

## CENTRAL MUGA ERI RESEARCH & TRAINING INSTITUTE, LAHDOIGARH

Central Muga Eri Research & Training Institute, Lahdoigarh, Jorhat with a network of RSRS, Boko, RSRS, Imphal and RECs located at Lakhimpur (Assam), Coochbehar (West Bengal) and Fatehpur (Uttar Pradesh) provides R&D support for the development of muga and eri industries especially in eastern and North-eastern regions of the country. A brief highlight of the research works done during the year 2020-21 is presented below:

### Host Plant Improvement, Production and Protection

- Castor gene pool was enriched with 22 collections made from North East and other parts of the country to bring in variability with focus on perennial character. Selected potential perennial accessions and cultivated accessions were crossed in 12 different cross combinations with an aim to develop a perennial castor variety with improved characteristics.
- The phyto-chemical diversity assessment study in Som has thrown light on the impact of varied environmental and edaphic conditions on its cultivation. The study has also aided in identifying the suitable soil corrections for quality leaf production.
- The study on the effects of petroleum industry on Muga culture in Assam has thrown light on the real impact of anthropogenic activity of petroleum industry on muga growing areas. The biochar based soil amendment has been found as one of the most suitable mitigation strategies to minimize the petroleum pollution load in muga growing areas.
- Nutritional status of vanya sericulture top soils in Manipur was assessed and spatial distribution maps were prepared to depict the availability of micro and macro nutrients. Ameliorative measures were suggested to enrich the nutrient deficient soils for harvesting quality Muga and Eri cocoons.
- A study was initiated to assess the impact of elevated CO<sub>2</sub> and temperature on muga culture for devising suitable mitigation measures to ensure climate resilient muga culture in NE.
- Three major food plants of eri silkworm, viz., castor, kesseru and tapioca were evaluated

for eri silkworm rearing under different agro-climatic conditions of Manipur. Castor was found as preferred food plant.

- During the year 16,758 seedlings of Muga and Eri host plants were supplied to different stakeholders under various programmes/schemes. This has supported to augment plantation of superior host plant accessions at farmers' fields about 33 acres.

### Silkworm Improvement, Production and Protection

- The host plant leaf volatiles were extracted by using extractor equipment directly from the living plants and chemical cues were identified through GC-MS. Responses of Eri and Muga silk moth towards selected host plant volatiles was observed in Gas Chromatography linked Electro-Antenna detection (GC-EAD) experiment. Application of *P. bombycina* leaf extract on Muga silk moth enhances realized fecundity by reducing egg retention. Similarly, application of *Ricinus communis* leaf extract during oviposition of Eri (*S. ricini*) silk moth increases realized fecundity.
- The healthy muga silkworms from various muga potential areas of North-east India were collected and total 260 microbes were isolated. Out of them 160 bacterial isolates were screened for cellulolytic activity and finally 28 cellulase degrading bacteria were obtained for further experiment.
- Under muga silkworm improvement programme, one promising muga silkworm line with improved characteristics such as above 500 m filament length, compact cocoons and fecundity above 250 was shortlisted and its stabilization is in progress.
- Identified for the first time an endoparasitoid wasp, *Xanthompimpla* predator, which exists in muga ecosystem parasitizing muga silkworm along with other saturniid silkworms like *Attacus atlas*.
- Microsporidia infecting Muga silkworm were isolated, purified and germination assays were conducted.
- Survey and collection of wild eri (*S. canningi*) was carried out in different districts of Manipur. 220 nos. *S. canningi* cocoon were collected, F<sub>1</sub> selfed seed was prepared and F<sub>1</sub> generation rearing was successfully completed. 04 ecoraces and C2 breed were selfed upto F<sub>4</sub> generation with constant selection in each generation to attain homozygosity for utilization in inter and intra-specific hybridization programme.
- Economically viable novel egg laying devices were designed to produce more Eri DFLs in less space. Standardized each day egg collection technique

from the new devices has helped in synchronization of hatching, which further benefits in subsequent rearing performance.

- Castor variety NBR-1 was identified as most suitable for Eri chawki rearing. Other eri chawki rearing techniques such as novel brushing technique, novel bed disinfectant method, optimization of no. of worms to be reared per tray, leaf quantity required per DFL, lime quantity required per DFL during and after moulting and ideal temperature and humidity were standardized.
- Three promising eri silkworm eco-races, viz., Borduar, Titabar & Manipur local along with C-2 breed were evaluated in four seasons under different agro-climatic conditions of Manipur. Borduar was found as better race with 83.57 % ERR which is at par with C2 breed (83 %). Among six strains, the highest ERR was found in Yellow plain (91.33 %) and GB plain (91.27 %).
- 45,700 dfls of oak tasar were produced against the target of 45,100 with 101.33% achievement and supplied to State govt. and adopted seed rearers for further multiplication during spring crop 2021.
- Determined the economic injury level and economic threshold level of *P. raya* and *H. puera* infesting *Q. serrata*. Identified bioneem as the most effective bio-pesticide for control of oak plant pests with a reduction percentage of 83.40 % in *P. raya* and 76.08 % in *H. puera*, respectively. This finding will reduce the use of hazardous chemical insecticides for control of insect pests by farmers.
- Developed simple, low cost and user friendly PET bottle trap for control of adult uzi fly. Also developed an integrated pest management strategy for control of uzi fly.

programmes during the year.

- A total of 1701 nos. of farmers, officials, students and NGO members were trained/up-skilled under six different training components like Farmers Skill Training, Technology Orientation Programme, Training under Post cocoon Sector, Training under Sericulture Resource Centre and Non-CBT funded trainings. 467 beneficiary farmers were also trained in Textile Sectors under “**SAMARTH**” scheme
- Integrated practice of ITK and modern technology for higher muga cocoon yield was validated at 14 farmer's field under on farm trials of technology programme (OFT). Average cocoon yield increased by 22.8% over the existing recommended practice and both the cocoon yield and ERR was highly significant over the existing recommended practice during Jarua crop (Dec-Jan 2021).
- Efficacy of formulation for controlling bacterial flacherie disease in Muga silkworm was confirmed under on station trials. Significant enhancement was recorded in cocoon production (10-12%) during summer crop.
- 3750 seedlings of Kesseru accessions (HF005 and HF008) were supplied to 26 Eri farmers for popularization of these superior accessions in Upper Assam with a total area plantation of 8.44 acres under TOT programme.
- 2000 Borpat seedlings were distributed among 7 women Eri culture farmers for raising block plantations in 4.5 acres of land. 02 kisan nurseries of this promising perennial eri host plant were successfully established in upper and lower Assam.

## II TRANSFER OF TECHNOLOGY

### CENTRAL MUGA ERI RESEARCH AND TRAINING INSTITUTE, LAHDOIGARH, (ASSAM)

- Three Vanya Resham Krishi melas, 01 workshop, 02 exhibitions, 03 Field Days, 16 Awareness Programmes and 16 Technology Demonstration Programmes were organized by the Institute. About 3131 persons were sensitized through these