

## Assessment of the effective cross nodulation of legume species with the nodulating bacteria from *Mimosa pudica* L.

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### Abstract

Symbiotic nitrogen fixation is one of the biological processes important for development of sustainable agriculture by which the atmospheric nitrogen (N) is converted to ammonia, which has considerable potential for wider use in Sri Lankan agriculture. Many leguminous plants have capitalized on this unique bacterial capability by going into partnership with nitrogen-fixing bacteria called rhizobia. This mutualistic association is highly specific, such that each rhizobial species interacts with only a specific group of legumes and *vice versa*. Knowing such symbiotic specificity and finding different legumes nodulated by specific rhizobial species can lead to improved crop yield without the substantial input of chemical fertilizers. *Mimosa pudica* L. is a tropical leguminous perennial herb and a weed. It readily nodulates and fixes nitrogen in symbiotic association with rhizobia strains and two other genera of bacteria *Burkholderia* and *Cupriavidus*, belong to  $\beta$ -rhizobia. In the present study root nodulating bacteria were isolated from *Mimosa pudica* root nodules and tested for cross nodulation of some important legumes. They include species *Vigna unguiculata*, *Glycine max*, *Vigna mungo*, *Vigna radiata*, *Psophocarpus tetragonolobus* and *Vigna unguiculata* subsp. *sesquipedalis*. Control experiment was planned in each tested legume species, without the cross inoculation of nodulating bacteria from *Mimosa pudica*. Pot experiment was designed and pots were filled with sterilized soil. Pots were covered using polythene to minimize other rhizobial contamination in both control and tested legumes, apart from nodulating bacteria isolated from *Mimosa pudica* in experimental pots. Three months after inoculation the legumes were tested for cross inoculation and growth and yield characteristics were also statistically compared with the respective control. Further, nodulation of each legume species by rhizobia isolated from *Mimosa pudica* was compared statistically. It was revealed that the growth, yield and nodule number of some legume species, *Vigna unguiculata*, *Vigna unguiculata* subsp. *sesquipedalis* and *Vigna mungo* showed a statistically significant difference ( $p < 0.05$ ) compared to respective control. It can be concluded that some legume species can form effective nodules from the nodulating bacteria isolated from *Mimosa pudica* and hence enhance their growth and yield. Therefore, the future implications of these findings could have an extremely positive impact on developing strategies to enhance successful legume-*Rhizobium* and  $\beta$ -rhizobia interactions and legume productivity.

**Keywords:** Host specificity, Legumes, Rhizobium, Symbiotic nitrogen fixation,  $\beta$ -rhizobia

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