

Mini Clonal Technology: An Innovative Propagation Tool for Agroforestry Trees

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SUMMARY

Mini clonal technology is one of the innovative methods of the mass multiplication of agroforestry tree species under mist chamber in control condition. It has known for its high rooting potential, rooting speed and quality roots. The procedure involves the selection of clone, clonal multiplication, construction of sand bed trough, planting and management of clones, collection of apical shoot cuttings, mini cutting treatment and planting in sand beds or media, acclimatization and hardening. The technology reduces the gestation period almost half. This technology produces a greater number of cuttings per year and per unit area without any requirement of rooting hormone.

INTRODUCTION

Agroforestry has gained world-wide attention for its productive, protective and ameliorative functions. The prevailing forest policy, 1988 has the restriction on felling trees which was resulted in shortage of wood and wood products for the industrial usage. The gap between demand and supply of wood has increased over the period of time. The agroforestry practices meet out the wood demands and contribute the timber requirements across the country. Agroforestry has higher productivity compared to natural forests. The efficient tree breeding and tree improvement programmes directed to improved genetic resources enhanced the productivity. As seed-based propagation methods has its own limitations like long period of growth, chances of showing recessive characters etc., use of clonal technology have been attracted (Parthiban *et al.*, 2014). The objectives of clonal propagation have changed to the productivity and quality of wood rather than other characters. Identification and addition of new clones in the successive rotations been practiced in higher rate of clonal selection and tree improvement programmes in that coppicing was no longer an objective (Parthiban & Seenivasan, 2017). Mini clonal technology has originated from Brazil, as they were widely practiced for the mass multiplication of industrial agroforestry tree species like *Eucalyptus*, *Melia dubia*, *Casuarina*, *Neolamarckia cadamba* etc.

Procedure of Mini Clonal Technology

Selection of Clone

It is the first step in Mini clonal technology. Based on the superiority of morphological characters, growth attributes and apical dominances, candidate plus trees (CPTs) selected individually through comparison or check tree method. Trees are generally selected in 3 years after planting or selection in half rotation age. The selected tree is cut at base at the height of 15cm above ground level and allows the tree to coppice. The coppice was harvested and treated with rooting hormone. The ramets are multiplied for field testing and evaluation. Based on the performance in the field trial the selected clones are screened and make ready for mini clonal technology.

Clonal multiplication

The identified clones are multiplied through mini clonal technology. The clonal material is established through micro propagation under controlled conditions mainly in Hi tech polyhouses. The roots are produced in shoots and planted in mother clonal garden.

Construction of sand bed trough

The screened clones are planted in the sand bed having various bed sizes of 10 m x 1 m x 0.6 m or 5 m x 1 m x 0.6 m or 3 m x 1 m x 0.6 m depending on the planting material requirement and management technologies. The trough is a cement concreted or fabricated through GI sheet structure. The bottom of the trough is filled with stones up to 20-25 cm height from the ground level. Finely sieved river sand was filled on above portion of stone

filling. The trough is covered with UV stabilized polythene film on top and insect proof mesh in side. The bed is connected with proper irrigation and fertilization facilities. Usually drip irrigation is recommended.

Planting and management of clones

The clones are planted in mother clonal garden for the multiplication. The ramets are planted at 10 cm x 10 cm spacing. The clones have to irrigate every one-hour interval. It will activate the cell division and emerge new shoots for the harvest. The following nutrients were supplemented for the growth of micro shoots. Depending on the rate of growth and species, the fertilizer can be applied twice or thrice.

Urea- 300-400 ml or g/m²

SSP- 150-175 ml or g /m²

KCL- 175-250 ml or g /m²

Micro nutrient mixture – 100 ml or g /m²

Harvesting of apical shoot cuttings

The clonal plants were allowed to grow up to 30-60 days after that the plants are pruned to induce shoots. The cut end stem will produce new shoots from 8-10 days and after 15-20 days the cuttings can be collected. Treat the collected shoot cuttings with 2% carbendazim solution.

Mini cutting treatment

The shoot cuttings form new apical meristems. It does not need the application of hormone treatment. The root grows straight down from the base.

Planting of apical shoot cuttings

The collected cuttings are planted in root trainers which are filled with coir pith. Rooting starts in 15 days onwards. After 25 days the old rooted plants are ready for hardening. Some clones require hormonal treatment before transplanting. The root trainers are kept in green house with the temperature of 32-35°C and relative humidity of 85-95%. Every 30 minutes watering enhances the uniform rooting process. Following this mini clonal technology, at least one harvest per month. For every harvest, minimum of 3-5 shoots per plant can be done.

Acclimatization and Hardening

The rooted plants are hardened in shade house. 50% of shading for 7-15 days was maintained in shade house. Later these plants are shifted into open nursery for 30 days with proper irrigation and fertilizer application. The plantlets/ planting material is ready in 60-75 days for field planting.

CONCLUSION

Mini clonal technology has enough potential for the mass multiplication of agroforestry tree species for achieving demand and supply of industrial wood products. It has reduced the time period of growth with less mortality rate. The technology has enhanced the rooting potential and uniformity of the quality of planting material. The practice of mini clonal technology can supply the enough and efficient planting material or plantlets to meet the demand of the tree growers and other commercial forestry ventures.

REFERENCES

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