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Tree Growth, Flowering and Pollen Attributes of Low Chill Peach Cultivars in the Tarai Region of Uttarakhand

Rajender Kumar*, D.C. Dimri, Jitendra Singh Shivran, Lavanya S. and Maneesh Kumar
Department of Horticulture,
G.B. Pant University of Agriculture & Technology, Pantnagar (Uttarakhand), India.

(Corresponding author: Rajender Kumar)*
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ABSTRACT: The present study was performed to determine the nature and magnitude of variation among 12 low chill peach cultivars for different tree growth, flowering and pollen attribute and to identify the potential genotypes with respect to these attributes. The investigation was carried out for two years (2021 and 2022) at Horticulture Research Centre, Patharchatta of G. B. Pant University of Agriculture & Technology, Pantnagar. The cultivars Florda Prince recorded the highest tree height (5.40 m), tree spread (4.87 m), trunk girth (82.95 cm) and volume (74.67 m^3). In 2021, the earliest bud swell stage was noticed in Florda Gold (8th January), while Selection-12 attained it at last (25th January). However, with a slight delay to the previous year, in 2022, Florda Gold and Florda Prince showed the earliest bud swell stage (16th and 18th January, respectively), whereas Selection-12 displayed most late on the 3rd of February. The density of flower buds was examined as sparse in 4 cultivars; medium in 5; dense in Red June and Shan-i-Punjab; and highly dense in Florda Gold. Concerning pollen viability, the cultivar Florda Prince obtained the highest viability percentage (98.33%) and Selection-12 had the minimum (82.33%). For breeding purposes, the data concerning the variation in dates of bud swell and viability percentage can be valuable. From the present study it is also suggested that the cultivars *viz*., Florda Gold, Red June and Shan-i-Punjab showing superiority for flower bud density can be utilized as a suitable genetic resource for breeding new low chill peach cultivars. Genetic variability in the cultivars needs to be further examined for their genetic parameters and divergence to have a better understanding of the relationship between the traits at the genotypic and phenotypic levels.

Keywords: *Prunus persica*, Growth, Flowering, Pollen viability.

INTRODUCTION

Peach [*Prunus persica* (L.) Batsch] is one of the most important fruits of the Rosaceae family and ranks 3rd after apples and pears. Though most opine that the peach originates in China (Wang, 1985; and Faust and Timon 1995), a few studies suggest that it originated in Persia. Hilly areas of Tibet and southwest China are the primary centers of peach diversity, while Iran is the secondary center (Kumar *et al*., 2013). Globally, they are grown on a commercial scale in temperate and subtropical regions. Several different varieties of peaches are grown throughout the world, however, the majority of peach production in India is accounted by a relatively small number of varieties (15-20) (Kumar *et al*., 2013).

As a result of high productivity, regular bearing and precocious nature, low chill peach cultivation has gained considerable attention over the past few years. The fruit of these subtropical peaches is harvested nearly two months earlier than those grown in hills, resulting in good economic returns since there are no other major temperate fruit crops in the market during that period (Kumar *et al*., 2015). However, due to a variety of circumstances, including insufficient cooling and irregular rainfall, the yield and quality of commercial peach cultivars in the sub-tropics of India have dropped in recent years.It could be attributed much to the formation of the blind node in the sub-tropical condition under the current scenario of climate change. Penso *et al*. (2020) described that the phenological cycle such as dormancy break is most affected under subtropical and tropical conditions, which results in alterations of flowering and effective fruiting, along with branch growth and development (Nava *et al*., 2009; Couto *et al*., 2010). There may also be an impact on the formation of buds, especially floral buds, which are not fully developed and form 'blind nodes' (Monet *et al*., 1971; Dennis *et al*., 2000; Faust, 2000; Williamson *et al*., 2008).

Variability is the basic requirement of any breeding program; therefore, the characterization and evaluation of germplasm are considered to be an indispensable part

of crop improvement programs. The germplasm is a valuable source material because it offers scope for the generation of genetic diversity and its evaluation contributes to the identification of cultivars for its direct or indirect use in the breeding work (Sonaniya and Singh 2022). It focuses mainly on morphological, pomological and phenological characteristics (Yilmaz *et al*., 2009). There are various standards and guidelines developed both at the international (UPOV; International Union for the Protection of New Varieties of Plants, Geneva and IPGRI; International Plant Genetic Resources Institute, Rome) and national levels (PPV & FRA; Protection of Plant Varieties and Farmer's Rights Authority, New Delhi) for the taxonomic description and identification of cultivars. The micro-morphological features of pollen grains are also an important diagnostic trait that plays a key role in the identification of different plant species. Besides this, the success of fertilization in controlled pollination depends upon the pollen viability of a genetic resource available and therefore knowledge of such attribute is prerequisite for any crop improvement program.

MATERIALS AND METHOD

Experimental site and experimental materials. The present study was undertaken on twenty years old low chill peach cultivars (12 Nos) maintained at HRC, Patharchatta, of G. B. Pant University of Agriculture and Technology, Pantnagar located in the *Tarai* belt of the Himalayas at 29.5º North latitude and 79.3º East longitude and an altitude of 243.94 metres above MSL. The climate of the experimental site is humid subtropical with dry and hot summers.

Measurements and observations. The morphological characterization of 12 low chill peach cultivars was carried out for two consecutive years from January, 2021 to June, 2022. The trees evaluated were all kept under uniform cultural practices throughout the experimentation. Tree attributes viz., height and spread were measured with the help of calibrated staff and tree volume as per the methodology outlined by Westwood (1993). The PPV&FRA test guidelines were followed to evaluate the peach cultivars for different phenological observations (Anonymous, 2015). While the pollen viability was determined using the acetocarmine (1%) test.

Statistical analysis. The experiment was laid out in a randomized block design**.** All data were subjected to Analyses of Variance (ANOVA). Significant differences among groups were determined using Duncan's multiple range tests at $p<0.05$. All computation and statistical analyses were done using IBM SPSS Statistics 19 statistical software (IBM, NY, USA).

RESULTS AND DISCUSSION

***Tree growth characteristics*.** Data presented in Table 1 indicate the variability among the cultivars for tree vigour and growth habit. Out of 12 peach cultivars, as many as four (Pratap, Early Grand, Florda Prince and Shan-i-Punjab) were found to have strong vigour, seven had (Florda Gold, Florda Red, Pant Peach-1, Red June, Sharbati Late, Sharbati Surkha and Selection-12) medium vigour and only one (Saharanpur Prabhat) exhibited weak vigour. Variation in tree growth habit was found to be spreading in Florda Prince and rest of all cultivars (Saharanpur Prabhat, Pratap, Early Grand, Florda Gold, Florda Red, Pant Peach-1, Red June, Sharbati Late, Sharbati Surkha, Shan-i-Punjab and Selection-12) displayed upright to spreading growth habit (Table 1).

All the 12 peach cultivars under study registered considerable variation for tree vigour and growth characteristics. The differential behaviour in tree growth characteristics of the present study confirms the genetic variability of different cultivars. The study by Gradziel and Beres (1993) suggested that trees with upright growth habits may be suitable for high-density planting systems or could be used as a genetic resource to develop short-statured peach scion varieties. Such variation among the cultivars for tree vigour has been reported by Jana (2015), who found that tree vigour varied from semi-vigorous (Pratap and Prabhat) to vigorous (Florida Sun, Shan-i-Punjab and Florda Prince) and to weak type in No. 22.

Table 1: Evaluation of low chill peach cultivars for tree characters (pooled data of 2021 and 2022).

Sr. No.	Cultivars	Vigour	Growth habit	Tree height (m)	Tree spread (m)	Trunk girth (cm)	Tree volume (m^3)
1.	Saharanpur Prabhat	Weak	Upright to spreading	3.22^{f}	3.44^{d}	37.90^{g}	20.17^{f}
2.	Pratap	Strong	Upright to spreading	4.84^{cd}	4.33^{c}	57.00^{f}	53.56^{d}
3.	Early Grand	Strong	Upright to spreading	4.97^{bcd}	4.49^{bc}	63.53^{e}	58.18^{abc}
4.	Florda Prince	Strong	Spreading	5.40^{a}	4.87^{a}	82.95^{a}	74.67^{a}
5.	Florda Gold	Medium	Upright to spreading	4.93^{bcd}	4.57^{abc}	67.85^{d}	58.68^{ab}
6.	Florda Red	Medium	Upright to spreading	5.08^{b}	4.56^{bc}	62.20^{e}	61.76^{b}
7.	Pant Peach-1	Medium	Upright to spreading	5.08^{b}	4.58^{abc}	62.94^{e}	62.26^{b}
8.	Red June	Medium	Upright to spreading	5.01^{bc}	4.68^{ab}	73.71^{c}	61.82^{b}
9.	Sharbati Late	Medium	Upright to spreading	4.61^{e}	4.30^{c}	66.67^{d}	48.11^{e}
10.	Sharbati Surkha	Medium	Upright to spreading	4.81^{d}	4.53^{bc}	62.42^{e}	55.08^{cd}
11.	Shan-i-Punjab	Strong	Upright to spreading	4.96^{bcd}	4.76^{ab}	76.23^{b}	61.53^{b}
12	Selection-12	Medium	Upright to spreading	4.49^{e}	4.59^{abc}	67.58^{d}	48.64^{e}

*Means with a common letter within a column show non-significant differences (at $p\leq0.05$) as per Duncan's multiple-range test

Thakur (2019) also observed upright to spreading nature of growth habit in Andros, Glohaven and Paradelux and upright in Pratap, Redhaven, Shan-i-Punjab and Suncrest. The observations recorded on tree height and spread are presented in Table 1, which revealed the highest tree height value (5.40 m) being noted for Florda Prince and the lowest (3.22 m) for Saharanpur Prabhat. Tree spread ranged from 3.44 m (Saharanpur Prabhat) to 4.87 m (Florda Prince). The highest tree spread value examined in Florda Prince differs non-significantly from Shan-i-Punjab (4.76 m) and Red June (4.68 m).

The different cultivars under evaluation differed significantly for trunk girth and tree volume (Table 1). Pooled analysis of data revealed the highest trunk girth value (82.95 cm) being noted for Florda Prince and minimum (37.90 cm) for Saharanpur Prabhat. Whereas, with regard to tree volume, Florda Prince had the maximum value (84.16 m^3) and Saharanpur Prabhat had the minimum (22.89 m^3).In the present study, the genotypes differed considerably for different plant growth attributes. Among the 12 peach cultivars, Florda Prince was found promising genotype for tree height, trunk girth, tree spread and tree volume. Yepthomi (2011) described about ten low-chilling peach cultivars and witnessed maximum tree height in Valle Grand (2.73 m) and minimum in Florda Prince (1.83 m).Previous studies also reported a high variability among peach cultivars for these parameters (Sharma *et al*., 2012; Kumar, 2015).

Flowering characters. The glance of data presented in Table 2 demonstrated that the date of bud swell varied considerably among all the cultivars under investigation and extended from 8th January (Florda Gold) to 25th January (Selection-12) in the year 2021. The earliest bud swell stage was registered for Florda Gold followed by Florda Prince (10th January) and Pant Peach-1 (10th January). Similarly, during 2022 Florda Gold showed the earliest bud swell stage (16th January) followed by Florda Prince (18th January) and Pant Peach-1 (20th January), whereas, the delayed bud swell stage was noted in Selection-12 (3rd February).The perusal of data on the density of flower buds is presented in Table 2. During both the years of investigation, the sparse density of the flower buds was observed in Saharanpur Prabhat, Pratap, Early Grand and Florda Prince; medium dense in Florda Red, Pant Peach-1, Sharbati Late, Sharbati Surkha and Selection-12; dense in Red June and Shan-i-Punjab whereas highly dense flower buds were reported in the cultivar Florda Gold.

Table 2: Evaluation of low chill peach cultivars for flowering attributes.

Sr. No.	Cultivars	Date of bud swell		Density of flower buds	Flower type	Corolla main colour	Petal shape
		2021	2022				
1.	Saharanpur Prabhat	17th Jan	26th Jan	Sparse	Showy	Very light pink	Medium elliptic
2.	Pratap	21st Jan	28th Jan	Sparse	Non-showy	Light pink	Narrow elliptic
3.	Early Grand	21st Jan	27th Jan	Sparse	Non-showy	Light pink	Narrow elliptic
4.	Florda Prince	10th Jan	18th Jan	Sparse	Showy	Very light pink	Medium ovate
5.	Florda Gold	8th Jan	16th Jan	Very dense	Showy	Very light pink	Medium ovate
6.	Florda Red	12th Jan	23rd Jan	Medium	Showy	Light pink	Narrow elliptic
7.	Pant Peach-1	10th Jan	20th Jan	Medium	Showy	Very light pink	Medium ovate
8.	Red June	23rd Jan	2nd Feb	Dense	Showy	Light pink	Medium ovate
9.	Sharbati Late	21st Jan	27th Jan	Medium	Showy	Medium pink	Narrow elliptic
10.	Sharbati Surkha	14th Jan	25th Jan	Medium	Showy	Light pink	Medium elliptic
11.	Shan-i-Punjab	22nd Jan	1st Feb	Dense	Showy	Very light pink	Medium elliptic
12.	Selection-12	25th Jan	3rd Feb	Medium	Showy	Light pink	Narrow elliptic

Out of 12 peach cultivars analyzed, only 2 cultivars namely, Pratap and Early were found to have a non-showy type of flower (Table 2), whereas, rest of other displayed showy type of flower. There was a slight difference noticed in the main colours of corollas of different cultivars studied, including very light pink in Saharanpur Prabhat, Florda Prince, Florda Gold, Shan-i-Punjab, light pink in Pratap, Early Grand, Florda Red, Pant Peach-1, Red June, Sharbati Surkha, Selection-12, and medium pink in Sharbati Late (Table 2). It was noted that the shape of petals (Table 2) varied from medium elliptic in Saharanpur Prabhat, Sharbati Surkha and Shan-i-Punjab to narrow elliptic in Pratap, Early Grand, Florda Gold, Sharbati Late and Selection-12 and to medium ovate in Florda Prince, Florda Red, Pant Peach-1 and Red June. While, the number of petals was obtained as five in all the 12 peach cultivars under study.

Data pertinent to the flowering shoot thickness (mm) and length of internodes (mm) is presented in Table 3. The flowering shoot thickness was found maximum (4.04 mm) in Early Grand which differ non-significantly from Pratap (4.02 mm), Florda Prince (3.96 mm) and Red June (3.91 m). The minimum shoot thickness was recorded in Selection-12 (2.64 mm). Out of the 12 accessions studied (Table 3), Pratap recorded maximum (27.04 mm) inter-nodal length, which was statistically *at par* with Early Grand (26.91 mm), Sharbati Surkha (26.27 mm), Shan-i-Punjab (25.24 mm) and Saharanpur Prabhat (24.71 mm). Whereas Florda Gold recorded minimum (20.06 mm) value followed by Selection-12 (21.07 mm), Red June (21.56 mm), Sharbati Late (21.71 mm) and Florda Red (22.54 mm) (Table 3).

Table 3: Evaluation of low chill peach cultivars for flowering shoot thickness, length of internode and pollen viability (pooled data of 2021 and 2022).

Sr. No.	Cultivars	Flowering shoot thickness (mm)	Internodal length (mm)	Pollen viability (%)
1.	Saharanpur Prabhat	3.44^{b*}	24.71^{abc}	95.67^{ab}
2.	Pratap	4.02^{a}	27.04^{a}	96.00^{ab}
3.	Early Grand	4.04^{a}	26.91^{ab}	93.67^{bc}
4.	Florda Prince	3.96^{a}	24.37^{abcd}	98.33^{a}
5.	Florda Gold	3.30^{b}	20.06^{f}	94.67^{bc}
6.	Florda Red	3.23^{b}	22.54^{cdef}	92.33^{c}
7.	Pant Peach-1	3.21^{b}	23.72^{bcde}	96.33^{ab}
8.	Red June	3.91^{a}	21.56^{def}	95.33^{b}
9.	Sharbati Late	3.63^{ab}	21.71^{def}	92.33^{c}
10.	Sharbati Surkha	3.24^{b}	26.27^{a}	83.00^{d}
11.	Shan-i-Punjab	3.48^{b}	25.24^{abc}	84.67^{d}
12.	Selection-12	2.64^{c}	21.07^{ef}	82.33^{d}

*Means with a common letter within a column show non-significant differences (at p≤0.05) as per Duncan's multiple-range test

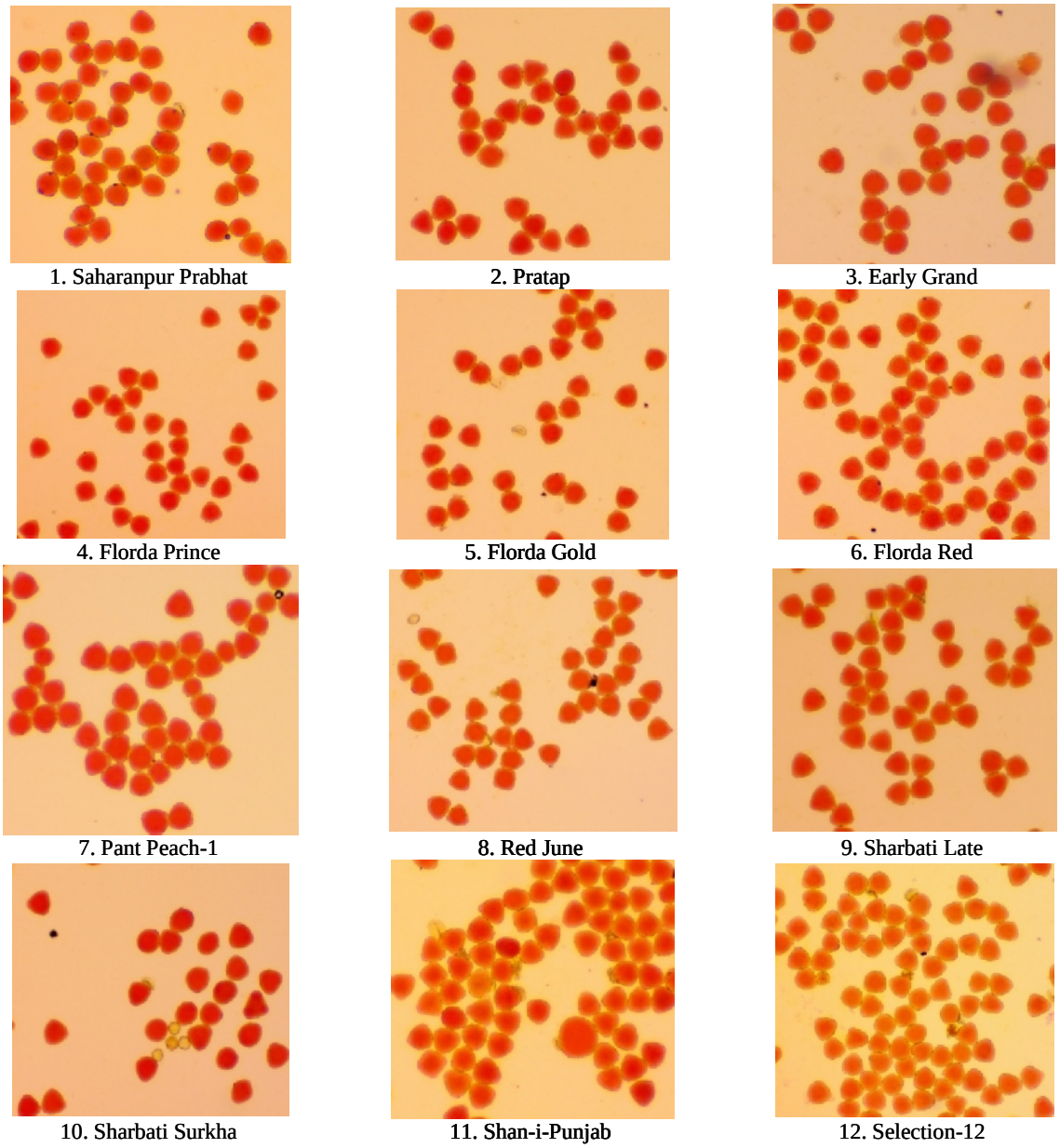

Plate 1. Pollen viability of low chill peach cultivars.

PPV&FRA guidelines described similar findings with respect to flowering shoot thickness and revealed it to be less than 3 mm in Fertilia, Nimla; 3-4 mm in Cresthaven, Snowcrest and greater than 4 mm in Red Globe (Anonymous, 2015). Inter-nodal length of shoots is considered a good indicator of dwarfness in a genotype. Chauhan (2016) recorded maximum (3.88 cm) inter-nodal length in Paradelux whereas minimum in July Elberta (2.39 cm). Chalak *et al*. (2006) observed a showy flower type in Beccoque and Helberta and a non-showy type in Redhaven and Elberta. Thakur (2019) identified the morphology of the petal as medium elliptic in Andros, Glohaven, Paradelux and Shan-i-Punjab; narrow elliptic in Pratap and circular in Redhaven and Suncrest. The findings of the present investigation also substantiate the report of Qadri *et al*. (2017); Ikinci and Bolat (2018).

***Pollen viability*.** It is evident from the data presented in Table 3 and also displayed in Plate 1that the cultivar under study differs significantly for pollen viability. The cultivar Florda Prince obtained the highest pollen viability (98.33%) which was statistically *at par* with Pant Peach-1 (96.33%), Pratap (96.00%) and Saharanpur Prabhat (95.67%), while the Selection-12 witnessed the lowest pollen viability percentage (82.33%).

In general, pollen viability has been reported to vary from species to species, cultivars to cultivars and group to group depending on the ploidy level and the degree of the hybridity of the cultivar. Using acetocarmine (1%) and erythrosine B (0.10%), Singh *et al*. (2015) investigated the pollen viability of low chill peach cultivars and found that the viability percentage ranged from 94.51 to 98.93% with acetocarmine (1%) and 84.19 to 97.70% with erythrosine B (0.10%). Bodh *et al*. (2019) also determined the pollen's viability of peach and reported it to vary from 91.35 per cent to 98.47 per cent with acetocarmine and erythrosine B respectively.

CONCLUSION

A preliminary requirement for the exploitation of useful traits in fruit breeding is identifying and describing the genetic variability available in genotypes. The cultivars having varying dates of bud swell stage and different viability percentages can be useful for initiating any hybridization programme. In crop improvement, yield is a key objective, but it is also a complex phenomenon, affected both biotically and abiotically. One such factor is flower bud density. Therefore, from the present study it is suggested that the cultivars *viz.,* Florda Gold, Red June and Shan-i-Punjab showing superiority for this attribute could be a suitable parent for breeding low chill peach cultivars having a high density of flower buds.

FUTURE SCOPE

Genetic variability in the cultivars needs to be further examined for their genetic parameters and divergence, to have a better understanding of the relationship between the traits at the genotypic and phenotypic levels. Moreover, very few efforts have been made in the country to characterize the available germplasm of peach on a molecular basis for their role in future breeding programs. To develop a new cultivar that has desirable traits such as non-melting and non-browning flesh with slow-ripening, it is important to understand how these traits are being in herited as well as the possible parent combination to breed them.

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Conflict of Interest. None.

REFERENCES

Anonymous (2015). Guidelines for the conduct of test for distinctiveness, uniformity and stability on Peach [*Prunus persica* (L.) Batsch]. Protection of Plant Varieties and Farmer's Rights Authority (PPV & FRA), Government of India, New Delhi, pp.1-16.

Bodh, S., Singh, D., Dogra, R. K. and Chauhan, N. (2019). Comparative Response of Some Peach [*Prunus persica* (L.) Batsch.] Accessions for Tree, Foliage and Floral Traits. *International Journal of Economic Plants*, *6*(3): 116-121.

Chauhan, A. (2016). Characterization of Some Peach (*Prunus persica* L.) Germplasm Accessions. M.Sc. Thesis submitted to Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.).

Chalak, L., Chehade, A., Elbitar, A., Cosson, P., Zanetto, A., Dirlewanger, E. and Laigret, F. (2006). Morphological and Molecular Characterization of Peach Accessions [*Prunus persica* (L.) Batsch] Cultivated in Lebanon. *Lebanese Science Journal*, *7*: 23-31.

Couto, M., Raseira, M. C. B., Herter, F. G. and Silva, J. B. (2010). Influence of High Temperatures at Blooming Time in Pollen Production and Fruit Set of Peach 'Maciel' and 'Granada'. *Acta Horticulturae, 872*: 225–230.

Dennis, F. G., Jr. (2000). Flowering, Fruit Set and Development Under Warm Conditions. In Temperate Fruit Crops in Warm Climates; Erez, A., 1st ed.; Springer: Norwell, MA, USA. Pp 101–122.

Faust, M. and Timon, B. (1995). Origin and Dissemination of Peach. *Horticultural Reviews*, *17*: 267-379.

Faust, M. (2000). Physiological Considerations for Growing Temperate-Zone Fruit Crops in Warm Climates. In Temperate Fruit Crops in Warm Climates; Erez, A., 1st ed.; Springer: Norwell, MA, USA, pp. 137–156.

Gradziel, T. M. and Beres, W. (1993). Semi Dwarf Growth Habit in Clingstone Peach with Desirable Tree and Fruit Qualities. *Hort Science, 28*: 1045-1047.

Ikinci, A. and Bolat, I. (2018). Yield and quality performance of some peach varieties grown under Sanliurfa ecological conditions. *African Journal of Agricultural Research*, *13*: 47-53.

Jana, B. R. (2015). Performance of Some Low Chill Peach (*Prunus persica* L.) Under Eastern Plateau Regions of India. *International Journal of Current Microbiology and Applied Sciences*, *4*(12): 752-757.

Kumar, A. and Shahnaz, E. (2013). Effect of Growth Regulating Substances on Stratification of Wild Apricots (*Prunus armeniaca*) Kernels Under Kashmir Conditions. *Indian Journal of Agricultural Sciences*, *83*(11): 1253-1256.

Kumar, P. (2015). Variability and Association Studies on Low Chilling Genotypes of Peach [*Prunus persica* (L.) Batsch]. M.Sc. Thesis submitted to Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.).

Monet, R. and Bastard, Y. (1971). Effects D'une Température Modérément Élevée: 25°C, Sur Les Bourgeons Florauxdu Pêcher. *Physiol. Vég.*, *9*: 209-226.

Nava, G. A., Dalmago, G. A., Bergamaschi, H., Paniz, R., Santos, R. P. and Marodin, G. A. B. (2009). Effect of High Temperatures in the Pre-blooming and Blooming Periods on Ovule Formation, Pollen Grains and Yield of Granada peach. *Scientia Horticulturae*, *22*: 37-44.

Penso, G., Citadin, I., Scariotto, S., Santos, C. E., Júnior, A., Bruckner, C. H. & Rodrigo, J. (2020). Development of peach flower buds under low winter chilling conditions. *Agronomy*, *10*: 428.

Qadri, R., Ubaid, Z., Saleem, A., Iqbal, A., Nisar, N., Khan, M. M. and Azam, M. (2017). Phenotypic and Biochemical Diversity Among Peach Cultivars Grown Under Environmental Conditions of Pothohan Pakistan. *Journal of Horticultural Science & Technology*, *56*(2): 238.

Sharma, P. P., Thakur, S. and Sharma, N. (2012). Comparative Studies on Growth, Flowering and Fruiting Behaviour of New Introductions of Peach Cultivars with July Elberta under Mid Hill Conditions of Himachal Pradesh. *Progressive Horticulture*, *44*: 206-10.

Singh, D., Yepthomi, G. Y. and Kumar, K. (2015). Variation in Tree, Foliage, Phenological and Pollen Characters of Low Chill Peach Germplasm Accessions Under Mid-hills of Himachal Pradesh. *International Journal of Bio-resource and Stress Management*, *6*(1): 145-150.

Sonaniya, R. and Singh S. K. (2022). Morphological characterization of Chilli (*Capsicum annuum* L.) Germplasm for the Mining of Breeding Traits. *Biological Forum – An International Journal*, *14*(2a): 120-130.

Thakur, A. (2019). Evaluation of Selected Peach [*Prunus persica* (L.) Batsch] Cultivars. M.Sc. Thesis submitted to Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.).

Wang, Y. L. (1985). Peach Growing and Germplasm in China. *Acta Horticulturae*, *173*: 51-55.

Williamson, J. G., Wert, T. W., Chaparro, J. X., Miller, P.and Rouse, R. E. (2008). Flower and Vegetative Bud Set of Four Low-Chill Peach Cultivars at Three Locations in Florida. Proceedings of the Florida State Horticultural Society, *121*: 46–48.

Yepthomi, G. (2011). Characterization and evaluation of low chilling peach (*Prunus persica* L.) germplasm. M.Sc. Thesis submitted to Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.), India.

Yilmaz, K. U., Ercisli, S., Asma, B. M., Dogan, Y. and Kafkas, S. (2009). Genetic Relatedness in *Prunus* Genus Revealed by Inter-Simple Sequence Repeat Markers. *Hort Science*, *44*: 293-297.

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