

Variation in Time of Flowering and Leaf Bud Burst in Different Varieties of Peach

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The present investigation was conducted to determine the variation in time and duration of flowering and leaf bud burst in 15 peach varieties during 2015-2016 at the Department of Fruit Science, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni-Solan. Data on bud burst and flowering were recorded during January (-1.4 °C to 23 °C temperature) and February 2016 (1.5 °C to 26 °C temperature). Time of the leaf bud burst was earliest in Flordaprince on 11th January, 2016 and July Elberta was the last on 5th February 2016. The flower initiation was found to be earliest in Saharanpur Prabhat on 10th January, 2016 whereas July Elberta was the last on 4th February, 2016. The variability observed in different peach varieties in time and duration of flowering and leaf bud burst can be utilized efficiently in future breeding programmes.

Key Words: Bud burst, Duration, Flowering, Peach, Variation

Introduction

Peach is one of the most important fruit crops belonging to genus *Prunus* and grown widely in temperate and subtropical regions of world. China is leading in peach production followed by Spain, Italy, Greece, and the United States. In India, it is grown over an area of 18,000 ha with production of 1,07,000 MT (Anonymous, 2017). Peach is a good source of sugar, vitamins, calcium, potassium etc. and is recommended for weight reduction or diabetic diets (Patel *et al.*, 2014). Most of the peaches are grown in temperate regions where they require 500-1000 or more chilling hours at or less than 7.2°C. However, its cultivation has now been extended to warm temperate as well as sub-tropical regions where they require 100-300 chilling hours. During last decade, cultivation of peach has also given some encouraging results in sub-tropical areas of Jammu & Kashmir (Ahmed *et al.*, 2014). Spring frost is one of limiting factors in peach cultivation, which affects the bud burst as well as flowering by formation of ice crystals adversely affecting the fruit set. Okie and Blackburn (2008) suggested that flowering is much more influenced by chilling requirements than heat requirements. They reported that the genotypes having low chilling requirements are susceptible to late frost

damage as they bloom early in cold regions whereas, genotypes with high chilling requirements could suffer inadequate chilling in warm regions or years, resulting in irregular floral and leaf bud breaks ultimately affecting the fruit set. However the spring frost damage can be avoided by developing cultivars with late blooming dates and those with higher flower numbers are more likely to have sufficient numbers of flowers remaining after frosts. In temperate tree species, early ripening cultivars are often preferred because of better market prices for their fruits. The present investigation was carried out to determine the variation in time and duration of flowering and leaf bud burst in 15 peach varieties.

The investigation was carried out in the Peach Experimental Blocks of Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan (HP), by collecting the data on flowering and leaf bud burst behaviour from 15 varieties of peach namely July Elberta, Early Redhaven, Suncrest, Tropic Sweet, Paradelux, Saharanpur Prabhat, Earligrande, Flordaprince, Tropic Snow, Flordaglo, Vallegrande, Tropic Beauty, Pratap and Shan-i-Punjab during 2016. UPOV (2014) test guidelines were followed to assess and characterize the 15 peach accessions. In each case, three bearing plants (6-7 years old) grafted on wild peach were taken to

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record the observations. The data on time of beginning of flowering was determined when 10% flowers in all trees opened and were accordingly classified as early, medium or late. The time of initiation of leaf bud burst was recorded in each individual tree as indicated by unfolding of leaf primordial from shoot axis in 3-4 buds at least and categorized as early, mid or late (UPOV, 2014). The duration of flowering was recorded as number of days from the date of opening of first flower to the date of opening of last flower in each accession.

The time of beginning of leaf bud burst ranged from 11th January, 2016 to 5th February, 2016 (Table 1). Bodh *et al.* (2019) also reported period of leaf bud burst between January to March. However, Singh *et al.* (2005) reported that bud sprouting occurred between 1st February (Flordaprince) and 14th March (Shan-i-Punjab) under Jammu conditions. Generally, in most of the peach tree cultivars flowering occurs before bud burst depicting that the chill requirement of flowering was reached before the bud burst. However some cultivars sprout before flowering because they require more heat for flowering than for bud burst, which determine their adaptability for subtropical climate (Souza *et al.*, 2017). Chavarria *et al.* (2009) also reported that the flower buds have lower chilling requirements as compared to leaf bud and demonstrated that the heat influences bud break in flower buds. The flower initiation was found to be earliest in Saharanpur Prabhat on 10th January, 2016 followed by Flordaprince on 11th January, Pratap on 15th January, Shan-i-Punjab on 16th January whereas July Elberta was the last on 4th February, 2016. Chalak *et al.* (2006) also reported July Elberta to be late flowering type. The variation in time of flowering is perhaps due to the differences in chilling hour requirement to break bud dormancy in various accessions and was evident from early flower initiation in low chill accessions. Rouse *et al.* (2006) also reported that in Flordaprince, Flordaglo and Tropic Beauty, flowering period ranged from January to mid March. Similar variation in the period of flower initiation has been reported earlier by Carter *et al.* (2003) and Byrne and Boonprakob (2008). However, Polat *et al.* (2012) reported blooming period to vary from 21st March (Early Red) to 17th April (JH Hale). The time and duration of flowering may vary according to the number of chilling hours as well as the time when temperature begins to increase, which promotes flowering and bud burst of plants. Higher temperatures can induce the continuous floral bud

development by altering the heat requirement, which explains the difference in the same cultivar at different locations (Alves *et al* 2018).

The duration of leaf bud burst was the longest (16 days) in Paradelux and smallest (8 days) in Pratap and Shan-i-Punjab. Duration of flowering was observed to be longest in Tropic Snow (14 days) and smallest in Earligrande (7 days) (Fig. 1). Polat *et al.* (2012) reported blooming period to vary from 21st March (Early Red) to 17th April (JH Hale) whereas duration of flowering from initiation to full bloom was found to be longest in Flordaprince and shortest in Earligrande and Early Redhaven. However, Wert *et al.* (2009) reported that TropicBeauty had the longest FDP followed by Flordaglo, Flordaprince and UF Gold. Szabo and Nyeki (2000) reported that the duration of flowering period is equally subjected to seasonal variation by the same temperature effect. They claimed that the flowering duration lasts 14-21 days at most but only 5-9 days if the temperature is very high. From the present study, it can be concluded that the peach accessions exhibited variation for time and duration of flowering and leaf bud burst, which may be attributed to seasonal variations i.e. temperature, endodormancy, chilling requirements etc. This variability can be utilized in breeding for maximizing peach adaptability as well as cultivation at different agro-climatic regions.

Table 1. Time and duration of flowering in peach accessions during 2016

Genotype	Date of flowering (5%)	Date of flowering (75%)	Full bloom (100%)	Duration of flowering
July Elberta	Feb 4	Feb 10	Feb 16	12 days
Early Redhaven	Jan 17	Jan 22	Jan 24	7 days
Suncrest	Jan 18	Jan 22	Jan 27	9 days
Tropic Sweet	Jan 25	Jan 31	Feb 5	11 days
Paradelux	Jan 31	Feb 2	Feb 10	10 days
Saharanpur Prabhat	Jan 10	Jan 14	Jan 18	8 days
Valle grande	Jan 19	Jan 22	Jan 29	10 days
Flordaglo	Jan 27	Jan 30	Feb 4	8 days
Tropic Beauty	Jan 21	Jan 24	Jan 31	10 days
Earligrande	Jan 19	Jan 23	Jan 26	7 days
Pratap	Jan 15	Jan 20	Jan 24	9 days
Shan-e-punjab	Jan 16	Jan 19	Jan 25	9 days
Glohaven	Jan 18	Jan 22	Jan 28	10 days
Tropic Snow	Jan 20	Jan 24	Feb 3	14 days
Flordaprince	Jan 11	Jan 15	Jan 22	11 days

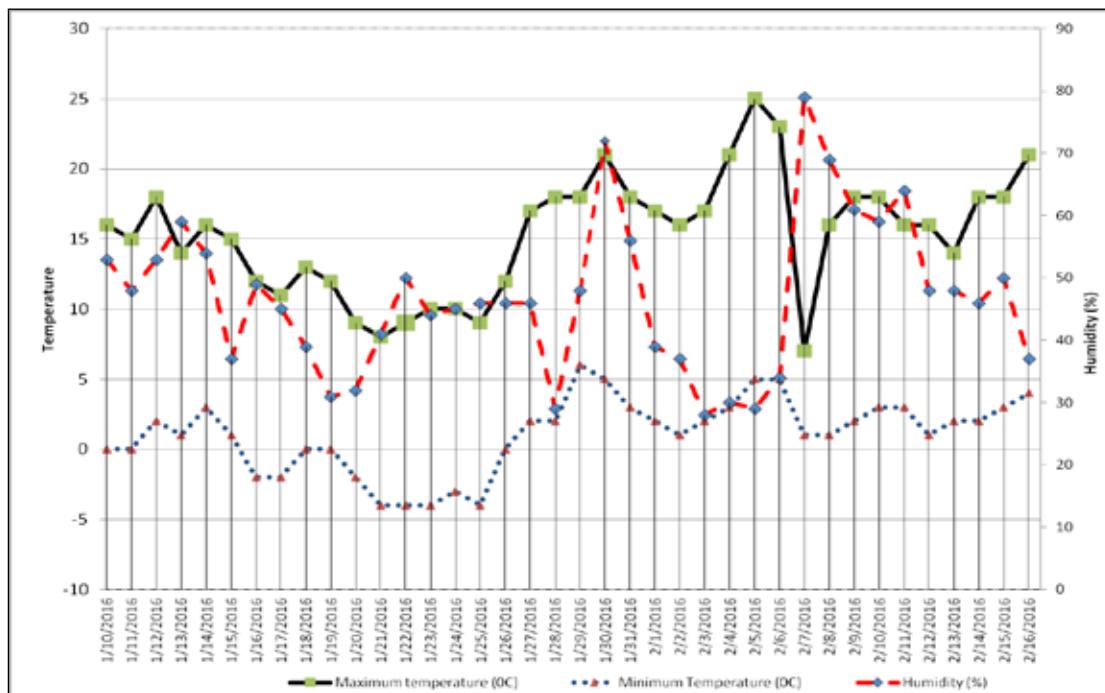


Fig. 1. Data on temperature and humidity from 10 January to 16 February, 2016

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