Minutes of the 67th meeting of Research Council held on 11th & 26th March, 2024 at meeting room of CSR&TI-Berhampore

The 67th Research Council meeting was convened in two phases during March 2024, with Dr. T. Selvakumar and Dr. Jula S. Nair serving as Chairs for the respective sessions. Dr. T. Selvakumar, Director, BTSSO (Additional charge, CSR&TI-Berhampore) presided over the first meeting on 11th March wherein new concepts were discussed. Dr. Jula S. Nair joined virtually for this session. At the outset, Dr. T. Selvakumar welcomed the newly appointed scientists and advised them for active participation in research and extension activities of the Institute. The subsequent meeting on March 26th, chaired by Dr. Jula S. Nair, focused on reviewing concluded projects, assessing ongoing project progress, and deliberating on the activities of SEEM & Training divisions.

As no comments were received, the minutes of 66th RC meeting were confirmed.

List of participants is appended in *Annexure–I*.

Subsequently, agenda-wise items were taken up for discussion.

New Concepts

A total of eight new concepts were comprehensively deliberated during the meeting.

New Concept 1: IoT-based automated drip Irrigation for smart & sustainable sericulture

Project Details

Objectives

(i) To ensure water conservation in sericulture by using smart sensor-based drip irrigation

(ii) To provide real time monitoring of the soil water status to the farmers

Expected Outcome

To come out with a robust, smart & sustainable irrigation system for mulberry sericulture

Utilization

Providing sericulture farmers with an automatically controlled, smart, sensor-based, energy efficient, low cost, drip irrigation system for producing high amount of quality mulberry leaves.

Investigators: PI- Dr. Deepika Kumar Umesh (Sci-C, Mulberry Physiology); CI's: Dr. Yallapa Harijan (Sci-C, MBG) & Dr. Khasru Alam (Sci-C, Mulberry Pathology); **PA/ JRF:** 1

Duration: 3 years

Proposed Budget: Rs 22.00 lakhs [including sensor based irrigation system-to be developed in collaboration with National Agricultural Institutes - Rs 2.5 L and TDR Soil Moisture Meter- Rs 1.5 L]

RC comments

The concept was approved with minor modifications. RC recommended the inclusion of additional details regarding the design of IoT-enabled drip Irrigation, exploring the potential integration of soil nutrient sensors, and to include newly joined scientist, whose relevant expertise aligns well with the project, as a Co-Investigator. The inclusion of the term "sustainable" in the title should be reconsidered.

New Concept 2: Sensor based waste water management to reduce water footprint of silk industry

Project Details

Objectives

(i) To recycle & reuse waste water discharged from silk Industry after treatment

(ii) To check discharge water quality in real time using smart sensors

Expected Outcome

To come out with a robust method for treating waste water from the silk Industry and monitoring its discharge quality, post-sericin extraction

Utilization

This work aims at reducing the water foot print of silk industry for a sustainable future and at the same time, extract the by-product sericin from waste water for more income generation

Investigators: PI- Dr. Deepika Kumar Umesh (Sci-C, Mulberry Physiology); CI's: Dr. Pooja Makwana (Sci-C, Biotechnology) & Dr. Y. Nagaraju (Sci-B, Microbiology); **PA/ JRF:** 1

Duration: 3 years

Proposed Budget: Rs 28.70 lakhs [including sensor based waste water monitoring system- to be developed in collaboration with National Agricultural Institutes – Rs. 3.0 L]

RC comments

The concept was approved with minor modifications. RC recommended the inclusion of additional details regarding biological process of waste water treatment employing microorganisms; prospective methods on extraction of sericin and to include scientist from R&S section of the Institute as Co-Investigator.

New Concept 3: Bio-herbicide for ecofriendly & sustainable weed management in sericulture

Project Details

Objectives

(i) To develop an effective plant-based bio-herbicide

(ii) To study its effect on weed management in sericulture

(iii) To evaluate its effect on silkworm

Expected Outcome

To come out with a bio-herbicide which can be an effective weed management tool in sericulture

Utilization

Providing sericulture farmers with safe & eco-friendly bio-herbicide for effective weed management in mulberry plantation in order to produce good quantity of quality leaves

Investigators: PI-Dr. Deepika Kumar Umesh (Sci-C, Mulberry Physiology); CI's: Dr. K. Rahul (Sci-C, Silkworm Pathology) & Dr. Pradeep S.D (Sci-B, Mulberry Physiology); **PA/ JRF:** 1

Duration: 3 years

Proposed Budget: Rs 29.30 lakhs (including a UV-Vis Spectrophotometer- Rs 5 L)

RC comments: The concept received approval with minor modifications. RC recommended implementing the practice of two-time weeding as the recommended standard and comparing it with plots where bio-herbicide is applied, as well as an absolute control group where no weed control measures are taken. The inclusion of the term "sustainable" in the title should be reconsidered.

[Action: Dr. Deepika Kumar Umesh, Sci-C]

New Concept 4: Establishing a sick plot for root rot screening and revealing candidate susceptibility genes through transcriptomic analyses

Project Details

Objectives

(i) Isolation, characterization and pathogenicity assessment of root rot isolates of Eastern and North-Eastern region

(ii) Establishment of sick plot for root rot disease followed by screening of all mulberry varieties of E and NE region

(iii) Identification and validation of candidate susceptibility genes through transcriptome and gene expression analyses

Expected Outcome and Utilization

(i) Accurate identification of root rot pathogens available in East and NE India, providing valuable insights into the diversity and distribution of these pathogens

(ii) Transcriptomic profiling of mulberry plants infected with root rot pathogens, leading to the identification of candidate susceptibility genes. These genes will serve as a valuable resource for identification of molecular markers for breeding resistant cultivars towards development of targeted control measures for crop protection

(iii) Established sick plot will act as a resource for screening breeding material and germplasm for resistance against root rot, providing a standardized platform for disease screening

Investigators: PI- Ms. Sanghmitra Aditya (Sci-B, Mulberry Pathology); CI's: Dr. Khasru Alam (Sci-C, Mulberry Pathology), Dr. Pooja Makwana (Sci-C, Biotechnology) & Ms. Harshitha B S (Sci-B, MBG); **PA/ JRF:** 1

Duration: 4 years

Proposed Budget: Rs 30 lakhs (Including instruments- PCR Machine: Rs 4.0 L, Submarine electrophoresis system with power pack: Rs. 2.0 L, Desktop [i7 or i9, 16 GB RAM or above]: Rs 5.0 L, Transcriptome analysis: Rs. 5.0 L]

RC comments: Concept was approved with the following suggestions

- Modify the title for more clarity
- Refer the previous work from CSB CSRTI-Mysuru to avoid any duplication
- Select a site for establishing the sick plot that is isolated or distant from the regular experimental plantations
- Every precaution must be taken to prevent the spread of the pathogenic inoculum from the experimental plots
- Survey of root-rot disease to be done meticulously
- A high-end web-based server is to be included in the budget for bioinformatic analyses

[Ms. Sanghmitra Aditya, Sci-B]

New Concept 5: Establishment and evaluation of mulberry germplasm specific to subtropical climate

Project Details

Objectives

(i) To establish existing mulberry germplasm

(ii) To assess the molecular diversity and evaluation of yield and quality- related traits under subtropical climatic condition

Expected Outcome

(i) Re-established mulberry germplasm bank
(ii) Diversity based grouping/clustering of genetic material
(iii) Identification of diverse parents for improved leaf yield and quality for subtropical climatic conditions

Utilization

(i) Establishment of renewed germplasm bank
(ii) Identification of diverse parents for leaf quality and yield under subtropical climatic conditions provides an opportunity to develop improved cultivars

Investigators: PI-Ms. Harshitha B S (Sci-B, MBG); CI's: Dr. Yallappa Harijan (Sci-C, MBG), Mr. Pradeep S D (Sci-B, Mulberry Physiology); **PA/JRF:** 1

Duration: 4 years

Proposed Budget: Rs 26.3 lakhs (Including instruments- PCR Machine: Rs 4 L, Submarine electrophoresis system with power pack: Rs 2 L)

RC comments

RC approved the concept as the existing germplasm is more than 50 years old and suggested to decide the site for re-establishment of germplasm bank in discussion with Director/Divisional Incharge-Moriculture. The first objective may be changed to better fit the project's goals.

[Action: Ms. Harshitha B S, Sci-B]

New Concept 6: Fertilizer use pattern and fertility status of mulberry growing soils of Eastern and North-Eastern states of India

Project Details

Objectives

(i) To study the prevailing soil nutrient management practices in mulberry
(ii) To determine the fertility status of mulberry growing soils

Expected Outcome

Proposed study will generate valuable information regarding fertilizer use pattern and nutrient management practices commonly followed in mulberry gardens in East and NE states. It will also identify the socio-economic factors responsible for the existing fertilizer use pattern. Further, the effect of current fertilizer use pattern on soil fertility will also be evaluated.

Utilization

This information will serve as a foundation to propose suitable intervention strategies to bridge the gap between recommended nutrient management technologies and their adoption by farmers. Further, it would be helpful to revise the nutrient recommendations by considering region specific soil related constraints as well as the available nutrient sources.

Investigators: PI- Mr. Ravi Saini (Sci-B, Soil Science & Chemistry) & CI: Dr. Suresh K (Sci-C, MBG); **PA/ JRF:** 2

Duration: 2 years

Proposed Budget: Rs 26.55 lakh (Including instruments- pH meter: Rs 0.35 L, EC Meter: Rs 0.3 L, Kjeldahl digestion and distillation unit: Rs 5 L, Computer and printer: Rs 1 L, Tabs: Rs 0.6 L)

RC comments

RC has endorsed the concept and suggested that the PI collaborate with the CI to review the sample size. Additionally, the survey methodology should be deliberated with extension scientists. Given potential manpower limitations for completing the project within the specified timeline, it is recommended to involve scientists from nested units/main Institute as CIs.

[Action: Mr. Ravi Saini, Sci-B]

New Concept 7: Microbial consortium for sustainable management of potassium and micronutrients in organic mulberry cultivation

Project Details

Objectives

(i) To survey and characterize beneficial microorganisms associated with organic mulberry in Northeast

(ii) To formulate a consortium for potassium and micronutrient management in mulberry

(iii) To screen the performance of microbial consortium against popular mulberry varieties under pot culture conditions

Expected Outcome & Utilization

(i) The study may lead to development of a microbial consortium suitable for improving soil health and helps the plant in dealing with the nutrition and biotic stress

(ii) It also enables to find new isolates or strains of immense industrial and pharmaceutical importance

Investigators: PI- Dr. Y. Nagaraju (Sci-B, Microbiology) CI's: Mr. Ravi Saini (Sci-B, Soil Science & Chemistry) & Mr. Pradeep (Sci-B, Mulberry Physiology); **PA/ JRF:** 1

Duration: 3 years

Proposed Budget: Rs 45.36 lakhs (including instruments- Laminar airflow- Rs 2 L, Autoclave vertical- Rs 1.5 L, Microscope with dark field and Phase contrast- Rs 6 L, Bench top fermenter- Rs 5 L)

RC comments

The PI was recommended to present the concept in the forthcoming RC meeting, supported by thorough literature research and justification in support of his decision to take up this project.

New Concept 8: Utilization of Panchagavya in organic farming practices for mulberry cultivation

Project Details

Objectives

(i) To survey and identify the organic farming practices suitable for mulberry

(ii) To formulate the organic farming practices in mulberry

(iii) To formulate and estimate the microbial and biochemical quality of panchagavya

(iv) To establish an organic mulberry garden for evaluation of organic farming practices

Expected Outcome

(i) This study helps in identifying a suitable organic farming practice for mulberry in E&NE India

(ii) This study also helps in establishing the quality parameters for Panchagavya

(iii) It also helps in developing the organic farming package for the mulberry

Utilization

Organic farming practices can be implemented in mulberry field

Investigators: PI- Dr. Yalavarthi Nagaraju (Sci-B, Microbiology); CI's: Mr. Ravi Saini (Sci-B, Soil Science & Chemistry) & Dr. K. Suresh (Sci-C, MBG); **PA/ JRF:** 2

Duration: 3 years

Proposed Budget: Rs 51.11 lakhs (including instruments- Refrigerated Centrifuge: Rs 3 L, Double distillation unit: Rs. 1.5 L, Water bath: Rs. 1.5 L, PCR: Rs. 10 L)

RC comments

The PI was recommended to present the concept in the forthcoming RC meeting, supported by thorough literature research and justification in support of his decision to take up this project

[Action: Dr. Y Nagaraju, Sci-B]

Review of the Concluded projects

MTL02017CN: Study on sericulture-based IFS in hilly region of West Bengal

The PI presented an Integrated Farming System (IFS) model centered around Sericulture, highlighting its optimal Benefit-Cost (BC) ratio across different elevations (high hill, mid hill, low hill). PI was advised to organize capacity-building training (CBT) and awareness programs to foster the adoption of these models and submit the concluded project report in the prescribed format for onward transmission to CO, Bangalore.

[Action: Dr. Harish Babu, Sci C]

MOT02016EF: Seri-entrepreneurship development in aspirational districts of NE India

(DBT funded)

The PI was advised to establish a mechanism for monitoring and evaluating the socio-economic impact of the developed sericulture enterprises over time and submit the concluded project report in the prescribed format for onward transmission to CO, Bangalore.

MOE02011EF: Development of seri-entrepreneurship through sericulture chawki business by setting up two Chawki Rearing Centers (CRC) as demonstrative units in Murshidabad District, West Bengal

(NABARD funded)

The PI was advised to provide clear and actionable recommendations for scaling up the CRC model in other regions of West Bengal based on the finding of the present study and submit the concluded project report in the prescribed format for onward transmission to CO, Bangalore.

[Dr. Parameshwara Naik J., Sci-C]

Review of Ongoing projects

PIB02010SI: Final yield trial of promising high yielding mulberry genotypes for Eastern and North Eastern India

Dr. Suresh K presented the progress of the project which is as per milestone.

PIE13001MI: All India Co-ordinated Experimental Trial for Mulberry Varieties (Phase –IV) (coll. with CO, Bangalore)

Dr. Suresh K presented the progress of the project. It was advised that the facilitators of the respective test centers must extend co-operation in implementation of the project activities.

[Action: Dr. K. Suresh, Sci-C]

PIB02007SI: Improvement of mulberry leaf longevity in Eastern and North Eastern states of India

Dr. Deepika K U presented progress of the project. The PI was advised to expedite the process of plant hormone analysis from IARI, New Delhi

[Action: Dr. Deepika K U, Sci-C]

PIE02013SI: Final yield trial (FYT) of newly identified mulberry genotypes for leaf productivity and quality

PIB03013SI: Development of high yielding quality mulberry (*Morus* spp.) genotypes under sub-tropical conditions of Northern India (coll. with RSRS-Jammu)

Dr. Yallappa presented progress of the projects. The progress is as per schedule.

The house while reviewing the follow up action taken on the recommendations of previous RC meeting, it was observed that the PI didn't submit the concluded report of the project 'PPA02005SI'. The PI was advised to submit the same in the prescribed format without delay.

[Action: Dr. Yallappa H, Sci-C]

APS02020MI: Improvement of seed crop productivity in West Bengal

Dr. Satadal Chakraborty presented the progress of the project. The research and training progress is as per milestone. The PI was recommended to take necessary steps to ensure that the inputs reach the beneficiaries on time.

[Action: Dr. Satadal Chakrabarty, Sci-D]

ARE010028MI: Recommendation of novel fungicidal and insecticidal application for mulberry (coll. with CSRTI-Mysore)

MTL01025MI: Life cycle assessment of mulberry silk: A National Assessment (coll. with CSRTI-Mysore)

Mr. Khasru Alam, Co-PI briefed the progress of the projects which is found to be satisfactory. Regarding the project, MTL01025MI, it was advised that the PI may expedite the procurement of instruments proposed in the project in consultation with Store section.

[Action: Dr. Khasru Alam, Sci-C]

AIB02006MI: Improvement of Nistari lines for survival and silk productivity

Dr. Th. Ranjita Devi presented progress of the project. The progress is as per schedule. However, the budget utilization is low and the PI is advised to take necessary action since the project is slated to conclude in May, 2024.

[Action: Dr. Th. Ranjita Devi, Sci-C]

AIE02018SI: Identification of superior Bivoltine foundation cross as a male component to improve cross breed productivity in E & NE India

Dr. Satadal Chakraborty presented progress of the project. The progress is as per schedule.

Routine Programme: Silkworm disease monitoring of seed and commercial crop rearing of Eastern & North Eastern states

It was advised that the disease monitoring activities be strengthened in view of pebrine incidence. Appropriate disinfection strategies must be suggested to the stakeholders.

[Action: Dr. K. Rahul, Sci-C; Dr. M. Rabha, Sci-C]

On station evaluation of *Bombyx mori* bidensovirus (BmBDV) resistant SK6R X SK7R silkworm hybrids (coll. with SBRL-Kodathi)

It was advised to present the data pertaining to reeling parameters also.

[Action: Dr. K. Rahul, Sci-C; Dr. M. Rabha, Sci-C]

AIT02012CI: Characterization of mulberry silkworm, *Bombyx mori* L. mutants for tolerance to flacherie syndrome through genome editing tools (DST-JSPS project)

SIB01038MGC: Utilization of Japanese genetic resources for the development of productive bivoltine hybrids (coll. with CSRTI-Mysore)

Dr. Pooja Makwana presented the progress of the projects. The progress is as per set milestones.

AIT02008SI: Identification of high humidity tolerant silkworm breeds/hybrids for Eastern & North-Eastern India

AIB02019MI: Development of bivoltine double hybrids suitable for different regions of India

Dr. Raviraj presented the progress of the projects and are as per schedule.

MOE02014SI: Popularization of improved technologies developed in the field of mulberry sector for Eastern & North-Eastern India

Component I: Popularization of new mulberry varieties (C-2038, Tr-23, C-776 & C-2028)

Component II: Popularization of bio-control agents for the management of mulberry pests

Component III: Popularization of eco-friendly disinfectant, NIRMOOL

Component IV: Popularization of chawki rearing & shoot feeding (shelf rearing) with collapsible plastic mountages

Component V: Popularization of Sampoorna

All project components are progressing in accordance with the set milestones. It is advised that the PI's/CI's visit the centres where the ToT programs are underway to monitor the progress. Further, the indents concerning the requirements must be processed at an early date to ensure that the material reaches the nested /DoS units well in time.

[Action: Dr. K Suresh, Sci-C; Dr. Khasru Alam, Sci-C; Dr. G. Srinivasa, Sci-D; Dr. K. Rahul, Sci-C]

MOE02015MI: Evaluation of improved technologies developed in the field of mulberry sector for Eastern & North Eastern India

Component I: Evaluation of high yielding &bacterial leaf spot resistant mulberry variety C-2070

Component II: Evaluation of high yielding and low temperature stress tolerant varieties C-2060 & C-2065

Component III: Low cost drip fertigation system for mulberry in E & NE India

Component IV: Evaluation of eco-friendly silkworm rearing bed disinfectant Seri-Win

The progress of all the components is as per milestone. It is advised that the PI's/CI's visit the centres where the ToT programs are underway to monitor the progress.

[Action: Dr. Deepika, Sci-C; Dr. Suresh K, Sci-C; Dr. Yallappa, Sci-C; Dr. M. Rabha, Sci-C]

MTS13002MI: Impact assessment of mulberry sericulture technologies in India (in coll. with RCS, Bangalore)

Dr. P. Naik presented progress of the project. Since, the PA is recruited, it is advised to expedite the activities as per the set milestones.

Dr. G. Srinivasa briefed the progress of extension communication programs and other activities of SEEM division [main Institute and nested units]. Dr. P. Naik briefed the progress of CBT activities.

The progress in the activities of SEEM & Training Division are found to be satisfactory

[Action: Dr. G. Srinivasa, Sci-D; Dr. P. Naik, Sci-C]

Meeting ended with vote of thanks

Minutes approved

23/4/24

(Dr. Jula S. Nair)
Director

Annexure-I

List of participants in the 67th Meeting of Research Council (RC) held on 11.03.2024 & 26.03.2024 at CSRTI-Berhampore, West Bengal

#	Name	Designation
1	Dr. T. Selvakumar	Director, BTSSO (Additional charge, CSR&TI-Berhampore)
2	Dr. Jula S. Nair	Director
3	Dr. G. Srinivasa	Scientist-D, SEEM
4	Dr. A.R. Pradeep	Scientist-D, Biotechnology
5	Dr. Satadal Chakrabarty	Scientist-D, Sericulture Division, Farm Management & RST
6	Dr. K. Suresh	Scientist-C, MBG
7	Dr. Pooja Makwana	Scientist-C, Biotechnology
8	Dr. K. Rahul	Scientist-C, Silkworm Protection & PMCE
9	Dr. Parameshwara Naik J.	Scientist-C, Training
10	Dr. Deepika Kumar Umesh	Scientist-C, MBG
11	Dr. Thangjam Ranjita Devi	Scientist-C, SBG
12	Dr. Mihir Rabha	Scientist-C, Silkworm Protection
13	Dr. Raviraj V.S.	Scientist-C, Biotechnology
14	Dr. Yallappa Harijan	Scientist-C, MBG
15	Dr. Khasru Alam	Scientist-C, Mulberry Pathology
16	Dr. Harish Babu S.	Scientist-C, RSRS-Kalimpong
17	Mr. Arun Kumar	Scientist-B, Reeling & Spinning
18	Dr. Oshin	Scientist-B, SBG
19	Dr. Y. Nagaraju	Scientist-B, Microbiology
20	Ms. Harshitha B.S.	Scientist-B, MBG
21	Mr. Pradeep S.D.	Scientist-B, Mulberry Physiology
22	Ms. Sanghmitra Aditya	Scientist-B, Mulberry Pathology
23	Ms. Reshma R.	Scientist-B, Entomology
24	Mr. Ravi Saini	Scientist-B, Soil Science & Chemistry
25	Dr. Javid Ur Rahman	Scientist-B, SBG
26	Sugantichik Baraik	Project Assistant
27	Ranadip Das	Project Assistant
28	Nikita Mondal	Project Assistant
29	Trisha Das	Project Intern
30	Tamalika Mondal	Project Intern