EFFECT ON THE GROWTH OF BAMBUSA BALCOOA AND BAMBUSA VULGARIS VAR. VITTATA DUE TO TYPE OF NURSERY BED

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Abstract

A study was conducted at the nursery of Nagaland Bamboo Development Agency, Dimapur, Nagaland during January to April to investigate the effect on growth parameter of Bambusa balcooa and Bambusa vulgaris var. vittata by using two different types of bed, viz. raised bed and flat bed in soil mixture, viz. soil: FYM: sand 1:1:1 and soil:sand 1:1. The experiment was done under Randomized Block Design with five replications. The results showed that the two types of nursery bed had significant effect on the growth of the stem cuttings. The number of shoots, height of shoots, girth and length of roots were shown higher by raised nursery bed. In terms of the species, Bambusa vulgaris var. vittata showed the maximum average of number of shoots, height of shoots and length of rooting, whereas, the maximum average girth was shown by Bambusa balcooa. As far as soil mixture was concerned, soil:FYM:sand showed satisfactory results.

Keywords: Vegetative Propagation, Stem Cutting, Bambusa Balcooa, Bambusa Vulgaris Var. Vittata, Nursery Bed.

Introduction

Vegetative propagation is an asexual method of reproduction by using different parts like stem, branch, leaf etc. The off springs/clones are the exact duplicate of its parent plant, which cannot be done through sexual propagation. Vegetative propagation techniques were introduced in tree planting to overcome most of the problems that prevent successful propagation of important economic forest tree species (Libby and Rauter, 1984). Most of the bamboo species are multiplied through vegetative propagation due to the limited availability of the seeds. Vegetative propagation of bamboos involves various procedures, most of which aim at transforming the innumerable buds present at every node into planting material (Banik, 1980). Vegetative propagation of the bamboo species may be done through Culm cutting, branch cutting, rhizome, offset planting, Tissue culture and macro proliferation. Vegetative propagation has many plus points when compared to seed raised plantations. Some of the
advantages are that vegetative propagation is a rapid method of multiplication and is much cheaper than growing plants from seeds. And since the plants raised by this method are the same as its parent plant, the desirable traits of the parent plants are preserved. It is also essential for less viable seeds or for plants which do not produce seeds every year like bamboo. Since most bamboos are gregarious flowering type, availability of seeds are limited. Even if the seeds are available, they need to be fresh or otherwise they become less viable, thus resulting in the lower success rate of the seeds to germinate. Hence, like Agriculture, where improvised seeds are easily available in our country, the problematic gap of demand and supply of forest products can be solved by producing quality seeds and establishing superior plantations. However, unlike agriculture, in forestry the availability of quality seeds is not assured on account of various factors. Alternate seeding cycle in some species, poor viability and undesirable mixing of seeds collected from the forest floor are some of the key problems in obtaining quality seed material for raising vigorous planting stock (S.S Dhuria, 2007). Thus, due to the insufficient supply/unavailability of quality seeds, eventually vegetative propagation methods are being carried out for multiplication of plants.

*Bambusa balcooa*, an important multi-purpose species, is a clumping evergreen bamboo. It is also sometimes referred to as ‘Female bamboo’. The dull-green culms of this species are 12–23 m tall, with 18–25 cm circumference and widely scatters up to an altitude of about 600 m in several distinct regions having tropical monsoon, such in Bangladesh, Nepal together with North-East India, tropics in Asia and Africa (Stapleton, 1994 and Ohrnberger, 1999). *Bambusa balcooa* is considered to be the best raw material for structural usage and pulping. Its shoots are also tender and edible. It grows well in tropical lowlands with temperature ranging from 22-28°C. This bamboo species is mostly used for house construction, agriculture implements, baskets, bridges and also for making paper. It is considered one of the best materials for building purposes.

*Bambusa vulgaris var. vittata*, also known as yellow/golden bamboo is an open clumping bamboo belonging to sub family, Bambusoideae. The stems of this bamboo are not as straight as other bamboos, and are not very flexible either and the stems are randomly marked with narrow and broad green stripes. They are strong and have a thick culm walls. They grow up to a height of 10-20 m and has a diameter of 5-8 cm. *B. vulgaris* grows best at lower altitudes (below 1200 m altitude) in areas with annual rainfall ranging from 1500 to 3800 mm (Francis, 1993). *B. vulgaris* grows best at lower altitudes (below 1200 m altitude) in areas with annual rainfall ranging from 1500 to 3800 mm (Francis, 1993). It is
mostly used as an ornamental plant but it is also used for border plantation, wind break, hedge planting, its stems are used for fuel, making fences, poles, flooring. Just like other bamboo species, they also help in controlling soil erosion. It is used as raw material for paper pulp, especially in India. (D. Louppe, et.al, 2008). The young shoots are edible, which maybe either cooked or pickled. *B.vulagris* var. *vittata* also has a rich source of silica, which is an important supplement and hence is used in many skin care products and cosmetics. It is known to boost skin and hair as it helps to maintain moisture.

Nursery beds and potting mixture play an important role in forestry and for its different plant species. Nursery beds raise seedlings which help in growing plants that do not produce seeds annually. But since direct sowing is not always successful, we opt for artificial regeneration, and for artificial regeneration, nursery beds are very important since. It is important for slow growing plants and plants that need to be grown under protected conditions before transplanting them to the plantation site. Nurseries are also important for introducing exotics (Kamal Bhusal, 2010). Nursery-grown plants are sturdy and can be used for road side planting and also for reclaiming degraded and wastelands. Different types of nursery beds can be made according to the climatic conditions and the topography of the land. They can be raised, flat or sunken beds.

**MATERIALS AND METHODS**

The experiment was conducted entitled “Effect on growth of *Bambusa balcooa* and *Bambusa vulgaris* var. *vittata* due to different types of nursery bed” at the nursery of Nagaland Bamboo Development Agency, Dimapur, Nagaland during January to April. The experiment was laid out in randomized block design (RBD) with 4 treatments and five replications. The stem cutting materials used in treatments have 2 nodes. Holes were made on the stem cuttings after which they were filled up with rootone (rooting hormone) solution. They were planted in both raised and flat nursery bed. Periodical observations were taken on the number of shoots, length of shoots, girth and length of roots. The cuttings were uprooted from the beds after 120 days of planting and the observations were recorded. The data were subjected to statistical analysis (ANOVA), to find out the Significance of differences observed.
Table: Effect on the growth parameter of *Bambusa balcooa* and *Bambusa vulgaris* var. *vittata* due to different nursery bed (raised and flat.)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of shoot</th>
<th>Height of shoot (cm)</th>
<th>Length of Rooting(cm)</th>
<th>Girth (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁ (<em>B.vulg.</em>, soil:FYM:sand, Raised Bed)</td>
<td>3.62</td>
<td>4.68</td>
<td>8.73</td>
<td>4.20</td>
</tr>
<tr>
<td>T₂ (<em>B.vulg.</em>, soil:sand, Raised Bed)</td>
<td>2.15</td>
<td>3.91</td>
<td>9.10</td>
<td>2.25</td>
</tr>
<tr>
<td>T₄ (<em>B.bal.</em>, soil:sand, Raised Bed)</td>
<td>2.36</td>
<td>4.01</td>
<td>4.04</td>
<td>3.08</td>
</tr>
<tr>
<td>T₅ (<em>B.vulg.</em>, soil:FYM:sand, Flat Bed)</td>
<td>3.19</td>
<td>3.37</td>
<td>7.43</td>
<td>2.81</td>
</tr>
<tr>
<td>T₆ (<em>B.vulg.</em>, soil:sand, Flat Bed)</td>
<td>3.25</td>
<td>2.92</td>
<td>4.23</td>
<td>2.18</td>
</tr>
<tr>
<td>T₇ (<em>B.bal.</em>, soil:FYM:sand, Flat Bed)</td>
<td>3.96</td>
<td>4.59</td>
<td>10.13</td>
<td>2.61</td>
</tr>
<tr>
<td>T₈ (<em>B.bal.</em>, soil:sand, Flat Bed)</td>
<td>3.13</td>
<td>2.34</td>
<td>6.06</td>
<td>2.57</td>
</tr>
</tbody>
</table>

F test

<table>
<thead>
<tr>
<th>No. of shoot</th>
<th>Height of shoots</th>
<th>Length of Rooting</th>
<th>Girth</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
</tr>
</tbody>
</table>

SE.d±

| S | 0.203 | 0.203 | 0.759 | 0.262 |

C.D at 5% (P=0.05)

| 0.416 | 0.416 | 1.548 | 0.571 |

Fig 1: Effect on the growth parameter of *Bambusa balcooa* and *Bambusa vulgaris* var. *vittata* due to different nursery bed (raised and flat.)
RESULTS AND DISCUSSIONS

The method of rooting of cuttings has been adopted for propagation of bamboos since long (Pathak, 1899; Dabral, 1950; McClure, 1966). It has been reported (Y.A. Gulabrao, et.al.) that the growth parameter of culm cuttings of *Bambusa vulgaris var. vittata* and *bambusa balcooa* were observed. The results showed that the sprouting percentage and rooting percentage were observed to be maximum for *Bambusa vulgaris* (80.00) as compared to *Bambusa balcooa* (46.67) in all season (spring, summer, Rainy). Also, the culm size/girth was found maximum for *B. balcooa* as compared to *B. vulgaris*.

NO. OF SHOOTS

The numbers of shoots were found significant after 120 days of observation. The maximum average number of shoot was observed in T₃ (4.08), followed by T₇ (3.96) and T₂ (2.15) was recorded as minimum.

SHOOT LENGTH

The sprout lengths were found significant after 120 days of observation. However, the maximum average sprout length was observed in T₃ (6.19) followed by T₁ (4.68) and T₈ (2.34) was recorded as minimum.

GIRTH

The girth of shoot was found significant after 120 days of observation. The maximum average sprout girth was observed in T₁ (4.20) followed by T₃ (3.19) and T₆ (2.18) was recorded as minimum.

ROOT LENGTH

The observations on the length of roots were taken after 120 days of planting. The maximum root length was observed in T₃ (11.09), followed by T₇ (10.13) and T₄ (4.04) was recorded as the minimum.

CONCLUSION

From the present study, it can be concluded that the raised bed gave the most effective result for the growth parameter of both *Bambusa balcooa* and *B. vulgaris var. vittata*. For number and length of root and shoot, *Bambusa vulgaris* was observed to be the best for both flat bed and raised bed as compared to *B. balcooa*. However, shoot girth was found maximum
in $T_1$ ($B.balcooa$ - soil: FYM: sand - raised bed). As for the soil mixture, soil: FYM: sand 1:1:1 gave the most effective results in the growth of both bamboo species as compared to soil: sand 1:1:1.

The experiment was conducted from 1st January to 30th April, 2016. The results found in this experiment should be further studied and more experiments should be conducted for future benefits.

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