

# Comparative performance of budding methods in pecan nut propagation

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## Abstract

An experiment was laid out with four methods of budding performed on eight dates to standardize the best method and time of budding in pecan. Annular budding was found to be much superior to other methods of budding viz., patch, chip and forkert, as it registered a significantly higher bud take success and total growth of budded plants. While budding performed on June 30, gave best result, period from June 30 to July 15 was found optimum time for budding pecan nut under the mid hill conditions of North-Western Himalayas.

**Key words:** Pecan, *Carya illinoensis*, budding methods, propagation

## Introduction

Pecan (*Carya illinoensis*) is one of the most important and nutritious nut fruit of the world. Although, agroclimatic conditions of mid-hills of Himachal Pradesh, Uttar Pradesh and Jammu & Kashmir is quite suitable for its cultivation, yet the area under pecan plantation is limited at present. The majority of the trees being grown at present are of seedling origin, which has a long prebearing age, highly variable nut size and quality. As a result, at present, the pecan nuts are growing mostly as scattered trees rather than planned regular plantations. There is a great scope for the expansion of area under this fruit in the form of regular plantations in the interiors of Himalayan region, where cultivation of other perishable fruits is not a paying proposition. The non-availability of grafted or budded plants due to lack of suitable propagation techniques is the major constraint in extending the area under its cultivation in the country.

Although some work has been done on the vegetative propagation of pecan nut in Himachal Pradesh (Bhardwaj, 1981), but with very less success. Vegetative propagation through budding has been reported to give good budtake success in walnut (Ananda

and Bans, 1992). Investigations were, therefore, undertaken with a view to find out the most suitable budding method and time for pecan propagation under mid hill conditions of the North-Western Himalayas.

## Materials and methods

An experiment to standardize the method and time of budding in pecan was laid out in the fruit nursery of Department of Pomology, Nauni, Solan during 1995-96. Two and half years old seedling stock of uniform size, about 4 cm in girth, were selected and budded with scions of commercial cv. Mahan. The budsticks consisted of current season's growth having plump buds which were collected at the time of budding. Four methods of budding, viz., annular, chip, forkert and patch budding, were performed at 15 days intervals from May 15 to August 30. The experiment was laid out in randomized block design with three replications and 25 grafts per replication. Observations on budtake success were recorded after three months of budding. The linear and radial growth measurements were recorded during next dormant season (after one and half year of budding) and data were statistically analysed.

**Table 1. Effect of different methods and dates of budding on budtake success(%) in pecan nut**

Methods	Dates								Mean
	15 May	30 May	15 June	30 June	15 July	30 July	15 August	30 August	
Annular	22.84 (28.52)	38.70 (38.47)	54.19 (47.35)	82.54 (65.27)	79.46 (63.08)	60.13 (50.83)	32.56 (34.82)	8.74 (17.15)	47.39 (43.18)
Chip	46.38 (42.36)	16.17 (24.12)	12.67 (20.88)	8.37 (16.85)	3.57 (10.94)	2.96 (9.80)	2.78 (9.63)	1.54 (7.03)	11.86 (17.70)
Forkert	18.13 (35.73)	28.71 (32.39)	43.08 (41.03)	58.98 (50.13)	52.30 (46.32)	41.36 (40.05)	16.28 (23.81)	3.44 (10.63)	32.78 (35.01)
Patch	19.81 (37.64)	35.38 (36.51)	56.74 (48.85)	73.78 (59.21)	70.61 (57.17)	49.73 (44.83)	30.74 (33.65)	10.15 (18.53)	43.36 (42.04)
Mean	24.29 (36.06)	29.86 (32.87)	41.67 (39.52)	55.92 (47.86)	51.48 (44.37)	38.54 (36.37)	20.59 (25.47)	5.96 (13.33)	

CD(p=0.05)

Methods =1.18

Dates =1.96

Methods x dates =3.06

Fig. in parentheses are angular transformed values

**Table 2. Effect of different methods and dates of budding on linear growth (cm)**

Methods	Dates								Mean
	15 May	30 May	15 June	30 June	15 July	30 July	15 August	30 August	
Annular	136.4	132.8	133.8	145.8	141.6	126.3	96.3	83.7	124.6
Chip	138.6	134.1	126.5	118.9	109.5	94.3	87.8	75.6	110.6
Forkert	131.5	127.5	123.8	122.5	115.8	103.8	85.8	77.3	111.0
Patch	134.8	130.9	131.2	138.9	136.7	123.2	92.4	80.5	121.1
Mean	135.3	131.3	128.8	131.5	125.9	111.9	90.6	79.2	
CD( $p=0.05$ )	Methods =6.4		Dates =10.7		Methods x Dates =18.8				

**Table 3. Effect of different methods and dates of budding on radial growth (cm)**

Methods	Dates								Mean
	15 May	30 May	15 June	30 June	15 July	30 July	15 August	30 August	
Annular	8.36	8.32	8.28	9.04	8.45	7.36	6.94	6.31	7.88
Chip	8.95	8.16	7.84	8.05	7.89	6.85	5.97	5.84	7.44
Forkert	8.20	7.92	7.38	7.19	7.06	6.92	5.86	5.73	7.03
Patch	8.38	8.26	8.08	8.45	8.36	7.28	6.85	6.25	7.74
Mean	8.47	8.16	7.89	8.18	7.94	7.10	6.40	6.03	
CD( $p=0.05$ )	Methods =0.16		Dates =0.22		Methods x Dates =0.52				

## Results and discussion

**Budtake success:** Different methods and dates of budding and their interactions had a significant effect on the per cent budtake in pecan (Table 1). Among the four methods of budding tried, annular budding gave the highest budtake of 82.54 per cent on 30 June, followed by 79.46 per cent on 15 July, and an average of 47.39 per cent from 15 May to 30 August. These findings are in conformity with the findings of Blondel (1951), who also obtained higher budtake with annular budding in pecan. Ananda and Bans (1992) also recorded higher budtake with annular budding performed during June in walnut. Patch budding performed on 30 June and 15 July also gave significantly better budtake success than chip and forkert methods of budding. The other two methods, chip and forkert budding, gave a poor performance with an average budtake of 11.86 and 32.78 per cent, respectively.

Irrespective of the budding method employed, the 30 June budding with an average of 55.92 per cent, followed by 15 July with an average of 51.48 per cent budtake appeared to be the best time for budding in pecan. On these dates, the good budtake were recorded in annular, patch and forkert methods of budding, though in chip budding, the highest success was obtained on 15 May. These observations are in agreement with the findings of Sahrawat (1967), who reported last week of June to be the optimum time for walnut budding. The higher budtake in June-July budding might be because of optimum temperature and relative humidity and rapid sap flow in stock and scion, which favoured the callus formation and healing process.

**Growth of budded plants:** It is evident from the data in Tables 2 and 3 that different methods and dates of budding had a significant influence on the linear and radial growth of budded plants. Maximum mean linear (124.6 cm) and radial (7.88 cm) growth recorded in annular budding, which was significantly higher than chip and forkert budding and statistically at par with patch budding.

The budding performed on 15 May resulted in maximum linear (135.32 cm) and radial (8.47 cm) growth, which was at par with 30 May and 30 June budding but significantly higher than all other dates of budding. Annular budding performed on 30 June gave significantly higher linear (145.8 cm) and radial (9.04 cm) growth, which was followed by same method of budding on 15 July. The better growth attained by annular budded plants may be attributed to the better graft union due to more contact of the cambial layers of stock and scion, early bud sprouting and early initiation of subsequent scion growth.

## References

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