Effect of Different Time of Budding on the Bud Take Success of Peach on Peach Rootstock

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ABSTRACT

The experiment was carried out at Malakandar Farm of NWFP Agricultural University (Peshawar), Pakistan to investigate the effect of budding time on the performance of peach (Early Grande) as a scion cultivar on peach root stock. Peach seedlings were budded at 10 days interval from 5th June to 5th July. The data showed that budding time had no significant effect on bud take success and bud sprouting, while it significantly affected the budding growth, number of branches and number of leaves per plant. Maximum bud take success (85.0%) was recorded for plants budded on 5th and 25th of June. Bud sprouting (86.5%) was maximum for the plants budded on 5th July. Maximum budding growth (127.9 cm), number of branches per plant (14.8) and number of leaves per plant (292) were observed for the plants budded on 15th June. Minimum bud sprouting (64%), budding growth (85.5 cm), number of branches/plant (8.3), number of leaves/plant (111.0) were recorded for the plants budded on 5th June. Bud take success (80.0%) was minimum for the plants budded on 5th July.

Key words: Time of budding, Peach bud take success, Peach Rootstock

Introduction

Peach (Prunus persica) is a member of family Rosaceae. It was originated in its wild form in China and apparently was cultivated there about 2000 B.C before it was taken westward to Persia and later to Greece about 350 B.C. 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 [4].

The chilling requirement below 7°C temperature for peach is around 650-1100 hrs. Peach is a quite hardy fruit, preferring cold winter and sunny dry spring. It is successfully grown in plain and hilly areas of North West Frontier Province (N.W.F.P). Variety 6-A was the only commercial variety of the province till 1978-79, with Robin and Babcock cultivated on the limited scale. At present NJC-84, Carmon and Red French Early are promising varieties in the early maturing group, while NJ-238, Suwanee, Ranger and Spring Dust have shown good results among the mid- season and NJ241 is considered best among late season varieties. Flordasun an early and low chilling variety is recommended for commercial plantation in the plains of N.W.F.P. Total area in N.W.F.P under peach cultivation was 900 ha with a total production of 10100 (Agri.stat.Pak. 1993-94).

Peach is adaptable to a wide range of soils but it is essential that it must be well drained, fertile and slightly acidic with a pH range of 6.7-7.0. During nursery production, the common procedure is to grow rootstocks from seeds and then to bud named varieties upon them. The different stone fruits unite quite readily while subjecting to inter budding or inter grafting, but the resulting unions vary widely in degree of compatibility. Local peach was recommended as a root stock for scion varieties of peach because of its resistance against nematodes. Bitter almond and Hari apricot were not as promising as local peach. Almond stock was found incompatible with 6-A scion, which was found extremely susceptible to gumosis and shoot borer attack under the growing conditions of Peshawar, Pakistan. Lovell root stock performs well on fully

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drained sandy loam soil and it is susceptible to nematode. Okinawa root stocks have good compatibility with scion and adoptable to well drained sandy loam soil. The Chinese wild peach is strongly tolerant to alkaline soil and performed well as a root stock for peaches grown on alkaline soil [1].

Low success rate for budding stone fruit crops in South Ukraine was due to incorrect time of budding. Budding in all cases was carried out on 8 dates between 25th June and 5th September. In sweet and sour cherries the best time for budding was late August to early September, while mid-August for plums, apricots and peaches. Budding on 25th June gave only 32.6-36.7% success in cherries and nil in other species [11]. Peach cultivars Lola and Sumbuli, T-budded on the seedlings in late May to early June, grew well and bud success rate was averaged as 98.2-98.4% and transplants production was 95.0-95.9% [8].

Generally budding is practiced in the active growing season. 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 peaches on desi peach rootstock.

Materials and Methods

A research study highlighting the effect of different time of budding of peach on peach rootstocks was carried out at Malakander farm, N.W.F.P Agricultural University Peshawar. Cv. Early Grande were budded at 10 days interval on peach rootstock from 5th of June up to 5th of July.

The experiment was laid out in Randomized Complete Block design (RCB), with four treatments and four replications. Row to row distance of 60cm and plant to plant distance of 10cm were maintained. Forty plants were budded in each treatment and replicated four times in such a manner that 10 plants were budded on each date.

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:

1. Percent Bud success rate:

The green buds were counted after 20 days of budding and the percent bud take success was calculated by using the following formula:

\[
\text{Bud take success % age} = \frac{\text{Total green buds}}{\text{Total buds inserted}} \times 100
\]

2. Percent bud sprouting:

The sprouted buds in each treatment were counted 70 days after budding and sprouting percentage of bud was calculated with the following formula:

\[
\text{Bud sprouting % age} = \frac{\text{Sprouted buds}}{\text{Total bud take}} \times 100
\]

3. Budding growth (cm):

Five plants in each treatment were selected and the growth of the budding was measured using a measuring tape. One end of the measuring tape was placed on the budded portion and the other was extended to the top of the shoot in order to get actual length. The mean of the five plants was calculated.

4. Number of branches/plant:

Number of branches was counted on the budding growth in each treatment and average number of branches per plant was worked out.

5. Number of leaves/plant:

Number of leaves was counted on the budding growth in each treatment and the average number of leaves per plant was calculated.

Statistical analysis:

The data were analyzed statistically using MStatC. The means were compared using the LSD test at 5% level of significance.

Results and Discussion

1. Bud takes success (%):

The data recorded for the percent bud take success is presented in (figure-I), revealing that budding time had a non-significant impact on percent bud take success. The mean values for budding time revealed that maximum percent bud take success (85.0%) was obtained by the plants budded on 5th and 25th June respectively and least percent bud take success (80.0%) were obtained by the plants budded on 5th July. The reason might be due to presence of cell sap in root stock and scion during these dates (which is important for the union between stock and scion). Proper temperature and humidity could also facilitate the union between stock and scion. The results of Vasilenko [11] are also of primary importance, who budded peach cultivars on seedlings and reported 57.0-69.9% success in mid-August.
2. Bud sprouting percentage:

The data recorded for bud sprouting percentage is presented in figure-II, depicting that budding had non– significant effect on bud sprouting percentage. The mean values for budding time revealed that maximum bud sprouting (86.5%) were found in the plants budded on 5th July, while minimum bud sprouting (64.0%) were observed in the plants budded on 5th June. These results are in line with Gautam et al. [3], who reported the highest budburst (65%) while practicing T-budding of peach on local peach root stocks on 25th July.

3. Budding growth (cm):

Figure-III presents the data recorded for the budding growth, which explains that budding time caused a significant effect on budding growth. The mean values for budding time showed that maximum (127.9cm) and minimum (85.5cm) budding growth was obtained in the plants budded on 15th and 5th June respectively. The increase in budding growth is due to presence of greater number of leaves, that elevated the rate of photosynthesis and hence carbohydrate formation increased. These results confirm the results drawn by Ijaz Akhtar et al. [2] who studied that apricots were budded on peach rootstocks at 1-intervals from 7th June 1993 until 12th July 1993. Trevatt was used as scion cultivar with T-budding in practice. Bud growth was greater from budding on 12th July.

4. Number of branches:

The data recorded for number of branches is presented in figure-IV, shows that budding time had significant effect on the number of branches. The mean values for budding time depicted that maximum number of Branches (14.80) were produced by plants budded on 15th June, while minimum number of branches (8.3) were recorded on the plants budded on 5th June. The results are in parallel with Nitransky [6], who worked on the effect of different root stocks on the field tolerance of the peach cultivar Redhaven to unfavorable factors. Redhaven were budded on Lovell peach root stocks at different intervals in late summer (mid-August). It had significant effect on the health of trunk, branches, shoot growth and loss of the lateral shoot.

5. Number of leaves:

Figure-V presents the data recorded for the number of leaves, revealing that budding time had significant effect on the number of leaves. The mean values for budding time revealed that maximum number of leaves (292) were observed on the plants budded on 15th June followed by plants budded on 5th July (281) and 25th July (182), respectively. Minimum number of leaves per plant (111.0) were found on plants budded on 5th June. These results matched the result drawn by Ijaz Akhtar et al. [2]. They observed that maximum number of leaves occurred on plants budded on 28th June, while minimum leaves were observed on plants budded on 7th June. The maximum number of leaves/plant may be due to maximum number of branches and maximum budding growth.

Recommendations:

The following recommendation can be managed in light of the experiment conducted and literature reviewed;

June 15th was found to be the best time for budding of the peach on peach rootstocks, as it produced maximum budding growth, number of branches, number of leaves, therefore this date is recommended for budding of peach.
**Fig. II:** Bud sprouting percentage of Peach. Error bars represent standard error. Values with different letters were significant on different dates at 0.05 level.

**Fig. III:** Budding growth of peach. Error bars represent standard error. Values with different letters were significant on different dates at 0.05 level.

**Fig. IV:** Number of branches of peach. Error bars represent standard error. Values with different letters were significant on different dates at 0.05 level.

**Fig. V:** Number of leaves of Peach. Error bars represent standard error. Values with different letters were significant on different dates at 0.05 level.
References


