VEGETATIVE PROPAGATION OF DHAKIJAM AND GARJAN BY AIR-LAYERING

M. H. Rashid
M. Serajuddoula

Air-layering on Dhakijam (*Syzygium grande* Wt. Wald.) and Garjan (*Dipterocarpus turbinatus* Gaertn. F.) was done in sapling and adult trees with coconut fibre warp and polythene warp. Adult trees responded better than saplings in respect of rooting. Higher percentage of rooting was observed with coconut fibre warp than with polythene warp. The maximum success achieved in adult trees of Dhakijam and Garjan was 96 per cent and 56 per cent respectively. Rooted air-layered ramets were collected and planted in 30 x 45 cm polythene bags in the nursery for further establishment.

INTRODUCTION

Forest tree species are generally propagated from seeds, seedlings and stumps. Vegetative propagation from roots and shoot cuttings is another technique by which identical propagules could be perpetuated and proliferated.

Grafting, cutting and air-layering are the basic techniques of propagation and are very useful for tree breeding and improvement work. The importance of vegetative propagation is gradually increasing for establishment of Seed Orchard and Clonal Orchard (Jones 1979).

Many clones which are not easily propagated by grafting or cutting can be rooted by air-layering (Hartmann and Kester 1960). Moreover, ramets produced by air-layering have some additional advantages. These ramets ensure rapid growth, suppress weeds, avoid graft incompatibility problems in breeding work and cause early seeding (Lowery 1978).

MATERIALS AND METHODS

The saplings (5 to 10 years of age) were selected from Forest Research Institute Arboretum. Adult Dhakijam and

Garjan trees (50 to 80 years of age) were selected from Provisional Plus Trees (PPT) stock at Ukhia and Dulahazara forest areas. The rooting medium was prepared by mixing cowdung, mustard oil cake and soil in the ratio of 2 : 1 : 1. Two types of warping materials, coconut fibre and thin porus polythene cover, were used for air-layering.

Ten trees, five from each species were selected for sapling and adult trees used for the experiment. Vigorously growing branches of suitable stem diameter were chosen for the purpose (Table 1). To avoid infection sterilized grafting equipments were used. Girdles were made by removing the bark with the help of a sharp knife. Rooting medium was applied around the wound girdles in the form of paste. The warping materials were then used and tied firmly on both the ends to keep the inside saturated with moisture. The air-layers were checked periodically to observe the root development. After development of roots the successful ramets were separated from the mother trees, brought to the nursery and planted in polythene bags (30 x 45 cm) for establishment.

OBSERVATIONS AND DISCUSSIONS

About two months were taken for the development of roots in air-layering. Saplings of Dhakijam showed 52 to 58 percent of success while Garjan saplings showed only 10 to 18 percent. Adult trees of Dhakijam and Garjan showed 64 to 96 percent and 26 to 56 percent of success respectively (Table 2).

Table 1. Selected measurements of air-layers of sapling and adult trees for Dhakijam and Garjan

Phases of Plants or trees	Diameter of stem (cm)	Width of girdles (cm)	Locus of air-layers from apex (cm)	Width of warp (cm)
Sapling	0.50–0.70	1.5–2.0	20–30	10–12
Adult tree	0.70–1.00	2.5–4.0	40–60	10–14

Table 2. Percentage of successful air-layers in sapling and adult trees of Dhakijam and Garjan

Species	Phases	Number of air-layers prepared		Percentage of success air-layers	
		Coconut fibre	Polythene	Coconut fibre	Polythene
Dhakijam	Sapling	50	50	58	52
	Adult tree	50	50	96*	64
Garjan	Sapling	50	50	18	10
	Adult tree	50	50	56*	26

**Significant (T-test) at 5% level*

Although the rooting medium was the same for both the methods of air-layering, it was observed that the air-layering with coconut fibre showed higher percentage of success in both the species (Table 2). It was also observed that the coconut fibre warp have more water holding capacity than polythene warp. On the other hand polythene warp holds water for longer period. It may be assumed that constant humid condition and porosity of the coconut fibre warp yielded better results than with polythene warp in respect of gas exchange and easy development of roots. On the other hand polythene warp hold moisture and does not evaporate it causing damage to exposed cambium (Chaudhari 1962). Rooting media and warping material seem to play important roles in rooting percentage in air-layering.

Air-layers were made in the monsoon months of June and July, 1979. The time of air-layering may be an important factor. The required amount of moisture and temperature are available in rainy season. Kedharnath and Dhaundiyal (1963) observed hundred percent success in Pine species during the months of June and July.

CONCLUSIONS

It appears from the study that the air-layering of Dhakijam and Garjan is possible. But the optimum time of air-layering and selection of warping material are conditions essential for ensuring better success.

REFERENCES

Chaudhari, N. R., 1962. Air-layering in *Pinus roxburghii* Sargent. Indian Forester. Vol. 88 : 45–48

Hartmann, H. T. and Kester, D. E., 1960. Plant propagation, principles and practices. Prentice Hall, Inc. U. S. A. 559 pp

Jones, N., 1979. Studies of vegetative propagation of forest tree species in Bangladesh. Field document No. 21, Forest Research Institute, Chittagong, Bangladesh. 54 pp

Kedharnath, S. and Dhaundiyal, R. P., 1963. Preliminary observation on air-layering in *Pinus roxburghii* and *Pinus caribaea*. Indian Forester. Vol. 88 : 219–221

Lowery, R., 1978. Air-layering , a technique suitable for cloning *Pinus caribaea* var. *hondurensis*. The Malaysian Forester. 4(3) : 211–218

Md. Harun-ur-Rashid, Field Investigator and Md. Serajuddoula, Senior Research Officer, Forest Research Institute, Chittagong Bangladesh