PROJECT PROFILE

Title	**Conservation and Productivity Improvement of Red sanders (*Pterocarpus santalinus* l.f) (AICRP 8, Component – 6)**
Principal Investigator	**Dr. A. Karthikeyan, Scientist – G**
Project Associate	
Start and Completion dates	April 2020- September 2025

Objectives: To refine and develop silvicultural techniques for red sanders

Activities of Component-6:

Activity1: Isolation and multiplication of superior strains of Arbuscular Mycorrhizal fungi, *Rhizobium* and Phosphobacteria exclusively for *Pterocarpus santalinus.*

Activity 2: Assessment of nitrogenase activity of mass multiplied *Rhizobium* strains.

Activity 3: Inoculation of AM Fungi, *Rhizobium* and Phosphobacteria to seedlings and vegetatively propagated cuttings of *Pterocarpus santalinus* for growth enhancement.

Activity 4: Growth assessment of seedlings and vegetatively propagated *Pterocarpus santalinus* cuttings in nursery.

Activity 5: Establishment of field trial of *Pterocarpus santalinus* inoculated with superior strains of AM fungi, *Rhizobium* and Phosphobacteria.

Funding Agency	CAMPA- AICRP
Total budget outlay	44.36

SUMMARY

Red Sanders (*Pterocarpus santalinus*) is an ecologically and economically significant tree species that faces challenges in propagation and survival due to factors such as hard seed coat dormancy, slow growth, and limited natural regeneration. Additionally, its susceptibility to nutrient deficiencies in degraded soils further complicates large-scale afforestation efforts. The present study aimed to address these challenges by employing microbial inoculants and optimizing vegetative propagation techniques to enhance the growth and productivity of Red Sanders.

The use of microbial inoculants, including *Rhizobium*, arbuscular mycorrhizal fungi (AMF), and phosphate-solubilizing bacteria (PSB), has shown significant potential in improving the establishment and productivity of Red Sanders seedlings. The study demonstrated that combined inoculation of all three microbes resulted in superior plant growth, enhanced nutrient uptake, and increased survival rates compared to single inoculations and control treatments. These findings align with previous research indicating that microbial consortia create a synergistic effect, improving plant-microbe interactions, root colonization, and soil nutrient availability. The ability of *Rhizobium* to fix atmospheric nitrogen, AMF to improve phosphorus uptake, and PSB to solubilize bound phosphorus played a critical role in enhancing seedling performance under both nursery and field conditions.

Furthermore, vegetative propagation through stem cuttings was successfully employed as an alternative method to overcome the challenges associated with seed dormancy and slow

germination rates. The application of auxins, particularly indole-3-butyric acid (IBA) at 2000 ppm and 2500 ppm, significantly improved root and shoot development, ensuring a higher success rate for clonal propagation. The differential response to indole-3-acetic acid (IAA) and IBA suggests the need for targeted application of growth regulators based on the specific developmental requirements of Red Sanders cuttings. The successful establishment of vegetatively propagated plants provides an efficient alternative for mass propagation and conservation efforts.

The findings of this study highlight the importance of integrating microbial inoculants and optimized propagation techniques in Red Sanders cultivation programs. By enhancing seedling vigor, improving nutrient acquisition, and increasing survival rates, these strategies contribute to the sustainable management of this valuable species. Future research should focus on field-scale trials to assess the long-term impact of microbial inoculants and refine vegetative propagation methods for large-scale implementation. Given the endangered status and high demand for Red Sanders, adopting such biotechnological and ecological approaches can significantly aid in its conservation, afforestation, and commercial cultivation efforts.