MINUTES OF 63rd RC MEETING HELD ON 07.06.2022 AT CMERTI LAHDOIGARH

The 63rd Research Council meeting of CMER&TI, Lahdoigarh was held on 07th June 2022 under the Chairmanship of Dr. K.M. Vijaya Kumari, Director at conference hall of the Institute. The list of participants is enclosed as Annexure-I. The meeting was conveyed as per the agenda and explanatory notes.

AGENDA NO. 1: CONFIRMATION OF PREVIOUS RC MEETING MINUTES

The minutes of the 62nd RC meeting held on 18th February, 2022 were circulated to all the scientists of main institute and its Nested Units. Since, no comments were received, the minutes were considered confirmed.

AGENDA NO. 2: REVIEW OF ACTION TAKEN ON THE RECOMMENDATION/ DECISIONS OF THE LAST RC MEETING

Project wise actions taken report on the decisions/ recommendations of last RC meeting were presented by the Concerned Scientists.

AGENDA NO.3: NEW CONCEPT NOTES FOR APPROVAL

#	NEW RESEARCH PROPOSAL	DETAILS
1.	**Project title :**	**Evaluation of role of polyamines; spermidine and spermine in enhancement of fecundity and egg production of muga (*Antheraea assamensis*) and eri (*Samia ricini*) silkworms**
A	Investigators involved (PI & Co-I's)	**CMER&TI, Lahdoigarh** 1. Dr. Aftab A Shabnam, PI 2. Dr. Om Prakash Patidar, CI **GITAM, Visakhapatnam (AP)** 1. Prof. M Anitha, PI 2. Dr. GV Sireesha, CI
B	Objectives:	1. To standardize the effective dose of various polyamines that enhances egg production of muga and eri silkworms (CMERTI and GITAM). 2. To understand the mechanism by which polyamines enhance fecundity and egg production of muga and eri silkworms (GITAM). 3. Field trials with selected concentrations of polyamine (CMERTI).
C	Expected outcome and utilization:	The problem of inadequate seed supply can be addressed if the enhancement of fecundity ratio by polyamines in muga and eri silkworms is proved at lab scale and is tested at farm level. Moreover, the problem of male sterility leading to poor

		hatching of muga silkworm eggs during summer can also be addressed. The new method developed in the project will be given to seed production centres for testing. • Identification of genes involved in testicular development that help in enhancement of fertility. • Enhancement of sperm count, sperm maturity, sperm motility, fertilization, number of eggs produced and fertility ratio through application of polyamines. • Enhancement of farm level muga and eri egg production
D	Budget:	Rs.87.27 L (CMER&TI)& Approx. Rs. 57.77 L (GITAM) **Total: Rs. 145.04 L**
E	**63rd RC Suggestion**	• To check the polyamines in the untreated/control silkworms to confirm their decrease during stress conditions of summer. • Project is approved. • Submit to the funding agency and RCS, CO Bangalore.
CONCEPT NOTES PRESENTED IN THE PREVIOUS RC MEETING		
1.	**Project title :**	**Impact assessment of Skill Training on silk sector with reference to SAMARTH scheme in NE states**
A	Investigators involved	1. Sh. Bitupan Das 2. Dr. Manjunath, RN. CI 3. Dr. S A Ahmed , CO-PI
B	Objectives:	1. To assess the impact of training on quality and quantity of the output with special reference to sustainable revenue generation and skill up gradation among the beneficiaries. 2. To assess the impact of training on the output of subsector viz. Sericulture and Handloom in NER
C	Expected outcome and utilization:	• The study will be helpful for finding the impact of skill development in income generation. • On the basis of survey and real-time field requirement, course content /curriculum of the training may be fine tuned. • Study will indicate the output of subsectors viz. Sericulture & Handloom
D	Budget:	4.40 L
E	**62nd RC Suggestions**	• Modify the title, objectives and discuss the concept with statistician to reformulate the project accordingly. • Project duration maybe extended to 2 years and a scientist to be included from PCT section. • Include the entry level assessment and percentage of adoption to be estimated (6 months) post training. • Regular survey to assess the impact of the training and sustainable income generation among the trainees/entrepreneurs to be included. • Re-submit the modified concept and present in next RC

F	Follow up action taken on 62nd RC suggestions	PI presented the modified concept with incorporation of above suggestions
G	**63rd RC Suggestion**	• Add one more objective "To assess the socio economic status of beneficiaries". • Propose one Project Assistant for the project and revise the project budget accordingly. • Project is approved.

AGENDA NO. 4: REVIEW ON CONCLUDED PROJECTS

No project was concluded since last RAC/RCC.

AGENDA NO. 5: PROGRESS OF ON-GOING PROJECTS

#	ON-GOING PROJECTS	DETAILS
1.	**Project code and title:**	**AIB 05012–SI: Inter and intra–Specific Hybridization for Improvement of Eri Silkworm, *Samiaricini* Donovan**
A	Investigator involved	Dr.Reeta Luikham, (PI), Dr. Aftab Ahmad Shabnam, (CI)
B	Project period :	04 years (March, 2020 – February, 2024)
C	Objectives:	To develop improved cross breeds/hybrids of Eri silkworm with higher fecundity and silk yield for commercial exploitation.
D	Progress achieved:	Intra-specific hybridization was carried out by selecting pureline parents of ecoraces & C2 breed to cross in full diallel fashion to produce F1 crossed seed was completed. Selfing and grainage activities to produce crosswise F2 seed are under progress. Inter-specific hybridization was carried out by utilizing pure wild eri *S. canningi* as male parent and crossed with two ecoraces (Borduar and Kokrajhar) out of 04 ecoraces and C2 breed to produce F1 crossed seed is completed. Grainage activities to produce F2 crossed seed is under progress. Analysis of GCA & SCA is under progress.
E	Specific outcome:	Selection of pureline parental stock for utilization in actual breeding programme Crossing of pureline selected parents will lead to selection of improved Eri silkworm hybrid/breed. Estimation of GCA & SCA will be helpful to identify suitable cross combinations for future breeding programmes.
F	Budget and expenditure :	Budget Rs.**23.15** Lakhs Expenditure Rs. **7.89815**lakhs
G	Suggestion of last RC/RAC meeting:	**62th RC Comments** 1. The progress in the project is satisfactory. Investigators are advised to continue the project as per milestone. **39th RAC comments** 1. Progress made in the project is satisfactory.

		2. Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**62nd RC:** • Project is continued as per milestones. **39th RAC:** • Project is continued as per milestones.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	• Exploit the following best hybrid combinations by test verifying the results at CMER&TI and its attached farms: 1. BYP x T GBP 2. G YP x T GBP 3. C2 x BYP 4. G YP x C2 (High fecundity hybrid). • Repeat inter-specific hybridization work to get desirable results.
2.	**Project code and title:**	**AIP-05013-SI: Impact of elevated CO_2 and temperature on muga silkworm and its primary host plant**
A	Investigators involved	Dr. Amit Kumar (PI); Dr. Aftab Ahmad Shabnam (CI); Dr. G. Subramanyam up to 26.07.2021; Dr. D.K. Jigyasu (CI)
B	Project period :	March 2020-Feb 2023
C	Objectives:	1. To assess the influence of elevated CO_2 and temperature on growth and yield attributes of primary host plant (Som). 2. To assess the impact of elevated CO_2 and temperature on muga seed crop production, cocoon characteristics and fecundity. 3. To design strategies for adoption in muga silk worm rearing under the changing environmental scenario in Assam.
D	Progress achieved:	The project is running behind the schedule due to non-procurement of OTCs. However: ➢ Financial approval for Open Top Chambers (OTCs) has been received and the purchase order has also been issued to L1 party. The vender also accepted the order. ➢ Som plot selected for the experiment was maintained as per recommended package of practices. ➢ The treatment on the host plants will be given after the establishment of the Open Top Chambers. ➢ The long-term weather data of the Meghalaya has been completed. ➢ Long-term weather data of Assam is updated with available production data for publication as "Seri-climatic manual of muga growing districts of Assam".
E	Specific outcome:	Maintenance of the Som plantation as per the recommended package and practices
F	Budget and expenditure :	**Budget:** Rs. 44.72 lakh **Expenditure** till April 2022: 4.43597 Lakh
G	Suggestion of last	**Suggestions of 62nd RC held on 18th February 2022:**

	RC/RAC meeting:	➢ The proposed activities under the project have not been initiated yet due to non-procurement of OTC's for which the approval is awaited form standing committee. ➢ The PI may follow up the procurement of the same. ➢ Include muga silk production data in the book entitled "Seri-Climatic Manual of Muga Growing Districts of Assam" and publish the same. **Suggestions of 39th RAC held on 6th November 2021:** ➢ Expedite the process for procurement of OTCs and carry out the project as per milestone.
H	Follow-up action taken on last RC/RAC meeting:	**Follow-up action on 62nd RC held on 18th Feb. 2022:** ➢ The financial approval from the standing committee has been received and Supply order has been accepted by the L1 party. ➢ The installation of OTCs will be done shortly. ➢ Some data points of muga production in selected districts of Assam were available and have been incorporated into the book. **Follow-up action on 39th RAC held on 6th Nov. 2021:** ➢ The financial approval from the standing committee has been received and Supply order has been accepted by the L1 party. ➢ The installation of OTCs will be done shortly.
I	Suggestions of RCS	To check on conducting experiments as per set work under PIB AIP-05013-SI
J	Follow up action taken on suggestion of RCS	The project is running behind the schedule as the financial approval for the procurement of the OTCs from the standing committee was delayed and received during March 2022.
K	**63rd RC Suggestions**	• Initiate project work immediately after installation of OTCs is completed. • Publish "Seri-Climatic Manual of Muga Growing Districts of Assam" book with ISBN number.
3.	**Project code and title:**	**ARP-05015SI, Development of chemical based control measures for management of pebrine disease in Muga silkworm, *Antheraea assamensis* Helfer**
A	Investigators	Dr. Arun Kumar K. P. (PI)
B	Project period :	Jan 2021 – Dec 2023
C	Objectives:	• Effect of different chemical disinfectants and antifungal substances on survivability and infectivity of microsporidian spores • Efficacy analysis and field application of chemical disinfectants suitable for management of pebrine disease.
D	Progress achieved:	• The experiment on treatment of pebrine infected eggs was repeated and rearing of treated eggs is complete. Pebrine infected layings were divided on the basis of density of spores (low and high). Two disinfectants 0.2% NaOCl and

		2% Nirmool were used to disinfect the eggs. • Testing of different fungicides on survivability of pebrine spores is going on. • Germination assay with these fungicides is also being carried out simultaneously.
E	Specific outcome:	Both 0.2 % NaOCl and 2% Nirmool can be used to treat low density pebrine infected eggs. 0.2% NaOCl was found to be more effective as it resulted in less number of pebrine positive samples, whereas less emergence was seen in 2% Nirmool. But both the disinfectants were found to be ineffective in curbing pebrine disease in samples with highly dense *Nosema* spores.
F	Budget and expenditure :	Budget: 19.92 lakhs, Expenditure: 5.14 lakhs
G	Suggestion of last RC/RAC meeting:	**62nd RC Suggestions** Continue the project as per milestones and objectives of the project. **39th RAC suggestions** Continue the project as per milestone.
H	Follow-up action taken on last RC/RAC meeting:	**ATR on 62nd RC suggestion** Project is being continued as per milestone. **ATR on 39th RAC suggestion** Project is being continued as per milestones.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rdRC Suggestions**	Continue the project as per milestone.
4.	**Project code and title:**	**AIT05016MI- Integrating genomic and transcriptomics resources for functional insight into the biology of muga silkmoth *Antheraea assamensis***
A	Investigators involved	Dr. Arun Kumar K.P – PI
B	Project period :	2 Years (1/1/2021 to 31/12/2022)
C	Objectives:	• Development of web accessible database 'Mugabase' to host the muga sequence data, initially within CSB and later for public access. • Refining of assembly and annotation of the whole genome and transcriptome sequence data. • Identification and validation of functional genes associated with insect behaviour, silk quality and immunity.
D	Progress achieved:	1) Development of 'Vanya Silkbase' is under progress. 2) Standalone BLAST database of all the wild silkmoth genomes have been created. 3) Annotation of muga genome completed.

		4) Synteny analysis with against *Antheraea pernyi* genome is completed. 5) SNPs identified in both wild type and cultivar muga genome. 6) Experimental infection of muga silkworm is completed and tissues collected for gene regulation analysis.
E	Specific outcome:	• Homologs of silk protein Sericin is identified in other saturniid silkmoths. • Candidate silk character gene identified. • Around 5 Lakhs SNPs detected in both Wild type and cultivar muga genome. • Synteny analysis in comparison to *Antheraea pernyi* genome is completed.
F	Budget and expenditure :	Budget – 44.60 Lack Expenditure – 15.57 Lack
G	Suggestion of last RC/RAC meeting:	**62nd RC Comments** The progress in the project is satisfactory. Continue the project as per milestone. **39th RAC suggestions** 1) Present the brief outcome of Phase-I of the project in next meeting. 2) Continue the project as per milestone.
H	Follow-up action taken on last RC/RAC meeting:	**ATR on 62nd RC suggestions** The project is being continued as per milestones. **ATR on 39th RAC suggestions** 1) Outcome of Phase-I of the project will be presented in a single slide in the next RAC. 2) Project is being continued as per milestones.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	• Pacify the procurement of RT-PCR. • The progress in the project is satisfactory. Continue the project as per milestone.
5.	**Project code and title:**	**APR05018MI- Effect of various host plants separately and in combination on Rearing and grainage performance of Muga silkworm, *Antheraea assamensis* Helfer**
A	Investigators involved	Dr. Kh. Subadas Singh(PI), Sri S. A. S. Rahman (CI), Dr. DK Jigyasu (CI), Dr. Vikram Kumar (CI)
B	Project period :	3 Years (March, 2021 to Feb, 2024)
C	Objectives:	1. To study the effect of various host plants separately and in combination on rearing performance of muga silkworm. 2. To study the effect of various host plants separately and in

		combination on grainage performance of muga silkworm.
D	Progress achieved:	Experimental rearing of muga silkworm on different host plants Viz., Som (*Persea bombycina*), Soalu (*Litsea monopetala*), Dighloti (*Litsea salicifolia*) and Mejankori (*Litsea cubeba*) in different crop seasons is being conducted. Like in previous crops, muga silkworm rearing was conducted both solo and combinations of host plants during Chotua (Feb-March 2022). 1. In Chotua (Feb-March 2022), rearing on Som (*Persea bombycina*) showed better results in terms of ERR% (52) among solo rearing. 2. Combination of Soalu + Som perform better than solo rearing in terms of ERR% (54) 3. Highest fecundity was found from silkworm rearing on Soalu (242). 4. Som exhibited shorter larval duration (29 days and 31 days on Soalu) as compared to other host plants. 5. Longer larval duration was observed in case of combination rearing with host plants Mejankori and Dighloti.
E	Specific outcome:	Rearing of muga silkworm on different host plants in different crop seasons reveals the role of host plants in muga silkworm rearing and grainage parameters. Different host plants are showing different results in different crops. Most of the cases, Soalu exhibited better results in terms of larval weight, cocoon weight and fecundity. Som exhibited better results in terms of short larval duration (22 days in summer and 40 days in winter), shell weight, shell ratio% and ERR% as compared toSoalu and other food plants. However, in Chotua crop, best rearing performance was observed in the combination of Soalu with Som in terms of ERR%.
F	Budget &expenditure	Total budget is Rs.15.42 lakhs and expenditure is 2.3 lakhs
G	Suggestion of last RC/RAC meeting:	**62nd RC suggestions** • The PI has reported that all the four host plants are not available at the collaborating institutes. Hence, it is suggested to explore the availability of all four host plants in nearby areas and modify the target/milestones accordingly with due intimation to RCS. • As budget utilization is poor, the PI is advised to effectively utilise the budget. **39th RAC comments** • Conduct experiments in proper statistical design and present statistically analyzed rearing data. • Continue the project as per milestone
H	Follow-up action taken on last RC/RAC meeting:	**Compliance on 62 RC comments** 1. Suggestions complied. Exploration on the availability of all four host plants in nearby areas has been conducted and accordingly the target/milestones will be modified with due

		intimation to RCS, CO. **2.** Suggestion complied, effective utilization of the project budget will be covered up in the subsequent two years of the project duration. **Compliance on 39th RAC comments** Suggestion complied. Experiment is being conducted in proper statistical design and data will be presented in the next meeting. Project is continuing as per milestone.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	• PI to recheck the data and present statistically analysed comparative data in the forthcoming meetings. • In view of transfer of Dr. Subadas Singh (PI), Dr. D. Jigyasu is nominated as PI and Dr. D. Mech as CI of the project.
6.	**Project code and title:**	**APS 05020MI: Commercial egg production technology for ericulture**
A	Investigators involved	Dr. Mahesh D S, Sci-B (PI), Dr. Lalith Natarajan, Sc-D, EBSF, Topatoli, (Co-PI) Dr. Arunkumar K P, Sci-C (CI)
B	Project period :	February 2022 to January 2024
C	Objectives:	a. Standardization and selection of suitable egg laying device for commercial loose egg production in eri. b. Synchronization of hatching and subsequent rearing. c. Popularization of loose egg production in Ericulture.
D	Progress achieved:	- The standardization of suitable egg laying device is under progress.
E	Specific outcome:	Nil
F	Budget and expenditure :	Total budget is 13.49 Lakhs and expenditure is 0.21 Lakhs
G	Suggestion of last RC/RAC meeting:	**RC Comments** 1. Initiate the project as per the objectives and milestones. **RAC comments** 1. Project is approved. PI to submit the full project proposal within 15 days.
H	Follow-up action taken on last RC/RAC meeting:	**ATR on RC comments** 1. Project is initiated as per the objectives and milestones. **ATR on RAC comments** 1. Full proposal has been submitted and project was coded.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	Continue the project as per milestones.

7.	**Project code and title:**	**MOE 05022 MI: Evaluation and popularization of improved technologies developed in the field of Muga, Eri and Oak sector for Northeastern India (On-station/On-farm Trials of CMER&TI, Lahdoigarh)**
A	Investigators involved (PI & Co-I's)	Dr. D K Jigyasu, CMERTI (PI), Sri Suraj Pal, REC-Fatehpur (CI), Dr. James T Keisa, CMERTI (CI), Dr. Y Debaraj, RSRS-Imphal (CI), Dr.LSomen Singh, RSRS-Imphal (CI), Sri. B N Choudhury, RSRS-Boko (CI), Sri SAS Rahman, RSRS-Boko (CI), Dr D.Mech, REC-Lakhimpur (CI), Dr.Aftab A Shabnam, CMERTI (CI), Dr. SSubharani Devi, RSRS-Imphal (CI), Dr. Arun Kumar KP, CMERTI (CI), Dr. Amit Kumar, CMERTI (CI), Dr. Kh. Subadas Singh, CMERTI (CI), Dr Vijay. N, CMERTI (CI), Dr. Mahesh D S, CMERTI (CI), Dr. Manjunath R N, CMERTI (CI), Mr. Abhishek Singh, MESSO (CI)
B	Project period :	February 2022 to January 2024
C	Objectives:	➢ To popularize various technologies in different stages developed by the Institute ➢ To further create awareness for technological intervention among the farmers and beneficiaries ➢ To increase the overall cocoon production.
D	Progress achieved:	➢ OFT of 12 technologies was carried out at 7 locations covering 111 beneficiaries against a target of 680 beneficiaries. ➢ The OST of 09 technologies was also conducted at 11 locations. ➢ The OST for validation of IPM technology for control of uzi fly in oak tasar culture was carried out in one location at DOS farm. Rearing under progress. Worms are in 5th and spinning stage. ➢ The OST for validation of IPM technology for control of major insect pests infesting *Quercus serrata* was carried out in two locations at DOS farm. ➢ The OFT of popularization technologies at farmers level was carried out at 15 locations covering 101 beneficiaries. 2600 Kesseru (HF-008 & HF-005) seedlings and 11.5 kg castor (NBR) seeds were distributed to Eri beneficiaries in Sivasagar area of Assam. ➢ The OFT for establishment and popularization of new oak tasar silkworm breed C27 was carried out in three location covering three farmers. Rearing is under progress. Worms are in 5^{th} and spinning stage. ➢ The OFT for validation of use of PET bottles for uzi trap in oak tasar silkworm rearing was carried out in three location covering ten beneficiaries. Rearing is under progress. Worms are in 5th and spinning stage. ➢ The OFT for validation of use of Sodium hypochlorite for seed treatment against tiger band disease of oak tasar silkworm was carried out in three location covering three beneficiaries. Rearing is under progress. Worms are in 5th

		Stage.
E	Specific outcome:	Awareness and popularization of technologies in muga, eri and oak tasar.
F	Budget and expenditure :	**Budget:**Rs. 36.02 lakhs, **Expenditure till April 2022:** 0.45 Lakh
G	Suggestion of last RC/RAC meeting:	**Suggestions of 62nd RC meeting held on 18.02.2022:** ➢ Complete the left over target of OSTs/OFTs ➢ Revise the project budget as the project is approved for 02 years and include 02 OSTs for test verifying volatile blends for enhanced egg laying in muga and eri. **Suggestions of 39thRAC held on 6th November 2021:** It was suggested to compile the data and complete the pending OSTs and OFTs. For each technology and each location, minimum 10 different farmers to be covered.
H	Follow-up action taken on last RC/RAC meeting:	**Follow-up action of 62nd RC meeting:** ➢ Left over target of OSTs/OFTs has been completed in March 2022 as per target approved in Action Plan 2021-22. ➢ Project is revised as per suggestion and ready for submission to CO for further approval. **Follow-up action on 39thRAC held on 6th November 2021:** Compilation of data is going on and pending OSTs and OFTs will be completed as per milestones.
I	Suggestions of RCS	-
J	Action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	Achieve the set targets as per project milestones and action plan 2022-23.
8.	**Project code and title:**	**APS 05021EF: Studies on population diversity and role of host plant volatile cues for enhancing egg laying in temperate tasar (Vanya) silk moths *Antheraea proylei*.**
A	Investigators involved	Dr Sinam Subharani Devi (PI), Dr. Y. Debaraj (Co-PI) Dr. Kasthala Mary Vijayakumari (PI)
B	Project period :	Oct 2021- Sep 2024
C	Objectives:	1. To survey and establish population diversity of oak tasar silk moths across NER. 2. To establish potent food plants (Host) for oak tasar silk moths, *A. proylei* for egg production. 3. To isolate and evaluate highly suitable host plant volatiles to activate/increase egg laying in oak tasar silk moth. 4. To standardize the synthetic oviposition stimulant blends to enhance egg production in oak tasar silk moths and establishing the efficacy of developed technology. 5. To evaluate the synthetic volatile blend in large scale at oak tasar seed production centers.
D	Progress achieved:	Recruited two JRF.

		Initiated survey and collection of oak tasar silk moths from different regions of Manipur. Collected wild population of *Antheraea roylei* and *Antheraea frithi* from different districts of Manipur. Study the egg laying potential of *Antheraea proylei* on five different food plants viz. *Quercus serrata*, *Quercus griffithii*, *Lithocarpus dealbata*, *Quercus incana* and *Quercus semicarpifolia* under progress. Rearing of *Antheraea proylei* on three different food plants viz. *Quercus serrata*, *Quercus grifithi*, *Lithocarpus dealbata*, under progress. Worms are in spinning stage.
E	Specific outcome:	Nil
F	Budget & expenditure:	Rs.122.49 lakhs (40.69-RSRS, Imphal) & Rs. 4.45 lakhs
G	Suggestion of last RC/RAC meeting:	**RC Comments:** Initiate the project as per the objectives and milestones **RAC comments:** Specify whether population diversity will be established according to host plant availability or agro-climatic conditions. Recommendation: Project is approved with suggestions. PI to submit the updated proposal within 15 days.
H	Follow-up action taken on last RC/RAC meeting:	**Action taken against RC comments:** Complied as suggested **Action taken against RAC comments:** Population diversity study will be done based on the agro-climatic conditions. As suggested full project proposal submitted.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	Use other markers such as GBS, SNPs instead of cytochrome oxidase for molecular characterization.
9.	**Project code and title:**	**PIB-05005-SI: Genetic enhancement of Castor (*Ricinus communis* L.) germplasm as a source material for development of productive perennial varieties.**
A	Investigators involved (PI & Co-I's)	Aftab A. Shabnam (**PI**), Amit Kumar (**CI**), Vinodakumar S. Naik (**CI**) upto 29th Feb. 2020 and L. Somen Singh (**CI**), Dr. D.K. Jigyasu (**CI**)
B	Project period :	Oct. 2019 to Sept. 2022
C	Objectives:	1. Genetic enhancement of castor germplasm. 2. Development of pre-bred intermediate castor with perennial characteristics.
D	Progress achieved:	**Objective wise progress till date:** 1. Gene pool was enriched with 28 castor accessions [20 perennial and 03 annual castor accessions collected from North East region, 03 annual castor varieties (DCS-9, ICH-66 and DCH-519) collected from IIOR, Hyderabad, Kalpi-6 collected from UP and YTP-1 Collected from TNAU,

		Tamil Nadu]. 2. **1st crossing lot:** 12 different reciprocal/cross combinations, F_1 generation plants selfed & F_2 seeds harvested. Selfed F_1 seeds of potential perennial accessions were also sown for mass selection. F_2 generation in progress. **2nd crossing lot:** 17 cross combinations were carried out and F_1 seeds of 15 crosses harvested. 02 wide crosses (NBR-1 X NBR-P-Imphal and NBR-1 X SBR-P-Shillong) were successfully carried out and F_1 seeds harvested. F_1 generation in progress. **Progress during the period:** ➢ Preliminary selections in F_1 generation and selection of perennial trait (woody stem castor) were carried out from F_2 generation plantation and the selected hybrids were labeled for further studies and selfing to harvest pure seed. ➢ 01 new castor accessions was added to gene pool from Manipur. ➢ Leaf samples were collected from left over accessions for carrying out biochemical characterization. Data recording is in progress ➢ Following plantations were maintained as per recommended package of practices: ❖ Plantation of 22 Castor accessions at farm-2. ❖ Plantation of F_1 and F_2 (1^{st} and 2^{nd} crossing lots) generations. ❖ Plantation of perennial castor plants selected from mass selection lot.
E	Specific outcome:	➢ Bagging of F_1 plants for harvesting pure F_2 seeds. ➢ Raising of plant to row progenies in F_2 generation and selection of perennial trait hybrids in F_2 generation. ➢ Inclusion of 01 new castor accession collected from NE region has enriched the castor gene-pool. ➢ Biochemical characterization of castor germplasm will help in identifying the potential castor accessions for inclusion in future breeding programmes.
F	Budget and expenditure :	**Budget:** Rs. 13.30 lakh; **Expenditure** till April. 2022: 6.41806
G	Suggestion of last RC/RAC meeting:	**Suggestions of 62nd RC held on 18th February 2022:** ➢ Continue the project as per milestones. **Suggestions of 39thRAC held on 6th November 2021:** ➢ Include disease tolerance data in characterization. ➢ Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**Follow-up action on 62ndRC held on 18th Feb. 2022:** ➢ The project is continuing as per the milestone **Follow-up action on 39thRAC held on 6th November 2021:** ➢ Disease tolerance of germplasm accessions will be studied during characterization programme. ➢ The project is continuing as per the milestone

I	Suggestions of RCS	To check on conducting experiments as per set work under PIB 05005SI
J	Follow up action taken on suggestion of RCS	Project activities are going on as per milestones under the project PIB 05005SI
K	**63rd RC Suggestions**	• RC recommends extension of the project upto 31.03.2023 without any additional budget. The stipend of the PA for the extended period maybe paid from the reoccurring head for which the PI to seek permission for reappropriation of budget from RCS, CO. • Continue as per milestones
10.	**Project code and title:**	**AIB 05006 SI: Breeding of muga silkworms for improved silk quality and disease tolerance**
A	Investigators involved	Dr. Arun Kumar KP, PI; Dr. Mahesh DS, CI; Dr. Manjunath RN, CI
B	Project period :	Oct 2019 – Sep 2022
C	Objectives:	1. Selection of better parents by field collection of muga silkmoth samples 2. Classical breeding studies to select better lines for muga silkmoths 3. Mass production for limited trials
D	Progress achieved:	• BP1 has been stabilized through continuous selection and rearing. Group rearing is going on and further selections will be performed to prepare DFLs for limited trial in next commercial season. • GBS based linkage analysis to identify the locus/loci linked to pupal hibernation during winter is going on. GBS sequencing is completed and analysis is going on. Initial analysis revealed that the wild stock showed high heterozygosity. The cultivated stock showed very low heterozygosity indicating the possible loss of vigor due to continuous selfing. • Wild muga genetic stock were included in breeding experiments and attempted for development of hibernating characters collected from different geographical region with better cocoon characters and fecundity. • Plastic collapsible mountage has been successfully used for mounting the breeding stock. It was found to be suitable mounting device for large scale production of quality muga cocoons. • Cold reeling technique has been modified through including of EDTA in the reeling solution, which further eased the reeling. It has been tested at commercial scale.
E	Specific outcome:	BP1 has been stabilized through continuous selection and rearing. Cold reeling has been tested in large number of cocoons at commercial scale and it was successful. GBS sequencing is completed and analysis is going on. Plastic

		collapsible mountage has been successfully used for mounting.
F	Budget and expenditure :	Budget: 18.32 lakhs Expenditure: 6.24 lakhs
G	Suggestion of last RC/RAC meeting:	**62nd RC suggestions** • The PI should use micro-climate chamber available at CMERTI to maintain the lines during unfavorable seasons. • As initial leads on cold reeling technique are promising, PI is advised to reproduce the results on larger scale to check the suitability of the technique for DFLs production and silk production simultaneously. **39th RAC suggestions:** • The progress made in the project is satisfactory. • Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**Compliance on 62nd RC Comments** • Micro-climate chamber will be used in the summer season. • Cold-reeling has been tested twice in 800 cocoons at commercial scale. One trial with 300 cocoons was carried out at farmers' field. **Compliance on 39th RAC comments** The Project is being carried out as per milestones.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	• Continue the recurrent selection in few more generations to fix the character of higher filament length. • RC recommends extension of the project for one year without any additional budget to complete the limited trials within the project period.
11.	**Project code and title:**	**APR05007SI: Standardization of chawki rearing practices for Eri silkworm, *Samia ricini* (Donovan)**
A	Investigators involved	Dr. Mahesh D S, Sci-B (PI), Dr.Arun Kumar K P, Sci-C (CI), Dr.Kh. Subadas Singh (CI)
B	Project period :	October 2019 to September 2022
C	Objectives:	a. Establishment and management of eri host plant garden for eri chawki rearing. b. Design and fabrication of Eri silkworm chawki reaing equipment. c. Development of new rearing method and ideal environment for eri chawki rearing.
D	Progress achieved:	-Project is being continued as per the milestone. -Selected farmers for distribution of chawki worms Bokakhat region and BTC (DoS Udalguri) region and conducted field testing and onsite demonstration of eri chawki raering technology in SRC, Bokakhat region. 2000 DFLs of C2 were brushed in both the places. 2000 DFLs of C2 were distributed

		for conventional rearing for yield comparision. -1000 DFLs of C2 is brushed in ESDP, Chungtia, Nagaland to popularize erichawki rearing practices to few more surrounding farmers. -Edited and released a booklet on "Erichawki rearing practices" in the workshop conducted by CMER&TI on 14/03/2022 at Guwahati. -Designed and fabricated a model erichawki rearing houset at GCC, Chenijan, CMER&TI for demostration and supply of chawki worms purpose.
E	Specific outcome:	-Designed and fabricated a model erichawki rearing houset at GCC, Chenijan, CMER&TI. -Selected farmers for erichawki distribution at DoSUdalguri region and Bokakhat region of Assam and conducted field testing and onsite demonstration of erichawki rearing technologyat SRC, Bokakhat. -A booklet on "Erichawki rearing practices" has been edited and published from CMER&TI.
F	Budget & expenditure:	Total budget is 18.15 lakhs and expenditure is 12.74 lakhs
G	Suggestion of last RC/RAC meeting:	**62nd RC Comments** • In all future trials, compare the chawki rearing with conventional rearing at all trial locations. • Continue as per milestone and conclude the project as per the scheduled time. **RAC comments** 1. Proper care should be taken throughout the chawki rearing for maintaining feed, breed and seed along with disease occurrence and preventive measures. 2. Identify and train some entrepreneurs for establishing micro chawkicenters to commercialize the technology. 3. Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**ATR on RC comments** 1. Suggestions complied. We will compare the performance of chawki rearing batch with conventional rearing batch in all the future trials at trial locations. 2. Project is being continued as per the milestone to conclude the project as per the scheduled time. **ATR on RAC comments** 1. Suggestions complied and proper care have been taken throughout the chawki rearing for maintaining feed, breed and seed along with disease occurrence and preventive measures. 2. Suggestions complied. The entrepreneurs are being identified in each field testing and demonstration for establishing the erichawki rearing centers to commercialize the technology. 3. Project is being continued as per the milestone.
I	Suggestions of RCS	Nil

J	Follow up action taken on suggestion of RCS	Nil
K	**63rd RC Suggestions**	• Identify and train entrepreneurs for establishing micro-chawki centres in the field. • RC recommends extension of the project upto 31.03.2023 without any additional budget. The stipend of the PA for the extended period maybe paid from the reoccurring head for which the PI to seek permission for reappropriation of budget from RCS, CO. • Continue the project as per milestones.
12.	**Project code and title:**	**AIT 05011EF: Molecular investigation into the lingo-cellulolytic system of a few wild silkmoths of North East India**
A	Investigators involved	Dr.Arun Kumar KP (PI), Dr. Rajal Debnath (CI)
B	Project period :	Sept 2019-Sept 2022
C	Objectives:	1 Impact of host plant range on the microbial community in *Antheraea assamensis* Helfer and *Samia ricini* Donovan 2 Lignocellulose degradation by the gut microbes associated with *Antheraea assamensis* and *Samia ricini* Donovan 3 Molecular characterization of the lingo-cellulolytic biomass degrading enzyme 4 Developing microbial pathogen resistance through induction of immunity in silkworm via manipulation of gut microbiome
D	Progress achieved:	• Whole Genome Sequencing of 10 bacterial strains with highest cellulase and xylanase activity has been completed and analysis is going on. • Rearing of Eri silkworms was carried out in 3 different host plants for metagenomic DNA isolation. Metagenomic DNA has been isolated from gut of 2 eri ecoraces viz. Kokrajhar and Borduar. • Two bacterial strains MS29 and MM43 isolated on Lactic bacteria agar media were selected for carrying out immunity boosting assay in Muga silkworms. Accordingly, two groups (50 each) of hatched muga larvae were first fed with Som leaves sprayed with MS29 and MM43 bacterial strains respectively for 24 hours. Another group with 50 muga silkworms were taken as control and fed with non-treated leaves. Similarly, 3 replicates were made and are brushed on Som trees after 24 hours of feeding. Rearing is going on.
E	Specific outcome:	Whole Genome Sequencing of 10 bacterial strains with highest cellulase and xylanase activity has been completed. Metagenomic DNA is isolated from flacherie infected muga silk worms. Metagenomic DNA is isolated from eri gut of 2 eriecorace viz. Kokrajhar and Borduar reared on 3 different host plants. Immunity boosting assay is being carried out in

		muga silkworms using 2 bacterial strains isolated in lactic bacteria agar media.
F	Budget and expenditure :	Budget:46.32 lakhs Expenditure: 13.11 lakhs
G	Suggestion of last RC/RAC meeting:	**RAC comments:** • Pacify the effective utilization of sanctioned fund. • Involve DR. Rajal Debnath, Sc-C from SBRL as CI as he was the PI of the project and has the requisite expertise. • Continue the project as per milestone **RC comments:** • Continue the project as per milestones
H	Follow-up action taken on last RC/RAC meeting:	**RAC:** • Fund utilization has been done for purchase of chemicals and services. • Dr. Rajal Debnath has been included as CI and the communication has already been sent to DBT for ratification. The project is being continued in collaboration with SBRL, Bangalore. • The project is carried out as per milestone. Quantitative analysis of the cellulase enzyme activity of cellulase positive strains were carried out. A total of 10 strains with highest cellulase and xylanase potential were selected and send for whole genome sequencing. The sequencing was completed however the fast QC report is not received yet. Metagenomic DNA isolation was carried out from Eri gut of 2 different ecorace viz. Kokrajhar and Borduar. Immunity boosting assay using 2 bacterial strains isolated in lactic bacteria agar media is carried out in muga silkworms. **RC:** • The project is carried out as per milestone. A total of 10 strains with highest cellulase and xylanase potential were selected and send for whole genome sequencing. The sequencing was completed however the fast QC report is not received yet. Metagenomic DNA isolation was carried out from Eri gut of 2 different ecorace viz. Kokrajhar and Borduar. Immunity boosting assay using 2 bacterial strains isolated in lactic bacteria agar media is carried out in muga silkworms.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	Continue the project as per milestones and conclude by Sept. 2022 without seeking any extension.
13.	**Project code and title:**	**BPP 05014CN: Standardization of Processing and Production of a Consumable Beverage from Mulberry**

		Leaves and Blending with Green Tea
A	Investigators involved	Dr. K. Sathyanarayana, M Chutia (upto June, 2021), Dr. P Sangannavar, Sri P Kumerasen
B	Project period :	March, 2020 – June, 2021
C	Objectives:	1. Standardization of protocol for preparation of mulberry leaf for production of mulberry tea and mulberry green tea (blending of green tea with mulberry leaves). 2. Standardization of protocol for blending of processed mulberry leaf with green tea for value addition. 3. Evaluation of biochemical and organoleptic properties and customer's acceptance of the products.
D	Progress achieved:	• Preliminary trials of blending processed mulberry powder and CTC green tea have been done. • The processed mulberry and tea leaves and their blended products were tasted by tasters of different tea broker houses. Biochemical analysis is completed. • TTRI and AAU were advised to complete the remaining work as per industrial standards besides preparing sample sachets for customer trials and popularization.
E	Specific outcome:	Process for preparing stand alone and blended mulberry beverage has been standardized.
F	Budget and expenditure :	4.00 (for CSB)
G	Suggestion of last RC/RAC meeting:	**RC Suggestion:** Coordinate with collaborating institutes for completion of left over work such as supply of leaf, preparation of samples of both standalone and blended mulberry beverage. **RAC Suggestion:** 1. Conduct a meeting of project working group to suggest future course of action on the outcome of the project. **2.** Extend the project till June 2022 to complete the left over work including customer feedback and patenting process.
H	Follow-up action taken on last RC/RAC meeting:	**ATR on RC Comment:** The collaborating Institutes were supplied with required quantity of leaf during March 2022 and accordingly approximately 3000 standalone and blended mulberry beverage sachets area ready for feedback analysis. Another project group meeting is proposed in the last week of June 2022. **ATR on RAC Comment:** The meeting of project PIs and CIs including collaborating institutes was conducted on 17th December, 2021 at CMER&I, Lahdoigarh and future course of action on the outcome of the project was devised. As suggested the project period extend up to June, 2022 and customer feedback will be taken during April-May, 2022
I	Suggestions of RCS	-

J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	Send the sample sachets of prepared standalone and blended mulberry beverage to CO, Bengaluru for feedback analysis during various meetings/symposiums.
14.	**Project code and title:**	**CFC 5017 MI: Exploration and adoption of novel muga cocoon cooking technology for increasing its reelability and raw silk quality.**
A	Investigators involved	Dr. Manjunath R.N, PI; Dr. Dip Kr. Gogoi, Co-PI; Dr. Rajiv K Munshi, CI (RSTRS)
B	Project period :	March 2021 to Feb. 2023
C	Objectives:	1. To study the efficacy of enzymatic and non-enzymatic approaches in muga cocoon cooking/ softening. 2. To develop a new cocoon cooking technique to improve the reelability& raw silk quality in muga cocoons dried under different techniques 3. To carry out large scale Multi-location trials at CSB and DoS reeling units for validating the efficacy of the newly developed cooking method. 4. To create awareness among the reeling beneficiaries to adopt/popularize the outcome of the project.
D	Progress achieved:	➢ A new cooking formulation that offers quick and efficient/uniform cooking of muga cocoons has been developed and validated for its efficacy and shelf life at laboratory trials (in comparison to traditional soda based cooking methods). ➢ Further, the formulation was test verified at reelers level in Palasbhari, Guwahati and Sivsagar regions in coordination with DoS.
E	Specific outcome:	➢ The trial results were ascertained by reduced cooking duration, reduced breakages (by ~20%), improved reelability and recovery during the reeling process.
F	Budget and expenditure :	**Budget:** Rs. 18.27 lakh; **Expenditure**: 4.02 lakhs
G	Suggestion of last RC/RAC meeting:	**Suggestions of 62nd RC:** Continue the project as per milestones. **Suggestions of 39th RAC held on 6th November 2021:** ➢ For achieving the target of enzymatic approach in muga cocoon cooking, expertise with other CSB Institutes may be explored for collaboration. ➢ Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**Follow-up action on 62nd RC:** ➢ The project is continuing as per the milestone **Follow-up action on 39th RAC held on 6th November 2021:** ➢ Expertise with other CSB Institutes was explored and Dr.

		D K Gogoi, Sc-D from RSRS Khoraput has been approved by RCS for being included as Co-PI in the project for achieving the target of enzymatic approach in muga cocoon cooking. Accordingly, the project will be executed. ➢ The project is continuing as per the milestone
I	Suggestions of RCS	Nil
J	Follow up action taken on suggestion of RCS	Nil
K	**63rd RC Suggestions**	• Progress under the project is satisfactory. PI to continue the trial of 'Muga super cook' and look for commercialization of the same through some entrepreneurs. • Dr. D.K. Gogoi, Scientist-D & CoPI of the project should present the progress of enzymatic approach through virtual mode in the next meeting.
15.	**Project code and title:**	**MFM 5019 MI: Development of Honeycomb Mountages and Harvesting Technology for Muga Cocoon Production with Improved Uniformity and raw silk recovery.**
A	Investigator involved	Dr. Manjunath R.N, PI; Dr. Mahesh D. S, CI;
B	Project period :	March 2021 to Feb. 2023
C	Objectives:	1. Fabrication of honeycomb mountages and suitable harvesting technology for uniform muga cocoon production. 2. Impact assessment of honeycomb mountages on cocoon production, cocoon characteristics and reeling performances. 3. To conduct on-station feasibility trials of the mountages at CSB/DoS units for prototype test verification
D	Progress achieved:	➢ Optimization of honeycomb mountage dimensions has been completed through lab scale prototypes and trials. ➢ Fine tuning and Fabrication of Honeycomb mountages (for commercial scale) having optimized cell dimensions & good ventilation with suitable harvesting technology (keeping low-cost, eco-friendly, durability and affordability aspects in mind) is under progress through outsourcing.
E	Specific outcome:	A new type of mountage with a possibility to produce uniform cocoon production.
F	Budget and expenditure :	**Budget:** Rs. 10.95 lakh Expenditure till Jan. 2022: 1.85 Lakh
G	Suggestion of last RC/RAC meeting:	**Suggestions of 62nd RC:** ➢ Investigators are advised to continue the project as per milestone. **Suggestions of 39th RAC:** ➢ Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**Follow-up action on 61st RC held on 10th August 2021:** The project is continuing as per the milestone **Follow-up action on 39th RAC held on 6th November 2021:** ➢ The project is continuing as per the milestone

I	Suggestions of RCS	Nil
J	Follow up action taken on suggestion of RCS	Nil
K	**63rd RC Suggestions**	PI is advised to explore more models to make the mountages user friendly, environment friendly and economical.
16.	**Project code and title:**	**MOE 05004EF: Adoption of improved sustainable technologies of muga culture for elevation of cocoon production in the tribal belt of Assam**
A	Investigators involved	Dr. Vijay N, Sc-C, (PI), Dr. Dip Kumar Gogoi, Sc-D, (Co-PI), Dr. D .Mech, Sc-D, (Co-PI)Dr. S A S Rahaman, Sc-D, (Co-PI), Dr. Sathyanarayana, (Co-PI)
B	Project period :	August 2019 to July 2022
C	Objectives:	1) To promote adoption of improved Muga rearing technologies among tribal rearers through sustainable NGO-rearer linkages facilitated by CMER&TI. 2) To improve the socio-economic status of tribal population by enhancing cocoon production through improved muga culture.
D	Progress achieved:	• Conducted 02 awareness program on disease management of silkworm at Boko and Goalpara districts. • Conducted 02 technology demonstration on use of foot sprayer for spray of lahdoi for controlling of muscardine disease and flacherie disease • Introduced a new technology called Cold Reeling to the beneficiary farmer of Goalpara districts. • Release of *Nesolynx thymus* for biological control of uzi fly in the farmers' field. • Conducted farmer's skill training program on Post Cocoon Technology with practical demo on use of improved cocoon reeling technology for raw silk production. • Farmers were provided with inputs like nylon net, lahdoi, foot sprayer, DFLs and sodium hypochlorite • Distribution of 1000gm DFLs to the beneficiary farmers at Boko, Kamrup • Preparation of videos of improved technologies of muga culture under progress • A Total of 14nos of programs was conducted *i.e.*, 9nos Awareness programs, 2 nos Group discussion, 1 no field day, 2nos Technology demonstration and 4nos training programs conducted at study area.
E	Specific outcome:	The farmers are adopting the improved technologies of muga culture which will helps in the increase the cocoon production. Farmers are adopting the use of chemical disinfectants for the controlling of disease which will help them to get good amount cocoons compared to benchmark.
F	Budget and expenditure	Rs. 25,51,000 and Rs.13,70,523 (17,36,500)
G	Suggestion of last	**62nd RC:**

	RC/RAC meeting:	• Complete the left over target as per the milestones in the project. **39th RAC:** • The progress made in the project is satisfactory. • Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**62nd RC:** The target of the project is executed as per the set milestones 02 awareness program, 02 technology demonstration program and 01 training program was conducted at study area
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	• PI is advised to demonstrate only established and listed technologies to the adopted farmers, which are already envisaged in the project proposal. • Continue the project as per milestones.
17.	**Project code and title:**	**APR: 05008SI Standardization of Rearing and Grainage Technologies of *Antheraea frithi* Moore**
A	Investigator involved	Dr. L. Somen Singh, PI, Dr. S. Subharani Devi, CI
B	Project period :	October 2019 – September 2022
C	Objectives:	To standardize the rearing and grainage technologies to suit for commercial adoption
D	Progress achieved:	Emergence behaviour of *A. frithi* moths studied from 2nd crop harvested cocoons and observed moth emergence after undergoing 138-150 days of pupal diapause. Seed cocoons are under preservation.
E	Specific outcome:	Moth emergence observed after undergoing 138-150 days of pupal diapause from 2nd crop harvested cocoons.
F	Budget and expenditure :	Rs. 12.85 lakhs and 2.123lakhs
G	Suggestion of last RC/RAC meeting:	**RC comments:** Continue as per milestone and conclude the project as per the scheduled time. **RAC comments:** ➢ Specify the cost benefit associated with the bamboo baskets besides identifying economic viability of any other materials. ➢ Continue the project as per milestones
H	Follow-up action taken on last RC/RAC meeting:	**Action taken against RC comments:** As suggested, the project will be continued as per the milestone and suggestions noted **Action taken against RAC comments:** Suggestions noted and will be worked out during spring crop, 2022. As suggested the project is continued as per the milestone
I	Suggestions of RCS	Nil

J	Follow up action taken on suggestion of RCS	Nil
K	**63rd RC Suggestions**	• The activities should be carried out as a regular program after completion of the project duration. • Continue as per milestones and timeline of the project.
18.	**Project code and title:**	**AIB: 05009SI Isolation of thermo-tolerant line(s) of Oak tasar silkworm *Antheraea proylei* J.**
A	Investigators involved	Dr. Y. Debaraj, PI, Dr. S. Subharani Devi, CI, Dr. Arun Kumar, CI
B	Project period :	October 2019 – September 2022
C	Objectives:	To isolate thermo-tolerant line of oak tasar silkworm, *Antheraea proylei* Characterization of Heat shock protein gene in thermo-tolerant line.
D	Progress achieved:	Spring crop rearing completed and seed cocoon are under preservation. Amino acid sequencing studies conducted for detection of heat shock proteins in RTRS 1 at Dept. of Biotechnology, Manipur University. **RTRS 1:** 1) Expression of HSP 19.9 was not observed. 2) Expressions of HSP 60 and HSP 90 decrease at 32◦C but further increase with increase in temperature. 3) No significant differences were found in the expression of HSP70 protein. 4) Expression of HSP 21 increases with increase in temperature.
E	Specific outcome:	Protein profiling studies of RTRS 1 showed expression of HSP 21, HSP 60 and HSP 90 and showed increase or decrease with temperature.Seed cocoons of heat tolerant population are preserved for continuing the generation.
F	Budget and expenditure	Rs. 21.90 lakhs and 2.43 lakhs
G	Suggestion of last RC/RAC meeting:	**RC comments:** Continue the project as per milestones. **RAC comments:** ➢ The progress made in the project is satisfactory. ➢ Continue the project as per milestones
H	Follow-up action taken on last RC/RAC meeting:	**Action taken against RC comments:** As suggested, the project will be continued as per the milestone **Action taken against RAC comments:** As suggested the project is continued as per the milestone.
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	• RC recommends extension of the project upto 31.03.2023

		without any additional budget. • Continue the project as per milestones.
19.	**Project code and title:**	**APR: 05010SI Evaluation of Eri Silkworm Races suitable for different agro-climatic conditions of Manipur.**
A	Investigators involved	Dr. Y. Debaraj (PI) and Dr. L.Somen Singh (CI)
B	Project period :	October 2019 – September 2022
C	Objectives:	To identify the best performing eri silkworm race in different agro-climatic conditions of Manipur.
D	Progress achieved:	Eri food plants are being maintained for next crop rearing.Rearing of different eco-races and strains under progress. Worms are in spinning stage.
E	Specific outcome:	➢ Nil
F	Budget and expenditure	Rs. 11.80 lakhs and 1.42 lakhs
G	Suggestion of last RC/RAC meeting:	**RC suggestions:** Continue the project as per milestones **RAC suggestions:** ➢ PI to justify why all the ecoraces are not included in the study as proposed in the project document. ➢ Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**Action taken against RC comments:** As suggested, the project will be continued as per the milestone **Action taken against RAC comments:** ➢ Initially more ecoraces included in the project, however rearing of more ecoraces is not feasible due to maintenance problem, lack of sufficient food plant, manpower, etc. Hence it was suggested by RC to consider only the most promising ecoraces like Borduar, Titabar & Manipur local with C2 breed. Evaluation of six eri silkworm strains also included. ➢ As suggested the project is continued as per the milestone
I	Suggestions of RCS	-
J	Follow up action taken on suggestion of RCS	-
K	**63rd RC Suggestions**	PI is advised to recheck the statistical data and present in next meeting.

As CI with other Institutes:

1.	**Project code and title:**	**BPS 01013CN- Utilization and diversification of silkworm pupae products for human & animal consumption and composting.**
A	Investigators involved	Dr. Mahesh D S, Sci-B (PI), Dr. James Keisa, Sci-D (CI)
B	Project period :	September 2020 to August 2022
C	Objectives:	a. To evaluate nutrients and bioactive compounds in

		silkworm pupae of Eri and Muga. d. To characterize proteome of Eri and Muga silkworm pupae.
D	Progress achieved:	-The sensory evaluation tests for preserved eri pupae provided by CFTRI at different interval has been completed to identify the shelf life of eri pupae. -Eri pupal snacks prepared by CFTRI is also tested through sensory evaluation by the panellists of traditional area (Assam) and collected the observations made by the panellists and submitted to CFTRI for further studies. -Submitted 7 nucleotide sequences to NCBI GenBank and obtained accession numbers in connection with bacterial species identified from spent muga silkworm pupae. The proteome characterization for both eri and muga puape are under progress.
E	Specific outcome:	-Identified 7 bacterial species in the spent muga pupae by sequencing and submitted 7 nucleotide sequences to NCBI GenBank and obtained accession numbers in connection with bacterial species identified from spent muga silkworm pupae. -Protein characterization to identify the different proteins present in eri pre pupae, matured pupae and muga pupae is under progress.
F	Budget and expenditure :	Total budget is 11.88 lakhs and expenditure is 6.87 lakhs
G	Suggestion of last RC/RAC meeting:	**RC Comments** 1. Continue the project as per the milestone **RAC comments** 1. Progress was discussed. It was suggested to present the progress of all the collaborative projects of other Institutes from next RAC meeting. 2. Continue the project as per milestones.
H	Follow-up action taken on last RC/RAC meeting:	**ATR on RC comments** 1. Project is being continued as per the milestone to achieve the target. **ATR on RAC comments** 1. Suggestion noted and progress will be presented in next RC. 2. Project is being continued as per the milestone.
I	Suggestions of RCS	Nil
J	Follow up action taken on suggestion of RCS	Nil
K	**63rd RC Suggestions**	Continue the project as per milestones.
2.	**Project code/title:**	**CYF 07014MI – Development of 3D Woven Silk Fabrics And Their Applications**
A	Investigators	HS Hambulingappa, CSTRI, PI, Manjunath R.N, CMERTI, Co-PI
B	Project period	June, 2020 to May, 2022 (Extended upto Nov. 2022)

C	Objectives	• To modify the existing 2D weaving loom suitably for producing industrial scale 3D woven fabrics. • To produce 3D woven silk fabrics with various fiber architecture and fabric parameters. • To characterize the properties of 3D fabrics made from different varieties of silk yarns to suit them for various textile and technical applications.
D	Progress achieved:	• Retrofication of existing 2D weaving loom suitable for producing industrial scale 3Dwoven fabrics completed. • 2 trials of 3D woven silk fabrics with various fiber architecture and fabric parameters have been produced. • Characterization of mechanical properties of 3D fabrics namely fabric constructional parameters, wicking, abrasion, tensile, stiffness and air permeability conducted for first two trials of the fabrics.
E	Specific outcome	• The technology of 3D weaving can be easily adopted in both Handloom and Shuttle less looms. • The 3D structures developed can be further envisaged for specific end-use applications.
F	**62nd RC Suggestions**	**RC Comments** • Continue the project as per the milestone **ATR on RC comments** • Project is being continued as per the milestone to achieve the target.
H	**63rd RC Suggestions**	Continue the project as per the milestone

AGENDA NO. 6: Discussion on Annual Action plan (2022-23) and 66th RCC ATR.

Following Institute specific recommendations of Action Plan 2022-23 were discussed and targets were assigned:

1. The status of mug a breeds viz., CMR-1 & CMR-2 and Eri hybrids, YP x CBZ and CBS X GBZ to be furnished by May 2022 including the performance across the seasons.

(Action: Dr. Reeta Luikham, Scientist-D, Dr. Arun Kumar, Scientist-C and Dr. Subadas Singh, Scientist-C)

2. Research project to be taken up on Eri pupae storage & packaging, besides strategy for transportation and marketing of pupae to be worked out. Products from Korea/Japan on pupae & pupae by-products may be examined and development of similar products may be explored in collaboration with R&D labs on food sciences.

(Action: Dr. Mahesh, D.S., Scientist-C and Dr. James Keisa, Scientist-D)

3. To take up need based research project on "Development of Ericulture in Gujarat (Castor based) and Tamil Nadu (Tapioca based), for which detailed proposals in the RMIS formats to be submitted by June 2022.

(Action: Sh. Suraj Pal, Scientist-D & Dr. Jigyasu, D.K, Scientist-C for Gujarat and Dr. Vijay N. for Tamil Nadu)

4. The muga silkworm conservation programme to be taken up in project mode.

(Action: Dr. Jigyasu, D.K, Scientist-C)

5. To expedite the management practices developed for control/eradication of tiger band disease in oak tasar sericulture.

(Action: RSRS, Imphal)

6. To conduct training programme on Statistics for the Scientists under CMER TI before 31st March 2022. 7. To publish the Hand Book on Sericulture (Muga & Eri) before 31st May, 2022.

(Action: Dr. Vijay N.)

7. To publish the Hand Book on Sericulture (Muga & Eri) before 31st May, 2022.

(Action: PMCE Division)

Follow-up action on the decision of 66th meeting of RCC of CSB

#	Decision	ATR
Agenda Item 2		
1	To make use of social media tools *viz*., Facebook, Twitter, Youtube etc. to popularize the technologies and programmes	***Action: Dr. Manjunath, Sc-C***
2	To schedule year-long activities and maintain activity dashboard; and sharing link with Director [Tech.] for monitoring and guidance	***Action: Extension, Training and PMCE Division***
3	To prepare two page document on top 10 challenges & opportunities for presentation in the next RCC meeting	***Action: PMCE Division***
4	To provide scientist-wise details of projects involved (on-going & concluded), technologies developed, no. of publications and brief research output & outcome etc	***Action: PMCE Division& all scientists***
5	To encourage young talent in teaching at Universities and other reputed educational/research organisations; MoU to be made with the local universities for undertaking R&D projects in collaboration mode	***Action: All Scientists, Training Division and PMCE Division***
6	Net economics to be provided along with B:C ratio while presenting technology benefits	***Action: Dr. Vijay N, Scientist-C, Extension Division***
7	To present global scenario of Eri & Muga growing/culturing countries across world	***Action: Dr. Vijay N, Scientist-C, Extension Division***
8	To present climate change impact with respect to Eri & Muga in comparison with Mulberry	***Action: Dr. Amit Kumar, Scientist-C, Host Plant division and Silkworm Division***
9	To prepare time-bound action plan for enhancing the production of Oak Tasar, as Oak tasar silk is presently being imported in the country	***Action: RSRS, Imphal, Silkworm Division, CMERTI-Lahdoigarh***

Agenda Item 3		
1	RACs to rigorously monitor the progress of on-going projects and facilitate meaningful deliberations on the outcome of concluded projects.	***Action: PMCE Division***
2	To include a slide on the salient recommendations of the RAC chairman in the next RCC meeting.	***Action: PMCE Division***
3	Budget utilisation with regard to execution of the ongoing research projects is observed to be very poor for CSB funded projects, which needs a thorough review by the concerned Directors.	***Action: All Scientists and PMCE Division***
4	All progenitors/concerned institutes to maintain/strengthen the breeders stocks (host plants) for timely supply to the stakeholders.	***Action: Host Plant Division***
5	To submit concluded project report (RMIS-10) well within the specified time limit.	***Action: All Scientists and PMCE Division***
6	To work out on the modification/updation of the economic models with 4x4/8x8 spacing, with partial/ full mechanisation by minimizing the labour involvement and to recommend a package for monoculture as well as inter-cropping on the basis of NABARD model.	***Action: Dr. Vijay N, Scientist-C, Extension Division***
7	Scientists working in Biotechnology (Silkworm & Host Plant) laboratories to visit the field frequently to collect the first hand information on the burning field issues to addressed through molecular work/approach.	***Action: All concerned scientists and Biotechnology Division, CMER&TI, Lahdoigarh***
8	All the studies on vanya silks to be taken up in consultation with CTRTI-Ranchi for Tasar and CMERTI-Lahdoigarh for Muga, Eri & Oak tasar.	***Action: PMCE Division***
9	The divisional/sectional heads at each institute level to take lead role in mentoring and encouraging the young scientific workforce and to come up with meaningful research proposals. Weekly review of activities to be done by division heads.	***Action: All Division Heads***
10	To arrange meeting frequently with the subject experts at institute level	***Action: PMCE and Training Division***
11	To continue soil testing activity at institute level for concerned state seri-farmers and to record EC, OC and pH on continuous basis	***Action: Host Plant Division***
12	Collaborate with VSTs/ UAS-Raichur on mission mode for suitable mechanization in sericulture.	***Action: All concerned scientists, Host Plant and Silkworm Divisions***

INSTITUTE SPECIFIC RECOMMENDATIONS BY 66th RCC:

1. **CMERTI-Lahdoigarh:**
   a. The findings of two concluded research projects were reviewed and suggested following observations

- **APS 05001 EF** (enhancing egg laying in muga and eri), output of the project to be evaluated and validated in ToT project

Action: Dr. Jigyasu, D.K., Scientist-C,
Dr. James Keisa, Scientist-D and Silkworm Division

- **MOE 05003 EF** (economic upliftment of eri farmers), output of the project not yielded any positive results, outcome to be dropped

Action: Dr. Himangshu Barman, Scientist-C,
RSRS, Boko.

AGENDA NO. 7: Any other points for discussion

- The budget utilization in most of the projects is poor. The PIs are advised to effectively utilize the allocated project budget.

(DR. K.M. VIJAYAKUMARI)
Director & Chairperson

Annexure-1

LIST OF PARTICIPANTS OF THE 63rd RESEARCH COUNCIL MEETING OF CMER&TI, LAHDOIGARH HELD ON 07-06-2022

S. No.	Name & Designation
1	Dr. K.M.Vijaya Kumari, Director, CMER&TI, Lahdoigarh
2	Dr. Y. Debraj, Scientist-D, RSRS, Imphal
3	Dr. Reeta Luikham, Scientist-D, CMER&TI, Lahdoigarh
4	Dr. L. Somen Singh, Scientist-D, RSRS, Imphal
5	Dr. D. Mech, Scientist-D, REC, Lakhimpur
6	Sh. S.A.S. Rahman, Scientist-D, RSRS, Boko
7	Dr. T.James Keisa, Scientist-D, CMER&TI, Lahdoigarh
8	Dr. Aftab Ahmad Shabnam, Scientist-D, CMER&TI, Lahdoigarh
9	Sh. Bitupan Das, Scientist-D, CMER&TI, Lahdoigarh
10	Dr. S. Subharani Devi, Scientist-D, RSRS, Imphal
11	Dr. H. Barman, Scientist-C, RSRS, Boko
12	Dr. Amit Kumar, Scientist-C, CMER&TI, Lahdoigarh
13	Dr. Arun Kumar, Scientist-C, CMER&TI, Lahdoigarh
14	Dr. Kh.Subadas Singh, Scientist-C, CMER&TI, Lahdoigarh
15	Dr. D.K.Jigyasu, Scientist-C, CMER&TI, Lahdoigarh
16	Dr. Vijay N. Scientist-C, CMER&TI, Lahdoigarh
17	Dr.Mahesh D.S. Scientist-B, CMER&TI, Lahdoigarh
18	Dr. Manjunath R.N. Scientist-B(R&S), CMER&TI, Lahdoigarh
19	Dr. Om Prakash Patidar, Scientist-B, CMER&TI, Lahdoigarh
20	Sh. Dhrubo Jyoti Gogoi, JRF, CMER&TI, Lahdoigarh
21	Sh. Suraj Kumar Shah, JRF, CMER&TI, Lahdoigarh
22	Ms. Lucu Moni Borah, JRF, CMER&TI, Lahdoigarh
23	Ms. Padmini Baruah, JRF, CMER&TI, Lahdoigarh
24	Sh. Kalpajyoti Gogoi, JRF, CMER&TI, Lahdoigarh
25	Ms. Krondashree Duarah, JRF, CMER&TI, Lahdoigarh
26	Ms. Priyanka Sahu, PA, CMER&TI, Lahdoigarh
27	Ms. Priya Boro, PA, CMER&TI, Lahdoigarh
28	Sh. Jyoti Ranjan Mishra, PA, CMER&TI, Lahdoigarh
29	Ms. W. Sapana Devi, PA, CMER&TI, Lahdoigarh