EFFECT OF TEMPERATURE AND RELATIVE HUMIDITY ON GRAFTING AND BUDDING OF TEAK (*TECTONA GRANDIS* LINN. F)

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Introduction

In the genetic improvement of forest tree species vegetative propagation methods assume great importance as it enables the tree breeder to assemble the selected clones in the seed orchard to achieve self-sufficiency in seed and other requirement of reproductive material. The most important challenge is to identify and standardise the most efficient and economical vegetative method, most suited and successful for the species and location specific environment. In teak improvement programme of Indo-Danish Project grafting and budding trials were carried out in the field based on the past experience of authors. In this paper, it is proposed to present the near-perfected vegetative propagation technique under field condition for teak with special reference to Dehra Dun as it varies from place to place. In case of Andhra Pradesh the most suitable time for grafting is October-November and February-March (Krishnamurthy, 1989) while in Malleswarum it is January to April (Reddy *et al.*, 1989). In Arunachal Pradesh March and May were found to be the best period of budding to semi-evergreen and deciduous trees (Beniwal, 1989).

Materials and Methods

Scion material was collected from plus trees and grafted on 1-2 year old stock. The methods used were patch budding and cleft grafting. The scions were mostly from one year old branch cuttings from the middle portion of the crown having dormant buds. The bud and cleft grafting was carried in field from 1986 to 1989 spreading over to four months i.e. March to June. No special treatments were given except watering the grafts regularly twice a day. During this experiment stock between 1 to 1.5 cm diameter class was used. It was observed that the thickness of stock is most important in case of patch budding and cleft grafting as the matching of cambium is essential. Stock of larger diameter can also be used but they demand more labour, material and time to work upon, hence slow down the speed of work.

Results

The data presented in Table 1 clearly indicates that the patch budding can be started right from March with 40 to 90 per cent success, while cleft grafting gives the desired results, in April and May with

Table 1

Effect of temperature and humidity on the success of patch budding and cleft grafting in Tectona grandis

Years	Weather and success % data	March	April	May	June
1986	Av. Temp. °C	18.0	22.6	23.4	26.2
	Av . RH(%)	68.0	61.5	62.0	69.0
	Success (%) patch budding	50.0	90.0	80.0	10.0
	Success (%) cleft grafting	40.0	80.0	90.0	25.0
1987	Av Temp. °C	18.7	22.5	22.9	27.3
	Av. RH (%)	66.0	59.5	59.5	62.5
	Success (%) patch budding	60.0	80.0	90.0	09.0
	Success (%) cleft grafting	35.0	90.0	95.0	30.0
1988	Av. Temp.°C	17.5	24.1	26.7	26.7
	Av. RH(%)	70.0	61.5	57.0	65.5
	Success (%) patch budding	50.0	60.0	70.0	10.0
	Success (%) cleft grafting	25.0	80.0	80.0	25.0
1989	Av. Temp.°C	17.6	21.3	26.2	26.0
	Av. RH (%)	64.5	55.0	45.5	69.0
	Success (%) patch budding	40.0	80.0	90.0	20.0
	Success (%) cleft grafting	40.0	85.0	90.0	35.0
Av. success (%) of four years.	Av. Temp.°C	17.95	22.62	24.85	26.55
	Av. RH(%)	67.12	59.37	56.00	66.62
	Patch budding	50.00	77.50	82.50	12.25
	Cleft grafting	35.00	83.75	88.75	28.75

success of 80 to 95 per cent. Temperature and humidity are two important environmental factors which regulate the success of both the methods. Low temperature i.e. below 20°C inhibits the sprouting causing low success.

Discussion

From the results presented in table it is quite evident that both cleft grafting and patch budding can be carried out with a high percentage of success if these are done

under the climatic condition when average temperature is 21.3° to 26.70°C and relative humidity 45.5 to 60 per cent which prevails in Dehra Dun during the month of April and May, this may vary from year to year. The success achieved in case of cleft grafting was 80-95% while in case of patch budding it was 60-90%. Before and after this period the success was not very encouraging however, in case of patch budding, 50 per cent success was obtain in the month of March which is quite satisfactory.

This clearly indicates that apart from skill the time factor definitely has a controlling role in the success of the operation done. If the temperature is low, then the desired the bud or scions may remain dormant and some dry up. If the temperature and humidity are higher the rotting of scion and bud material was observed. However in some cases the dormant bud may sprout next year but the scion generally dries. If the conditions of temperature and humidity are ideal the sprouting takes place within a week although it various from clone to clone.

Keeping this in view it will be now clear why April and May were found most suitable months for these operations. If such conditions can be created in a glasshouse the work period can be prolonged but for large scale operations the work has to be carried out in field so the need to find out the optimum time period becomes paramount.

In cleft grafting the stock is cut to fit in the scion and binding material and polythene tape, to check the evaporation from the cut surface, is used. This takes at least 12-15 minutes to make one graft. If the stock is thinner the cost will increase further more in terms of labour, time and material. If the union does not take place the labour goes waste and stock is deformed.

In patch budding only a small portion of bark is removed from the internode and after fixing the bud only polythene tape is required to keep it in position and protect from desiccation and it hardly takes 3-6 minutes to complete the operation and also in terms of reproductive material. Hence it is easier and more economical as compared to cleft grafting.

Pooling together the data for four consecutive years it is clear that temperature and relative humidity do play an important role in the success of the grafts. It may also be noted that bud grafting can be started earlier than the cleft grafting.

SUMMARY

Cleft grafting and Patch budding are highly successful methods for clonal propagation of Teak provided that work is carried out at 21.3° - 26.3°C temperature and 45.5 - 62 per cent relative humidity. Cleft grafting is less economical method in terms of time, material and work as compared to patch budding which is far more easier and cheaper technique. The work is generally carried out in open field condition and for Dehra Dun, April and May were found most suitable period to obtain the maximum success. The percentage of success can be increased by the use of greenhouse or Mist chamber.

सागौन (*टैक्टोना ग्रांडिस* लि० वत्स) के कलम उपरोपने में और कलिका बांधने पर तापमान और आपेक्षिक नमी का प्रभाव

डी०पी० उनियाल व एम०एस० रावत

सारांश

दीर्णिका उपरोपण और पट्टी कलिका बंधन सागौन के कृन्तक प्रवर्धन की बहुत सफल रहने वाली विधियों में से है बर्शते कि यह कार्य 21.3° सें० से 26.7 ° सें० तापमान और 45.5-62% आपेक्षिक नमी पर किया जाए । समय, वस्तु और कार्य के विचार से पट्टी कलिका बंधन की तुलना में दीर्णिका उपरोपण की विधि आर्थिक दृष्टि से कम लाभकारी रहती है क्योंकि कलिका बन्धन उससे अधिक सरल और सस्ती विधि है । यह कार्य प्रायः खुली क्षेत्र दशाओं में किया जाता है और देहरादून में इसमें अधिकतम सफलता पाने के लिए अप्रैल और मई सबसे अधिक उपयुक्त पाए गए हैं । हरित ग्रह या धुंध प्रकोष्ठ उपयोग में लाकर सफलता प्रतिशत और भी बढ़ाया जा सकता है ।

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