MINUTES OF 69th RESEARCH COUNCIL MEETING OF CMER&TI, LAHDOIGARH HELD ON 9th January 2024

The 69th RC meeting was held on 9th January 2024 under the Chairmanship of Dr. K M Vijaya Kumari, Director of CMER&TI Lahdoigarh in hybrid mode. The list of participants is enclosed as Annexure-I. The meeting proceeded with discussions as per the agenda items.

AGENDA NO. 1: CONFIRMATION OF LAST RC MEETING MINUTES

The last (68th) RC meeting of CMERTI, Lahdoigarh was held on 5th October 2023 and the corresponding minutes were circulated among all the Members. Since no comments received from any of the members, the minutes of the meeting were confirmed.

AGENDA NO. 2: FOLLOW UP ACTION ON THE RECOMMENDATION/ DECISIONS OF THE LAST RC MEETING

The project wise action taken on the decisions/recommendations of the last meeting was presented by the respective scientists while presenting the progress of their projects.

AGENDA NO. 3: NEW CONCEPT NOTES FOR APPROVAL

#		DETAILS
1.	Project title:	**Breeding for development of genetically improved Som (*Persea bombycina*) genotype**
A	Investigators	Dr. Harisha R, PI; Dr. Om Prakash Patidar, CI;
B	Project period:	5years (tentative)
C	Objectives:	1. Collection and characterization of som germplasms (both new and existing germplasm) 2. Development of improved som genotype for higher leaf yield
D	Methodology	• Identification of superior parents through characterization • Selection of desirable parents for hybridization programs • Making F_1 Multiplications of superior F_1 through leaf bud cuttings
E	Expected outcome	• Gene pool enrichment of som host plant for future breeding programs • Passport data (NDUS-traits) of all the som germplasm (both new and existing) will be generated • Improved som genotype for leaf yield
	69th RC Suggestions	1. *A comprehensive breeding plan maybe proposed, encompassing additional objectives such as improvement in leaf yield, disease resilience, drought resistance and climate adaptability.* 2. *Consequently, the project should be amended to incorporate detailed objectives and methodologies, aligning with the proposed breeding plan.* 3. *Present the revised concept in next RC.*
2.	Project title:	**Characterization of stem borer complex in Som (*Persea bombycina*) and validation of their mitigation strategies**
A	Investigators	Dr. K Chandrakumara, PI; Dr. Harisha R, CI; Sh. Pulak Rabha, CI;
B	Project period:	6 months (tentative)

C	Objectives:	1. Collection, Identification and molecular characterization of various stem borers in Som plants
		2. Validation of most feasible tactics for managing stem borers
D	Methodology	• Identification of different stem borer species infesting Som plants.
		• Selection and imposition of different treatments
		• Evaluating the effectiveness and safety of different treatments imposed
		• Validation of most effective control tactics.
E	Expected outcome	• Knowledge on the taxonomic details of stem borer complex
		• Information on the extent of severity
		• Expect the most effective and feasible management strategy
69th RC Suggestions		1. *Incorporate investigations into the seasonal prevalence, life cycle, and patterns of damage pertaining to stem borer.*
		2. *Further, conduct a comprehensive survey to acquire additional data, expanding the scope to also include red ants, uzi, termites, etc.*
		3. *Propose the expansion into a full-fledged project with a primary emphasis on formulating an integrated approach for their management.*
		4. *Present the revised concept in next RC.*

3.	Project title:	**Genome-Wide Association Study of Pupal Hibernation Traits in Wild Muga Silkworm (*Antheraea assamensis*) Populations**
A	Investigators	Dr. Kaiho Kaisa, PI; Dr. Jigyasha, CI; Dr. Arun Kumar K.P, CI;
B	Project period:	6 months (tentative)
C	Objectives:	1. To identify genes linked to pupal hibernation in wild Muga silkworm
D	Methodology	• Identification of significant genomic loci associated with hibernation trait.
		• Searching for the genes around the vicinity of significant loci
		• Annotate the identified genomic regions using functional databases.
		• Validation of identified genes.
E	Expected outcome	• Identification and subsequent harnessing of the hibernation trait for commercial rearing might significantly help in improving the seed availability in Muga ecosystem as hibernation will aid in skipping rearing during unfavorable months.
69th RC Suggestions		1. *The proposed quantum of study can be taken as one objective. The concept to be proposed as full-scale project and initial 6 months can be dedicated to generate the necessary data.*
		2. *Take the leads from the earlier completed Muga breeding and Muga genome projects and propose the full project with marker assisted breeding approach.*
		3. *Present the revised concept in next RC.*

4.	Project title:	**Assessment of carbon sequestration potential and nitrogen-use efficiency of Som (*Persea bombycina* Kost)**
A	Investigators	Sh. Sinto Antoo, PI; Dr. Harisha R, CI; Dr. K Jigyasu, CI;
B	Project period:	3 years (tentative)
C	Objectives:	1. Assessment of carbon sequestration potential of Som germplasm accessions
		2. Estimation of NUE for revision of recommended fertilizer doses and minimizing the subsequent losses.
D	Methodology	• Measurement of height, diameter at breast heigh (DBH) and

		estimation of carbon storage using allometric equations
		• Yield parameters (above and below ground biomass)
		• Estimation of N content in plants and soil by Kjeldahl method (Kjeldahl, 1883)
		• Estimation of N assimilation enzymes like Glutamine synthetase, Glutamate synthase, and Glutamate dehydrogenase (Mohanty and Fletcher, 1980)
		• Leaf photosynthetic pigment content (Hiscox and Israelstam,1979; Arnon, 1949) and protein content
		• Estimation of NUE
E	**Expected outcome**	• Som is expected to have a higher potential for carbon sequestration and thus reduce carbon footprint. Understanding of NUE of Som plants can help in future breeding programs for crop/host plant improvement
69th RC Suggestions		*1. Explore the inclusion of additional host plants, encompassing both Eri and Muga silkworms, and subsequently detail the objectives and methodologies accordingly.* *2. Consult with CTRTI Ranchi to investigate any analogous studies they have previously undertaken on similar lines for Tasar plantation.* *3. Present the revised concept in next RC.*
5.	**Project title:**	**Validation of ITKs in Eri PCT and Exploring Opportunities for Enhancement.**
A	**Investigators**	Roshan Lal Meena, PI; Manjunath R. N, CI; Vijay N, Nishant Singhal, RSTRS Guwahati, CI;
B	**Project period:**	02 years
C	**Objectives:**	1. Identification of the ITKs involved in Eri PCT in Assam, Meghalaya, Nagaland Region. 2. Scientific validation of selected ITKs associated with Eri Post Cocoon technology. 3. Identification of the scope for improvisation and integration of selected effective ITKs with modern practices and comparative evaluation.
D	**Methodology**	• Identifying Existing Practices • Coordination with Department of Sericulture and Community Interaction for Knowledge Collection • Identification of New ITKs & its validation • Exploring Improvement Opportunities
E	**Expected outcome**	• Documentation and revival of traditional knowledge. • Scientific validation of ITKs for adoption in another region. • Comparative evaluation of ITKs and modern practices can be utilized for economic empowerment of local communities.
69th RC Suggestions		*1. Explore engagement with organizations such as Giz, Nesfac, and other relevant bodies or committees that have previously undertaken comparable value chain analyses, for effective planning.* *2. Systematically identify and scrutinize region-wise ITKs within all the designated states and subsequently conduct their scientific comparison and validation with CSB-recommended/existing technologies.* *3. BTC region maybe also be included under the project.*

		4. *Accordingly submit the revised concept note within 15 days on eSubmis Portal under intimation to silkworm division head and PMCE.*
6.	**Project title:**	**PCR based detection of pathogens of muga silkworm**
A	**Investigators**	Brunda B N, PI;
B	**Project period:**	6 months
C	**Objectives:**	1. To develop a multiplex polymerase chain reaction (PCR) assay capable of simultaneously detecting and differentiating Pebrine, Muscardine, Bacterial Flacherie, Viral Flacherie, and Grasserie in silkworms
D	**Methodology**	• Optimization of multiplex PCR assay parameters • Validation of Multiplex PCR sensitivity & specificity • Field validation and application
E	**Expected outcome**	• Expected to contribute to the improvement of silkworm health management by providing a powerful diagnostic tool for the simultaneous detection of multiple pathogens. • Early and accurate identification of diseases in Eri silkworms, ultimately aiding in the development of effective disease control and management strategies in sericulture.
69th RC Suggestions		*1. The current concept primarily emphasizes identification; however, a more substantial focus on proposing control measures and management is recommended.* *2. After conducting essential initial trials, a revised full-scale project with a concentrated emphasis on implementing control measures and its management maybe proposed.* *3. Present the revised concept in next RC.*
7.	**Project title:**	**Exploring the Genetic Landscape: Comparative Analysis of Wild and Cultivated Muga Silkworms**
A	**Investigators**	Dr. Jigyasha, PI; Dr. Kaiho Kaisa, CI; Dr. Arun Kumar K.P, CI;
B	**Project period:**	6 months (tentative)
C	**Objectives:**	1. To identify & annotate key genetic markers linked with heterozygous loci in wild & cultivated population 2. To explore the genetic diversity between wild & cultivated population
D	**Methodology**	• The identification of heterozygous loci will be carried out using GBS data from 19 samples representing both cultivated and wild populations of the muga silkworm. • Gene Annotation of the regions associated with heterozygous loci in both wild as well as cultivated population using functional databases. • Pathway analysis for the genes will be identified on heterozygous loci in both wild as well as cultivated population • Genetic Diversity analysis will be performed on both cultivated as well as wild muga silkworm by using Phylogenetic analysis, Cluster analysis and Population structure
E	**Expected outcome**	• This study will aid in a detailed understanding of the genomic makeup of both wild and cultivated muga silkworms, as well as identification of genes linked to heterozygous loci in the muga silkworm.
69th RC Suggestions		*1. Take leads from the concluded projects 'AIB05006SI & AIT05016MI' and propose a full-fledged project with 02 or 03 years' duration.* *4. Initial 06 months of the project can be utilized to generate some more data required for initiating a project with marker assisted breeding approach.*

	2. Present the revised concept in next RC.

AGENDA NO. 4: CONCLUDED PROJECTS

#		DETAILS
1.	Project code and title:	**ARP5015SI: Development of chemical-based control measures for management of pebrine disease in Muga silkworm, Antheraea asamensis Helfer**
A	Investigators	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:	• Nosema is able to affect closely related organisms proving its simultaneous evolution along with the host organism. • Complete genome sequences of Nosema sp. infecting eri and muga has been deciphered. silkworm. • NaOCl and Nirmool were finally selected to be good candidates for egg disinfection to reduce pebrine incidence. • If field application has to be suggested, then Nirmool is a good disinfectant.
E	Utility of Outcome/ future course of action	• NaOCl and Nirmool can be used for egg disinfection to reduce pebrine spread. • Complete genome sequence of Nosema from eri and muga can be utilized in identifying pathogenicity islands and virulence factors.
	69th RC Suggestions	*1. Continue the ongoing investigations into virulent and non-virulent studies as a routine activity.* *2. The outcome of the project (Use of NaOCl and Nirmool) to be included in the OST programme of action plan (2024-25).* *3. Submit the final concluding report in Part-10 format for onward submission to CO, CSB and upload the same in the e-submis portal.*

AGENDA NO. 5: REVIEW OF THE PROGRESS OF ON-GOING PROJECTS

#		DETAILS
1.	Project code and title:	**AIB-05012-SI: Inter and intra-specific hybridization for improvement of eri silkworm, *Samia ricini* Donovan**
A	Investigators involved	Aftab A. Shabnam (CI till June 2023 & PI from July 2023); Mahesh D. S (CI from July 2023); Reeta Luikham, (PI till June 2023)
B	Project period:	4 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.
	69th RC Suggestions	*1. Continue and complete the project as per the milestones and duration.* *2. Complete the initial evaluation trial of hybrid combinations at 03 Institute farms.* *3. Maintain the 02 fecundity lines with recurrent selections in successive generations till the purity is achieved in the selected lines.* *4. The leftover activities under the project to be continued as regular*

		activity and conclude the project by Feb. 2024 without seeking any extension.
2.	**Project code and title:**	**AIB 5013 SI: Impact of elevated CO_2 and temperature on muga silkworm and its primary host plant**
A	**Investigators involved**	D. K. Jigyasu (PI, w.e.f. 01.08.2022), Amit Kumar (PI up to 31.07.2022 & Co-PI w.e.f. 01.08.202022); Aftab A Shabnam (CI); G. Subramanyam, (CI up to 26.07.2021)
B	**Project period:**	March 2020 to Feb 2023
C	**Objectives:**	1. To assess the influence of elevated CO2 and temperature on growth and yield attributes of primary host plant (Som). 2. To assess the impact of elevated CO2 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.
	69th RC Suggestions	*1. Recheck the temperature & humidity recorded inside OTCs and compare with outside OTC conditions.* *2. Sinto Anto, Sc-B may be added as CI in the project for effective implementation of the project.*
4.	**Project code and title:**	**APR-05018-MI: Effect of various host plants separately and in combination on Rearing and grainage performance of Muga silkworm, *Antheraea assamensis* Helfer**
A	**Investigators involved**	DK Jigyasu (PI w.e.f. 1st July, 2022), Kh. Subadas Singh (PI up to 30th June, 2022), S. A. S. Rahman (CI), Vikram Kumar (CI), D. Mech (CI, w.e.f. Nov., 2022)
B	**Project period:**	March 2021 – 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.
	69th RC Suggestions	*1. PI should ensure the timely conclusion of the project.* *2. The outcome of the project should be highlighting the best feed combination in the order of overall performance.*
5.	**Project code and title:**	**APS-05020-MI - Commercial egg production technology for ericulture**
A	**Investigators (PI & Co-I's)**	Mahesh D S, (PI), Lalith Natarajan, EBSF, Topatoli, (Co-PI), Arun Kumar K P, (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.
	69th RC Suggestions	*1. The PI should ensure timely completion of the project without seeking extension.* *2. The outcome of the project should be test verified through OSTs during 2024-25.*
6.	**Project code and title:**	**APS-05021-EF: 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	S Subharani Devi (PI), Y. Debaraj (CI), K MVijaya Kumari (PI)
B	Project period:	Jan., 2022- Dec. 2024
C	Objectives:	• To survey and establish population diversity of oak tasar silk moths across NER.
		• To establish potent food plants (Host) for oak tasar silk moths, A. proylei for egg production.
		• To isolate and evaluate highly suitable host plant volatiles to activate/increase egg laying in oak tasar silk moth.
		• To standardize the synthetic oviposition stimulant blends to enhance egg production in oak tasar silk moths and establishing the efficacy of developed technology.
		• To evaluate the synthetic volatile blend in large scale at oak tasar seed production centers.
69th RC Suggestions		1. *Increase the number of moths in the upcoming grainage activities.*
		2. *Continue as per the 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 (OST/OFT of CMER&TI)**
A	Investigators involved (PI & Co-I's)	D K Jigyasu, CMERTI (PI), Sri Suraj Pal, REC-Fatehpur (CI), L Somen Singh, RSRS-Imphal (CI), Sri. B N Choudhury, RSRS-Boko (CI), Sri SAS Rahman, RSRS-Boko (CI), Dr D. Mech, (CI), Aftab A Shabnam, (CI), S. Subharani Devi, RSRS-Imphal (CI), Arun Kumar KP, (CI), Amit Kumar, CMERTI (CI), Kh. Subadas Singh, (CI), Dr Vijay. N, (CI), Mahesh D S, (CI), Manjunath R N, (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.
69th RC Suggestions		1. *Compare the outcome of OST/OFT data with the actual outcome/results reported in the respective research projects.*
		2. *Continue the project and achieve yearly targets as fixed in Annual Action Plan (2023-24)*

8.	Project code and title:	**ARP05023CN: Muga and Eri silkworm disease monitoring in north eastern states of India**
A	Investigators involved	Bitupon Das (PI), Lopamudra Guha (Co-PI) and all Scientists of CMER&TI & MESSO units (CIs).
B	Project period:	March 2023 to February 2028
C	Objectives:	1. To monitor silkworm diseases during grainage and rearing and its management with respective DoS in North Eastern states
69th RC Suggestions		1. *Prepare an application similar to SeriDM app prepared at CSR&TI, Mysore. Take support from IT section of CMER&TI and CO, Bengaluru for preparing the application.*
		2. *Form a disease incidence calendar based on the outcome generated from the project.*
		3. *Ms. Brunda, Sc-B may be included as CI in the project.*

9.	Project Code & Title	AIT05024EF - Advanced-Level Institutional Biotech Hubs at CMERTI-Jorhat Assam (Phase-II)
A	Investigator	Dr. Arun Kumar K P (P.I), Sh. Bitupan Das (C.I), Dr. Mahesh DS (C.I),
B	Project period:	3 Years, February 2023 – February 2026
C	Objectives:	1. Collection and maintenance of different eco-races and strains of eri silkworms. 2. Genotyping by Sequencing of selected eco-races and strains of eri silkworms. 3. Analysis of SNP data for use in different downstream applications for the improvement of eri silkworm
69th RC Suggestions		1. *Continue the collection of eco-races and maintain at Institute farms.* 2. *Continue the project as per the milestones.*

AGENDA NO. 6: TRANSFER OF TECHNOLOGY (TOTs) PROGRAMMES

The progress of ToTs was presented & discussed in the ongoing project MOE05022MI.

AGENDA NO. 7: EXTENSION COMMUNICATION PROGRAMMES

Progress of extension activities was presented by Dr. D. Mech, Scientist-D. It was suggested to complete the left-over target as per annual action plan 2023-24.

AGENDA NO. 10: CAPACITY BUILDING & TRAINING PROGRAMMES

Progress under capacity building and trainings was presented by Sh. Bitopan Das, Scientist-D. It was advised to make necessary efforts to achieve the leftover annual target for the year 2023-24.

(**Dr. K. M. Vijaya Kumari**)
Director & Chairperson-RC

LIST OF PARTICIPANTS IN THE 69th RESEACH COUNCIL MEETING OF CMER&TI, LAHDOIGARH HELD ON 9th JANUARY 2024

1. Dr. K. M. Vijaya Kumari; Director, CMER&TI, Lahdoigarh
2. Dr. Debraj, Scientist-D, RSRS Imphal, (*Attended online*)
3. Sh. Suraj Pal, Scientist-D, EREC, Fatehpur, Uttar Pradesh (*Attended online*)
4. Dr. Reeta Luikham, Scientist–D, CMER&TI, Lahdoigarh (*Attended online*)
5. Dr. D. Mech, Scientist-D, CMER&TI, Lahdoigarh
6. Sh. S A S Rahman, Scientist–D, RSRS, Boko (*Attended online*)
7. Dr. Laishram Somen Singh, Scientist-D, RSRS, Imphal (*Attended online*)
8. Dr. Aftab A. Shabnam, Scientist-D, CMER&TI, Lahdoigarh
9. Sh. Bitupan Das, Scientist-D, CMER&TI, Lahdoigarh
10. Dr. Sinam Subharani Devi, Scientist-D, RSRS, Imphal (*Attended online*)
11. Sh. Lohit Sonowal, Scientist-C, REC Sile
12. Dr. Arun Kumar K.P., Scientist-D, CMER&TI, Lahdoigarh
13. Dr. D.K. Jigyasu, Scientist-C, CMER&TI, Lahdoigarh
14. Dr. K. Subadas Singh, Scientist-C, RSRS Imphal (*Attended online*)
15. Dr. Vijay N., Scientist-C, CMER&TI, Lahdoigarh
16. Dr. Mahesh D.S., Scientist-C, CMER&TI, Lahdoigarh
17. Dr. Manjunath R.N., Scientist-C(R&S), CMER&TI, Lahdoigarh
18. Dr. Om Prakash Patidar, Scientist-C, CMER&TI, Lahdoigarh
19. Sh. Roshan Lal Meena, Scientist-B, CMER&TI, Lahdoigarh
20. Dr. Kaiho Kaisa, Scientist-B, CMER&TI, Lahdoigarh
21. Ms. Brunda B N, Scientist-B, CMER&TI, Lahdoigarh
22. Dr. Chandrakumara, Scientist-B, CMER&TI, Lahdoigarh
23. Dr. Jigyasha, Scientist-B, CMER&TI, Lahdoigarh
24. Dr. Harisha R, Scientist-B, CMER&TI, Lahdoigarh
25. Sh. Sinto Antoo, Scientist-B, CMER&TI, Lahdoigarh
26. Sh. Pulak Rabha, Scientist-B, REC Lakhimpur

Technical staff/Research Fellows
27. Sh. Simanta Saikia, SFA
28. Sh. Kalpajyoti Gogoi, JRF
29. Sh. Akib Hussain, JRF
30. Sh. Suraj K Shah, JRF
31. Ms. Akshita Choudhury, JRF
32. Ms. Rubi Sut, JRF
33. Ms. Wahengam Sapana Devi, PA
34. Ms. Raisa Begum, PA