Scope and Application of *Frankia* for Improved Cultivation of Casuarinas

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Abstract

Casuarina equisetifolia Forst and *C.junghuhniana Miq* are widely cultivated by Farmers and Paper industries in Tamil Nadu and Pududcherry, India. Genetically superior clones and seeds of these *Casuarinas* have been identified to increase the productivity of *Casuarinas* and thereby improve the livelihoods of Casuarina growers. The Casuarina growers of Tamilnadu and Puducherry accessing these superior planting stocks and cultivating in their farm lands for better productivity. But, the knowledge of symbiotic Nitrogen (N) fixing actnomycete Frankia associated with Casuarinas among Casuarina growers is sparse. Use of *Frankia* along with Casuarinas for cultivation in Farm lands, nutrient deficient sites and degraded areas can reduce the cost of chemical fertilizers. Superior strains of *Frankia* have been identified by Institute of Forest Genetics and Tree Breeding, Coimbatore, India based on Nitrogenase activity and their effect on bio mass improvement in Casuarinas. *Frankia* strains grown in liquid medium being supplied to the Casuarina growers by the Institute so as to avoid the use of chemical fertilizers. Farmers have been taught about *Frankia* and it's method of application in Casuarinas through various training programmes by the Institute, as it is necessary to inoculate *Frankia* in the clones of Casuarina as the clones are usually propagated in inert media (vermiculite). Inoculation of *Frankia* results in early establishment of root nodules in the clones of *C.equisetifolia and C.junghuhniana* that helps successful establishment in field. In the seedlings of Casuarinas, *Frankia improved* the root nodule biomass, number of root nodules and tissue N content. Under field conditions *Frankia* inoculated trees showed improved growth and profuse number of root nodules and *Frankia* influenced the soil nutrients particularly soil N. It was also studied that *Frankia* has the potential to rehabilitate the degraded areas like mine spoils along with *C.equisetifolia*. Hence, the use of *Frankia* has been proved in growth and biomass improvement of Casuarinas over the past few years by the institute. However, further studies on soil types and soil parameters that influences the population of *Frankia* , and the ecological variation of *Frankia* in Casuarina growing zones through molecular approaches are urgently required.