

List of Ongoing Projects: Genetics & Tree Improvement Division

| S. No. | Title of the Project | Name of the Principal Investigator | Duration of the Project | Funding Agency | Project Status | Project Objectives | Research Findings |
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| 1. | Enhancement of <i>in-vitro</i> production of anti-inflammatory and antimicrobial secondary metabolites from <i>Salvadora persica</i> 'Miswak' using elicitors | Dr. Anjali Joshi | 2025-2027 | ICFRE | Ongoing | <p>Short Term</p> <ol style="list-style-type: none"> 1. The evaluation of callus biomass, BITC production, and antioxidant enzyme activities using different explants from <i>S. persica</i>. 2. To study the effect of chemical and physical elicitors on producing secondary metabolites of <i>S. persica</i>. 3. Development of a protocol for production of secondary metabolite production from callus cultures of <i>S. persica</i>. <p>Long Term</p> <p>Enhancement of production of important secondary metabolites production from <i>S. persica</i> callus cultures.</p> | Callus cultures of <i>Salvadora persica</i> have been successfully initiated using nodes, internodes, and leaf segments as explants on four different media formulations with varying concentrations of plant growth regulators (PGRs). Callus induction was achieved from all explant types, with leaf explants showing the fastest response, initiating callus in approximately two weeks. The established calli are currently undergoing proliferation to increase biomass for downstream experiments. These cultures will serve as the foundation for subsequent studies aimed at enhancing the <i>in vitro</i> production of anti-inflammatory and antimicrobial secondary metabolites using elicitor treatments. |
| 2. | Development and validation of robust microsatellite markers in <i>Sterculia urens</i> and assessment of its population genetic structure | Dr. Anjali Joshi | 2025-2027 | ICFRE | Ongoing | <p>Short Term</p> <ol style="list-style-type: none"> 1. Utilising next next-generation sequencing to generate genomic sequence information of <i>S. urens</i> and the development of genomic microsatellite (SSR) markers | A comprehensive field survey was conducted across Rajasthan to collect plant material for genetic studies. Leaf samples were obtained from six populations of <i>Sterculia urens</i> in the districts of Rajsamand, Sirohi, and Udaipur, and DNA was |

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| | | | | | | <p>2. To validate the developed novel genomic SSR markers of <i>S. urens</i></p> <p>3. To assess the genetic structure of <i>S. urens</i> populations</p> <p>Long term To strengthen and expand the genetic resources of <i>S. urens</i> to encourage future conservation and genetic improvement programmes in the species.</p> | <p>successfully extracted from these samples. Seeds were also procured to raise seedlings, providing a reliable source of leaf material for sequencing and microsatellite marker development. These activities provide a robust basis for population genetic analyses, facilitating the assessment of genetic variation, validation of markers, and a better understanding of the species' population structure.</p> |
| 3. | Promotion of Sandalwood Cultivation through Training Programs across India to Improve the Economic Status of Farmers | Dr. Aditi Tailor | 2025-2029 | CAMPA | Ongoing | <p>A. Training</p> <p>1. Capacity building of master trainers from different ICFRE and non-ICFRE institutes and capacity building of State Forest Departments, sandalwood growers, FPOs, public and private sandalwood nurseries</p> <p>2. Training of farmers from across the country in sandalwood cultivation</p> <p>B. Extension</p> <p>1. Popularizing sandalwood cultivation and sandalwood-based agroforestry systems throughout the country</p> <p>2. Collaboration with end</p> | <p>Master training has been imparted to the ICFRE and non-ICFRE institutes/ organizations/ personnels for capacity building. Seeds have been procured and nursery establishment is underway.</p> |

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| | | | | | | users i.e., FPOs, sandalwood grower associations and State Forest Departments 3. Documentation of knowledge on cultivation practices and suitable host species | |
| 4. | Survey, Inventorisation, Documentation, propagation and Conservation of Rare, Endangered, Threatened Medicinal Plants of Arid and Semi-Arid Region | Dr. Desha Meena | 2023-2026 | NMPB | Ongoing | <ol style="list-style-type: none"> 1. Extensive surveys and explorations for field studies and collection of living plant materials/genetic resources from different regions 2. Inventorisation and documentation of important medicinal plants in their native/natural habitat 3. Population studies in native/natural habitat 4. <i>Ex – situ</i> conservation in two high-tech nurseries 5. Development of plant propagation techniques in the nursery and in the laboratory for plant multiplication. | Exhaustive surveys were carried out in Jodhpur and Jaisalmer districts of Rajasthan for the identification of natural populations of four RET species, <i>Caralluma edulis</i> , <i>Sarcotemma acidum</i> , <i>Blephariss indica</i> , and <i>Dipterygium glaucum</i> . Cuttings of <i>Caralluma edulis</i> and <i>Sarcotemma acidum</i> were collected from selected locations for macropropagation in the ICFRE-AFRI nursery. The results of the study will lead to the conservation of targeted threatened and endangered species through <i>in situ</i> and <i>ex situ</i> conservation. Also, the development of propagation techniques can help in increasing their numbers for replantation and the development of planting stock in the nursery for conservation of this valuable germplasm. |
| 5. | Assessment of neem germplasm for finalization of superior genotypes | Dr. Anjali Joshi | 2023-2026 | RFD | Ongoing | 1. Identification of superior neem genotypes having high | A total of 51 trees belonging to 22 provenances, growing in the AFRI Ecology field and AFRI |

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| | | | | | | <p>and stable seed yield, azadirachtin and oil content for providing neem quality planting material for cultivation in Rajasthan.</p> <p>2. Assessment of the genetic diversity of the selected superior genotypes to facilitate formulation of hybrid breeding programme and generate hybrid suitable for cultivation in Rajasthan.</p> <p>3. Multiplication of superior genotype and providing quality planting material to SFD, Rajasthan and other stakeholders.</p> | <p>main campus neem trials, were marked for assessment. HPLC analysis and oil estimation for the extracted first-year seeds have been completed. For the second year, data on seed yield traits, including number of fruits per panicle and number of panicles per fruiting branch, have been collected for the selected trees. Fruit collection, seed extraction, and recording of seed characteristics (seed length, seed width, and 100-seed weight) have also been accomplished. The three-year data from these trees will provide a comprehensive basis for the identification and selection of superior neem genotypes for future breeding and conservation programs.</p> |
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