A COST EFFECTIVE TECHNOLOGY FOR MASS MULTIPLICATION OF HILL BAMBOO (*ARUNDINARIA FALCATA NEES*)

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Abstract: In recent years, there has been a heavy demand for bamboo planting stocks impelled by the significant thrust in the bamboo sector. Non-availability of sufficient quantity of saplings is a major problem. Hill bamboo commercially known as Ringal is an important commodity for the communities of people residing in hills. Due to ruthless and unscientific extraction of this commodity for vide variety of uses by the hilly people compounded with gregarious flowering, this vocation is dividing fast from the nature. Hence replanting on large scale is essentially required to conserve the species. For mass production of planting material of Ringal, a macro-proliferation technique has been developed for *Arundinaria falcata* (Gol Ringal), a socio-economically important Ringal species for rural people. Six to eight fold increase in field plantable saplings can be generated continuously for innumerable period of time through this technology which is simple, cost effective and farmer's friendly.
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1.INTRODUCTION

Arundinaria falcata Nees. is a gregarious shrub with annual culms from a central rootstock. *Culms* usually 2-4 m high, rarely 6.5 m, 1-2 cm in diameter, green, grey, smooth, covered with a conspicuous whitish bloom when young, yellowish when old; *internodes* 15-30 cm long. A low altitudinal (1500-2100 m) Ringal is known to occur in Kashmir, Himachal Pradesh, Uttarakhand, and Western Nepal. In Uttarakhand, this bamboo is being used for making baskets, howkah pipes, mats, animal beds, sheds, fodder in scarcity period and in compounding many medicines. This species is found to flower gregariously and occasionlly sporadically. Troup (1921) mentioned its aproximate flowering cycle 28-30 years. The traditional method of propagation in this species is through rhizome section with 2-4 culms but this technique yields limited number of plants depending on the size of mother clump and hence not appropiate for large scale plantations.

In order to meet the demands of planting stock for extensive plantations, macropropagation technique is suggestive. Propagation through seeds is an easy approach but seeds of Ringal are not easily available due to long seedling intervals, gregarious flowering leading to death of entire clump and poor viability of seeds. A simple cost effective vegetative method has been developed for sympodial Ringal (*Arundinaria falcata*) which is highlighted in present work.

2. MATERIAL AND METHODS

Young seedlings of *Arundinaria falcata* were pricked up from the natural forest floor of Hathipau area of Mussoorie Forest Division (Figure 1) and brought to Plant Physiology Nursery, Botany Division, Forest Research Institute (Dehradun), India. These pricked seedlings were transplanted in poly bags (24x18 cm size) in the first week of August 2010 and watered regularly. Each polybag was earlier filled with mixture of sieved soil, sand and farm yard manure in 2:1:1 ratio weighting nearly 2.5 kg in each polybag. One young seedling was planted in each of the polybags which were kept in shade for a week. All the seedlings planted in polybags established well and then the same were shifted in the open under direct sunlight. The emergence of new growth was observed regularly and new sprouts were observed within 15-20 days. In the first week of April, the seedlings having culms, rhizome, and roots were carefully removed from the polybags. Each proliferating culm along with some rhizome section and roots was separated and again planted in fresh polybags for further growth and development. At the time of seperation of propagules due care was taken to ensure that each seperated propagule retains one

rhizome with buds and roots ((Figure 1) as suggested by Banik (1985). The separated propagules were again planted in polybags of the size 24x18 cm filled with the same mixture as mentioned above (Figure 1). Out of these freshly planted propagules, 1/6 propagules were retained for future multiplication purposes in the nursery whereas, 5/6 propagules were available for field planting and were planted in Forest Department Nursery at Magra, Mussoorie. The whole technique is cited in Figure 2.

3.RESULT AND DISCUSSION

The data recorded on the number of propagules produced, diameter of culms, etc. recorded at eight months period is reflected in Table 1. It was observed that sprouting occurred after 15-20 days of planting. A total of 310 culms were produced from 50 planted seedlings within an average of 6.0 culms per seedling. The propagules grew vigorously to reach an average height of 34.5 cm and diameter of 1.87 mm. Average number of roots per propagule was 11.5 with average length of 16.8 cm. Similar results were also recorded by Adarsh Kumar (1992) in *Bambusa arundinacea*. The tiller number increased with the passage of time and average number of culms was recorded 5-6 in six months period (Figure 2). In *Bambusa tulda* three proliferated seedlings has been obtained in 9 months by Banik (1985) who also suggested that such process of seedling multiplication should not be continued for long time (e.g not more than 10 years in *Bambusa tulda*) as the time gap between the last multiplication and flowering gets shorter. The advantage of this technique is that proliferated seedlings remain small in size and hence easy to transport. The technique developed would overcome the scarcity of planting stock of this sympodial bamboo for future plantation and conservation strategies. This technique is low cost, simple and has direct application in the field.

Table 1. Number of propagules produced from eight months old seedlings and their growth parameters

Number of seedlings planted	50
Total number of culms after 8 months	310
Average number of culms per seedling	4.5
Average length of each culm (cm)	34.45
Average diameter of each culm (mm)	1.87
Average number of nodes in each culm	5.1
Average number of roots per seedling	11.5
Average length of each root(cm)	16.8

Figure 1. Pricking and transplanting of separated propagules of *Gol Ringal*

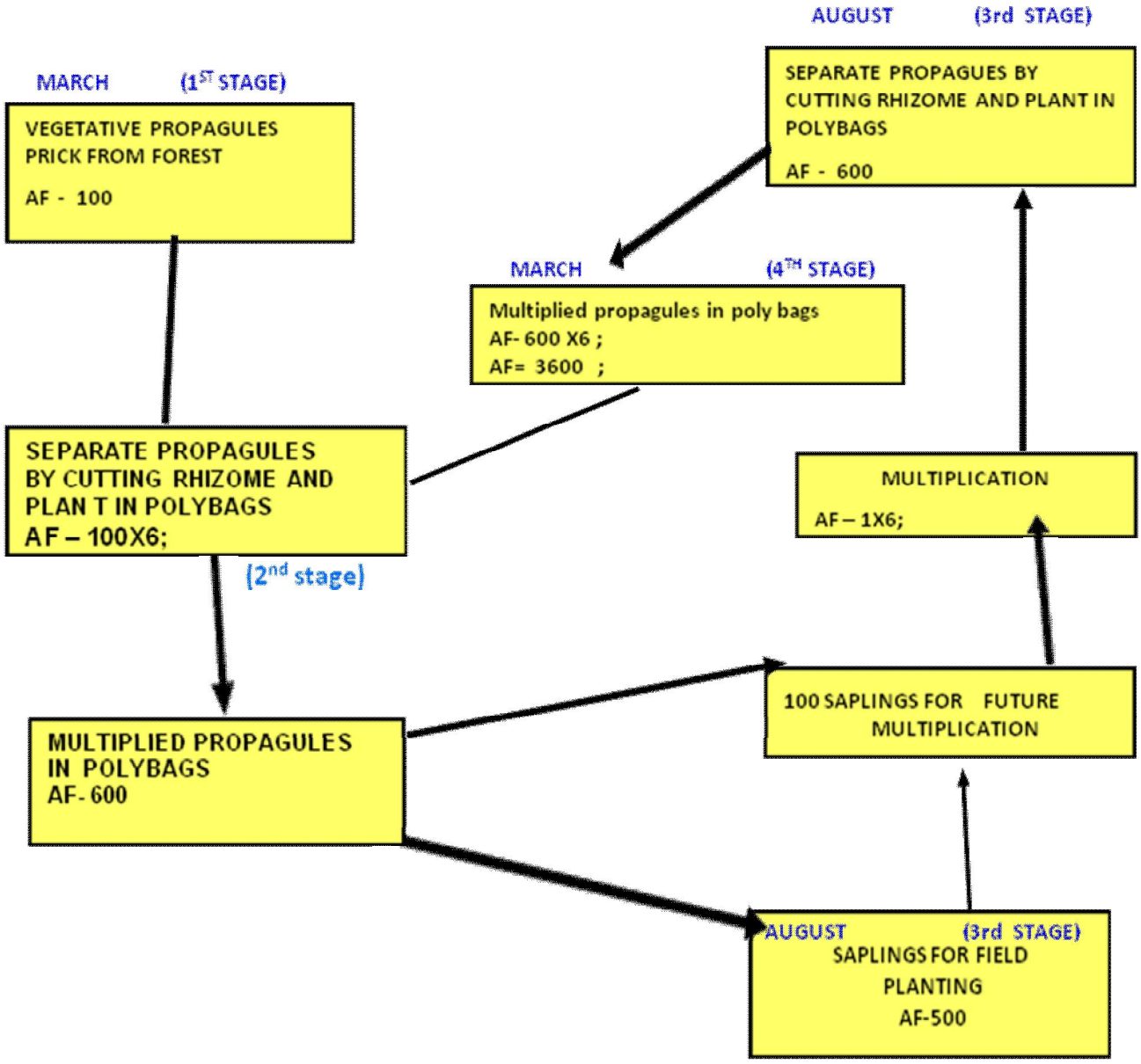

Figure 2. Mass production of field plantable saplings of Gol Ringal through Macro-proliferation

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