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Performance of some low chilling cultivars of peach under agro-climatic condition of Bihar on the physical characteristics

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Abstract

[*Prunus persica* (L.) Batsch] botanical name of peach is one of the most important temperate stone fruit belong to the family Rosaceae and sub family Prunoidae. Five peach cultivars viz; Shan-e-Punjab, Florida Prince, Pratap, Early Grand, Prabhat, were cultivated for evaluation purposes to come up with a suitable cultivar for commercial production under agro-climatic zone of Bihar, India. The experiment was laid out in a randomized block design with 4 replications at Bihar Agricultural College Sabour, Bhagalpur in the year 2018-19. The result revealed that the early bearing cultivars were Pratap, Prabhat and Florida prince gave potential yield on 1st week of April. Duration of flowering was varied from (40 to 49 days), Maximum duration of flowering was seen in Shan- e-Punjab (49 days) and minimum duration of flowering was seen in Early Grand (40 days).

Maximum fruit length was attained in Shan-e-Punjab (5.51cm) however the minimum fruit length was attained in Early grand (4.83cm). Maximum Fruit volume was seen in Shan-e- Punjab (55.20cc) and minimum fruit volume was seen in Early Grand (35.40cc). maximum fruit weight (58.59g), stone weight 5.77g) was found in Shan-e-Punjab. From the present study it is concluded that was the best performer Shan-e-Punjab followed by Prabhat under agro-climatic condition of Bihar. It was also revealed that are evitable microclimate was required for optimum plant growth, higher crop yield and best quality fruits.

Keywords: Prunus, peach, low chilling, varieties, etc.

Introduction

[*Prunus persica* (L.) Batsch] botanical name of peach is a deciduous tree wide-ranging cultivated and well liked stone fruit in the temperate regions of the world. It belongs to the family Rosaceae and genus prunus which is cultivated for both the purposes, table purposes as well as for processing. It is highly valued for its flavour and attractive color. The peach fruit is a rich source of vitamins, proteins, sugars (sucrose) and minerals. Peaches are found to have diuretic effects and blood purifier. They are also said to improve the heart and circulatory system, reduces blood pressure, improve the immune system and helps in boost concentration. Peaches are native from north-west China, where they spread to rest of the world via silk route (Hesse, 1975) [5]. The cultivation of peaches is mostly concentrated in temperate regions of the world across all the continents. It is widely cultivated in the regions extending from 10° North to 49° South latitude, where enough light, clear skies, long seasons and warm temperature found, mainly in low and mid hills with altitudinal range of 1000-2000 m above mean sea level (Gosh, 2001). In India it is cultivated mostly in the Himalayan region starting from Jammu and Kashmir and extending up to North-Eastern hills and also in the Northern Plains. Most of the cultivars of peach require 500-1000 chilling hours below 7.2°C and normally bloom in the spring. However, some current attempts have led to the development of low chill cultivars of peaches requiring 100-300 hours of chilling which can successfully be grown in subtropical areas (Nijjar and Khajuria, 1979) [8]. The choice of Peach Varieties For a particular area is depends upon the adaptability to local soil and climatic conditions. With the introduction of low chilling varieties its cultivation is extended in almost all the states of the north east India. Among the low chilling varieties, Flordasun, Shane- Punjab and Partap found suitable for mid hill conditions of northeast (Patel *et al.*, 2007) [9]. Keeping this in view some prominent low-chill peach genotypes were studied in this experiment to assess the performance with context to flowering characteristics and physical characteristics for commercial cultivation. per plant in order of merit. Similarly L7 for internodal for total yield per plant in order of merit. Similarly length at 95 DAS, number of nodes at 95 DAS, number of branches at 45 DAS were the good general combiners.

Material and Methods

The present studies were carried out Bihar agriculture university, sabour Bhagalpur during 2018-2019 on 7 yr old peach tree. five peach cultivar namely, Early Grand, Florida Prince, Shan-e- Punjab, Prabhat, Pratap were evaluated for flowering and fruiting and fruit quality parameters the tree were planted at 2 x 2m.the flowering behaviour were noted for all the cultivars visually. TSS of the fruit was estimated by Hand Refractrometer, acidity, ascorbic acid were described by Rangana (2010). Data were subjected to ANOVA test for Stastical Analysis under RBD. Flowering and harvestings dates were recorded in standard methods.

Result and Discussion

Flowering: Data recorded on flowering in (Table-1) were revealed that flower intiation earlier in Shan-e-Punjab and florida prince but duration of flowering was more in both cultivars. Whereas Pratap and Prabhat flowering duration was maximum the period of flowering was varied from 40 to 49 days in all the cultivars b/w 12/2 to 23/3. flowering duration seen in cultivar Shan-e-Punjab was 49 days which is at par with Pratap (44 days) and minimum flowering duration was seen in Early Grand (40 days) which is at par with the florida prince (43 days).to some extent same trend of flowering was observed by Josan *et al* (1999) ^[7] and Singh (1967) under Ludhiana Conditions.

Nijjar and Khajuria (1979) ^[8] also stated that bigger fruits were harvested in Ludhiana condition as the weather was suitable to grow. Regarding flowering, a peculiar habit was observed from Florida prince, Shan-e-Punjab, Punjab Red (Nectarine) and Pratap giving two times flowering in a season likely at temperature decreasing down (September to October) and temperature rising up (2nd and 3rd week of January) after dormancy. The cultivars Flordaprince, Prabhat and Pratap were earlier to attain maturity followed by Shan-e-Punjab and Early Grand) harvested at last.

Physical characteristics: The data recorded in fig-1 revealed that fruit length was maximum in Shan-e-Punjab (5.51cm) which was at par with the cultivar Florida Prince (5.06 cm), Pratap (4.89 cm), Prabhat (4.84 cm), and Early Grand (4.83 cm) and minimum fruit length was recorded for Early Grand (4.83cm).

The data recorded for fruit breadth in fig -1 indicated that maximum Fruit breadth was observed in Prabhat (4.64 cm) which was at par with cultivar Shan-e-Punjab (4.56 cm), Pratap (4.49 cm), Florida Prince (4.34cm), Early Grand (4.09

cm) and minimum fruit breadth was observed in Early Grand (4.09 cm).

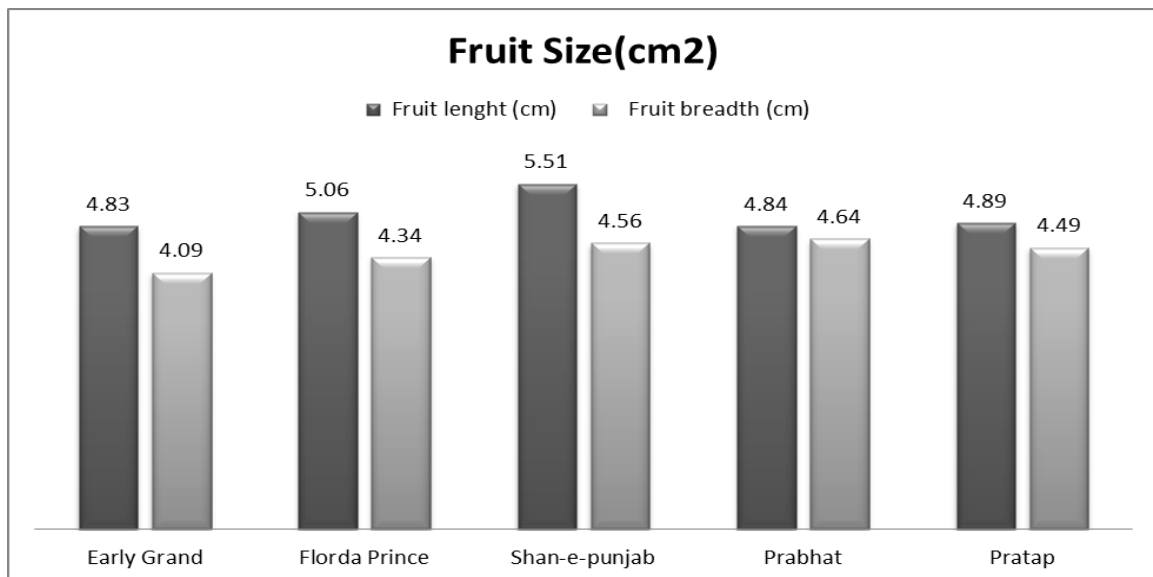
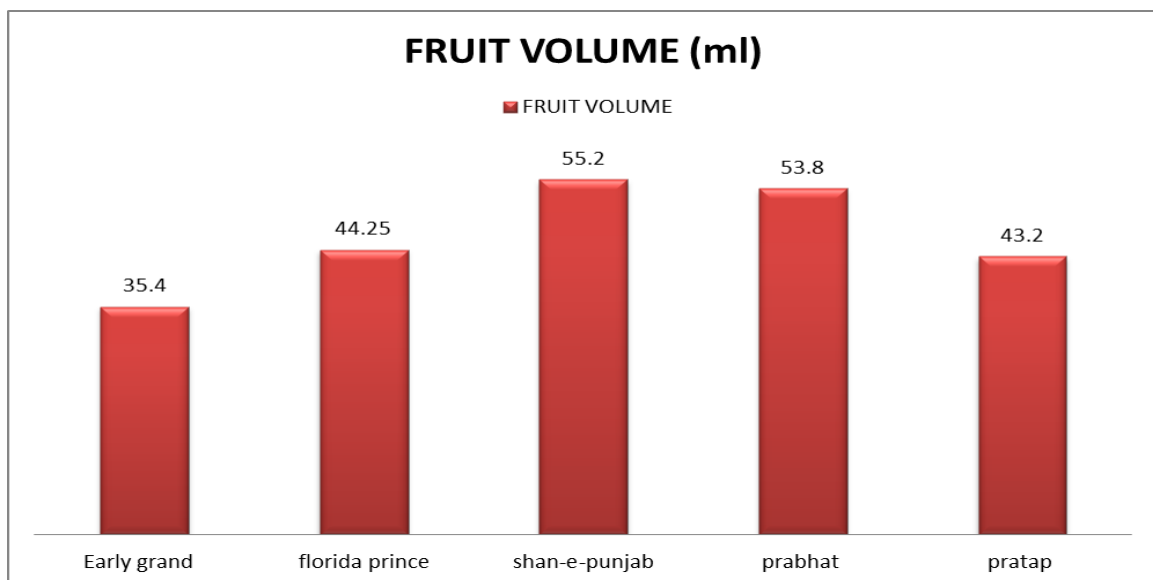
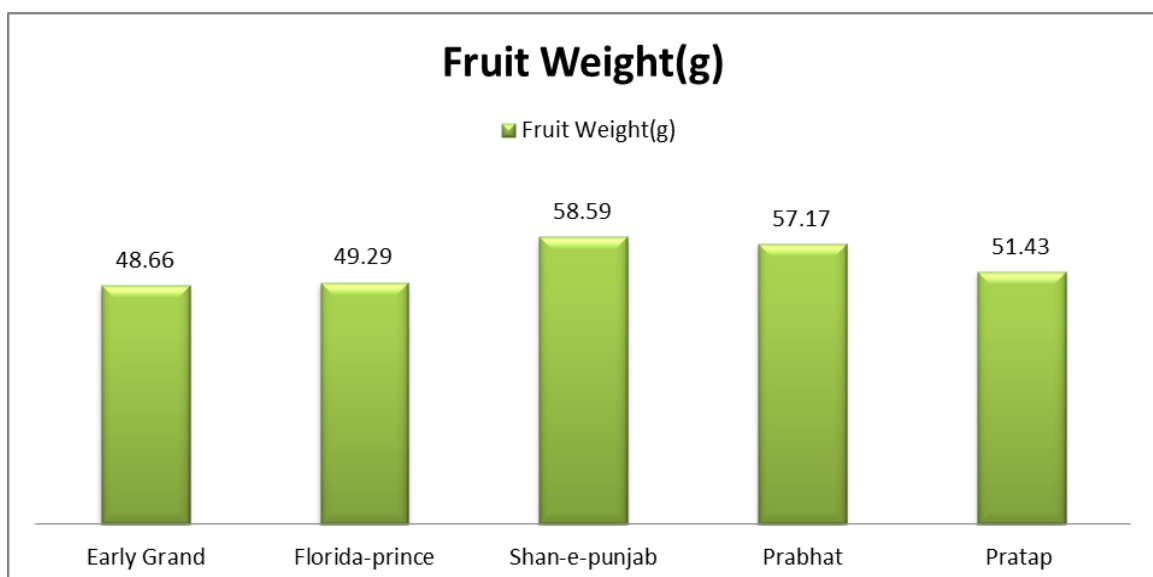
The analysis of variance in respect of to fruit weight of different cultivars reveals that the average fruit weight for different cultivar were found to be significant. the cultivars under study ranged from 48.66 to 58.59 g per fruit in (fig-3). Significantly, maximum fruit weight (58.59 g) was attained in 'Shan-e-Punjab' which is at par with Prabhat and Pratap. However the minimum fruit weight (48.66 g) was attained in 'Early Grand' which was statistically different with 'Florida prince' (49.29 g). The result was collaborate with the data of Jana (2015) and chaurasiya (2017) ^[6, 2] The analysis of variance in regarding of fruit volume of peach indicated that the treatment were found to be significant. The data pertaining to fruit volume have been presented in (fig- 2), which reveals that fruit volume for the cultivars under study ranged from (35.40cc to 55.20 cc). Highest fruit volume (55.20cc) was recorded in 'Florida prince' and shan-e-punjab which is stastically similar to each other while the minimum fruit volume (35.40cc) was found in Early Grand followed by Pratap (43.20cc).

Higher pulp weight (55.19 g) was attained in 'Prabhat' which is at par with shan-e-punjab (54.30g) and Pratap (49.86 g). The minimum pulp weight (46.04 g) was recorded in 'Florida prince', which was followed with 'Early Grand' (46.13g) which as shown in the fig-5. The maximum stone weight (5.77 g) was recorded in 'Shan-e-punjab' which was at par with 'Prabhat' (3.21 g). The minimum stone weight (3.21 g) was recorded in Prabhat and followed by Early grand (3.60g) which is at par with the Pratap (4.14g) shown in the fig-4). Diurnal variations in temperature are also responsible for early and late flowering in peach (Fishman and Genard, 1998). The observations on different fruiting characteristics revealed that 'Pratap had highest yield (17.00kg/tree) followed by prabhat and lowest yield was found in Early grand (2.43kg/tree) shown in fig-6. Maximum duration of harvesting was seen in Florida Prince (109 days) and minimum duration as seen in Early Grand (74 days) was shown in (fig-7).

However, the overall superiority with respect to fruit set of all cultivars may be due to improved pollination because of suitable climatic conditions during flowering and fruit set. the results of this finding was lining with finding of Jana, B.R (2015) and chaurasiya (2017) ^[6, 2]. The results of present investigation showed marked variations may be also due to attributed to genetic variability of peach cultivars and climatic situations such as occurrence of rainfall near maturity, low chilling hrs during fruit set, high humidity etc

Table 1: Flowering characteristics of low chilling Peach cultivar in agro-climatic conditions of bihar

Varieties	Date of bud swell	Date of first flowering	Date of last flowering	Date of harvesting	Duration of Flowering
Early Grand	28/1/2019	12/2/2019	23/3/2019	21/4/2019	40
Florida prince	19/12/2018	29/12/2018	12/2/2019	17/4/2019	43
Shan-e-punjab	13/12/2018	28/12/2018	15/2/2019	18/4/2019	49
Prabhat	29/12/18	3/1/2019	20/2/2019	16/4/2019	47
Pratap	25/12/18	8/1/2019	22/2/2019	14/4/2019	44
Sem(±)	-	-	-	-	1.18
CD at 5%					3.64

Figures - Physical characteristics of the low chilling cultivars of Peach in agro-climatic conditions of Bihar**Fig 1:** Characteristic of low chilling cultivars on fruit size in agro-climatic conditions of Bihar.**Fig 2:** Characteristic of low chilling cultivars on fruit volume in agro-climatic conditions of Bihar.**Fig 3:** Characteristic of low chilling cultivars on fruit weight in agro-climatic conditions of Bihar.

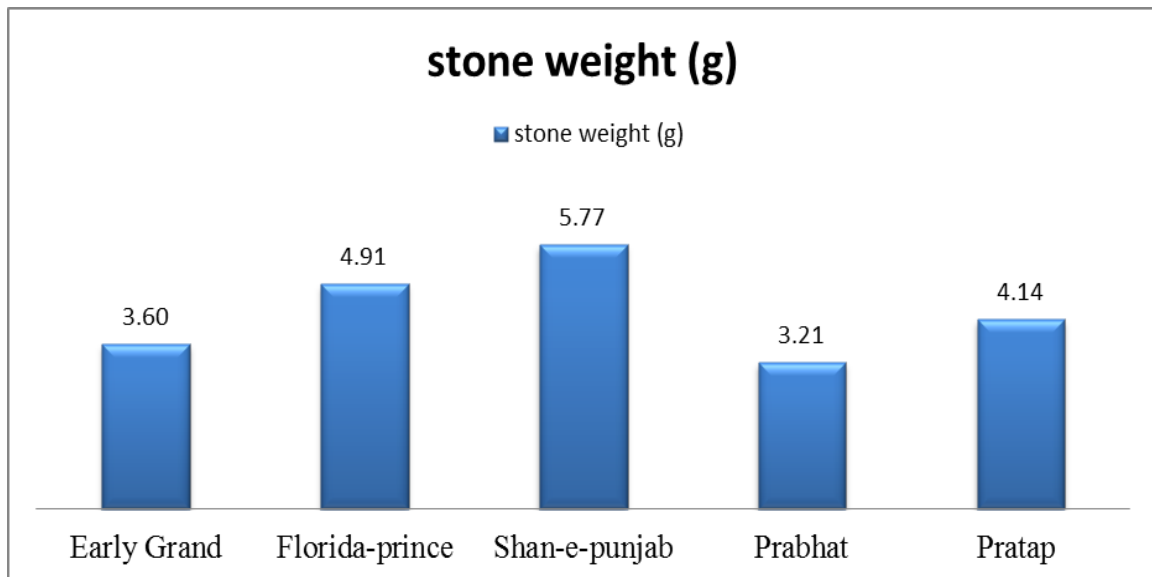


Fig 4: Characteristic of low chilling cultivars on stone weight in agro-climatic conditions of Bihar.

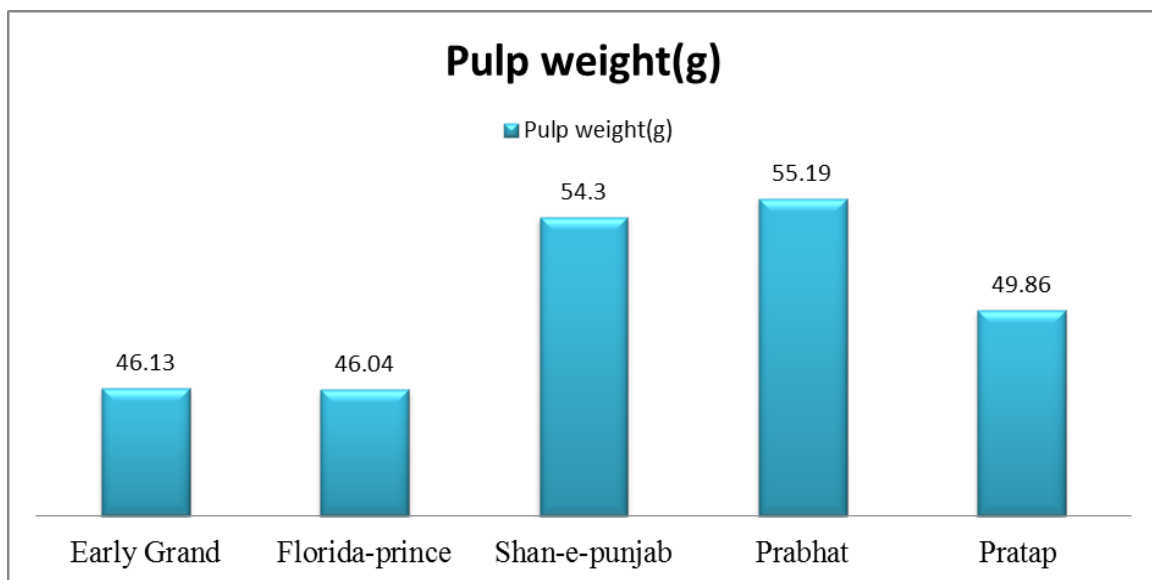


Fig 5: Characteristic of low chilling cultivars on pulp weight in agro-climatic conditions of Bihar.

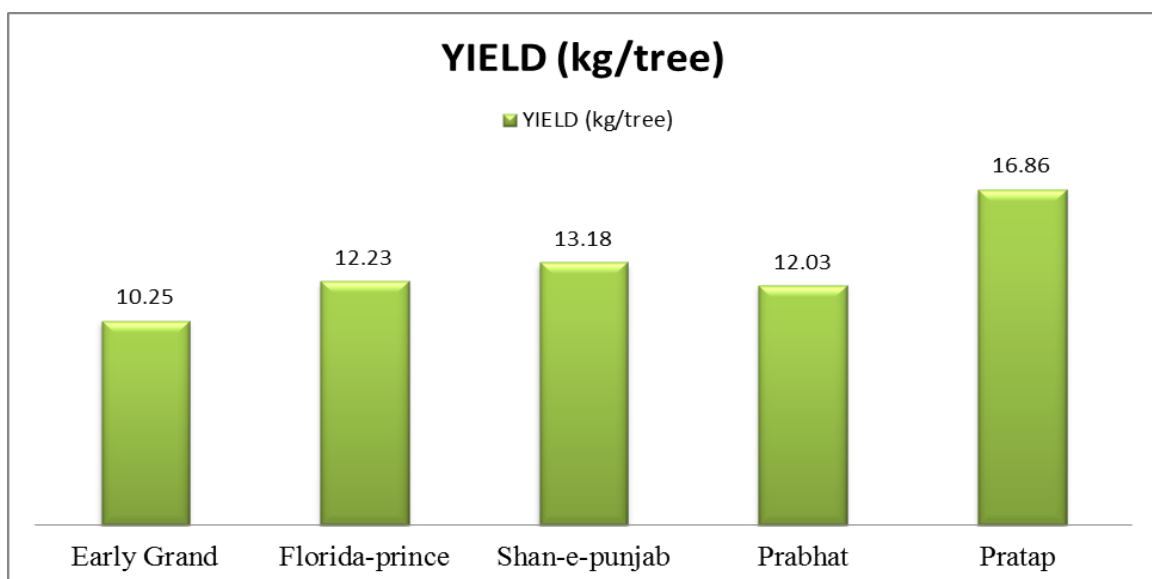


Fig 6: Characteristic of low chilling cultivars on yield in agro-climatic conditions of Bihar.

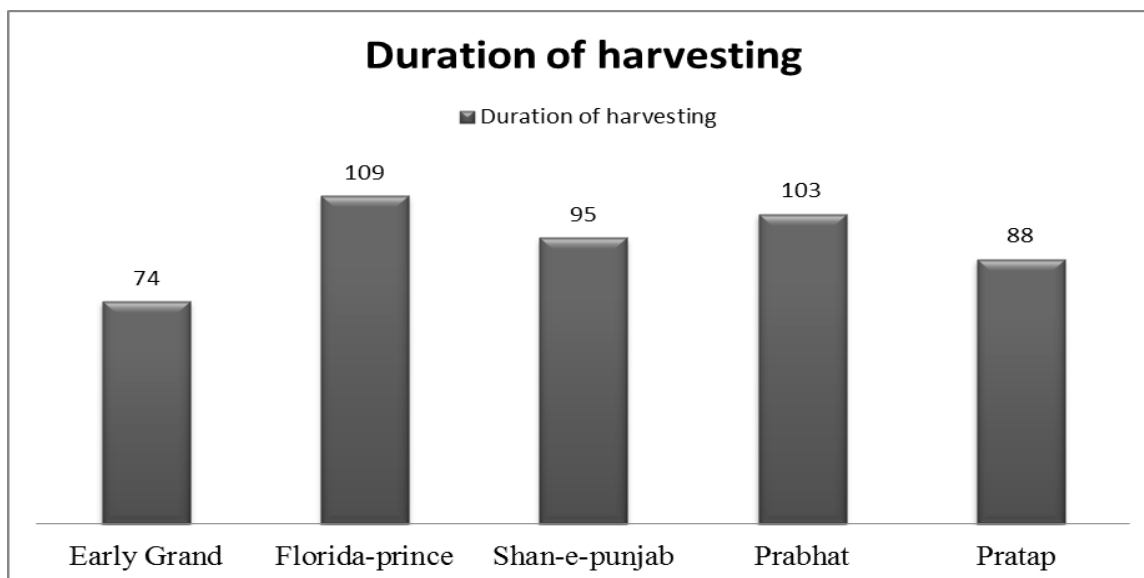


Fig 7: Characteristic of low chilling cultivars on duration of harvesting in agro-climatic conditions of Bihar.

Conclusion

Present findings indicates that Pratap was found to be the best variety for harvesting the highest yield. However, the bold fruit size was observed in Shan-e-Punjab. Finally it can be concluded that Shan-e-Punjab is the best cultivar for overall performance under agro-climatic condition of Bihar.

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