

B-39: A study on the multiplication of *Bambusa vulgaris* and *Bambusa arundinaceae* through shoot tip culture

K Hirimburegama, N Gamage

(Dept. of Botany, Univ. of Colombo, Colombo 3)

Bambusa vulgaris and *B. arundinaceae* (Family Poaceae) were the experimental cultivars in this study. Bamboo is now considered as a useful multipurpose economic tree as it is utilised for construction work, handicraft, paper industry etc. With increased demand for bamboo shoots, cutting of plants has increased. Since, the main source of supply of bamboo in Sri Lanka is the forest and the village grooves, due to over exploitation and

misuse, bamboo resources are getting depleted. To combat the situation, replanting is necessary. Since conventional propagation systems have limitations, *in vitro* methods for easy propagation can contribute towards bamboo plantations. The objective of the study is to determine *in vitro* multiplication of 2 bamboo species.

The nodal buds of *B. vulgaris* and *B. arundinaceae* were used as the explant. Buds of height 2.0 cm and diameter 6.0 mm were obtained from the middle position of a culm. Buds from the 2 ends (apex and base) were avoided.

Surface sterilisation: Nodal buds, after removal of prophylls, were washed initially with soap (Sunlight™) and water and then immersed in 70% ethanol (v/v) for 15 - 20 min. Then they were kept in 50% Clorox for 30 min and in 0.1% HgCl₂ for 5 min. Finally they were washed twice with sterile distilled water before inoculation.

Nodal segments were directly inoculated on Murashige and Skoog (MS) medium (1962), supplemented with several combinations of growth regulators as given below:

- 1) IBA (0.75 mg/l) + GA (0.5 mg/l) + adenine sulphate (50 mg/l)
- 2) NAA (0.1 mg/l) + BAP (0.5 mg/l) + GA(0.5 mg/l)
- 3) BAP (2.26 mg/l) + IBA (0.20 mg/l) + Kinetin (0.02 mg/l)

Cultures were incubated in 16 h photoperiod provided by white Cool Fluorescent lights. Occurrence of bud break, time taken and the number of shoots proliferated from the explant were recorded.

The mid buds were selected and the prophylls were removed before inoculation as the above 2 factors were shown to enhance bud-break.

Bambusa vulgaris and *Bambusa arundinaceae* showed shoot multiplication on MS with adenine sulphate (50 mg/l) + IBA (0.75 mg/l) + GA (0.5 mg/l). The rate of multiplication from a single meristem was rather poor. However, since each node contains about 6-8 axillary buds, and if each bud (shoot) multiplies, a considerable number of shoots could be obtained.

Initiation of shoot multiplication was observed around 30-35 days after transfer of the explant. Average of 5 buds were produced from a single node in about 52 days. The longitudinal section of the proliferating shoots showed the induction of several axillary buds from the axillary meristem.

The composition 0.5 mg/l NAA + 0.5 mg/l BAP + 0.5 mg/l GA did not show bud proliferation but, as with the previous composition, an average of 3 shoots developed in 30 days. The shoot had an average height of 20.7 mm in 3 weeks. However, on the composition which showed a better proliferation, the height of the shoots reached only 9 mm in 3 weeks. There was no prominent difference in shoot multiplication in the 2 bamboo species tested.

The study reveals that, it is possible to multiply the shoot meristem of axillary buds of both species. Of the growth regulators tested, adenine sulphate and IBA appear to enhance shoot multiplication. It also appears that a combination of cytokinin, auxin and GA cause shoot multiplication. Shoot multiplication of bamboo has not been reported in Sri Lanka, even though, *in vitro* growth of axillary and apical meristem have been reported.