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RESEARCH ARTICLE

STUDIES ON DIFFERENT TIME INTERVAL AND BUDDING METHODS ON THE BUD TAKE SUCCESS OF NECTARINE ON PEACH (*PRUNUS PERSICA* L.) ROOTSTOCKS

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ABSTRACT

The experiment was carried out at Fruit Nursery of VCSG Uttarakhand University of Horticulture and Forestry, Bharsar, Pauri, Garhwal, Uttarakhand, India, in 2016. To investigate the effect of different time of budding on the performance of Nectarine cv 'Red June' as a bud stick cultivar on peach root stock. Peach seedlings were budded at 15 days interval from 20th August to 20th September. The data showed that budding time and had no significant effect on number of leaves, while it significantly affected the days taken to sprouting, length of longest sprout(cm), diameter of thickest sprout(cm), number of branches, bud take success rate, survival budded plant percentage and total saleable plant percentage. Earliest bud sprout(161.46), Maximum number of leaves(135.15), length of longest sprout (85.68 cm), diameter of thickest sprout(0.93 cm), bud take success rate (87.63%), survival of budded plant(86.52%) and total saleable plant (96.86%) were observed for the plants budded on 20th August. Maximum number of days to sprouting (176.12 days), and minimum Number of leaves(103.45), length of shortest sprout (66.36 cm), diameter of sprout(0.68 cm), bud take success rate (72.38 %), survival of budded plant (71.21 %) and total saleable plant (88.49 %) were recorded for the plants budded on 20th September.

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INTRODUCTION

Peach (*Prunus persica* L.) is a member of family Rosaceae. It was originated in China, where its culture dates back at least to 3000 years. Three wild species are still commonly found there *Prunus davidiana* is an ornamental tree growing wild in northern China and is used as rootstock. The Romans were cultivating the peach since time of Christ and spread it throughout their empire in Europe; from there it was disseminated over the world into all countries of the temperate zones. Peach is now commercially grown around the world between 250 and 450 latitudes above and below equator (Childers, 1975). Peach is an important stone fruit grown in warm temperature zones of the world. Two horticultural races are also grown in sub-tropical regions. However, the peaches produced in the sub-tropics are of inferior quality. The attractive colour of the fruit with excellent quality and taste make peach a most popular fruit in the world. Generally budding is practiced in the active growing season.

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The time of budding is different in different species and even varieties. One variety may perform well in one time while the others may not do so. Keeping in view the importance of budding time, this project was initiated to find out the best time of budding for Nectarine cv. Red June on local peach rootstock. The peach along with its smooth skin mutant, the nectarine, is a temperate juicy fruit of excellent appearance and quality. It comes in the market early in season, particularly from low chilling cultivars grown in warmer regions. The grower can benefit from the relatively higher market price at this juncture due to the scarcity of other fruits. The first good crop of peach is obtained within 4-5 years of planting, which is sooner than majority of the other temperate fruits. Peach culture is, therefore, expending on a faster pace in many countries and its fruit production is highest among all the stone fruits (Childers, 1975). Nectarine (*Prunus persica spp. nucipersica*.) this is a stone fruit in warm temperate climate also grown in sub-tropical regions. It is most popular because of its attractive colour, excellent quality and taste, grown in warm temperate zone of Europe, North America, South Africa, Asia and Australia. Nectarines are smooth skin mutants, with fuzziness allied to peach; it is non-pubescent peach of smaller size.

Nectarine kernel contains minerals 39-55 percent Fat, 23-30 percent Proteins, 14.8 percent Crude fiber, 2.7 percent Minerals. Budding during September was reported to be superior in May to June in the western hills of India (Srivastava, 1964). Ring budding during April to May and T- or shield budding from June to September has good success (Thapar, 1966). However, under sub-tropical conditions maximum percentage of success was observed in January (Sharma and Singh, 1979). Budding makes very efficient use of a bud stick, as only a single bud is needed to propagate a new tree this reduces both the number of trees required to supply bud stick and the labor to maintain the tree and bud sticks. Budding also makes efficient use of plant material in cases when a bud stick of a particular rootstock is limited. Budding may also result in a stronger union. The simplicity and speed of budding especially the T-budding and chip budding techniques, makes these useful for amateur horticulturists. A single, well learned method can be used in a wide variety of applications. T-budding, the predominant propagation technique for southeastern peaches, is done beginning in early summer (June budding). June budding is done as soon as the seedling rootstocks are large enough to bud (late May to early June), and continues through mid to late June. Buds for dormant budding may be taken in mid to late summer. Dormant budding can be practiced from mid-July to early September, as long as the bark on the rootstock separates cleanly from the woody tissue beneath it, and the bud shield separates cleanly from the bud stick. Buds are not forced until the following spring. In March following dormant budding, cut the rootstocks off about two inches above the bud, forcing the bud to grow.

Although peach is a very popular fruit crop, yet its cultivation in our country has remained in state of neglect. The non-availability of the quality planting materials (rootstock and bud-wood) and lack of efficient propagation techniques and other information on the performance of cultivars under different agro-climatic condition of temperate region are the major constraints in the expansion of peach cultivation in India. In peach no systematic work has so far been done on their survivability and morphological performance in relation to propagation method (budding) with suitable time of propagation under hilly conditions of Garhwal. Generally budding is practiced in the active growing season. The time of budding is different in different species and even varieties. Keeping in view the importance of budding time, this research was initiated to find out the suitable time of budding and to evaluate appropriate budding method for peach on local peach rootstock.

MATERIALS AND METHODS

A research study highlighting the "**Studies on different Time interval and Budding Methods on the Bud Take Success of Nectarine on Peach (*Prunus persica* L.) Rootstocks:** Was carried out at Fruit Nursery, VCSG Uttarakhand University of Horticulture and Forestry Bharsar Pauri Garhwal, Uttarakhand, India, during 2016. Nectarine cultivar *i.e.* 'Red June' were budded at 15 days interval on peach seedling rootstock, from 20th August up to 20th of September with shield, chip budding practices followed. The experiment was laid out in Randomized Block design (Factorial), with three treatments and three replications. Row to row distance of 60 cm and plant to plant distance of 10cm were maintained. Twenty four plants were budded in each treatment and replicated three times in such a manner that 8 plants were budded on each time. Topping was also done after 2-3 weeks of the budding with the purpose of diverting the food materials to budding growth. All cultural practices like manuring, Hoeing, weeding and irrigation were uniformly carried out during the research study.

The following parameters were studied:

Days taken to bud sprouting: The days taken to bud sprouting in each treatment was recorded from the date of budding to date of first bud sprout.

Average sprout length (cm): The Length of sprouts(cm) was measured in each treatment with the help of scale in each previously tagged budded plants at 30 days interval and the mean length of sprouts were calculated.

Average diameter of sprout (cm): The diameter of randomly selected sprout was measured in centimeter by Vernier Calipers or micro meter at 30 days interval and average was worked out.

Average number of leaves per budded plants: The total number of leaves was counted on newly emerged shoots of buds at 30 days interval and average number of leaves on sprouted buds was calculated.

Percentage bud take success rate: The green buds were counted when maximum percent of bud sprouting and the percent bud take success was calculated by using the following formula:

$$\text{Bud success rate \%} = \frac{\text{Total green buds}}{\text{Total bud inserted}} \times 100$$

Percent survival of budded plants: The survival budded plants were recorded in each treatment after 8 to 10 months at the termination of experiments and the survival percentage of buds was calculated by following formula:

$$\text{Survival of budded plants \%} = \frac{\text{Number of survive budded lants}}{\text{Total bud take}} \times 100$$

Percent total saleable plants: The plants attaining good height and vigor in growth were considered as saleable plants. The number of such saleable plants were recorded at the end of growing season and expressed under:

$$\text{Total saleable plants \%} = \frac{\text{Number of saleable plants}}{\text{Number of survive budded plants}} \times 100$$

Statistical analysis: Data were evaluated by analysis of variance with using standard statistical procedure in the Factorial Randomized Block Design (FRBD). Standard errors of mean's (S.EM.±) were computed in each case and the critical differences (C.D.) at 5 percent level of significance were calculated only for significance results (Snedecor and Cochran, 1987).

RESULTS AND DISCUSSION

Days taken to bud sprouting: Data presented in table (1). The interaction among different time and methods were also found significant with respect to (161.46 days) taken to first bud sprout 20th August + shield budding (T_1M_1 treatment combination).

Table 1. Effect of Different Time and Methods of Budding on Various Characters

Treatment	Days taken (No. of days)	Shoot length (cm)	Shoot Diameter (cm)	Number of leaves	Bud take success rate %	Survival %	Saleable plants %
T_1M_1	161.46	85.68	0.93	135.15	87.63	86.52	96.86
T_2M_1	169.49	83.51	0.88	122.45	79.37	78.84	95.21
$T3M_1$	170.94	70.75	0.74	116.62	76.53	75.41	90.44
T_1M_2	170.64	80.67	0.88	122.31	83.49	81.32	95.30
T_2M_2	177.61	76.45	0.83	109.27	75.22	74.65	94.48
T_3M_2	176.12	66.36	0.68	103.45	72.38	71.21	88.49
C.D $_{0.05}$	0.69	0.45	0.03	0.47	0.46	0.42	0.40

T_1=20th August, T_2=5th September,T_3=20th September, M_1= Shield Budding, M_2=Chip Budding

Fig.1. Bud sprout from a budded plant

Due to, when maximum saps flow in rainy season for suitable time and method of budding. In accordance to our present investigation, Ahmad, *et. al.* (2015) observed that the significant effect of budding method and time on number of days to sprouting showed that maximum number of days to sprouting (199.14) were observed in plants produced through T- budding with September while minimum number of days to sprouting (194.29) were recorded for chip budding with August in Guava.

Average length of longest bud sprout (cm): The interactions among different time and methods of budding were also found significant with respect to length of longest bud sprout (85.68cm) was recorded from 20th August with shield budding (T_1M_1 treatment combination) showed that table (1).. The increase average length of bud sprout is due to, favorable climatic conditions, presence of greater number of leaves, that elevated the rate of photosynthesis and hence carbohydrate formation increased. These results confirm the results drawn by Dwivedi *et al.* (2000) indicate that the 14 and 21 August have given the best results in terms of linear growth (24.70 cm) in apricot under cold arid condition of Ladakh.

Diameter of thickest sprout (cm): Data showed in table (1). 20th August + Shield budding (T_1M_1 treatment combination) were obtained thickest sprout (0.93 cm). Might be due to the maximum budding growth in those plants budded under T_1 treatment (20th August). It is clear from the mean data that plants budded through (Shield budding) have maximum budding growth which results in maximum stem thickness due to having more photosynthetic. Ahmad, *et al*. (2015) Statistical analysis of the data revealed that budding dates, methods and their interaction had significant effect on stem thickness in guava budding. Maximum stem thickness (58.25 mm) was recorded on plants budded on September with T-budding, while minimum stem thickness (53.50 mm) was observed in plants budded on August+ chip budding.

Average number of leaves: The interactions among different time and methods of budding data showed in table (1) found significant with respect to the number of leaves. Higher number of leaves (135.15) were observed under T_1M_1 treatment combination (20th August + shield budding). The higher number of leaves with optimum time and methods might be due to better bud growth and more number of branches. This augmented absorption and translocation of nutrients from soil which take active part in various plant metabolic processes. These results matched the result drawn by Akhtar *et al.,* (2000) they observed that maximum number of leaves (292.54) occurred on peach plants budded on 28th August with chip budded, it's may be due to maximum number of branches and maximum budding growth.

Bud take success rate (%): Data presented in table (1).The interactions among different time and methods of budding were also found significant on bud take success percentage. Maximum bud take success (87.63%) were recorded for the plants budded on T_1M_1 treatment combination (20th August + shield budding). Due to by proper climatic condition to facilitate the union between stock and bud takes. The results of Singh, *et al.* (1986) noted that shield budding performed in mid September (T_3) gave the highest percentage of success (95.30%), followed by mid-August (92.0%).

Survival budded plant (%): Data present in table (1) showed significant difference among different time and methods on survival percentage. Maximum plant survival (86.52 %) was recorded from 20th August practiced on shield budding (T_1M_1 treatment combination). It is due to the fact that budding in August produce favorable environmental conditions for the healing process of bud wounds and resulted in the development of normal vascular tissues at the bud union which result in maximum plant survival. Similarly, budding late in the growing season contributed to unfavorable conditions for healing process which results in the poor development of normal vascular tissue at the bud union.

The findings of the study conducted by. Khattak *et al.* (2001) observed in case of propagation methods chip budding gave better survival of budded plants (80.00%).

Total saleable plant (%): The interaction among between different time and methods has significant difference on plant saleable showed on table (1) and found maximum saleable plant (96.86%) were taken under T_1M_1 (Shield budding practiced on 20th August). Higher percentage of such plant obtained 20th August on shield budding practice is attributed to proper and quick union formation, early bud sprout and longer period time available for growth. Similarly results by, Joolka and Rindhe (2000) obtained the highest proportion of saleable plants (98.32%) in chip budding, followed by T-budding (98.32%) in pecan nut.

Conclusion

Conclusions based on experimental results are as:

- Nectarine cv. Red June budded on to Peach seedlings rootstock through shield budding showed good results with respect to bud take success, survivability and most of the plant growth parameters as compared to chip budding.
- In case of budding time interval most of the growth parameters showed good results with highest bud take success and survivability when the plants are budded on 20th August as compared to 5st September and 20th September.

Recommendation

- Based on the above conclusion, the following recommendation is made:
- Shield budding on 20th August is the best for better growth of Nectarine cv. Red June

REFERENCES

Ahmad S., Munir M., Bostan N. and Rabi F. 2015. Effects of budding methods and time interval on bud take success in seedless guava (*Psidium guajava* L.).*Journal of Agricultural and Biological Science* 10(4): 146–51.

Akhtar I., Hussain S. A. and Nawab A. 2000. Effect of different time of budding of apricot on peach root stock. *Sarhad Journal of Agriculture*.16: 163–5.

Childers NF. 1975. Modern Fruit Science. Horticulture Publication, Rutgers University, Brunshrick New Jersey.

Dwivedi S K. Singh B. and Paljor E. 2000. Studies on vegetative propagation of apricot (*Prunus armeniaca* L.) through grafting in Ladakh. Indian *Journal of Horticulture.* 57(1): 39–41.

Joolka N K. and Rindhe A B. 2000. Standardization of method and time of budding in pecan. *Indian Journal of Horticulture* .57(1): 51–3.

Khattak M S., Malik M N. and Khan M A. 2002. Guava propagation through chip budding. Pakistan *Journal of Agriculture Research* 17(2):178-181.

Singh, M. Sharma, J.K. 1979. Effect of Rootstocks on Nutrient Status of Grafted ´Perlette´ Grapevines at the Nursery Stage. *Acta Horticulturae*.689.

Singh, J. and Singh, H. 1986. Effect of time of budding and plan growth regulation on bud take in plums. *Horticulture Abstracts*.58(11):732.

Srivastava, R.P. 1964. Propagating guava by budding method. *Indian Horti.*8(2):6-8.

Thapar. 1966. A History of India 1, Harmondsworth, New York, Ringwood Markham Auckland: Penguin Books.

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