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ROOTING OF CUTTINGS OF SOME FAST GROWING FOREST TREE SPECIES OF BANGLADESH UNDER OPEN BED CONDITION

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Abstract: Rooting trials of branch cuttings of satian (*Alstonia scholaris* Br.), burma simul (*Ceiba pentandra* L. Gaertn) and gamar (*Gmelina arborea* Linn.) were conducted. Results showed that in satian, IBA has a positive effect on early rooting and an increase in IBA concentration enhanced the percentage of rooting success, number of root per cutting and root length. In burma simul, the highest rooting success was found in the control cuttings, IBA did not show any positive effect on rooting success, root number and root length. In gamar, increase in size and diameter of branch cuttings had a good relation to rooting success, number of root formation and root length.

Keywords: Rooting; Branch cutting; Fast growing tree; Satian; Burma simul; Gamar

Introduction

Fast growing trees are generally harvested within a short time. Satian, burma simul and gamar are some of the important fast growing industrial species of Bangladesh, generally used as raw materials for match factories, pulp and paper industries and sports good industries (Rashid et al. 1986). These species are also used as fuel wood in the rural areas of Bangladesh. Moreover, gamar is very useful for planking, panelling, carriages, furniture and carpentry of all kinds (Troup, 1936). Fruits of burma simul provide good quality cotton for filling purposes. Little work on the vegetative propagation of the above species has been done so far in Bangladesh. Recently vegetative propagation of satian through tissue culture has been found successful (Hadiuzzaman et al., 1991). In gamar, non leafy juvenile cuttings showed only 14.8% rooting success (Rashid et al., 1986). But when the cuttings of gamar were treated with Indole Butyric Acid (IBA) 37% rooting success was found (Rahman, 1977). In burma simul, non leafy adult cuttings showed 46.0% rooting success under open mist condition (Rashid et al., 1986). However, in all the above cases, the results were not satisfactory for clonal forestry programme as it needs at least 75% rooting success for a given species (Campinhos and Ikemori, 1980). Therefore, an attempt has been taken to test the rooting ability of cuttings of the species under open bed condition.

Materials and Methods

Branch cuttings of the species were collected from Bangladesh Forest Research Institute campus, Chittagong. The cuttings were first excised by pruning shears and later trimmed by a sharp sculpel with a slanting cut at the basal end. The ages of the donor plants were 3, 20 and 10 years for satian,

burma simul and gamar respectively. The cuttings were 15-20 cm long. Mean diameter of the cuttings of satian and burma simul were 0.6 and 1.03 cm respectively whereas in gamar there were 3-diameter sizes: big size (2.0 cm), medium size (1.5 cm) and small size (1.0 cm). Number of nodes per cutting was 3 for each of the species. The cuttings of satian and burma simul were treated with 0.1%, 0.4% or 0.8% IBA in talc powder form whereas in gamar, the 3 diameter classes were the treatments. Rooting medium was a mixture of gravel, coarse and fine sand. The gravel layer (7.5 cm) was at the bottom. The coarse sand layer (15.0 cm) was in the middle and the fine sand layer (15.0 cm) was to the top. The rooting bed was made at the nursery under open sun. Watering was made by automatic mist spray with regular interval. The mean temperature of the rooting medium was 27 °C at 9 am, 31.5 °C at 12am and 30.8 °C at 2pm. The relative humidity in the air was 65% at 9am, 55% at 12 noon and 57% at 4pm. Randomized block design was followed for the experiment. There were 3 replications of 10 cuttings in each treatment. The experiment was set during April in Bangladesh.

Results and Discussion

Satians: New auxiliary buds formed both in treated and control cuttings 5-7 days after setting. Treated cuttings rooted after 14 days and the control cuttings rooted after 21 days. Similar response of early rooting by using IBA was found in *Dalbergia sissoo* (Pain and Roy, 1981). IBA showed positive effect on rooting (Table- 1). The cuttings treated with 0.8% IBA showed the highest percentage rooting (76%) whereas there was no significant differences in percentage rooting between the cuttings treated with 0.1% and 0.4% IBA (Table- 1). Similar trend was found in case of average root number and average root length where 0.8% IBA showed 12.8 and 9.8 cm respectively (Table- 1). Similar results of more root number and root length in higher concentrations of IBA were also reported for *Terminalia superba* (Siaguru, 1986).

Table- 1. Effect of rooting hormone on satian branch cuttings in open bed condition.

| Species: Satian | Control | IBA 0.1% | IBA 0.4% | IBA 0.8% |
|--------------------------|----------|----------|----------|----------|
| Rooting success (%) | 40 | 70 | 70 | 76 |
| Average root number | 5.7±1.7 | 10.9±3.6 | 11.1±2.5 | 12.8±2.5 |
| Average root length (cm) | 4.7±0.88 | 5.5±1.5 | 6.6±1.5 | 9.8±1.8 |

± represents t.se (at p = 0.05)

Burma simul: Buds sprouted after 7-10 days in treated and control. Roots appeared after 15 days on treated and 20 days on control cuttings. Highest rooting success was found in controls (73.5%) but among the treatments, 0.8% IBA showed the highest success (43.3%). Average root number and root length per cutting were found highest (3.4 and 5.9 cm respectively) in control in both the cases (Table- 2). The IBA treatment was not necessary for rooting in this type of easy to root species. Similar behaviour of some tropical forest species where the overall percentage of rooting was found to be unaffected by IBA treatment has been reported by Lo (1985) and Siaguru (1986).

Table- 2. Effect of rooting hormone on burma simul branch cuttings in open bed condition.

| Species: Burma simul | Control | IBA 0.1% | IBA 0.4% | IBA 0.8% |
|--------------------------|---------|----------|----------|----------|
| Rooting success (%) | 73.5 | 33.3 | 23.3 | 45.3 |
| Average root number | 3.4±1.1 | 2.8±1.0 | 3.0±1.0 | 2.8±1.0 |
| Average root length (cm) | 5.9±2.2 | 3.0±0.95 | 3.0±0.80 | 2.5±0.60 |

± represents t.se (at p = 0.05)

Gamar: Buds formed after 3-5 days and roots appeared after 7-10 days after setting in all the size classes. Highest rooting success (50%) was found in large sized class and the lowest in the small sized class. The medium sized class took the intermediate position. It is clear from the data that there is strong correlation between carbohydrate content and rooting ability of cuttings (Eliasson, 1978). For root number and root length, no significant differences were found between the large sized and medium sized cuttings, but they were significantly higher than the small sized class (Table- 3).

Table- 3. Effect of diameter on rooting of gamar branch cuttings in open bed condition.

| Species: Gamar | Big size (dia: 2 cm) | Medium size (dia: 1.5 cm) | Small size (dia: 1 cm) |
|--------------------------|----------------------|---------------------------|------------------------|
| Rooting success (%) | 50 | 23.3 | 6.7 |
| Average root number | 9.5±4.2 | 9.1±3.2 | 3.8±1.0 |
| Average root length (cm) | 9.6±2.3 | 8.9±1.7 | 5.1±1.3 |

± represents t.se (at p = 0.05)

Conclusion

Clonal propagation is possible for satian as the rooting success was satisfactory (76%) but a field trial is necessary. Large scale clonal propagation is possible for burma simul as the rooting success was quite higher (73.5%) and no need for using rooting hormones as percentage of rooting was found higher in the controls. In gamar, rooting success was found poor (50%). So, cutting trial with IBA is necessary.

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