PROCEEDINGS OF THE 55TH MEETING OF THE RESEARCH ADVISORY COMMITTEE OF CSR&TI (CSB), BERHAMPORE
HELD DURING 04-05 AUGUST 2022 IN DUAL MODE (PHYSICAL / VIRTUAL)

The 55th meeting of the Research Advisory Committee (RAC) of CSR&TI (CSB)-Berhampore was held during 04-05 AUGUST 2022 in dual mode (Physical / Virtual) to review the progress of R&D projects/programmes under the Chairmanship of Dr. Chirantan Chattopadhyay, Principal Scientist & Joint Director Academic (Actg.), ICAR-Indian Institute of Agricultural Biotechnology, Ranchi and Former Vice Chancellor, Uttar Banga Krishi Vishwavidyalaya (UBKV), Cooch Behar, West Bengal.

At the outset, Dr. Dipesh Pandit, Scientist-D, PMCE welcomed the Chairman, all the esteemed Members of the RAC (2021-23), Scientists and other participants to the meeting. Dr. B. T. Srinivas, Director (Tech), CSB emphasized the importance of Silk Samagra 2 program implemented for the whole country through state DoS. Shri Goswami, Dy. Director (I/C), DoS-West Bengal flagged the difficulty in getting P1 seed cocoons and requested to focus on farmers' problem(s) and introduce technology to improve quality of reeled silk. Dr. Sharmila, Sci. D. & I/C, NSSO, Bangalore requested to improve supply of bivoltine hybrid DFLs in the eastern region. The Chairman, in his brief introductory deliberation, requested all the members for more fruitful interaction with the DoS officials and Scientists. He further requested Director (Tech) and RCS, Central Silk Board to recruit more young Scientists for the Institute while he asked CSR&TI to pursue with CSB for the posting of fresh Scientists against present vacancies with appropriate justification and raise the issue in the meeting of the RCC.

The Committee observed a two-minute silence to mourn the sad demise of Dr. Palash Mandal, Professor, University of North Bengal, Siliguri, who was a collaborator of an important research project of the CSR&TI and an invitee of the meeting.

List of participants is appended in Annexure–I.

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

ITEM NO.1: Confirmation of the minutes of the 54th meeting of the RAC held during 21-22 January 2022 at the CSR&TI Berhampore:

As no comments were received from any member of the committee, the minutes of the 54th Meeting of the RAC were confirmed.

ITEM NO.2: Research highlights and follow-up action on the recommendations of the 54th meeting of the RAC

Dr. Kishor Kumar C.M., Director, CSR&TI-Berhampore and Member-Convenor, RAC presented the R&D highlights, extension activities, BV-CPP program, transfer of technology, training activities of the CSR&TI-Berhampore (WB) and its nested units located in different Eastern and North-Eastern States since last RAC meeting. Dr. M. Moorthy, Sci-D, RCS, CSB emphasized the requirement of more DFLs indent from West Bengal. Dr Nirmal Kumar suggested preparing statistics on Sericulture in West Bengal. The house was informed about the authorization of the hybrid '12Y x BFC1' by HAC at CO, CSB which was appreciated by the Committee. It is informed that farmers mainly accept DFLs of improved cross breeds (ICB) in Malda and Birbhum region. The Chairman enquired the performance of the clusters and its difficulties. In reply, Dr Srinivas, SEEM Divn., explained the problems of clusters and explained the importance of dryland sericulture which is suitable for BV. He informed the house that horizontal expansion is difficult due to reducing land holding; however, vertical expansion for increased productivity may be possible by using potential breeds and recommended technologies.

Dr. Dipesh Pandit, Scientist-D, In-charge, PMCE Division presented the review of follow-up action taken on the recommendations/ decisions in the 54th meeting of the RAC held during 21-22 January

2022. The follow up action taken associated with each project were reviewed in detail and it was found satisfactory.

On the pilot study of rescheduling of rearing, the Committee made following suggestions:

i. How much intake of DFLs increased under the pilot study?
ii. Assess the improvement due to change in schedule and in different crops including Aghrayani, Falguni and Baishakhi
iii. Discuss with DoS and confirm the changes due to rescheduling in another year
iv. Study with various parameters on rearing and mulberry leaf quality, productivity, etc.
v. Validate the results through another pilot study at farmers' level
vi. Rescheduling of rearing require planning at various levels
vii. P1 crop should also be considered for rescheduling
viii. Inputs have to be given to farmers at all stages, jointly with DoS
ix. Spacing of mulberry to be considered for assessment

On the proposed project on chlorophyllin extraction, PI informed that sample was sent to CCAMP, Bangalore for analysis and results are awaited.

In continuation of the projects on R&S, the Chairman emphasized the need to appoint a Reeling & Spinning Scientist at the Institute.

On the collaborative project with UNB, the Committee advised the PI, Dr. Pooja to visit the Department of Botany/ University of North Bengal to finalize the work done and settle the account.

ITEM NO. 3: **REVIEW OF CONCLUDED PROJECTS**

PRP 08002 MI: Identification of candidate genes based powdery mildew resistance for utilization in disease resistance breeding in Mulberry [Collaborative project of SBRL, Kodathi].

Dr. Suresh, Sci-C presented conclusion report. On discussion, Dr Bhattacharya suggested to consider more studies before finalizing the markers against powdery mildew tolerance. The Chairman suggested considering purine degradation pathway to analyze nitrogen utilization by the pathogen. Further marker- trait association is to be analyzed. The conclusion report of the work done in the Institute was accepted.

[Action: Dr Suresh, Sci-C]

AIB02009 MI: Authorization trials of silkworm hybrid, 12Y x BFC1 in Eastern and North-Eastern India

The PI presented the conclusion report of the project. The committee appreciated the authorization of the 12Y by Hybrid authorization Committee, CSB. On discussion, the RAC advised for large scale trial (popularization) with NSSO as a partner for multiplication and distribution. Dr Moorthy advised to assess the diapause character of 12Y. The conclusion report was accepted.

[Action: Dr N. Chandrakanth, Sci-C]

AIE06002MI: Evaluation of Bivoltine Silkworm Genetic Resources for Tolerance to Abiotic Stress in Selected Hotspots (Coll. of CSGRC - Hosur)

The PI presented the conclusion report of the institute as part collaborative project. The House suggested collecting copy of total final report from CSGRC-Hosur.

[Action: Dr N. Chandrakanth, Sci-C]

AGENDA NO.5: NEW RESEARCH PROJECT PROPOSAL FOR APPROVAL (1 No.)

Title of the project: Improvement of seed crop productivity in West Bengal

Dr. Satadal Chakrabarty, Sci- D & PI presented the proposed project along with referees' comments. The committee suggested the following:

i. To conduct a survey on performance of Nistari for last five years using data from DoS farms
ii. Check the performance of Nistari in P3, P2 and P1.

iii. Find benchmark value for traits
iv. Include farmers from North Bengal and other sericulture areas also for training

The proposal was accepted with suggested modifications from referees and on improved methodology.

[Action: Dr Satadal Chakrabarty, Sci- D]

AGENDA NO.6: REVIEW OF THE PROGRESS OF ON-GOING PROJECTS

PIE 02002 SI: Evaluation of performance of mulberry genotype C-9 under red and laterite soils

Dr. Suresh, Sci-C presented the progress in the project. The committee suggested for varietal evaluation under the two soil types, nutritional efficiency, genetic makeup and segregation of the traits. The Committee expressed concern over the impact of rain on nutritional intake by the plants.

[Action: Dr Suresh, Sci-C]

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

Dr. Suresh, Sci-C presented the progress in the project which was as per plan.

[Action: Dr Suresh, Sci-C]

PIB 02007 SI: Improvement of mulberry leaf longevity in Eastern and North Eastern states of India

Dr. Deepika, Sci-C presented the progress in the project which was found satisfactory and as per plan. Committee suggested performing hormone titer variations associated with senescence. Prof. Varatharajan suggested collecting pest incidence data.

[Action: Dr Deepika, Sci-C]

PIE13001MI: All India Co-ordinated Experimental Trial for Mulberry Varieties (AICEM- Phase –IV)

Dr. Suresh, Sci-C presented the progress in the project which was found satisfactory and as per plan. The Committee advised to present difference in traits or performance, if any, from different locations.

[Action: Dr Suresh, Sci-C]

PIE 02013SI: Final yield trial (FYT) of newly identified mulberry genotypes for leaf productivity and quality.

Dr. Yallappa Harijan presented the progress in the project which was as per plan.

[Action: Dr Yallappa Harijan, Sci-C]

PPA 02005SI: Optimization of spacing and nutrient dose for newly developed high yielding mulberry variety C 2038 under irrigated condition

Dr. Yallappa, Sci-C presented the progress of the project that was noted to be as per schedule.

[Action: Dr. Yallappa, Sci-C]

PIB 03013SI: Development of high yielding quality mulberry (*Morus* spp.) genotypes under sub-tropical conditions of Northern India (Coll. With RSRS-Jammu)

Dr Yallappa Harijan, Co-I presented the progress in the project which was initiated in June 2022. He informed about the supply of fruits/ seeds of different genotypes/ varieties of mulberry to RSRS Jammu to initiate the project.

[Action: Dr. Yallappa, Sci-C]

AIB 02006 MI: Improvement of Nistari lines for survival and Silk productivity

The PI presented the progress in the project which was found as per plan. The committee suggested the following

1. To compare filament length after cold and hot reeling and with earlier reports / literature.
2. To consider other important traits also for improvement
3. To perform correlation among different traits and heritability test to explain generation wise variations,
4. To increase the population size to avoid inbreeding depression and to increase the number of individuals for the cold reeling for consistent result.
5. To allow the base population without changes.

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

AIE 02018SI: Identification of superior Bivoltine foundation cross as a male component to improve cross breed productivity in E & NE India

The project was initiated in May 2022. The PI presented the project and detailed methodology, referees' comments and action taken. The Committee suggested using improved multivoltine breeds for crossing.

[Action: Dr. Chandrakanth, Sci-C]

AIB 01009MI: Evaluation of New Bivoltine Double Hybrid, TT21 X TT56 at Farmers' Level for Authorization for Commercial Exploitation (Coll. of CSRTI - Mysore)

The PI presented the project and the progress was as per schedule. The Committee suggested rearing 500 DFLs of FC1 x FC2 for comparison.

[Action: Dr. Chandrakanth**, Sci-C]**

AIC 02004CN: **Molecular characterization and assessment of the efficacy of low molecular weight peptide isolated from mulberry leaf against flachariie disease of silkworm**

The PI presented the progress in the project that was as per schedule. The PI informed the house that the samples were sent to CCAMP for final analysis. Four selected peptides are under synthesis. The Committee enquired on the traits of the peptides and advised to conduct bioassay for AMP activity of the synthetic peptides.

[Action: Dr. Pooja Makwana, Sci-C]

AIT 02012CI: Characterization of mulberry silkworm, *Bombyx mori* L. mutants for tolerance to flacherie syndrome trough genome editing tools (DST-JSPS project)

The PI presented the progress in the project that was as per schedule. The Committee advised to target better breeds of silkworm and find out target genes associated with tolerance / resistance / susceptibility. Dr. Nirmal Kumar enquired on the present status of DNV infection in India. The committee was informed about the visit of the foreign collaborator for detailed discussion on the training in genome editing.

[Action: Dr. Pooja Makwana, Sci-C]

AIT 02008 SI: Identification of high humidity tolerant silkworm breeds/hybrids for Eastern & North-Eastern India

In absence of Dr. Ravi Raj, Sci-C & PI, Dr. Pooja Makwana, presented the progress in the project that was as per schedule. Expression analysis of candidate genes has to be taken up.

[Action: Dr. Ravi Raj, Sci-C]

<u>Ongoing project for ratification of the RAC and approval</u>

AIB 02019MI: Development of bivoltine double hybrids suitable for different regions of India
Co-ordinator: Dr. Manthira Moorthy S., RCS Bangalore
PI: Dr. Raviraj, V.S. (CSRTI-BHB)
CI: Dr. Kusuma L. (CSRTI-Mysuru), Dr. Kiran R. (CSRTI-Pampore) & Dr. Rita Singh (RSRS-Jammu)
June 2022 to May 2025

In absence of Dr. Ravi Raj, Sci-C & PI, Dr. A R Pradeep, Sci-D presented the project.
The Committee approved the project with the following modifications/ suggestions:

i. Training is to be imparted to young Scientists in Silkworm Breeding programs
ii. RSRS, Manipur to be included for experimental rearing as per referees' comments with additional budget.
iii. Number of successful generations / years to be recalculated for each region and duration of the project/ budget to be reassessed accordingly.
iv. Referees' comments to be circulated among RAC members for comments.
v. Advised for discussion with Co-Ordinator on cocoon selection

[Action: Dr. Ravi Raj, Sci-C]

Review of Collaborative ongoing projects:

AIT 08005MI: Development and evaluation of Bidensovirus resistant silkworm hybrids developed from marker assisted breeding lines-Phase II (Coll. of SBRL- Kodathi)

Dr Mihir Rabha, Sci C & CI presented the progress in the project that was as per schedule. Dr. Rabha provided details of DNV virus used in the study and on the bioassay conducted. The Committee advised to validate the marker in larger population and conduct bioassay to accompany the marker presence to establish lines with marker assisted resistance.

[Action: Dr. Mihir Rabha, Sci-C]

MOE 02011EF: Development of Seri-Entrepreneurship through sericulture chawki business by setting up 02 Chawki Rearing Centers (CRC) as demonstrative units in Murshidabad district, West Bengal [NABARD-funded project]

Dr. Shaffi Afroz, Sci C & PI presented the progress in the project that was as per schedule. The Committee suggested finding the cost of production and economics of CRC. The Chairman enquired on NABARD feedback that was replied as positive. The PI informed the initiative of NABARD on making a documentary on this project, which was appreciated by the RAC.

[Action: Dr. Shafi Afroz, Sci C]

MTS 13002 MI: Impact Assessment of Mulberry Sericulture Technologies in India

Dr. Shafi Afroz, Sci C & CI presented the progress in the project. The project is initiated on 01 July 2022.

[Action: Dr. Shafi Afroz, Sci C]

MOT 02016EF: Seri-Entrepreneurship Development in Aspirational Districts of North-Eastern India (DBT funded)

Dr. Parameshwar Naik, Sci C & PI presented the progress of the project that was as per schedule. The house suggested focusing specifically on each parameter. The Chairman opined that the project is important in developing seri-enterprenureship in north-east region and hence to be projected with findings to the RCC.

[Action: Dr. Parameshwar Naik, Sci-C]

MTL 02017CN: Study on sericulture based IFS in hilly region of West Bengal

Dr. Harish Babu, Sci-C & PI presented the progress of the project that was as per schedule

[Action: Dr. Harish Babu, Sci-C]

MOE 02014SI: 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/BC259 & C-2028)

Dr. Suresh, Sci-C presented the progress of the project that was as per schedule.

Component II: Popularization of Bio-control Agents for the management of mulberry pests

Dr. Khasru Alam, Sci-C presented the progress in the project. The Committee suggested to give the names of the biocontrol agents used and present data separately and to consult with an expert in the field to decide on the quantum of biocontrol agent to be released in the field.

Component III: Popularization of eco-friendly disinfectant, NIRMOOL

Dr Mihir Rabha, Sci C & CI presented the progress of the project that was as per schedule.

[Action: Dr Mihir Rabha, Sci-C]

Component IV: Popularization of Chawki, Shoot/Shelf rearing & plastic collapsible mountages

Dr. Shafi, Sci C & CI presented the progress of the project that was as per schedule. The Committee suggested to collect data from individuals and groups of farmers.

[Action: Dr. Shafi Afroz, Sci C]

Component V: Popularization of Sampoorna

Dr. Mihir Rabha, Sci C & CI presented the progress of the project that was as per schedule. Director (Tech) suggested using Sampoorna during leaf shortage. Dr. Nirmal Kumar explained the hormonal aspects of Sampoorna.

[Action: Dr. Mihir Rabha, Sci-C]

MOE 02015MI: 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-7
Component II: Evaluation of High Yielding and Low temperature stress tolerant varieties C-01 & C-11
No deviation in performance of variety was reported by the PI for components I & II.

[Action: Dr. Suresh, Sci-C/ Dr Deepika, Sci- C]

Component III: Low Cost Drip Fertigation system for mulberry

Dr Yallappa Harijan, Sci-C presented the progress of the project that was as per activity milestones. The Committee advised to find lacuna, if any, in the fertigation technology and to give established bench mark value. Dr Nirmal Kumar enquired on the set norms for each mulberry variety. Committee suggested introducing other technologies developed in the field to integrate different technologies into the package of practice. Dr Zakir Hussain, RSRS, Kalimpong suggested for two crops properly, though a third crop can be tried at Kalimpong.

[Action: Dr. Yallappa, Sci-C]

Component IV: Evaluation of Eco-friendly Silkworm Rearing Bed Disinfectant Seri-Win

Dr. Mihir Rabha, Sci C & CI presented the progress of the project that was as per schedule.

[Action: Dr. Mihir Rabha, Sci-C]

General comment: The Committee opined that deviation if any from the technology developed only may be presented for each component of OFT / OST programs.

Training Activities

Dr. Parameshwar Naik, Training (I/c) explained the different programs undertaken by the Division.

Comments from RAC Members (Concluding remarks):

Shri Bikash Chandra Roy, Farmers' representative & RAC Member expressed his happiness over the discussion that scientists are working for the sericulture community. He added some information to the house that in some areas sericulture is affected by the vegetable cultivation; Seed zone and

commercial zone to be kept separate; seed farmers should get better price; high yielding varieties of mulberry or hybrids are more susceptible to pests and succumb to them easily; Labex is best.

Professor Bhattacharya appreciated the progress and outcome. He emphasized the improvement in seed crop production. In Biocontrol program, methodology to be improved. For Nistari, parents used to be kept with basic traits. Markers for DNV1 and DNV2 are separately to be tested along with bioassay.

Dr. Nirmal Kumar suggested focusing on climate resilience and value chain interventions while formulating new projects. Focus on contribution of different technologies to silkworm and mulberry improvement components. Present an introductory line for each project slide showing the earlier results. He advised to focus on north- eastern states and Odisha.

Dr. S. Manthira Moorthy suggested improving BV production in WB.
DoS should use the contribution of Silk Samagra in West Bengal Sericulture through projects for post cocoon sector and seed sector and suggested to utlilize Samagra workshops.

Prof. Varatharajan appreciated the presentation. On Biocontrol, he suggested to verify biodiversity of different predatory species. He suggested impact of hormonal variations in mulberry on insect-pest biology.

Mr. Kachui, Dy. Director, DoS, Manipur appreciated the contribution of the scientists.

Shri S. Goswami, Dy. Director (I/C), DoS, Murshidabad, WB thanked for the co-operation of CSRTI with DoS.

Dr. B. T. Srinivas, Director (Tech), CSB requested for involvement of the scientists in improving the mulberry varieties and use the R&D developments towards farmers' cause. He stressed the need for developing packages of practices for important mulberry varieties.

Dr. Chirantan Chattopadhyay, Chairman suggested to focus on whitefly and powdery mildew as both are important biotic stresses affected by climate changes. He emphasized the need of contribution of R&D projects for farmers' benefit. The Chairman suggested detailed discussion on the projects / presentation within Institute before projecting to RAC so as to discuss only important points in the RAC meetings. For newly initiated projects, one slide with relevant points to be presented to the RCC. The Chairman queried whether movement of silk material happens across the international border in the Eastern sector and to collect information as a requirement for the RCC. He appreciated the efforts of the Scientists in improving research output and opined that they have better potential that could be expressed with improved physical, technical and financial supports. He encouraged the Scientists to publish findings in high impact journals and avoid the low-rated ones. He requested the CSR&TI to also maintain a google scholar citation index (h index, i-10 index) that should also be presented in the list of publications during the meeting of the RCC. Scientists having higher citations should be appreciated.

The meeting ended with Vote of Thanks to all concerned.

Approved the minutes

Chirantan Chattopadhyay
Chairman, RAC

LIST OF PARTICIPANTS IN THE 55th MEETING OF RESEARCH ADVISORY COMMITTEE (RAC) HELD during 04-05 Aug 2022

#	NAMES	DESIGNATION
1.	Dr. Chirantan Chattopadhyay	Chairman, RAC
2.	Dr. Somnath Bhattacharya	Professor, BCKV, Member RAC
3.	Dr. R. Varatharajan	Professor, Manipur University, Member RAC **(Virtual)**
4.	Dr. S. Nirmal Kumar	Former Director, Member RAC
5.	Dr. B.T. Srinivasa	Director (Tech.), C.O.-Bangalore, Member RAC
6.	Dr. Sharmilla K.K.	Director (NSSO.)(I/C) ,C.O.-Bangalore, Member RAC **(Virtual)**
7.	Dr. S. Manthira Moorthy	Scientist-D, RCS, CSB, C.O. Bengaluru, Member RAC
8.	Sri Bikash Chandra Roy	Member RAC, Rearers Representative,
9.	Shri Sidhartha Goswami	Dy. Director(I/C) MSD for Commissioner, Govt. of W.B., Member
10.	Shri K. Kachui	Dy. Director, DoS, Govt. of Manipur, Member
11.	Dr. Kishor Kumar C.M.	Director, CSR&TI, Berhampore, Member Convenor
12.	Shri Swapan Kumar Maity	Extn. Officer, DoT(Seri), Murshidabad, Govt. of West Bengal
13.	Shri Laitonjam Dev Kumar	Inspector, DoS, Imhal, Govt. of Manipur
14.	Mr. Zakir Hossain	Scientist –D, RSRS, Kalimpong, West Bengal
15.	Dr. Dip Kumar Gogoi	Scientist –D, RSRS, Koraput, Odisha
16.	Dr. Kartik Neog	Scientist –D, RSRS, Jorhat, Assam
17.	Dr. Srinivasa G.	Scientist –D(SEEM), CSR&TI, Berhampore
18.	Dr. A.R. Pradeep	Scientist–D, CSR&TI, Berhampore
19.	Dr. Dipesh Pandit	Scientist –D (PMCE), CSR&TI, Berhampore
20.	Dr. Satadal Chakraborty	Scientist–D, CSR&TI, Berhampore
21.	Dr. N. Chandrakanth	Scientist-C, CSR&TI, Berhampore
22.	Dr. Suresh K.	Scientist-C, CSR&TI, Berhampore
23.	Dr. Pooja Makwana	Scientist-C, CSR&TI, Berhampore
24.	Dr. Shafi Afroz	Scientist-C, CSR&TI, Berhampore
25.	Dr. Parameshwar Naik	Scientist- C, CSR&TI, Berhampore
26.	Dr. Mihir Rabha	Scientist-C, CSR&TI, Berhampore
27.	Dr. Deepika Kumar Umesh	Scientist-C, CSR&TI, Berhampore
28.	Dr. Yallappa Harijon	Scientist-C, CSR&TI, Berhampore
29.	Dr. Ranjitha Devi	Scientist-C, CSR&TI, Berhampore
30.	Shri. Khasru Alam	Scientist-C, CSR&TI, Berhampore
31.	Dr. Harish Babu	Scientist-C, RSRS, Kalimpong
32.	Shri Pranesh Prasad	Deputy Director (Computer)
33.	Miss Surabhi Ghosh	SRF, CSR&TI, Berhampore
34.	Nilofar Yasmin	JRF, CSR&TI, Berhampore
35.	Miss Susmita Debi	PA, CSR&TI, Berhampore
36.	Smt. Mahua Chattopadhyay	Senior Technical Assistant (STA) [PMCE}
37.	Shri Subrata Sarkar	Senior Technical Assistant (STA) [PMCE}
38.	Smt. Subhra Karmakar Mustafi	Senior Technical Assistant (STA) [PMCE}

Meeting was arranged in dual mode (Physical &Virtual)

ABSENTEE:

1. Dr. Debabarata Basu, Professor of Agricultural Extension, Bidhan Chandra Krishi Viswavidyalaya, Member
2. Md. Salauddin Momin, Reelers' Representative, Member
3. Director, DoS Tripura, Govt. of Tripura, Member