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Evaluation of pot mixture for propagation of bamboo species (*Bambusa tulda*)

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Abstract

An experiment was conducted to find out the suitable pot mixture for the improvement of the vigour of the seedlings in *Bambusa tulda*. Pot mixture containing soil + sand + vermicompost (2:1:1) recorded the maximum seedling survival (82.5%), seedling height (131.3 cm) and number of offsets (12.4) at 10 months after sowing.

Key words: Bamboo, *Bambusa tulda*, Biofertilizers, Nursery mixture, Seed propagation, Vermicompost

Introduction

Bamboo is one of the important forest species used in paper industry, house construction, ornaments making *etc.* Most of the bamboo species are propagated both by seeds and vegetative means. *Bambusa tulda* is mainly multiplied by seeds, culms, rhizomes *etc.* The seedlings in the nursery usually vary in vigour and other growth characters. Therefore, production of good quality seedlings is an important step for ensuring uniform plantation. Seedling quality can be improved in nursery through utilizing proper container and media mixture. Many researchers reported the increased seed germination (Bahuguna *et al.,* 1989; Vanangamudi *et al.,* 1993; Biradar *et al.,* 1998) and seedling vigour (Maronek *et al.,* 1980; Young, 1990) in the forest species due to the use of the nursery mixture. However the use of the nursery mixture with suitable organics and biofertilizers for *Bambusa tulda* is limited. Hence the present study was aimed to find out the suitable nursery mixture for the production of more offsets for vegetative propagation or forest planting through seed propagation in *Bambusa tulda* species.

Materials and Methods

The nursery pot mixtures were prepared by using different media, manure and biofertilizers as per the following details. The treatments are T_1-soil alone; T_2-soil+sand (2:1); T_3-soil + sand + FYM (2:1:1); T_4-soil + sand + poultry manure (2:1:1), T_5- soil + sand + vermi-compost (2:1:1), T_6-soil + sand + neem cake (2:1:1), T_7-soil + sand + ash (2:1:1), T_8-soil + sand + DAP (2:1:10 g kg^{-1} base), T_9-soil + sand + Azospirillum (2:1:10 g kg^{-1} base), T_{10}-soil + sand + Phosphobacteria (2:1:10 g kg^{-1} base), T_{11}-soil + sand + VAM (2:1:10 g kg^{-1} base), T_{12}-soil + sand + PPFM (2:1:10 g kg^{-1} base), T_{13}-soil + sand + Azophos (2:1:10 g kg^{-1} base), T_{14}-soil + sand + Azophos + VAM (2:1:10 g kg^{-1} base), T_{15}-soil + sand + Azophosmet (2:1:10 g kg^{-1} base) and T_{16}-soil + sand + Azophosmet + VAM (2:1:10 g kg^{-1} base).

The different nursery mixtures were filled separately in the polythene bags (25 x 15 cm) in three replications comprising of 25 bags in each replication by following the completely randomized design. The bamboo seeds were sown in the polythene bags and watered regularly for the germination of the seeds. The survival per cent was calculated after three months of sowing of seeds. The seedling height at three and five months after sowing and number of offsets at three, five and ten months after sowing were recorded. The data was analyzed using the statistical method described by Panse and Sukhatme (1967) and the critical difference values were calculated at 5% probability level.

Results and Discussion

The seedlings in the nursery will vary in vigour and other growth characters. It is important that only vigorous seedlings are selected for planting (Farooqi and Sreeramu, 1999). The vigour of the seedlings is highly influenced by the nursery pot mixtures. In the present investigation, the results showed that the treatment T_5 recorded the maximum seedling survival per cent (82.5%) followed by T_4 and T_8 which recorded 75.0% survival (table 1). Similar results of pot mixture containing soil: sand: vermicompost/ soil: sand: goat manure gave higher germination and vigorous seedlings in *Albizia lebbeck* (Natarajan, 1999) and arecanut (Raja *et al.,* 2002).

Table 1. Effect of nursery pot mixture treatments on seedling survival and vigour in bamboo (*Bambusa tulda*)

Treatments	Seedling survival (%)	Seedling height (cm)		Number of offsets		
		3 MAS	5 MAS	3 MAS	5 MAS	10 MAS
T_1	72.5	32.9	95.9	4.8	7.0	8.3
T_2	72.5	28.0	80.1	4.2	9.1	8.7
T_3	72.5	44.8	97.0	4.6	8.3	9.1
T_4	75.0	44.5	121.2	5.5	11.5	12.7
T_5	82.5	44.8	131.3	4.4	12.4	13.2
T_6	70.0	35.7	84.0	4.7	7.0	8.4
T_7	65.0	32.8	87.2	4.6	7.2	8.0
T_8	75.0	42.9	84.1	5.4	8.0	9.6
T_9	70.0	43.7	87.6	4.1	7.3	8.6
T_{10}	70.0	45.4	106.5	3.7	9.0	8.4
T_{11}	72.5	36.4	89.1	5.4	10.1	10.3
T_{12}	72.5	36.2	83.4	4.9	8.0	8.9
T_{13}	70.0	33.5	84.4	5.4	7.5	8.3
T_{14}	70.0	28.3	85.9	4.9	8.6	9.3
T_{15}	70.0	28.2	88.2	4.7	7.5	8.3
T_{16}	70.0	29.4	81.2	4.8	8.3	8.4
SEd	1.98	2.87	5.74	0.58	1.09	1.19
CD (P=0.05)	4.19	6.09	12.17	NS	2.32	2.53

T_1-soil alone; **T_2**-soil+sand (2:1); **T_3**-soil + sand + FYM (2:1:1); **T_4**-soil + sand + poultry manure (2:1:1), **T_5**-soil + sand + vermicompost (2:1:1), **T_6**-soil + sand + neem cake (2:1:1), **T_7**-soil + sand + ash (2:1:1), **T_8**-soil + sand + DAP (2:1:10 g kg^{-1} base), **T_9**-soil + sand + Azospirillum (2:1:10 g kg^{-1} base), **T_{10}**-soil + sand + Phosphobacteria (2:1:10 g kg^{-1} base), **T_{11}**-soil + sand + VAM (2:1:10 g kg^{-1} base), **T_{12}**-soil + sand + PPFM (2:1:10 g kg^{-1} base), **T_{13}**-soil + sand + Azophos (2:1:10 g kg^{-1} base), **T_{14}**-soil + sand + Azophos + VAM (2:1:10 g kg^{-1} base), **T_{15}**-soil + sand + Azophosmet (2:1:10 g kg^{-1} base) and **T_{16}**-soil + sand + Azophosmet + VAM (2:1:10 g kg^{-1} base).

Seedling height was maximum (44.8 cm and 131.3 cm) in the treatment T_5 (soil + sand + vermicompost (2:1:1) followed by T_4 (soil + sand + poultry manure (2:1:1) which recorded 44.5 cm and 121.2 cm during 3rd and 5th months after sowing respectively (table 1). However, no significant difference was observed between these two treatments.

The number of offsets produced was high (13.2 and 12.4) in the treatment T_5 (soil + sand + vermicompost (2:1:1) during 5th and 10th months after sowing respectively. The next best treatment *viz.,* T_4 (soil + sand + poultry manure (2:1:1) produced 11.5 offsets at fifth month and 12.7 offsets at ten month of sowing which had no significant difference with previous treatment. Soil alone (T_1) (7.0 and 8.3) and soil + sand + ash (2:1:1) (T_7) (7.2 and 8.0) recorded minimum number of offsets during five and ten months after sowing (table 1). Among the treatments, the number of offsets produced during three months after sowing was not significantly different.

It was found that the vermicompost acts as a good pot mixture because it contains rich nitrogen (1.5-2.5%), phosphorus (0.9-1.7%), potassium (1.5-2.4%), magnesium (0.2-0.3%), calcium (0.5-1.0%), sulphur (0.4-0.5%) and vitamins (Sreekrishna Bhat, 1999). It also has growth hormones like gibberellins, which regulate the plant growth. It can supply full requirement of micronutrients and enhances the availability of both native and added micronutrients in soil (Purakayastha and Bhatnagar, 1997). This might be the reason for enhanced performance in bamboo seedlings. The farm yard manure has 0.5% nitrogen, 0.2 % phosphorous and 0.5 % potassium which are slightly higher in poultry manure (3.03 % N, 2.63 % P, and 1.4 % K) (Sankaranarayanan, 2004). The increased nutrient level in poultry manure might be the cause of the seedling vigour improvement in the bamboo after the vermicompost treatment. The vermicompost has the additional nutrients and vitamins other than nitrogen, phosphorous and potassium which showed positive effect on the seedling vigour. The other treatments including biofertilizers had no significant effect on the performance of the seedlings.

Conclusion

It is concluded that the pot mixture comprising of soil + sand + vermicompost (2:1:1) have recorded the maximum survival percentage, plant height and offsets. Therefore this pot mixture can be recommended for getting the vigourous seedlings through seed propagation. Maximum number of offsets produced can also be separated for further vegetative propagation or planting.

References

Bahuguna, V. K., K. P. Unnikrishnan and U. C. Dhaundiyal. 1989. Studies on the performance of Philippines and Malaysian provenance of *Albizia falcatoria* (L.). Febrez. at nursery stage under north Indian tropical conditions. *Indian Forester* 115(4): 209-215.

Biradar, K. M., M. Shekhargouda, M. N. Merwade and Ravi Hunje. 1998. Studies on seed dormancy and germination in sandal (*Santalum album* L.). *Seed Tech News* 28(4): 54.

Farooqi, A. A. and B. S. Sreeramu. 1999. Coconut. In: Bose TK *et al* (eds.) *Tropical Horticulture* Vol. 1. Naya Prokash Publishing Co., Calcutta. Pp.538-562

Maronek, D. M., J. M. Hendrix and J. Kiernan. 1980. Differential growth response to the mycorrhizal fungus *Glomus fasciculatum* of southern Magnolia and *Junipers* grown in containers in composted hardwood barkshale. *J. Amer. Soc. Hort. Sci.* 105: 206-208.

Natarajan, S. 1999. *Investigations on seed source variations, standardization of seed testing procedures and nursery techniques in Albizia lebbeck* (L.) Benth. *Ph.D. Thesis*, Tamil Nadu Agricultural University, India.

Panse, V. G. and P. V. Sukhatme. 1967. *Statistical Method for Agricultural Workers*, Indian Council of Agricultural Research, New Delhi.

Purakayastha, T. J. and R. K. Bhatnagar. 1997. Vermicompost: a promising source of plant nutrients. *Indian Farming* 46(11): 35-37.

Raja, K., V. Palanisamy and P. Selvaraju. 2002. Effect of organics and bioinoculants on the production of quality seedlings in arecanut (*Areca catechu* L.). In: Proc. *International Conference of SAARC Countries on Biotechnology in Agriculture, Industry and Environment*, 28-30 December, 2001, Yashwantrao Chavan College of Science, Karad. Pp. 159-169

Sankaranarayanan, K. 2004. Nutrient potential of organic sources for soil fertility management in organic cotton production. http://www.cicr.org.in/research_notes/nutrient_organic_ cotton.pdf.: 1-6.

Sreekrishna Bhat, S. 1999. Organic farming-An eco friendly agriculture for spices growing. *Spice India* 12(3): 7-10.

Vanangamudi, K., S. Padmavathi, V. Manonmani and C. Surendran. 1993. Effect of pelleting with biofertilizer, biocides and nutrients on the viability and vigour of neem seed. In: *World Neem Conference,* Feb. 24-28, Bangalore Pp. 64.

Young, C. C. 1990. Effect of phosphorus – solubilizing bacteria and vesicular arbuscular mycorrhizal fungi on the growth of tree species in subtropical and tropical soils. *Soil Sci & Plant Nutr 36(2):* 225-231.