# EFFECT OF BUDDING METHOD AND TIME ON VEGETATIVE PROPAGATION OF JAMUN (*SYZYGIUM CUMINI* SKEELS.)

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**Abstract:** Among various methods of budding, patch and shield budding are commonly used in jamun. The patch budding is a well established and commercial method of propagation of jamun due to highest per cent of bud take and success shield budding is practiced largely. On the basis of finding obtained from the present investigation, it can be concluded that Jamun seedling budded on 15th June with patch method showed better performance over shield budding with respect to maximum bud take, bud sprouting, height and diameter of budding. The interaction effect (time and method) found to be non-significant in most of cases.

**Keywords:** Patch budding, Shield budding, Bud takes, Bud sprouting

## INTRODUCTION

The jamun (*Syzgium cumini* Skeels) is popular indigenous minor fruit of India. It belongs to the family myrtaceae and is known by different names such as black plum, Indian black cherry, jamun, kalajam, jam and jambol in different parts of India. Jamun trees are found scattered throughout the tropical and subtropical regions but there is no organized orcharding of this fruit crop in the country. It is commonly found from Indo- Gangetic plains in North to Tamil Nadu in South. It also grows in the lower range of the Himalayas and Kumaon hills. Jamun fruits are very important from nutrition point of views; it is a good source of iron, apart from sugars, protein and vitamins. It contains Iron (1.0%), Calcium (0.02%), Fat (0.1%), Phosphorus (0.01%), Protein (0.07%), Mineral matters (0.4%), Fibre (0.9%), Carbohydrates (19.7%), Moisture (28.2%) and Calorific value (83 per 100g) as reported by Singh *et al*., (1967). Vitamin A and C contents of jamun fruit is higher than apple. The fruit is well known for its medicinal properties. The ripe fruit is astringent, stomatic, carminative and antiscarbutic and is used in treatment of chronic diarrhea, heart, liver trouble and scanty urine. The seed is astringent and very efficacious for diabetes and glycosuria.Propagation method is the most important because jamun is not multiplied by this way but improvement of the wild species to cultivated one can be made easily by this method. Among various methods of budding, patch and shield budding are commonly used in jamun. The patch budding is a well established and commercial method of propagation of jamun due to highest per cent of bud take and success shield budding is practiced largely because of well awareness of its technique to nursery men.

In recent years demand for jamun plant has increased manifold. This has necessitated standardization of technique for commercial propagation of jamun plants. In the present investigation it was tried to improve upon the budding technique in jamun in different time interval.

## MATERIAL AND METHOD

### Experimental site

The horticulture experimental garden is located in South- Eastern part of Varanasi city at $25^0$ 81' North longitude and $80^0$ 30' East longitude and about 128.93 meters above the mean sea level.

### Preparation of nursery bed

To make the condition of field nearly uniform for seed germination, sufficient amount of FYM and sand were added to the nursery bed. The height of the raised bed was kept 15 cm above ground level.

### Seed showing in nursery

Before sowing the seeds were soaked in water for the 24 hours. The seed sowing was done in accordance with time of sowing in nursery beds. The seeds were sown at a depth of 5 cm at a distance of 25x15cm.

### Mulching

After seed sowing the nursery bed was mulched with layer of dry grasses and sprinkler irrigation was done daily till germination of seed. After seed germination, the grass- mulch was removed carefully.

### Budding

The seedling which attained budding thickness (0.5cm) after 90,120 and 150 days were considered

for budding. The patch and shield methods of budding were employed all the time of budding.

**Observations**

The following observations were noted for experiment

**Per cent bud take**

After budding, the buds which remained green up to the end of bud sprouting were considered for the recording of per cent bud take.

**Per cent sprouting**

The emergence of sprout from the bud was recorded for bud sprouting and expressed in per cent.

**Seedling height**

Height of jamun seedling was recorded at 90,120 and 150 days after sowing. Height of seedling was measured with the help of a meter scale from the ground level to the apex of the growing plant and expressed in cm.

**Diameter of stem**

Stem diameter was recorded with the help of Vernier Calipers at the height of 15 cm, above the ground level.

## RESULT AND DISCUSSION

**Budding method**

Plant materials consisted of 9-12 month-old uniform jamun seedlings. Plants were grown in the raised nursery beds at the Horticulture experimental garden, Banaras Hindu University. Budding operation was performed immediately after arrival of the section –shoot at the site where the budding operation was to be performed. In patch budding a rectangular patch of bark was removed completely from the root stock and a patch of bark of the same size containing a bud of the desired variety was placed there. The procedure was completed by tying the patch with polythene strip leaving the bud open to grow.

The second method of budding was shield. The "T-bud" designation arises from the T- like appearance of the incision in the stock, whereas the "shield – bud" name is derived from the shield like appearance of the bud when it is ready for insertion into the stocks. The budding was performed at a height of 18 to 20 cm from the ground on rootstock. A straight cut of the similar length as bud had, was made into the bark of the rootstock with the help of a budding knife. The bark around the cut was slightly loosened from the wood and the bud was carefully inserted into the incision. As soon as the operation was become over, the bud was tied with the polythene stripes of 150 gauge thickness and about 25 mm width. The similar budding method was employed by Singh *et al.,* (1967) and Parik (1987).

**Per cent of bud take and bud sprouting**

The data pertaining to per cent bud take and bud sprouting as influenced by different budding times and method are presented in Table 1. Data revealed that per cent bud take was significantly higher when budding was performed on 15$^{th}$ June followed by 30$^{th}$ June and also was comparable with rest of the budding times. However, values were 37.77 ad 63.30 per cent in 15$^{th}$ March and in 15$^{th}$ June budding respectively. The interaction between time and method of budding was found to be significant. The maximum bud take (91.13%) was recorded in 15$^{th}$ June with patch budding whereas the minimum bud take (35.47%) was recorded with shield budding. The similar finding have also been made by Venkatraman and Satyanaraya (1956) and Moti and Charurvedi, (1976).

The per cent of bud sprouting ranged between 37.77 to 63.30. The maximum bud sprouting was recorded with 15$^{th}$ June budding, which was significantly higher over rest of the treatments. However, the minimum bud sprouting (37.77%) was recorded with 15$^{th}$ March budding. The bud sprouting is influenced by various budding method and the highest bud sprouting (75.25%) was recorded with patch method of budding, whereas lowest (25.83) in shield method of budding. The per cent bud sprouting trend was as similar as it was observed in case of bud take. Mawani *et al*., (1992) advocated that weather played an important role in bud union and sprouting as humidity which ensured callus interlocking and highest callus production.

**Height of Jamun budding**

The data pertaining to height of jamun budding as influenced by different budding time treatment are presented in Table 2. The height of budding increased considerably with 15$^{th}$ June budding. The maximum height of 29.48 cm, 35.92 cm and 39.78 cm at 60, 90 and 120 days after budding was recorded respectively. The minimum height was obtained in shield budding. In patch budding, the height was 26.14 cm at 60 days, 35.57 cm at 90 days and 38.13 cm at 120 days after budding.The height of budding varied from 34.62 to 39.78 cm after 120 days of budding showing the similar response of time as noted after 90 days of budding. The similar result was also recorded by Singrot (1980).

**Diameter of budding**

The data pertaining to diameter of budding are presented in Table 3.The diameter of budding after 60, 90 and 120 days was 0.27 cm, 0.38 cm and 0.48 cm respectively. The budding with 15$^{th}$ June gave maximum diameter in patch budding over the shield budding. The diameter under shield and patch budding ranged between 0.22 to 0.24 cm at 60 days , 0.32 to 0.36 cm at 90 days and 0.38 to 0.46 cm at 120 days after budding. In case of diameter also the interaction effect between time and method was found to be non- significant at 60 days after budding. However, the interaction effect remained significant at 90 and 120 days after budding. It might be due to

high temperature and humidity which caused congenial atmosphere for the growth of budding. The following result was observed by Kajal (1983).

**Table 1:** Effect of budding time and method on bud take and bud sprouting.

| S.no | Budding time | Bud takes (%) | | | Bud sprouting (%) | | |
|---|---|---|---|---|---|---|---|
| | | Shield | Patch | Mean | Shield | Patch | Mean |
| 1 | 15th March | 15.75 | 59.80 | 37.77 | 15.75 | 59.80 | 37.77 |
| 2. | 30th March | 19.30 | 65.80 | 42.55 | 19.30 | 65.80 | 42.55 |
| 3. | 15th April | 23.23 | 96.23 | 46.23 | 23.23 | 96.23 | 46.23 |
| 4. | 30th April | 25.47 | 71.13 | 48.30 | 25.47 | 71.13 | 48.30 |
| 5. | 15th May | 27.60 | 74.72 | 51.16 | 27.60 | 74.72 | 51.16 |
| 6. | 30th May | 29.37 | 80.97 | 55.17 | 29.37 | 80.97 | 55.17 |
| 7. | 15th June | 35.47 | 91.13 | 63.30 | 35.47 | 91.13 | 63.30 |
| 8. | 30th June | 30.47 | 89.23 | 59.85 | 30.47 | 89.23 | 59.85 |
| | | 25.83 | 75.25 | | 25.83 | 75.25 | |
| | CD at 5% | Time = 0.34<br>Method = 0.67<br>T x M = 0.95 | | | Time = 0.34<br>Method = 0.67<br>T x M = 0.95 | | |

**Table 2:** Effect of budding time and method on height of jamun budding.

| S.no | Budding time | Height of budding (cm) under two method | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 60 days | | | 90 days | | | 120 days | | |
| | | Shield | Patch | Mean | Shield | Patch | Mean | Shield | Patch | Mean |
| 1 | 15th March | 20.63 | 21.53 | 21.08 | 28.47 | 24.83 | 26.65 | 34.66 | 34.58 | 34.62 |
| 2. | 30th March | 20.77 | 21.90 | 21.33 | 28.77 | 29.67 | 29.22 | 34.83 | 35.58 | 35.21 |
| 3. | 15th April | 24.63 | 25.85 | 25.24 | 29.83 | 33.43 | 31.63 | 36.42 | 37.42 | 37.83 |
| 4. | 30th April | 24.73 | 25.93 | 25.33 | 31.83 | 34.83 | 33.33 | 36.22 | 38.68 | 37.45 |
| 5. | 15th May | 25.85 | 27.50 | 26.68 | 33.27 | 35.17 | 34.22 | 37.77 | 38.75 | 38.26 |
| 6. | 30th May | 26.15 | 28.40 | 27.28 | 33.50 | 37.00 | 35.25 | 38.60 | 39.97 | 39.28 |
| 7. | 15th June | 29.12 | 29.83 | 29.48 | 34.67 | 37.17 | 35.92 | 38.80 | 40.76 | 39.78 |
| 8. | 30th June | 27.38 | 28.13 | 27.76 | 33.63 | 36.43 | 35.03 | 38.42 | 38.87 | 38.64 |
| | | **24.91** | **26.14** | | **31.75** | **33.57** | | **36.96** | **38.13** | |
| | CD at 5% | Time = 0.42<br>Method = 0.84<br>T x M = NS | | | Time = 0.51<br>Method = 1.02<br>T x M = 1.44 | | | Time = 0.31<br>Method = 0.62<br>T x M = 0.88 | | |

**Table 3:** Effect of budding time and method on diameter of jamun budding.

| S.no | Budding time | Height of budding (cm) under two method | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 60 days | | | 90 days | | | 120 days | | |
| | | Shield | Patch | Mean | Shield | Patch | Mean | Shield | Patch | Mean |
| 1 | 15th March | 0.20 | 0.21 | 0.20 | 0.29 | 0.34 | 0.31 | 0.38 | 0.38 | 0.36 |
| 2. | 30th March | 0.20 | 0.22 | 0.21 | 0.30 | 0.33 | 0.32 | 0.35 | 0.40 | 0.38 |
| 3. | 15th April | 0.21 | 0.23 | 0.22 | 0.32 | 0.34 | 0.33 | 0.37 | 0.44 | 0.41 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 4. | 30th April | 0.22 | 0.24 | 0.23 | 0.32 | 0.35 | 0.34 | 0.38 | 0.46 | 0.42 |
| 5. | 15th May | 0.23 | 0.25 | 0.24 | 0.33 | 0.36 | 0.35 | 0.39 | 0.48 | 0.44 |
| 6. | 30th May | 0.25 | 0.25 | 0.25 | 0.34 | 0.37 | 0.35 | 0.41 | 0.50 | 0.46 |
| 7. | 15th June | 0.26 | 0.28 | 0.27 | 0.36 | 0.40 | 0.38 | 0.43 | 0.53 | 0.48 |
| 8. | 30th June | 0.22 | 0.26 | 0.24 | 0.34 | 0.39 | 0.36 | 0.39 | 0.52 | 0.46 |
| | | **022** | **0.24** | | **0.32** | **0.36** | | **0.38** | **0.46** | |
| | CD at 5% | Time = 0.019<br>Method = 0.009<br>T x M = NS | | | Time = 0.0035<br>Method = 1.0071<br>T x M = 0.0100 | | | Time = 0.006<br>Method = 0..012<br>T x M = 0.017 | | |

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**REFERENCES**

**Kajal, R.S.** (1983). Studies on the effect of showing depth, seed and budding treatment on germination and budding growth in Ber (*Zizyphus mauritiana* Lamk.) Thesis Abstract, Haryana Agriculture University, Hisar. **9**:176

**Mawani, P.B. and Singh, S.P.** (1992). Effect of method and time of budding on growth and development of bud grafts in Ber (Zizyphus mauritiana Lamk) cv. Gola. Horticultural Journal. **2**: 79-83

**Moti, D.L. and Chaturvedi, O.P.** (1976). Propagating some subtropical fruits by budding. *Panjab Horticultural Journal*, **16** (1/2):33-38.

**Parik, O.P.** (1987) Ber- a valuable fruit. *Indian Horticulture*, **23**:5-6.

Singh, S.K., Krishnamurty, S. and Katyal, S.L. (1967). Fruit culture in India, ICAR, New Delhi pp. 255-9

**Singrot, R.S. and Makhija, M and Chauhan, K.S.** (1980). Vegetative propagation of Ber IV. A note on the effect of different time of budding on budding performance. *Haryana Journal of Horticultural Sciences*, **9** (1/2):40-42.

**Venkatraman, L. and Satya Narayan, G.** (1956). Vegetative propagation of Sitaphal (*Annona squamosa*). *Indian Journal of Horticultural*, **13**:90-100.