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**Central Sericultural Germplasm Resources Centre**  
**Central Silk Board, Hosur – 635 109**

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**MINUTES OF THE 40TH MEETING OF  
RESEARCH ADVISORY COMMITTEE HELD ON 15<sup>TH</sup> JANUARY, 2021.**

The 40<sup>th</sup> meeting of the Research Advisory Committee [RAC] of CSGRC, CSB, Hosur, was convened on 15<sup>th</sup> January, 2021 under the chairmanship of Dr. Chandish R. Ballal, Director (Retd.), National Bureau of Agricultural Insect Resources [NBAIR], Bengaluru. The list of participants is appended at **Annexure-1**.

At the outset, Dr. B.T.Sreenivasa, Director, CSGRC, Hosur welcomed Dr. Chandish R. Ballal, Chairperson of the reconstituted Research Advisory Committee and expressed his gratitude for accepting the Chairmanship of the RAC Committee for the second consecutive term. Then he welcomed the Members, Dr. P. E. Rajasekharan, Dr. Manjunath Gowda, Dr. Ravindra Singh, Dr. Modhumita Dasgupta and Dr. Anitha Kodaru. He also welcomed Dr. R.K.Mishra, Director (Tech) & Member RAC, Dr. Sathyanarayana, Scientist-D & Member RAC. He informed the house that the review period of the meeting is from April, 2020 to September, 2020 and requested the Chairperson for the opening remarks.

Dr. Chandish R. Ballal welcomed all the participants to the RAC meeting and expressed happiness for the continued association with the centre. She opined that consistent effective involvement in work is required for maintenance of the germplasm resources and hence the centre deserves more recognition and international exposure. She urged the scientists to enhance the visibility of the organisation through participation in international conferences and publications in peer-reviewed journals.

Later, Dr. B.T. Sreenivasa, Director, CSGRC presented an overview of the activities being carried out at CSGRC, Hosur. Dr. R. K. Mishra, Director, Technical, CSB greeted the new RAC and lauded the efforts done by the centre in conserving, maintaining and characterizing mulberry and silkworm germplasm. Dr. K. Sathyanarayana, Scientist-D & Head, RCS, CSB briefed the Committee members about the research management in CSB.

**ITEM NO. I: CONFIRMATION OF MINUTES OF THE 39<sup>th</sup> MEETING OF RAC HELD  
ON 23<sup>rd</sup> OCTOBER, 2020**

As no comments were received, the Committee confirmed the minutes.

## **ITEM NO. II: REVIEW OF FOLLOW-UP ACTION ON THE DECISIONS TAKEN IN THE 39<sup>th</sup> MEETING OF THE RAC HELD ON 23<sup>rd</sup> OCTOBER, 2020**

The follow-up action taken on the decisions/suggestions of the 39<sup>th</sup> RAC meeting was presented by Dr. M. Maheswari, Scientist-D and after reviewing critically, the house took the following decisions.

- The ATR should be crisp, quantified and to be presented with deadlines, wherever applicable.
- Each scientist should publish at least two research papers in reputed/NAAS rated journals in a year as first author.
- Outcome of the concluded projects to be published in a brochure format with relevant information in bullet format with good photographs.
- Scientists should apply for travel grants for attending conferences/seminars nationally and internationally, which will not only enhance the visibility of the centre, but also provides an opportunity to exchange ideas.
- With regard to the ongoing project PIG-06004SI-Studies on cytological status of Mulberry Genetic Resources, the objectives to be modified as per the suggestions of the previous RAC and the consent of the CO be obtained.
- With regard to the project PIG-06005SI, Molecular characterization of Mulberry Genetic Resources for identification of the duplicates and effective utilization, the committee approved the midterm corrections made to the project based on the recommendations of the previous RAC and the revised referees comments. However, change of title was not recommended.

**[Action: All concerned scientists]**

## **ITEM NO. III: REVIEW OF THE CONCLUDED COLLABORATIVE RESEARCH PROJECT**

The collaborative project, PIB-3505, Development of drought tolerant mulberry variety for rain fed sericulture was reviewed by the committee and the following suggestions were made.

The Committee advised to collect the relevant information on the project from the host institute for further germplasm characterization. Publications from the project should come out with co-authorship of CSGRC scientist. The Committee observed that the budget utilization is inadequate and realistic budget should be projected while proposing new projects. Outcome of the project and its utilization should be clearly spelt out in future presentations.

**[Action: Dr. G. Thanavendan, Sc-C]**

#### **ITEM NO. IV REVIEW OF PROGRESS OF THE ON-GOING RESEARCH PROJECTS**

The ongoing project, **PIE06001 SI, Collection, Characterization, Evaluation, Conservation and Supply of Mulberry Genetic Resources (IX phase - 2018-2021)** was reviewed by the house and the following suggestions were made.

- The source of germplasm collection (primary or secondary) to be indicated, confirm the mulberry species collected from the exploration, ensure back up of collection at the host institute and also at NBPGR through cryopreservation to safeguard the precious germplasm material from the unpredicted climate changes.
- The unique mulberry germplasm should be identified and registered with NBPGR through online for protection of germplasm. Accessions that have tolerance to new insect pests and diseases should be identified and collection of *M. notabilis* species may be tried through NBPGR as well as through ISC platform.
- New germplasm material being collected needs to be compared with the check variety for assessing yield/growth parameters. Further, as requested by the investigator, the house recommended for a Project Assistant to execute the works under the project *viz.* collection and computation of data, *etc.*, for which CSGRC may seek the approval of CO.
- The future explorations for germplasm collection to be planned well in advance and NBPGR to be informed well in advance so that joint exploratory trips can be taken up. Dr. Anitha Kodaru, Member RAC to be informed too.
- For registration and management of genetic resources of mulberry it is proposed to have training at ICAR-IIHR in the month of February 2021.
- While, collecting the germplasm material, the geo-coordinates of the place of collection shall be recorded.

**[Action: Dr. G. Thanavendan, Scientist-C]**

The ongoing project **PIG 06004 SI, Studies on cytological status of mulberry genetic resources** was reviewed and the house suggested to use R-10 macerozyme or cellulase to improve protocol for different genotypes.

In order to enhance the estimation, the time of harvest of leaf and stage of root tips should also be taken into account and the literature pertaining to the selection of chemicals for staining and fixation can be reviewed. Earlier researcher Dr. Haradhan Sau's protocol may be used for chromosome preparation and paid software may be used for karyotype analysis. Cluster/PCA result of 200 core accession should be published in high impact factor journal.

**[Action: Shri. Raju Mondal, Scientist –B]**

**PIG 06005 SI- Molecular characterization of mulberry genetic resources for the identification of duplicates and effective utilization.**

- The morphological characters considered for study should be increased for reaffirmation of the duplicates identified. Principal Component Analysis should be carried out for probable duplicates identification.
- DNA barcoding of different *Morus* sp. represented in the accessions maintained by CSGRC should be conducted to discriminate at species level. Subsequent identification of duplicates within species can be done using SSR markers. The WGS of *Morus indica* may be taken up after confirmation with other institutes involved in CSB-DBT network project.

**[Action: Dr. M.C. Thriveni, Scientist-B]**

**PIT 08004 MI: Study on epigenetic and autophagy modifiers on induction of haploid microspore embryogenesis in mulberry**

- The basis for selection of mulberry accessions for tissue culture study needs to be given in future presentations and M5 may be replaced with other mulberry variety.

**[Action: Shri. Raju Mondal, Scientist -B]**

**AIE 06002 MI- Evaluation of bivoltine silkworm genetic resources for tolerance to abiotic stress in selected hotspots.**

- The molecular markers association with the specific traits needs to be studied and the final association of the markers with thermo-tolerance may be analyzed from the outcome of trial rearing.
- Relative humidity values in the rearing facilities to be recorded and included while presenting the rearing performance of the silkworm accessions at selected hotspots.
- As the performance of the summer and autumn rearing was very poor under RSRS, Jammu, one more trial can be taken up in consultation with the test centre. If necessary, the investigator from CSGRC may visit the test centre to monitor the trials.
- The recorded data to be subjected to appropriate statistical analysis. Fecundity data may be excluded from the evaluation factors since layings were provided by CSGRC, Hosur.

**[Action: Dr. M. Maheswari, Scientist -D]**

**AIE-06003 SI: Evaluation of silkworm genetic resources of *Bombyx mori* with reference to inbreeding depression and their conservation.**

- Statistician to be consulted to ascertain the biometric analysis method utilized for calculating inbreeding depression. The time period for evaluation of inbreeding depression can be divided and carried out phase wise for better evaluation. The available data should be used to estimate inbreeding depression by dividing the period of germplasm maintenance into convenient time periods.
- As requested by the investigator, house agreed for providing a project assistant to assist in the project works viz. data recording, analysis etc.

[Action: Dr. C.M. Kishor Kumar, Scientist -D]

**The project AIT-06006 MI, Marker-assisted screening to identify silkworm genetic resources tolerant to *BmNPV* and *BmBDV*** was approved by CO during November, 2020 and after thorough discussion, the house ratified the project proposal with the following suggestion.

- Markers linked to *BmNPV* tolerance may be reviewed and the possibility of developing SCAR markers can be explored. The base level expression of different transcripts can also be assessed using qRT-PCR to understand the natural variation in expression profiles of selected transcripts across different silkworm genotypes.

[Action: Dr. Ritwika Sur Chaudhuri, Scientist-C]

Later, the project proposal on **Molecular characterization and assessment of genetic diversity in silkworm (*Bombyx mori*) germplasm**, which was discussed and approved by the previous RAC was reviewed once again and the following decisions were taken.

- The genome analysis of silkworm races, PM and Nistari and also the ddRAD sequencing may be outsourced to a reputed company through e-tendering/GeM portal. Collaborative works proposed with UAS Bangalore may be relooked as the sequencing activities can be outsourced and the analysis can be done in collaboration with the sequencing firm. Further, options like collaborating with National Genomics Core at CDFD, Hyderabad can be considered. National Genomics Core has been established by the Department of Biotechnology, Govt of India to provide high end genomic solutions and as a full-service provider for the research needs of academic institutes and industry.
- The work plan and budget may be revised in consultation with SBRL, Kodathi. House also advised to propose Research fellow (RA) with strong background of bioinformatics for the project along with a JRF. The work plan under the project may be sent to Dr. Modhumita Dasgupta, Member RAC for discussion and needful suggestions. House further suggested to utilize the service of the experts in the area of bioinformatics and genome analysis on consultancy, as approved by the core committee of CSB Directors, if required for the project.
- The revised proposal may be submitted to CO by latest by 20<sup>th</sup> February, 2021.

[Action: Dr. G. Lokesh, Scientist-D]

House suggested to propose a new research project on the screening of silkworm germplasm for microsporidia tolerance/resistance and developing microsporidia refractory silkworm genotype in collaboration with SBRL, CSB, Kodathi.

[Action: Dr. G. Ravikumar, Scientist-D]

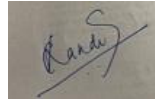
#### ITEM NO. VIII: ANY OTHER POINTS WITH THE PERMISSION OF THE CHAIR

- Name of the Institute to which the germplasm was supplied to be mentioned along with year of supply.
- Website needs to be upgraded and made more user-friendly.
- Proposal for supply of fruit yielding mulberry varieties to the farmers and pricing of germplasm can be placed before Germplasm Committee and all the germplasm material supply be done along with MTA and feedback form.
- Year-wise break-up of collection of mulberry and silkworm accessions should be presented. Publication details should feature in Presentation of Overview of CSGRC, Hosur.
- Dr. R.K. Mishra, Director (Tech.) assured the posting of technical assistants at CSGRC, Hosur in the next financial year.
- If the involvement of scientists in projects is rationalized, then project assistants will be provided for such projects based on requirement.
- With regard to low budget utilisation especially in the project coded “AIE-06002-MI **Evaluation of bivoltine silkworm genetic resources .....in selected hotspots**” and “AIE-06003 SI **Evaluation of silkworm genetic resources ..... and their conservation**, house advised to re-estimate the budget requirement for the remaining period and submit the revised proposal to CO for consideration.
- Dr. P.E. Rajasekharan, RAC Member appreciated the efforts of Director, CSGRC, Hosur for conducting the meeting. He urged for more visibility of the centre.
- Dr. Manjunath Gowda, RAC member suggested that heritability, genetic advance and genetic variability studies be taken up in the centre. He also opined that publications are to be made in journals with TR impact factor instead of NAAS-rating.
- Dr. Ravindra Singh, RAC member, suggested taking up projects on hibernation schedules in collaboration with SSTL, Kodathi, Bengaluru.
- Dr. Modhumita Dasgupta, RAC member expressed that there is improvement in presentations. However, emphasis should be laid on subjecting the data to appropriate statistical analysis in order to make the data more relevant.
- Dr. Anitha Kodaru, RAC member congratulated all officers and staff of CSGRC, Hosur for their contributions to the centre. Budget utilization to be kept in mind while executing research projects. MGIS needs to be updated and website upgradation is more important to gain more visibility. Publications on unique germplasm material are essential before

attempting germplasm registration process at NBPGR. The number of cryopreserved material may be updated in the database.

Dr. Chandish R. Ballal, Chairperson thanked one and all for their whole-hearted participation and expressing their views in the meeting. She reiterated that the centre's visibility should improve through publications and participation in national and international conferences.

The meeting concluded with a vote of thanks offered by Dr. Jameela Khatoon, Scientist-D, Reeling Section, CSGRC, Hosur.



**CHAIRPERSON  
RESEARCH ADVISORY COMMITTEE  
CSGRC, HOSUR**

**Date: 30.01.2021**

**List of participants in the 40<sup>th</sup> Meeting of Research Advisory Committee held on 15.01.2021**

1. **Dr. Chandish R. Ballal**, Former Director, NBAIR, Bengaluru, **Chairperson, RAC**.
2. Dr. Anitha Kodaru, Principal Scientist, NBPGR, Hyderabad, Member RAC.
3. Dr. P.E. Rajasekharan, Principal Scientist, ICAR-IIHR, Bengaluru, Member RAC.
4. Dr. Manjunath Gowda, Professor, UAS, GKVK, Bengaluru, Member RAC.
5. Dr. Ravindra Singh, Scientist-D (Rtd), Central Silk Board, Member RAC.
6. Dr. Modhumita Dasgupta, Scientist-G, ICFRE, Coimbatore, Member RAC
7. Dr. R.K. Mishra, Director (Tech), CSB, Bengaluru, Member RAC
8. Dr. K.Sathyannarayana, Scientist-D, RCS, CSB, Bengaluru- Member RAC
9. Dr. B.T. Sreenivasa, Director, CSGRC, Hosur, **Member Convener RAC**
10. Dr. C.M. Kishor Kumar, Scientist-D & Head, Silkworm Division, CSGRC, Hosur
11. Dr. M. Maheshwari, Scientist-D & Head, PMCE Division, CSGRC, Hosur
12. Dr. G. Ravikumar, Scientist-D & Head, Mulberry Division, CSGRC, Hosur
13. Dr. Jameela Khatoon, Scientist-D (R&S), CSGRC, Hosur
14. Smt. G. Punithavathy, Scientist-D, CSGRC, Hosur
15. Dr. G. Lokesh, Scientist-D, CSGRC, Hosur
16. Sh. Nazeer Ahmed Saheb, Scientist-D, RCS, CSB, Bengaluru
17. Dr. Ritwika Sur Chaudhuri, Scientist-C, CSGRC, Hosur
18. Dr. G. Thanavendan, Scientist-C, CSGRC, Hosur
19. Dr. K.Tulsi Naik, Scientist-C, SBRL, Kodathi, Central Silk Board
20. Dr. A. Ramesha, Scientist-C, SBRL, Kodathi, Central Silk Board
21. Dr. M.C. Thriveni, Scientist-B, CSGRC, Hosur
22. Shri. Raju Mondal, Scientist-B, CSGRC, Hosur
23. Smt. K. Gayathri, Asst. Director (A&A), CSGRC, Hosur
24. Shri. S. Sekar A.D (Comp), CSGRC, Hosur
25. Shri. R. Gopinath, Steno Gr. I, CSGRC, Hosur
26. Shri. Narendra Kumar, Assistant Librarian, CSGRC, Hosur
27. Shri. Vijaya Kumar, J.E, CSGRC, Hosur