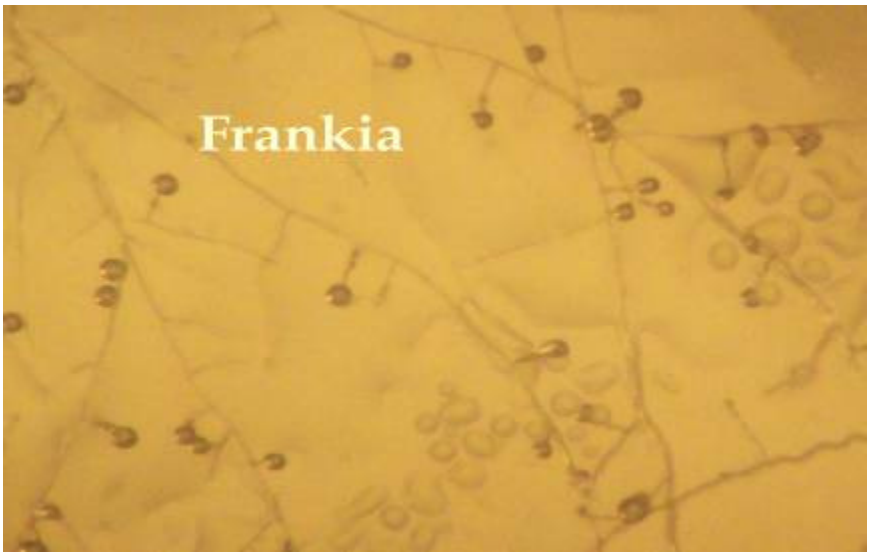
A New Technique for Nitrogen fixation in Rooted stem cuttings of Casuarinas

Casuarina equisetifolia and C. *junghuhnina* have been widely cultivated for serving fuel wood, land reclamation, dune stabilization shelter belts and pulp making in Andhra Pradesh, Tamilnadu, Puducherry and Orissa. These trees fix atmospheric Nitrogen through the symbiotic relationship with *Frankia* a soil bacterium of actinomycete group. The roots of these trees produces root nodules where the bacteria fixes atmospheric Nitrogen (362 Kg/ha/year) which is an essential nutrient for all plant metabolic activities. At the time planting of Casuarina trees, root nodules collected from matured trees are crushed and added to seedlings. However, this practice is often unsuccessful if the crushed root nodule contains dead or inactive *Frankia*. Further, high yielding and genetically superior tress of *C.equisetifolia* and *C. junghuniana* are selected and propagated vegetatively for pulp and paper production. But as the vegetative propagation uses inert material (vermiculite) for rooting there is no chance for *Frankia* association. Therefore after planting of these stocks it is necessary to apply 150 Kg of Di Ammonium Phosphate (DAP) per acre at the age of 6-12 and 18-24 months.

Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore has developed a solution to reduce the chemical fertilizer costs and to enhance the Nitrogen fixation in rooted stem cuttings of *C. equisetifolia* and *C. junghuhniana.* Instead of using crushed nodules IFGTB has isolated *Frankia* from root nodules and cultured it in an artificial liquid media. After 30 days of incubation the culture of *Frankia* obtained and was homogenated as inoculum. Application of this inoculum at the rate of 5 ml during the root initiation stage of *C. equisetifolia* and *C. junghuhniana* resulted in the development of 3-7 nodules weighing 40-55mg / rooted stem cuttings after 30 days. Thus the nodulation was successfully achieved due to inoculation of *Frankia* in the rooted stem cuttings in presence of inert media (vermiculite) for the following benefits.

Benefits of Inoculation of *Frankia*

- Early establishment of Nitrogen fixation in rooted stem cuttings of *C.equisetifolia* and *C. junghuhniana*
- Reduction of usage of chemical fertilizers.
- Improvement of growth and biomass in *C. equisetifolia* and *C. jnghuhniana*


Frankia

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