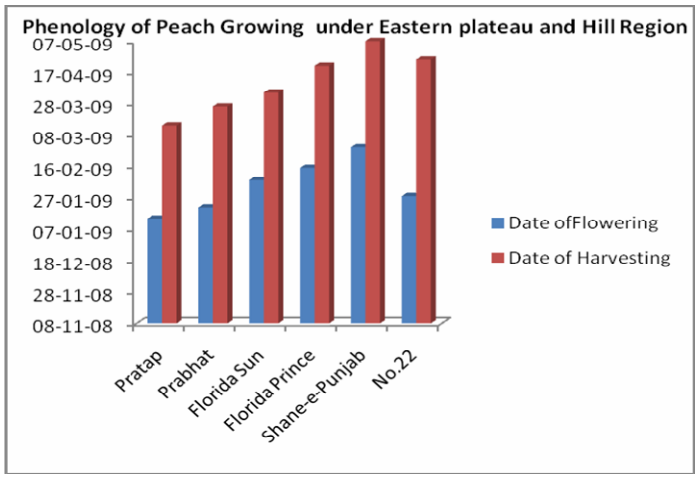
Table.2 Physico- Chemical Properties and Yield of Different Peach Cultivars

Cultivars	TSS(^{0}B)	Acidity (%)	Ascorbic acid (mg/kg)	Reducing Sugar (%)	Total Sugar (%)	Yield/ kg /plant
Pratap	13.867	0.323	66	6.668	10.42	15.852
Prabhat	17.967	0.18	65	4.402	12.6	12.031
Floridasun	17.3	0.277	75.5	5.926	11.6	4.599
Floridaprince	17.533	0.302	55	6.43	10.5	12.26
Shane-e-Punjab	16.8	0.357	174.333	6.536	13.5	12.759
No.22	15.8	0.22	158.667	4.607	12.12	8.672
CD at 5%	1.35	0.45	31.47	NS	3.17	5.02

Table.3 Tree, Flower and Fruit Characters of Different Cultivars of Peach

Cultivars	Tree growth	DFB	Stone type	Fruit blush	Presence of Grooves on Stone	Market Acceptibility
Pratap	Semi vigorous	110-115	Free stone	Red	Present	Very Good
Prabhat	Semi vigorous	100-105	Clingstone	Yellow with green tinge	Absent	Good
Florida Sun	Vigorous	90-95	Semi cling stone	Deep Yellow	Present	Good
Floridaprince	Vigorous	70-80	Semi cling stone	Red	Present	Good
Shane-e-Punjab	Vigorous	120-125	Semi Clingstone	Yellow with red spot	Less Groves	Very Good
No.22	Small	85-90	Cling stone	Yellow	Absent	Good
CD at 5%		8.77	--------	------	------	--------

Fig.1 Phonology of Peach Growing under Eastern Plateau and Hill Region



This might be due to water stress and high temperature during harvest. The cultivar, Pratap accounted for the maximum yield per tree (4years) 15 .85 kg /plant. Yield is most important parameter for peach production under different soil and climatic condition (Annonymous, 2015).

The maximum total sugar content of 13.5 per cent was found in the cultivar Shan-e-Punjab. The minimum total sugar content was found in cultivar Pratap (10.42 ^{0}B).

From the present study it is concluded that vigorus, spreading type 'Shan-e- Punjab' was the best performer followed by Pratap and Prabhat under Eastern plateau and hill regions of India. Several workers have worked on the physico-chemical properties of peach fruits (Kher and Dorjay 2001, Neelam and Ishtiaq 2002) in the past and the maximum variability was observed in peach genotypes prevailed in our country India.

Phenology and Fruit Quality and Market Acceptance

Six peach cultivars were tried for evaluation purposes to detect suitable cultivars for commercial production under hill and plateau condition of Jharkhand province of India. The result revealed that the early bearing cultivars were Prabhat, Pratap Flordasun and Floridaprince bearing potential yield on last week of March. The late bearing promising cultivar was Shan-e-Punjab which bears largest fruit (39.93g) due to longer gestation period regarding DFB. This result was corroborated by Singh et al (2009) and Josan et al (2009) where Flordaprince and Saharanpur Prabhat matured in 4th week of April under Punjab condition. Kanwar et. al., (2002) also reported that the first to attain fruit maturity was Flordaprince on 3rd week of April. Due to differences in agro-climatic conditions, there was variability among the genotypes. Fruit size and quality were generally affected by environment (Chadha et al.,1968 and Edward and Watson,1994). Diurnal variations in temperature are also responsible for early and late flowering in peach (Fishman and Genard,1998). It was found that all six genotypes were statistically different in fruit growth period from flowering. Data from the table-3 revealed that Flordaprince DFB of Pratap was the minimum of 70-80 days as compaired to Shan-e-Punjab (120-125 days). This is an important parameter and taken into consideration for distant marketing. The colour of fruit (skin) and pulp are also important indices to differentiate between peach cultivars as it influences market acceptability. Flordaprince and Pratap had the maximum red blush. In Indian domestic market has had likeness towards big peach fruits having high sugar content. Therefore, Shan-e-punjab and Pratap had better market acceptability than other cultivars.

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