Minutes of the 64th Research Council meeting held on 28.10.2020 and 29.10.2020 at CSRTI-Mysuru through webex platform

The 64th meeting of Research Council of CSRTI-Mysuru was held on 28th - 29th October 2020 through video conferencing mode on webex platform to review the new concept notes, concluded research projects and progress of on-going projects, TOT, Extension and Capacity building programmes of the Institute and nested units. The list of the participants is appended at **Annexure - I.**

Dr. N.Balachandran, Scientist-D welcomed Dr. Pankaj Tewary, Director and Chairperson of RC, divisional/sectional heads, heads of RSRSs and nested units, all the scientists and JRFs, SRFs, RAs of the main Institute and scientists of nested units got connected through webex for the RC meeting as it was maiden attempt to conduct the RC through video conferencing and it was requested to all concerned to follow the guidelines circulated earlier.

Director in his opening remarks informed that due to COVID-19 pandemic we could not do much progress for the period between April - June, 20 in respect of clusters and non captive areas resulted in reduction in intake of dfls consumption and cocoon yield and requested all the team of nested units to make concerted efforts to cover up the gap in production and productivity during the remaining period towards achieving the set targets.

I. Confirmation of the minutes of the 63rd meeting held on 12.12.2019 and 13.12.2019

The minutes of the 63rd meeting of RC were circulated to all the members, as no comments were received from any of the member, the minutes were confirmed.

II. Review of follow up action taken on decisions of previous meeting

A. *Development of productive mulberry hybrids with functional traits associated with WUE and NUE for obtaining optimized leaf yield - Dr. Gandhidoss Sci-D was advised to submit the revised concept note as per RCS suggestions for approval.*

As suggested by RCS, CO, Bengaluru, the revised concept note Development of mulberry autotetraploids from genotypes with functional traits associated with climate resilience for breeding programme was forwarded to RCS section on 12-06-2020. Decisions/Reply is awaited from RCS, CO, Bengaluru.

B. *Director advised to record success stories and video films on various aspects/approaches that make impact on the sericulturists and submit them to SEEM for compilation of Second book on Success stories.*

Sci-D and Head, SEEM division informed that success stories of 64 farmers across south zone have been compiled and editing of compilation is under progress for publication of Success Stories Vol-II book. Director advised to complete the works and submit the proof of the book by 15th December 2020.

(Action: Sci-D and Head SEEM division)

Review of progress on the decisions of new concepts/projects proposed in 63rd RC.

PMCE appraised the status of various concept notes approved by 63rd RC and noted the present status of the same.

As suggested by the 63rd RC the following four concept notes were revised as per the approval/suggestions of RCS section of CO, Bengaluru; referee's comments were obtained and after revision with incorporating referee's suggestions submitted to RCS, CO, Bengaluru for coding. These were approved and coded recently.

1. *Development of package of practices for tree mulberry under protective irrigation-by Dr.Dhaneswar Padhan, Sci-B, Agronomy section* (PPA 01016 SI)

2. *Studies on the economics of cocoon production in mulberry sericulture of South India- by Smt. Joycy Rani Dasari, Sci-C, SEEM division* (PPF 01017 SI)

3. *Effect of potassium mobilizing bacteria Frateuria aurentia on growth and development of mulberry - by Dr. N.Dhahira Beevi, Sci-D, RSRS, Salem* (PIN 01018 SI)

4. *Screening of drugs to inhibit the PI3K-AKT pathway in Bombyx mori for controlling Nuclear polyhedrosis virus infection-by Dr.G.Mallikarjun Sci-C, SW pathology section* (AIT 01019 SI).

Similarly as per the RCS suggestions the two concept notes were merged and the revised concept note was submitted to C.O. on 13-06-20 for approval. Decisions/Reply is awaited from RCS, CO, Bengaluru.

1. *Mulberry cocoon price forecasting using machine learning techniques- Dr.Amit Saha, Sci-B, SEEM Division.*
2. *Development of hybrid model to forecast the raw silk production- Dr.Amit Saha, Sci-B SEEM Division*

The following three concept notes by Shri. M.N.Chandrashekar Sci-D which were approved in the 63rd RC were referred to CSTRI, Bengaluru by RCS section, CO, Bengaluru for further decisions but so far no reply has been received. Director advised to send a reminder to know the status of the projects.

1. *Improvement of competitiveness of multi end reeling machines.*
2. *Artificial Intelligence in raw silk testing and grading*
3. *Air jet in silk reeling*

The final project after revision along with referee's comments and consent letters from Industrial partners have already been submitted for coding on 27-07-20 in respect of the following two projects by Shri. S.M.Hukkeri Sci-D, SED section. Decisions awaited from RCS CO, Bengaluru.

1. *Improvement of existing machines/ technologies for drudgery reduction in sericulture.*
2. *Development of multi-sensor system for gender identification and separation of sex in cocoons through integrated Artificial Intelligence.*

With regard to the concept note on '*Developing silkworm rearing house models suitable for all seasons'* by Shri. S.M.Hukkeri, Sci-D SED division a detailed report on various rearing houses and their economics from Andhra Pradesh, Telangana Tamil Nadu and Maharashtra was compiled and submitted on 29.02.2020 for inclusion in the project proposed to be collaboration with CBRI, Roorkie. Present status of the project is yet to be received from RCS,CO, Bengaluru.

Irrigation water requirement for mulberry crop to amend prevailing recommendations [weather based (crop coefficient) approach] by Dr. Rajaram S., Sci-D, REC, Samayanallur

As per CO suggestions a committee has been formed vide office note dated 09-03-20 incorporating Scientists from all the three RSRSs viz., Ananthapur, Kodathi and Salem and also scientist from Agronomy, RTI and Reeling section along with Dr. S.Rajaram REC, Samayanallur to discuss and submit a compréhensive project to work out water requirement to produce one kg of mulberry leaf, cocoons and raw silk besides addressing the objectives of the concept note under different soil and climatic conditions at the earliest but due to COVID-19 restrictions the committee could not make any progress on this aspect. Director advised the scientists concerned to attend to the work immediately through video conference mode on webex platform and submit the project document at the earliest.

(Action : All the Scientists concerned)

Review of on going projects

AIT-3628: Assessment of SNP variation in silkworm (Bombyx mori L) by Genotyping by Sequencing and genome-wide association mapping of important commercial traits. (Funded by DBT)-Networking project with RVCE, Bangalore

Decision: It was informed that PMCE is not aware of the extension of the project by DBT. Director advised Dr. S. Manthiramoorthy Sci-D to forward copy of the correspondences to DBT and extension letter received from DBT, New Delhi to PMCE for reference and records.

(Action: Dr. S. Manthira Moorthy Sci-D, BBL)

Any other points:

The website of CSRTI, Mysuru to include the works of nested units like RSRSs, SSBS, Coonoor and P4 BSF Hassan in brief.

The details were received only from SSBS, Coonoor and P4 BSF, Hassan and updated in the website. Director advised all the RSRSs/ RECs to provide inputs/ details for uploading in the Institute website by 30th November 2020.

(Action: Heads of RSRSs and DD Computer)

III. Review of new concepts/projects proposals.

As per agenda, the review of concept notes was taken up. PIs presented the concept notes and the project wise decisions taken by the committee are as follows:

1. *Bio and phytoremediation of Chlorantraniliprole contamination in mulberry garden due to its sprays in previously cultivated crops and its impact on silkworm rearing.*

Decision: The committee **approved** the concept note, with a suggestion to cover the major groups of insecticides and chemicals, since it is a serious field problem faced by new farmers who have shifted cultivation from vegetable crops to Mulberry cultivation. Further as suggested by CO on the concept note presented in 62nd RC, survey works were also conducted by RSRS, Salem. The revised concept to include the concept of Dr. Bhuvaneswari (Sl. No. 22) on non spinning syndrome also. Revised concept note may be submitted immediately.

(Action: Dr. N. Sakthivel Sci-D, RSRS, Salem and Dr.E. Bhuvaneswari Sci-C, SW Physiology)

2.*Development and popularization of an innovative inorganic and eco-user friendly disinfectant for washing and sterilization of Bombyx mori L. loose eggs.*

Decision: The committee did **not approved** the concept note, it was felt that the product can be validated through pilot study initially, based on the outcome and feedback from grainages, the technology could be popularised.

(Action: Dr. K. P. Kiran Kumar Sci-D, RSRS, Ananthapur)

3.*Development and popularization of broad spectrum, highly effective, eco- user friendly and cost effective bed disinfectant for the containment of various diseases of Bombyx mori L.*

Decision: The committee did **not approved** the concept note, as it is not the mandate of RSRSs.

(Action: Dr. K. P. Kiran Kumar Sci-D, RSRS, Ananthapur)

4.*Empowerment of vocational stream students for employment and entrepreneurship.*

Decision: The committee **approved** the concept note for taking up the proposal after thorough revision of concept note in consultation with CBT division of CSB. The matter was also discussed with Dr. Siddique Sci-D, CBT CO, CSB who was present on fag end of second day of RC on 29.10.2020.

(Action: Shri. B. Mohan Sci-D, SSBS,Coonoor)

5.*Identification of mortality factors of bivoltine silkworm pupa and measures to contain*.

Decision: The committee did **not approved** the concept note as the PI has not submitted the detailed proposal as per RMIS-01 format with full budget break up.

(Action: Dr. M.Venkatachalapathy Sci-D, RSRS, Kodathi)

6.*Evaluation of safety period of agrochemicals to mulberry silkworm / bioassay of agrochemicals to mulberry silkworms.*

Decision: The committee observed that, the concept needs revision, methodology needs standardization and revision, concept note was not submitted as per RMIS-01 format with head wise budget break up.

(Action: Shri. Satish B. Kulkarni Sci-D, RSRS, Kodathi)

7. *Adoption of improved sericulture technologies and their impact on the farmers of Ramanagaram mega cluster.*

Decision: The committee did **not approved** the proposal as similar kind of projects was undertaken already. Further concept note was not submitted as per RMIS-01 format with full budget break up.

(Action: Smt. P.Saraswathy Sci-D, RSRS, Kodathi)

8. *Popularization of MSG2 mulberry variety in Koppal and Raichur districts of Karnataka*

Decision: The committee **approved** the concept note and advised that objectives may be clubbed to three. As it is field related issue focusing on the popularization of MSG-2 variety in the semi arid areas. The source of planting material for covering the command area needs to be assessed and clarified.

(Action: Dr. A.Umesh Sci-C, REC, Koppal)

9. *Identification of consistent poor sericulture performers vis a vis best performers to find out the reasons for failure and remedial measures to improve economy.*

Decision: The committee felt that the concept note needs **revision** and observed that the proposal was not submitted as per RMIS-01 format with head wise budget break up. Advised Sci-D, SEEM division to come out with a comprehensive proposal covering the concepts Sl.no.7, 10 (by RSRS, Kodathi and RSRS, Mulugu respectively) and also involving other RSRSs including the expertise of Economist and scientists with Social science background of the Institute.

(Action: Sci-D and Head SEEM, Dr. T.V.S. Srinivasa Rao Sci-D, REC Eluru, Sci-D and Head RSRS, Kodathi and Mulugu)

10. *Impact of capacity building training on socio economic aspects of sericulture farmers in Telangana state.*

Decision: The committee did **not approved** and observed that the concept note was not submitted in RMIS 01 format, without proper budget breakup and references.

(Action: Dr. K.Praveenkumar Sci-D, RSRS, Mulugu)

11. *Impact of pest and disease management practices in sericulture among the farmers under cluster promotion programme in Telengana.*

Decision: The committee did **not approved** the proposal as a similar study has been completed by Scientist of the Institute and the concept note was not submitted in RMIS 01, without proper budget breakup and references.

(Action: Dr. Vinod Kumar Yadav Sci-C, RSRS, Mulugu)

12. *Development of a simple kit for mulberry leaf quality assessment.*

Decision: The committee **approved** the concept note with an advice to include all the earlier works done at the Institute and the technique to be standardized and concept note may be revised and submitted.

(Action: Dr. Divya Singh Sci-B, Mul. Physiology)

13. *Impact of domestication of silkworm breeds on spinneret and silk quality parameters.*

Decision: The committee **approved** the proposal. Advised to take it up as pilot study and proposal may be submitted accordingly.

(Action: Shri. S.M. Hukkeri Sci-D, SED)

14. *Non Destructive Testing Instrument for identification of silk content in the fabric.*

Decision: The committee **approved** the proposal.

(Action: Shri. S.M. Hukkeri Sci-D,SED)

15. *Design and Development of 3-D fabric based mountages suitable for silk worm rearing.*

Decision: The committee **approved** the proposal. Advised to take it as pilot study and proposal may be submitted accordingly.

(Action: Shri. S.M. Hukkeri Sci-D, SED)

16. *Studies on chemical-free and water-less disinfestation for room/equipments of CRC/Late age rearing for sustainable Sericulture*

Decision: The committee **approved** the proposal with change in heading. Advised to take it as pilot study and proposal may be submitted accordingly.

(Action: Shri. S.M. Hukkeri Sci-D, SED)

17. *Development of a transfer-ready, ecofriendly management package for the broad mite on mulberry*

Decision: The committee **approved** the concept and advised that the title of the project could be changed as Development of an Integrated management package against broad mite, *Polyphagotarsonemus latus* in mulberry"

Objectives may be revised

1) To assess the occurrence of broad mite and its natural enemies in mulberry.
2) To evaluate various control measures under laboratory and field conditions against broad mite and to develop an integrated management package.

More references are to be included. Budget is on the higher side which may be reduced. Methodology does not speak about other control measures. The project should be an integrated package for the management of broad mite. *Hirsutella thompsonii* is already available in the market for the use of farmers. The cross infectivity of the pathogen on silkworm should be thoroughly assessed before taking up the study. Use of Sulphur 80%, other acaricides and their safety to silkworms may be ascertained. Assess the use of sprinklers/ rain guns which already exist in farmers' gardens.

(Action: Dr. S. Mahiba Helen Sci-D, PML)

18. *Identification of suitable stains and antibiotics for easy detection of Nosema bombycis spores during mother moth examination.*

Decision: The committee **approved** the concept subject to revision of concept note incorporating the works of Prasad *et al* (2000), use of pebrine visualization solution in the study. Methodology has to be elaborated. Organization of work elements to be added. Include preliminary works with more references.

(Action: Dr. P.C. Santha Sci-D, SW Pathology)

19. *Standardisation of cold reeling techniques for breeding purposes.*

Decision: The committee did **not approved** the proposal. Proper documentation of the studies already undertaken may be compiled and after its study it can be taken up as an experiment only, not in project mode.

(Action: Shri. M. N.Chandrashekar Sci-D, Reeling section)

20. *Primary Yield Evaluation of short-listed hybrids for development of disease resistant productive genotypes with special reference to root diseases under assured water and input conditions.*

Decision: The committee **approved** the concept. Title may be revised as "Evaluation of promising mulberry genotypes for higher yield and disease resistance with special reference to root diseases in Primary Yield Trial". Objectives to include: Identification of superior genotypes with higher leaf yield and resistance to root diseases and Identification of trait specific markers for isolating genotypes with resistance to root rot and root knot.

Relevance / Review of literature: Mortality rate due to root rot may be highlighted. In the proposal, mostly the loss of leaf yield was mentioned but did not mention about death of the plants which is having more drastic effect in current situation of wider spacing. Incorporate literature on host plant

features that helps for plant resistance for root diseases and new screening tools for isolating desired genotype in perennial crops.

Methodology: Reduce no. of biochemical parameters, include only highly relevant to root rot and root knot. May be focused more on PR proteins and salicylic acid only. Advanced molecular markers are to be included. Standard protocols are to be followed. Histological/ anatomical characters associated with resistance to root rot and root knot, particularly root anatomical characters may be included. As this work may also help to identify trait specific molecular markers, instead of using 22 test hybrids to identify SSR markers for disease resistance, use selected genotypes with differential disease reaction from the progenies of different crosses. Those trait specific SSR markers, if identified, can be used for screening 22 test hybrids. Screening technique using stem cuttings in water with inoculum and assessment of internal colonization may be studied for root rot screening and if it is correlated with pot experimental results, it can be used as rapid screening tool.

(Action: Dr. S. Gandhi Doss Sci-D, MBG section)

21. *Standardization of extraction and characterization of Phytol, a bioactive compound in the excrement and quantification of phytol from different silkworm breeds/ hybrids of Bombyx mori .L for the possible exploitation in biomedical application.*

Decision: The committee **approved** the concept. First pilot study may be undertaken with in two months. To work out the extraction of phytol *vis a vis* other sources and compare their economics. Flow chart and data to be checked and revised. Could be taken up under Seri by product working group meeting.

(Action: Dr. E.Bhuvaneswari Sci-C, SW Physiology)

22. *A study on the Physio biochemical changes in the Silkworm Bombyx mori, showing non spinning syndrome*

Decision: The committee a**pproved** the concept and the proposal may be clubbed with Sl. No. 1 (Dr.N.Sakthivel concept note) and could be pursued as a composite project.

(Action: Dr. E.Bhuvaneswari Sci-C, SW Physiology)

23. *Preparation and characterization of mulberry and non-mulberry silkworm sericin beads for targeted drug delivery.*

Decision: The committee did **not approved** the concept as it is not new. Elaboration was on non-mulberry.

(Action: Dr. Mallikarjuna G Sci-C, SW Pathology)

24. *Whole Genome resequencing of elite and unique silkworm genotypes of India*

Decision: The committee **approved** the concept note. It was observed that, most of the roles assigned to CIs are of repetitive nature. The proposed lab under the PIC 01003 CN to be utilized for some of the studies. Final concept note may be submitted as suggested in the RMIS-01 format incorporating suggestions of RC.

(Action: Dr. Kusuma L Sci-C, BBL)

25. *Identification and development of β-sheet rich bivoltine silkworm breeds/hybrids by inducers.*

Decision: The committee **approved** the concept note. It was observed that with one PI and four CIs, an additional SRF is proposed. Advised for inclusion of Dr. K.N.Madhusudhan only for spectroscopy analysis is not justified. Justify the role of project coordinator. The proposed lab under

the PIC 01003 CN to be utilized for some of the studies. Final concept note may be submitted as suggested in the RMIS-01 format incorporating suggestions of RC.

(Action: Dr. Satish L. Sci-C, BBL)

26. *Development of productive auto sexing silkworm breeds/hybrids of Bombyx mori L and separation of male silkworm population(eggs)for commercial exploitation by optical sorting method.*

Decision: The committee **approved** the concept**.** Final concept note may be submitted in the RMIS-01 format after incorporating references listing.

(Action: Dr. S.Manthirmoorthy Sci-D, BBL)

27. *Development of Project Management Database of CSRTI, Mysuru*

Decision: The committee **approved** the concept**.** Final concept note in the RMIS-01 format may be submitted including relevant references.

(Action: Dr. Amit Saha Sci-B, SEEM)

28. *Studies on fecundity enhancement by application of natural stimulants during oviposition in silk moth Bombyx mori L.*

Decision: The committee did **not approved** the concept note and felt that it could be taken up as pilot study.

Action: Dr. R.Bhagya Sci-D, TVDC)

IV. Review of concluded projects

1.PIE 3511: Development of Distinctiveness, Uniformity and Stability guidelines for Mulberry (Morus spp.) and their validation (Phase II)

Decision: Smt. Bhavya presented the concluded project. Director advised the PI to complete the registration of other five mulberry varieties developed by this institute with PPV & FRA on priority before 15th November 2020.

(Action: Smt. Bhavya M. R., Sci-B, Mol.Bio. Lab.- I)

2. AIB 3537: Improvement of silkworm breeding in India and Bulgaria

Decision: Dr. Manthiramoorthy presented the concluded project report. Chairman advised the PI to submit the concluded report in the RMIS-10 format by 30th November 2020 with statistically analysed data of the season wise performance of the breeds/hybrids evaluated.

(Action: Dr. S.Manthiramoorthy Sci-D, BBL)

3. AIB 01 001 MI: Evaluation of Cauvery Gold (MV1 x S8): An improved cross breed for cocoon productivity and silk quality

Decision: Dr. Chandrashekar presented the concluded project report. Director advised the PI to submit the concluded report in RMIS-10 format by 15th November 2020 incorporating the all the suggestions of XXII HAC meeting with season/region wise statistically analysed data.

(Action: Dr. K.B.Chandrashekar, Sci-D, MBL)

4. AIB 01002 MI: Evaluation of S8 x CSR16, a new bivoltine silkworm hybrid under authorization trials among the farmers South India

Decision: Dr. Meenal presented the concluded project report. Committee advised the PI to submit the concluded report in RMIS-10 format by 15th November 2020 incorporating all the suggestions of XXII HAC meeting with season/region wise statistically analysed data.

(Action: Dr. R.Meenal, Sci-D, BBL)

5. AIB 3596: Development of multi-viral disease tolerant (NPV, IFV and DNV) bivoltine silkworm breeds/hybrids of Bombyx mori L. through marker-assisted selection

Decision: Dr. Satish presented the outcome of the concluded project. Two bivoltine hybrids namely RDIN1 and RDIN2 have been developed for multi-viral diseases tolerance using Marker Assisted Selection. The performance of the breeds is evaluated under OST with RSRSs Kodathi, Chamarajanagara, Salem and Ananthapur.

Chairman observed that the one objective was missing in the presentation and advised the PI not to modify the approved project details and informed to submit the RMIS-10 at the earliest including all three objectives proposed in the project and also advised to present the progress in RAC as per approved project. Also advised to complete OSTs as committed/ proposed in the project.

(Action: Dr. Satish L. Sci-C, BBL)

6. AIT 3593: Transcriptome analysis of silkworm for identification of molecular markers for improvement of silk quality

Decision: Dr. Kusuma presented the concluded project and informed that two molecular markers Mannosidase and Ubiquitin are identified for silk quality which could be used for development of qualitatively superior silkworm breeds/hybrids through MAS.

Director advised to submit the RMIS-10 immediately indicating the proper reasons for the delay. Also it was suggested that the onus lies with the PI of the Project to follow the decisions taken (44th RAC) with proper documentation and in obtaining concurrence/endorsement from RCS, CO, Bengaluru in time through PMCE.

(Action: Dr. Kusuma L. Sci-C, BBL)

V. Review of ongoing projects

1. PIN 3563. Evaluation of improved mulberry genotypes for yield potential, nutrient uptake and use efficiency under varied cultivation practices.

Decision: Dr. C.M. Babu presented the progress and informed that in I year five crops and in II year two crops were harvested. Leaf NPK analysis and nitrogen uptake study was carried out. Bioassay conducted and biochemical parameters pertaining to the silkworm also completed during second year and committee advised to present detailed bioassay data.

(Action: Dr. Dhaneshwar Padhan, Sci-B, Agronomy)

2. PIC 3615: Mapping QTLs for Alkalinity tolerance in Mulberry (Morus spp.)

Decision: Smt. Bhavya presented the progress and informed that crosses between MR-2 × V-1 and Sahana × V-1 at PDG and demonstration plot were attempted, collected the ripened fruits after the crossing and the seeds were extracted. A total of 130 seedlings raised from the crosses MR2 × V1 (30) and Sahana × V1 (100) and maintained in the glasshouse conditions. A total of 40 contrasting germplasm accessions for alkalinity stress are maintained in nursery. The project period was extended by CO on request of PI upto December 2021. Action to be taken is clubbed with IX general comments.

(Action: Smt. Bhavya, M. R, Sci-B, Mol.biology)

3. PIC 3620: Engineering photosynthesis in mulberry for resilience to climate change: A C4 approach

Decision: Dr. Tanmoy Sarkar presented the progress. The committee advised to standardise the protocol shoot bud induction from leaf explants of V1 mulberry. If extension of the project period is required the proposal may be sent before three months of completion of the project with proper justifications as suggested in the review meeting by MS, CSB, Bengaluru on 25-09-20.

(Action: Dr. Tanmoy Sarkar, Sci-C, MBG)

4. PIB 3631:Primary Yield Evaluation for identification of superior mulberry hybrids with drought adaptive traits under sub-optimal irrigated condition

Decision: Dr. Tanmoy Sarkar presented the progress and informed that II crop data has been recorded and analysis revealed that out of 21 test genotypes, D57 showed higher leaf yield, above ground biomass, total shoot length than the check varieties (Vishala, RC1, AGB8) under sub-optimal irrigated conditions. Similarly D67 showed higher leaf yield, above ground biomass, total shoot length than check varieties (Vishala, G4, V1) under optimal irrigated conditions. Five polymorphic SSR markers showed genetic relatedness among the genotypes tested. Action to be taken is clubbed with IX general comments.

(Action: Dr. Tanmoy Sarkar, Sci-C, MBG)

5.PIB 3632:Evaluation of superior triploid genotypes for yield and adaptability under varied agro-climatic conditions of South India

Decision: Dr. Gandhi Doss presented the progress that I year first crop was harvested and data on the growth and yield attributes were recorded also incidence of major foliar diseases and root diseases including pest incidences were recorded in all the three centres. Committee suggested to check the ploidy level of the test varieties and also to present consolidated budget utilization figures of all the centres.

(Action: Dr. S.Gandhi Doss, Sci-D, MBG)

6. PIB 3633:Development of highly productive and widely adapted mulberry hybrids using exotic and wild germplasm

Decision:Dr. Aruna Kumar presented the progress and informed Nine different hybrids were generated and collected seeds from the two OPH. 930 F1 hybrid seedlings were developed and transplanted in main field. Maintained the F1 hybrids under glasshouse as well as in the open field conditions. Recorded the data on growth and yield attributes of the hybrids in the field. Nursery raised with cuttings of F1 hybrid to undertake the study of rooting ability. Action to be taken is clubbed with IX general comments.

(Action: Dr. G.S.Aruna Kumar, Sci-C, Mol. Biol Lab-I)

7a. PIC 01003 CN : NW2a - Validation of a high density SNP genotyping for QTL discovery by association mapping and biparental analysis in mulberry

Decision: Dr. Gnanesh presented the progress and emphasized the need for purchase of proposed equipments to establish the KASP-SNP genotyping facility at CSRTI, Mysuru to complete the project works as per milestones**.** Committee advised the scientist group working in Mol. Biology Lab-I to constantly coordinate with the stores section and ensure that the equipments are procured in time and project works are completed as per schedule.

(Action: Dr. B.N.Gnanesh, Ramanujan Fellow, Dr. Aruna Kumar and Smt. M.R. Bhavya Mol. Biol Lab.-I)

7b. PIC 01003 CN :NW2b - Discovery of QTL to drought adaptive traits by association mapping in Mulberry

Decision: Dr. Gayathri presented the progress and informed that that during the period saplings of diverse mulberry germplasm accessions were transplanted in cement structures (root structures) in augmented design along with check varieties (V1 and G4) for recording of phenotypic observations of drought adaptive traits in the first season. Supplied another set of saplings of diverse germplasm accessions to UAS, Bangalore for undertaking phenotyping study simultaneously in both locations. Phenotyping observations for drought adaptive traits and water use efficiency (WUE) were recorded in 204 genotypes. Growth parameters and root traits were recorded in 204 genotypes established in root structures. 2nd set of saplings of diverse germplasm accessions were raised in nursery for undertaking phenotyping study in next season. Action to be taken is clubbed with IX general comments.

(Action:Dr. Gayathri T, Sci-C, Mul. Physiology)

7c. PIC01003CN (NW2c) Identification of QTLs for yield associated traits in mulberry

Decision: Smt. Bhavya informed that the experimental garden was established with 231 genotypes with 5 replication under ARBD design. Harvested the first crop for the first year and data on growth and yield attributes were recorded. Action to be taken is clubbed with IX general comments.

(Action: Smt. Bhavya M.R. Sci-B, Mol. Biol. Lab-I)

7d. PIC01003CN (NW2d) Identification of QTLs for Nutrient Use Efficiency

Decision: Dr. Ravindra presented the progress and informed that estimation of nitrogen content for evaluation of nitrogen use efficiency of the genotypes is under progress. For evaluating phosphorus and sulphur use efficiency, saplings of diverse mulberry genetic resources were raised in the nursery. Action to be taken is clubbed with IX general comments.

(Action: Dr. V.Sobhana Sci-C, SSC)

7e.PIC 01003 CN : (NW2e)-Sustaining Mulberry Yield: Identification of QTLs conferring resistance to Root Rot Disease by Linkage Mapping and Trait Introgression

Decision: Dr. Aruna Kumar appraised that as per the project works, developed three mapping populations from the crosses *M. multicaulis* (ME-0168) x (S) Thailand Male, *M. multicaulis* (ME-0006) x (S) Thailand Male and Panjab local x Cathayana and were maintained in the field. Isolated, identified and mass multiplied the fungal pathogens (*Fusarium solani* and *Lasiodiplodia theobromae*). Saplings were raised from the selected cross *M. multicaulis* (ME-0168) x (S) Thailand Male (200 progeny) and transplanted to earthen pots under glasshouse condition and completed the phenotypic evaluation. Also evaluated segregating F1 progeny for root rot disease resistance. Action to be taken is clubbed with IX general comments.

(Action: Dr. Arunakumar G.S. Sci-C, Mol. Biol. Lab-I)

7f. PIC 01003 CN: (NW3b)-Development of new generation transgenic mulberry for drought stress tolerance and characterization of existing transgenic mulberry for confined field trials

Decision: Dr Tanmoy Sarkar presented the progress made in the project that putative transformed mulberry plantlets have been developed. A proposal for confined field trials/ event evaluation of SHN1 transgenic mulberry lines has been prepared as per milestones. The committee advised to initiate the IBSC formalities simultaneously as it will take time.

(Action: Dr. Tanmoy Sarkar, Sci-C, MBG)

7g.PIC 01003 CN :(NW4a)-Comparative quantitative and qualitative analysis of secondary metabolites for identification of biomarkers responsible for feed quality in mulberry

Decision: Dr. Gayathri informed that primary metabolites (carbohydrates, proteins, amino acids, tocopherols and ascorbic acids) were estimated in ten mulberry genotypes. Secondary metabolites extraction methods were standardized with three mulberry varieties (V1, G4 and G2). Action to be taken is clubbed with IX general comments.

(Action: Dr. Gayathri T. Sci -C, Mul. Physiology)

8.AIT 3628: Assessment of SNP Variation in Silkworm (Bombyx mori L) by Genotyping by Sequencing and genome-wide association mapping of important commercial traits. (Funded by DBT)- Networking project with RVCE, Bangalore

Decision: Dr. Manthiramoorthy appraised that 100 silkworm samples have been sent for NGS (outsourced for genotyping by sequencing) and awaiting results. Delay in getting approval for genotyping through outsourcing has hampered the progress of the project works as per mile stones. Hence extension of project period from DBT was requested. Director advised to forward related correspondences to PMCE for records.

(Action: Dr. S.Manthira Moorthy Sci-D, BBL)

9. AIB 01 009 MI: Evaluation of new bivoltine silkworm double hybrid TT21 X TT56 at farmers level for authorization and commercial exploitation

Decision: Dr. Manthiramoorthy appraised the progress of 1st cycle of P2 rearing conducted and 900 layings of P1 prepared and kept in hibernation schedule and 2nd cycle of parental and P1 rearing is completed, P1 and hybrid dfls are under preparation. Also P1 (TT21 -200 dfls and TT56-200 dfls) rearing is conducted by ASR of SSPC, Ramanagaram during Sept-Oct and crop is completed. 3000 dfls of TT21 x TT56 were supplied to Uttarakhand for autumn crop and crop is just completed. 1200 dfls were also supplied to farmers of Southern India. Data collection is under progress. 3rd cycle of parental rearing is initiated. Action to be taken is clubbed with IX general comments.

(Action:Dr. S.Manthira Moorthy Sci-D, BBL)

10.PIC 01007 SI: Development of protocol for production of medically fit silk (cocoon, sericin, fibroin) for clinical purposes

Decision: Dr. Ravindra PI of the project presented the progress. A rearing was conducted using leaf from the existing organic mulberry garden. Analysis of midgut, silk gland, and cocoon sample for heavy metal contents showed that Cd, As, Hg, Pb are within the permissible limit. A new organic garden has been established in 0.5 acre with V1 mulberry with (5+3) x 2 feet spacing is under establishment. Initial soil samples were tested for its fertility status and heavy metal contents. Phytoremediation with mustard crop (three times) carried out for removal of toxic elements from the soil. After phytoremediation, the soil samples were analyzed for nutrient status and heavy metal contents. All inputs like FYM, neem cake and water were analyzed for heavy metals. Nutrient solutions were standardized to undertake hydroponic and sand culture experiment. A prototype of hydroponic experiment has been installed with mulberry saplings. Process for erection of ventilated tunnel type polyhouse is under progress. Action to be taken is clubbed with IX general comments.

(Action: Dr. Ravindra. Sci-C, SSC)

11.PIC 01008 SI: Isolation, characterization of chitin/chitosan from silkworm pupal exuviae/spent pupae and its commercial exploitation

Decision: Dr. Madhusudhan presented the progress that different chemicals were tried as deproteinizing and demineralising agents for pupal exuviae and spent pupae. Among the different

chemicals, three deproteinizing and one demineralising chemicals have shown promising results in chitin extraction. Different concentration of short listed deproteinizing chemicals were used for extraction of chitin from pupal exuviae.
The deproteinizing and demineralising microbes (bacteria) were isolated from different sources. The microbial extraction of chitin was initiated in the project. Director advised to focus the progress as per the project document and not to deviate. Action to be taken is clubbed with IX general comments.

(Action: Dr. K.N.Madhusudhan Sci-D, SW Biotechnology Lab.)

12.AIB 01004 MI: Development of multivoltine breeds with improved silk quality utilizing indigenous and exotic bivoltine breeds

Decision: Dr. Chandrashekar appraised the committee that the, RNA samples were analysed for expression of diapause and non-diapause genes from the dfls generated from rearing. 12 RNA samples of the parental breeds and developed lines were analysed for the new primers designed for diapause and non-diapause genes. Based on the expressions of non-hibernating genes, those dfls were taken forward for further rearing. cDNA templates (samples) were preserved at SBRL for further analysis and authentication. Action to be taken is clubbed with IX general comments.

(Action: Dr. K.B.Chandrashekar Sci-D, MBL)

13.AIB 01011 SI: Development of Multivoltine foundation crosses for productivity and high silk percentage

Decision: Smt. Soudaminy PI of the project presented the progress that 12 best performing multivoltine parental breeds were identified to prepare multivoltine foundation crosses. Action to be taken is clubbed with IX general comments.

(Action: Smt. Soudaminy. P.V. Sci-D, MBL)

14.AIP 01006 SI: Identification of probiotic consortium to improve the productivity in mulberry silkworm, Bombyx mori.

Decision: Dr. Thirupathaiah presented the progress and informed that novel microbiological media was formulated for isolation of silkworm gut bacteria. Probiotic characteristics of silkworm midgut isolates were evaluated for their production enzymes, co-factors, metabolites, antimicrobial substances as well as their tolerance for different pH, temperatures and anaerobic conditions. Action to be taken is clubbed with IX general comments.

(Action: Dr. Y.Thirupathaiah Sci-C, SW Physiology)

15.ARP 01012 SI: Development of a knowledge base on the silkworm diseases and pests and their management

Decision: Dr. Mary Josepha Shery PI of the project informed that collection of published papers on silkworm diseases and pests and details of the projects conducted by various research institutes on silkworm diseases and its management is under progress. The disease survey data available with CSRTI was retrieved and arranged for analysis. Request sent to IMD Pune for the purchase of data of the weather data in selected clusters in south India. Director advised to present quantified data on the progress made with the project.

(Action: Dr. A.V.Mary Josepha Shery Sci-D, SW Pathology)

16.PRE 01005 CN: Demonstration and popularization of pheromone trap against silkworm uzi fly, Exorista bombycis

Decision: Dr. Mahiba Helen presented the progress. Demonstration trials have been conducted in Karnataka, Tamil Nadu and Andhra Pradesh covering 1300 farmers. Comparison of the performance of pheromone trap with uzi trap (yellow liquid)/sticky trap alone and the cocoon yield for Karnataka, Tamil Nadu revealed that there is significant difference between the pheromone trap compared to control. The committee advised to statistically analyse the results season wise and area wise and present the results as the percentage of infestation varies with season/area.

(Action: Dr. S. Mahiba Helen. Sci-D, PML)

17.PRE 01010 SI: Development of Integrated Pest Management (IPM) module for leaf roller Diaphania pulverulentalis (Lepidoptera: Pyralidae) in mulberry

Decision: Dr. Mahiba Helen the PI of the project appraised that laboratory mass production of *D. pulverulentalis* on mulberry leaf bouquet was standardized. Two insecticides Thiamethoxam 75% W/W SG and Emamectin Benzoate 3.0% + Thiamethoxam 12.0% WG were tested against *D. Pulverulentalis* third and fifth instar larvae and informed that the project is as per milestones. Action to be taken is clubbed with IX general comments.

(Action: Dr. S.Mahiba Helen. Sci-D, PML)

18.BPS 01013 CN : Utilization and diversification of silkworm pupae products for human and animal consumption and composting

Decision: Dr. Thirupathaiah informed that the project has just been initiated in the month of October-2020. Nutrient analysis in silkworm pupae is progressing. Director advised to complete the MOU signing with CIFRI, Barrackpore at the earliest and forward the same to CO. Also advised the coordinator and PI of the Project to regularly in touch with the counterparts to complete the project as per milestones as lot of expectations are there from the outcome of the project including commercialization of ALA.

(Action: Dr. S.Manthiramoorthy Sci-D and Dr. Y.Thirupathaiah Sci-C, SW Physiology)

VI. Trial of Technologies (OSTs/ OFTs)

The Scientists (PI) presented the progress made under their respective OSTs and OFTs and expressed concern that due to COVID-19 pandemic the trials could not be initiated as proposed with many of the nested units due to restrictions in movement.

OSTs

1.Validation of M-LAMP technology- Dr. Mallikarjun G.
2.Validation of chawki feed supplement formulation (CFSF) in RSRS/REC of Andhra Pradesh, Karnataka and Tamil Nadu- Dr. E.Bhuvaneswari
3.On station trials of newly developed multi-viral tolerant bivoltine hybrids-Dr. Satish L.
4.Evaluation of newly developed silkworm double hybrids-Dr. R.Meenal

OFTs

1.Evaluation of improved PM - 4 in the seed area farms of Department of Sericulture Govt of Karnataka and its cross breed (PM x CSR2) with the farmers- Dr. K.B. Chandrashekar
2.Evaluation of new productive bivoltine hybrid at farmer's level- Dr. S Manthiramoorthy
3.Evaluation of NPV tolerant bivoltine hybrid at farmer's level- Dr. S. Manthiramoorthy
4.Popularization of double hybrid - G11 x G19 - Dr. K.N.Madhusudhan

Decision: The committee noted the progress presented by individual PIs and advised to present the analysed data of trials along with control/primary data to have the clear impact of trial. The Chairman RC advised the PI scientists to put in extra efforts to complete the OSTs and OFTs as

proposed within the financial year. In the case of validation of M Lamp technology results should be presented in comparison with manual testing and highlighting the advantage/ efficacy of M-Lamp over manual examination.

(Action: All the concerned PIs)

VII. Extension (ECP) and other programmes

Shri. N.G.Selvaraju, Sci-D and Head SEEM division presented the progress of CPP and Extension communication programmes for the year 2020-21 and informed that as against the set target of 234. 89 lakhs dfls brushing we could achieve 88.60 lakhs dfls only (upto September 2020) with an achievement of 80.29 % and the average yield was 71.92 Kg/100 dfls. The estimated raw silk production was 2017.18 MT (81.91 %) against the set target of 2462.54 MT (upto September 2020).

Due to Covid -19 pandemic the extension communication programmes could not be conducted as per target. Upto September 2020 only 23 programmes were conducted and 814 farmers were sensitized covering 68 districts against the yearly target of 215 programmes. Under m-Kisan portal 44 SMS were sent to 76200 registered farmers in four languages.

Decision: The Chairman advised all the clusters CDFs to put in extra efforts that in the coming months and complete the assigned targets both on dfls brushing, raw silk production and also conduct of ECPs and achieve the target by end of the year.

(Action: Sci-D and Head, SEEM Division and all CDFs)

VIII.Training (CBT) and other programmes

Dr. M.Muthulakshmi, Sci-D and Head Training division presented the progress of various training and Capacity Building Programmes and informed that training programmes could not be conducted as per the target due to Covid -19. So far 229 beneficiaries were trained (upto September 2020) against the target of 1860 persons for the year. Through the model CRC functioning under division 30350 dfls chawki worms were reared and supplied to 217 farmers during the period.

Decision: Director suggested to complete the targets set under SRC programme. It was informed that the detailed head wise budget provisions were received from CBT division of CSB and circulated to both the RSRSs, Salem and Kodathi and to the RECs with whom the SRCs are functioning with an advice to revive the activities and complete the set targets.

IX. General comments

- All scientists must have at least one project as PIs. In spite of repeated reminders still many scientists are not having projects as PI; hence it is advised to propose concept notes in RCs to have individual projects by all scientists.
- A scientist to have maximum of 2 projects as PI and two as CI. Inclusion of scientists for name sake without actual involvement shall not be accepted.
- Inordinate delay in submission of concluded reports even after reminders is observed. Soft copy of the report in RMIS-10 format to be submitted within one month after completion of the project. Hard copy after RAC comments and ATRs.
- The RMIS-10 is respect of the concluded projects viz., PPA-3580 (Dr. V.Sobhana), AIT-3593 (Dr. Kusuma L.), AIB-3537 (Dr. S.Manthira Moorthy), AIB 01001 MI (Shri. S.B.Kulkarni / Dr. K.B.Chandrashekhar), AIB 01002 MI (Dr. R.Meenal), AIB-3596 (Dr. Satish L.) and revised

RMIS-10 of AIB-3537(Dr. K.B.Chandrashekhar) and AIB-3561(Dr. S.Purushottam) are pending /long overdue. The concerned scientists are once again advised to submit the same immediately by November 15th 2020.

- Budget utilization in majority of the projects is very dismal, PIs are responsible for the budget utilization. It is advised to judiciously use the approved budget and in cases where midterm correction in budget is required the proposal may be submitted with justifications. In future, exercise utmost caution while proposing budget during project formulation. Also the PIs shall ensure that completion of project works as per milestone and time schedule.
- Disposal of unserviceable articles which are already condemned and lying in the section may be initiated on priority following set guidelines and procedures. (Action DD and AD Stores section).
- As equipments are proposed in the projects, wherever administrative approvals are required, letter with suitable justifications should come from PIs first. Upon approval the PIs should submit proposal/justifications for purchase of the same in coordination with stores section through GeM portal and finally proposal should go to CO for financial approval.
- Project registers are not being submitted for verification. It should be updated and sectional/ Divisional heads to verify the progress and budget utilization every month and to be submitted for Director's verification on quarterly basis.
- Publication details are not received in the monthly reports submitted by Divisions/ sections, RSRSs/ RECs and other units. Therefore it is advised to submit the publications (popular/research article etc.) monthly basis. PMCE to circulate a format for submission of publication details.
- Scientists working in RSRSs/ RECs shall invariably contribute at least one popular article every six months per scientist to the in house magazine 'Indian Silk'. It is observed that here we are lagging behind. Therefore it is once again advised to stick to the Action Plan/ Core Committee of CSB Directors meeting decisions and publish articles on priority and submit the details to SEEM.
- Monthly and quarterly reports are not submitted in time by some of the divisions/sections and few RSRSs. The last date for submission of monthly report is 27th of every month and for quarterly report it is 2nd of succeeding month which may please be adhered to. PMCE/SEEM to inform the list of late submission to Director.
- Annexure V of QPR containing revenue generation details are not furnished by some of the sections (Income generation through cocoon sale/ disposal of PC etc) also by RSRSs in time. Therefore it is advised to submit the same in time in Annexure-V format of QPR.
- Percent increase/ decrease, frequency distribution, comparison with last year scenario are to be included in the CPP reports/presentations by the CDFs/ Scientists working in field units.
- Statistically analysed data with regional/seasonal variations in Silkworm and Mulberry productivity are to be highlighted in the concluded/ ongoing project reports/presentations.

The meeting ended with vote of thanks.

21.11.20

Director & Chairman, Research Council

Annexure-I

List of participants attended the Research Council meeting held on 28th and 29th October 2020 at CSRTI Mysore

#	**Name & Designation**	#	**Name & Designation of Scientists** linked with Webex from nested units
1	Pankaj Tewary Director and Chairman, RC	45	Kulkarni,S.B. Scientist-D RSRS Kodathi
2	N. Balachandran Scientist-D CSRTI, Mysore	46	Venkatachalpathy,M. Scientist-D RSRS Kodathi
3	K. B. Chandrashekar Sci-D CSRTI, Mysore	47	Sudhakar Rao, P.Scientist-D RSRS Kodathi
4	N. G. Selvaraju Scientist-D CSRTI, Mysore	48	N. Dhahira Beevi Scientist-D RSRS Salem
5	M.N. Chandrashekar Sci - D, CSRTI Mysore	49	N.Sakthivel Scientist-D RSRS Salem
6	Gandhi Doss S. Sci-D CSRTI, Mysore	50	P. Sudhakar Scientist-D RSRS Ananthapur
7	Tanmoy Sarkar. Sci-C CSRTI, Mysore	44	K.P. Kiran kumar Scientist-D RSRS Ananthapur
8	Mallikarjuna G. Sci-C CSRTI, Mysore	45	K Praveen Kumar Scientist-D RSRS, Mulugu
9	Arunakumar G. S. Sci-C CSRTI, Mysore	46	V.K.Yadav Scientist-C RSRS, Mulugu
10	Y. N. Sanath Kumar Sci-C CSRTI, Mysore	47	B. Mohan Scientist-D SSBS, Coonoor
11	Purushotham S. Sci-D CSRTI, Mysore	48	TVS. Srinivasa Rao Scientist-D REC,Eluru
12	Satish L Scientist-C CSRTI, Mysore	49	Somaprakash, D.S. Scientist-D, RSR, Chamarajanagar
13	Amit Saha Scientist B CSRTI, Mysore	50	A.Umesha Scientist-C, REC, Koppal
14	Ravindra Scientist-C CSRTI, Mysore		
15	Thirupathaiah Y. Sci-C CSRTI, Mysore		
16	Shivakumar Hukkeri Sci-D CSRTI, Mysore		
17	C.M.Babu Sci -D CSRTI, Mysore		
18	K.N. Madhusudhan Sci -C CSRTI, Mysore		
19	Gnanesh B. N. Ramjn. Fellow CSRTI, Mysore		
20	Vineet Kumar Scientist-D CSRTI, Mysore		
21	Ravinda Matigatti Sci -D CSRTI, Mysore		
22	Mary Josepha A.V. Sci-D CSRTI, Mysore		
23	M. Muthulakshmi Sci-D CSRTI, Mysore		
24	Santha P. C. Scientist-D CSRTI, Mysore		
25	Divya Singh Scientist B CSRTI, Mysore		
26	Bhuvaneshwar , E. Sci-C CSRTI, Mysore		
27	S. Mahiba Helen Scientist-D CSRTI Mysore		
28	Kusuma L. Scientist-B CSRTI, Mysore		
29	Geetha G.S. Scientist C CSRTI, Mysore		
30	Bhavya M. R. Scientist B CSRTI, Mysore		
31	R. Meenal Scientist-D CSRTI, Mysore		
32	H.M.Munikrishnappa AD,CSRTI, Mysore		
33	Rekha M DD,CSRTI, Mysore		
34	Manthira Moorthy S Sci-D CSRTI, Mysore		
35	Joycy Rani Sci-C CSRTI, Mysore		
36	Soudaminy P. V. Sci-D CSRTI Mysore		
37	R.Bhagya, Sci-D CSRTI Mysore		
38	Gayatri .T, Sci-D CSRTI Mysore		
39	G. K.Churendra CP CSRTI Mysore		
40	Pushpa H. PA CSRTI Mysore		
41	Ravindra K.N, SRF, CSRTI Mysore		
42	Bharath Gowda R.N ,SRF, CSRTI Mysore		
43	Lalith Kumari PA CSRTI Mysore		
44	Disha PA CSRTI Mysore		
45	Ashwini N, JRF CSRTI Mysore		