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Graft Take Success in Pecan Nut Using Different Varieties at Different Timings

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Abstract: Research studies were conducted in the lathe house at the Agricultural Research Institute, Tarnab, Peshawar, during 1997. Maximum graft sprouting (41.6%) and percent plant survival (36.11%) was recorded by grafting on February 24 as compared to no sprouting by grafting on March 20. Grafting on February 17 increased the number of days to sprouting (66), stem length (1.26m), stem diameter (1.27 cm), number of leaves per plant (28.3) and leaflet area (20.55 cm²). As far as the interaction effects are concerned the maximum values were observed by grafting Mohan on February 17 for all the parameters studied, in contrast to minimum values for all the parameters by grafting the varieties on March 12 except 0 percent graft sprouting by grafting on March 20. Therefore, Mohan can be recommended as best variety when grafted in the mid February.

Key words: Graft, Variety, Time interval

Introduction

Pecan nut (*Carya illinoensis*) belongs to the Juglandaceae family. It is also called "Mississippi nut" or "illinoensis nut" (John, 1962). The pecan first appeared on the North American continent during the cretaceous period (Stuckey and Kyle, 1925). Pecan requires about 600 chilling hours (Lagarda, 1987) and can successfully be grown in the plains of NWFP. Mishra (1985) compared side, whip, or cleft grafting. These soft wood graftings were carried out between 15 May and 31 August on 1 year old seedling. Whip grafting in August gave the highest success (90 percent), followed by side grafting (80 percent), success in May ranged from 20 to 35 percent and the failure was attributed.

Dyer and Cantrell (1989) used four techniques to graft sweet pecan scions to bitter pecan (*C. aquatica*) rootstock. Dormant season grafts (side, saddle and cleft grafts) resulted in negligible survival. Inlay bark grafting resulted in 76 percent survival after 1 year. faster scion growth rates were associated with increased crown closure above the grafted specimens.

Darsaniya (1991) carried out grafting trials from 1986 to 1988 on 5 dates between late July and Sep, on 2 to 3 year-old seedlings. In all years, grafting success was highest between mid-Aug. and mid-Sep. July grafting gave the poorest results. Height of grafting on the rootstock component had no marked effect on take, which ranged from 73-93.3 percent .

Yates and Sparks (1992) grafted CV. Desirable onto the lateral roots of 70-year-old seedling rootstocks for orchard cultivar conversion. Survival was higher for grafts made 6-8 weeks after bud break than for those made later in the season. Cultivar conversion upto 75 percent was recorded. Grauke and O'Barr (1996) grafted pecan CV. Oconee scions on seedling rootstocks from 9 open pollinated seedstocks. Rootstocks included 3 seed stocks each of pecan, *Carya aquatica* and their interspecific hybrid C x lecontei. Grafting success was greater on pecan and C x lecontei seedlings than on *C. aquatica*.

Materials and Methods

The research on grafting of pecan nut varieties Mohan, Wichita and Stuart on different dates viz February 17, February 24, March 04, March 12 and March 20 was carried out in the lathe house at Agricultural Research Institute, Tarnab, Peshawar during the year 1997. Two years old seedlings of wild pecan nut rootstock were taken from the nursery. These seedlings were of uniform size and thickness, having few buds. The seedlings were planted in lathe house in rows according to the experimental design. In the experiment three cultivars of the pecan nut i.e., Mohan, Wichita and Stuart were tongue grafted at five different starting from February 17 to March 20, at one week interval. Four plant per Treatment were used and the experiment were days to sprouting graft sprouting percent age. percent plant survival: Stem length: number of leaves per plant: and Leaflet area.

Results and Discussion

The data pertaining (Table 1) to the graft sprouting percent age show that maximum graft sprouting percent age (58.33%) was recorded for Mohan grafted on February 24 and minimum graft sprouting percent age (0.0%) was recorded for the all varieties plant grafted on the March 20. Similarly varieties wise maximum sprouting percent age was recorded in Mohan grafted on February 17. The mean value for number of days to sprouting (Table 2) shows that maximum number of days (72.7) to sprouting were taken by Mohan grafted on February 17 and minimum number of days (40.7) to sprouting were taken by Wichita grafted on March 12. From the above table it is clear that those plant which are grafted early in the autumn taken more days to sprouting as compared to plant grafted late in the early spring. However grafting in spring produced poor percent age of success. The mean value data (Table 3) for percent plant survival of grafted plant show that maximum plant survival (58.3%) was recorded in Mohan which grafted on February 17 and March 4 respectively and minimum plant survival percentage (8.33%) was recorded in wichita grafted on February 17. From the above data,

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Table 1: Graft sprouting percentage of various varieties of pecan nut grafted at different timings.

Treatments (grafting dates)	Pecan nut varieties			
	Mohan	Wichita	Stuart	Mean
17 Feb.97	58.33	16.67	33.33	36.11 AB
24 Feb.97	50.00	33.33	41.67	41.67A
04 Mar.97	33.33	58.33	25.00	38.89A
12 Mar.97	16.67	33.33	16.67	22.22B
20 Mar.97	0.00	0.00	0.00	0.00C
Mean	31.67	28.33	23.33	

LSD value at 5 percent for grafting dates = 17.29
 Standard Deviation for pecan varieties: 11.18
 Standard Deviation for grafting dates: 17.77
 Means of the same category not sharing a letter in common are significantly different at 5 percent level of significance using LSD test

Table 2: Number of days to sprouting of various varieties of pecan nuts grafted at different timings

Treatments (grafting dates)	Pecan nut varieties			
	Mohan	Wichita	Stuart	Mean
17 Feb.97	72.7A	60.0C	65.06	66.0A
24 Feb.97	65.3B	54.3E	59.3C	59.7B
04Mar.97	57.3D	46.7H	52.3F	52.1C
12Mar.97	50.7G	40.7J	44.71	45.3D
Mean	64.5A	50.4C	55.3B	

LSD value at 5 percent for varieties = 0.9257
 LSD value at 5 percent for grafting dates = 0.7861
 LSD value at 5 percent for interaction = 1.362
 Standard Deviation for pecan varieties: 0.816
 Standard Deviation for grafting dates: 1.22
 Means of the same category not sharing a letter in common are significantly different at 5 percent level of significance using LSD test.

Table 3: Percent plant survival in various varieties of pecan nuts grafted at different timings.

Treatments (grafting dates)	Pecan nut varieties			
	Mohan	Wichita	Stuart	Mean
17 Feb.97	58.33A	8.33C	25.00BC	30.55
24 Feb.97	50.00AB	25.00BC	33.33ABC	36.11
04 Mar.97	25.00BC	58.33A	25.00BC	36.11
12 Mar.97	16.67C	16.67C	16.67C	16.67
Mean	37.50A	27.08B	25.008	

LSD value at 5 percent for varieties = 7.467
 LSD value at 5 percent for interaction = 28.59
 Standard Deviation for pecan varieties: 6.58
 Standard Deviation for grafting dates: 16.66
 Means of the same category not sharing a letter in common are significantly different at 5 percent level of significance using LSD test

Table 4: Average stem length (m) of various varieties of pecan nuts grafted at different timings.

Treatments (grafting dates)	Pecan nut varieties			
	Mohan	Wichita	Stuart	Mean
17 Feb.97	1.83A	0.71F	1.24C	1.26A
24 Feb.97	1.33bc	0.80ef	1.38b	1.17b
04 Mar.97	1.06D	0.89E	1.29BC	1.08C
12 Mar.97	0.82EF	0.74F	0.81EF	0.79D
Mean	1.26A	0.79B	1.18A	

LSD value at 5 percent for varieties = 0.1075
 LSD value at 5 percent for grafting dates = 0.07003
 LSD value at 5 percent for interaction = 0.1213
 Standard Deviation for pecan varieties: 0.09
 Standard Deviation for grafting dates: 0.07
 Means of the same category not sharing a letter in common are Significantly different at 5 percent level of significance using LSD test.

Table 5: Average leaflet area (cm)² of various varieties of pecan nuts grafted at different timings.

Treatments (grafting dates)	Pecan nut varieties			
	Mohan	Wichita	Stuart	Mean
17 Feb.97	26.29A	18.13CD	17.24CD	20.55A
24 Feb.97	16.31DE	22.078	19.05C	19.148
04 Mar.97	14.31EF	23.78B	19.41C	19.17B
12 Mar.97	11.87g	19.38c	13.21fg	14.83c
Mean	17.19B	20.85A	17.23E	

LSD value at 5 percent for varieties = 1.239
 LSD value at 5 percent for grafting dates = 1.359
 LSD value at 5 percent for interaction = 2.354
 Standard Deviation for pecan varieties: 1.09
 Standard Deviation for grafting dates: 1.37
 Means of the same category not sharing a letter in common are significantly different at 5 percent level of significance using LSD test.

it is clear that the grafted plant received an inadequate period for the healing gave poor graft success. Mean value of stem length (Table 4) shows that minimum stern length (1.83 cm) was recorded when plant were grafted on February 17 and minimum stem length (0.74) was noted in plant grafted on March 12. The stem length is a genetic factor. The genotype and favorable environment leads to the variation in number of leaves in different varieties, which affect the production of photosynthates and their utilization.

The mean value (Table 5) for leaf area of grafted plant show that maximum leaf area (26.30 cm) was recorded in Mohan grafted on February 17 and minimum leaf area

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(11.87 cm) was recorded in the same variety Mohan grafted on March 12. The maximum leaf area in early grafting dates may be due to the early healing of graft union, which in turn produced maximum leaflet area.

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