

## Studies on the Growth Response Based on Sex in *Casuarina equisetifolia* with Effective Endosymbiont-*Frankia*

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### Abstract

The outstanding ability of *Casuarina* to grow vigorously on nutrient deficient soil is due to their symbiotic association with *Frankia* –an actinomycete that enables them to fix atmospheric nitrogen thereby tolerating difficult environmental constraints. With a scope to increase the biomass production of *Casuarina equisetifolia* in terms of sex, field surveys were undertaken in *Casuarina* plantation at different regions (coastal, riverine and inland) of Cuddalore District of Tamilnadu to study the distribution and determination of sex on the growth performance (dch, dbh and height) and biomass, nodulation frequency and nitrogen fixing capacities of the nodules. The nature of per cent distribution of male, female and monoecious trees revealed higher frequency of distribution to male population than the female and monoecious trees in the region observed and a significant variation in growth performance between male and female trees irrespective of regions. Variation in nodulation frequency and nitrogenase activity were also observed showing maximum in riverine region. Inoculation of *Frankia* (crushed nodule suspension) collected from different regions to macropropagated cuttings from male and female trees in pot culture experiment revealed, that all inocula were infective irrespective of sources, but, the growth response, nodulation, symbiotic effectiveness and chlorophyll content effectivity differed depending on the source of *Frankia*. Effect of inoculation with maximum effective nodule source from riverine region on the growth, biomass, nodulation, symbiotic effectiveness, biochemical constituents and total nitrogen content of the different plant parts, nitrogenase activity of the nodules at different age (1 to 9months) of the plants were studied. Selecting the superior sex (male) on the basis of increased productivity with inoculation of effective *Frankia* endosymbiont eventually ensures luxurious growth of the plant. The magnitude of this effect will be reflected in higher yields with short rotation beneficial to Farmers.