DBT SPONSORED RESEARCH PROJECTS 2012-13

Total 16 projects have been funded by DBT/DST under CSB R & D institutes

CSR&TI Mysore	**3**
CSR&TI Berhampore	**2**
SBRL Kodathi	**3**
CMER&TI Lahdoigarh	**8**
Total	**16**

CSR&TI MYSORE

1. Biological control of fungal root rot disease of mulberry by endophytic bacteria *burkholderia cepacia* and *bacillus subtilis* strains.

Objectives:

Screening and evaluation of *Burkholderia cepacia* and *Bacillus subtilis* strains against fungal root rot pathogens of mulberry.

Quantification of bacterial population threshold to induce systemic resistance through production of antifungal compounds

Use of efficient strains against soil borne fungal pathogens of mulberry.

Status:

Developed rifampcin resistant strains of *B.cepacia, B.subtilis* and *P.aeruginosa* (two strains each). Confirmed its antagonistic effect on the root rot pathogen *R. bataticola* using dual culture assay. To prepare the consortium, compatibility of the three strains were confirmed using standard procedures. For i*n vivo* studies, BCA's and pathogen were mass multiplied on talc based formulation and sorghum based formulation respectively. Pathogenicity tests using challenge inoculation method is initiated. Observations on disease development and control of disease are in progress.

2. DNA marker aided analysis of mulberry gene bank towards a core assembly for sustainable conservation and enhanced utilization in crop improvement (in collaboration with CSGRC, Hosur)

Objectives:

1. Identification of a panel of diverse mulberry germplasm amenable to association mapping by marker (by genomic and EST SSRs) aided analysis – CSRTI, Mysore

2. Construction of a core sub-set of mulberry germplasm by phenotypic and molecular marker (SSRs and AFLPs) analysis – CSRTI, Mysore & CSGRC, Hosur

3. Evaluation of panel of diverse mulberry germplasm for other important traits *viz*., sprouting, senescence, rooting, leaf quality, yield contributing traits and key morphological characters – CSGRC, Hosur

Status

1. A unique collection of 520 acc. from the whole collection (1065 acc.) was identified and genotyping of the UC using SSR markers is underway for identification of the panel (genotyping of 380 acc. completed)

2. Construction of core sub-set using phenotypic markers completed by both WMV-P and M-method

3. Unique collection (520 acc.) was established in an experimental plot under ARBD at CSGRC, Hosur

3. Popularization of productive bivoltine double hybrid "krishnaraja" with the farmers of karnataka

Objective:

Popularization of double hybrid with the farmers of Srirangapatna taluk, Mandya district, Karnataka

Status

A total of 3000 dfls of double hybrids were distributed to 10 farmers of Srirangapatna and average cocoon yield recorded was 66.4 kg as against 58.1 kg /100 dfls in CSR2xCSR4.

Procured disinfectants like, bleaching powder, Ankush, lime powder and plastic collapsible mountages for supply to farmers.

Cocoons samples of double and single hybrids were collected from the farmers for test reeling.

CSR&TI, BERHAMPORE, WEST BENGAL

1. Development, validation and utilization of SCAR marker(s) for powdery mildew (*Phyllactinia corylea*) resistance in mulberry [*in collaboration with CCMB, Hyderabad]*

Objectives :

1. Development of powdery mildew (PM) specific mapping progeny.
2. Raising of progeny by transfer of resistant trait to improved strain(s) for MAS based breeding approach.
3. Evaluation of mapping population for powdery mildew resistance and other associated parameters for SCAR validation.
4. Evaluation of mapping population for powdery mildew resistance under artificial epiphytotics.

Status

a. Completed altogether 5 rounds powdery mildew (PM) disease scoring in the established progeny (~260 no) for SCAR validation.
b. Evaluation of the progeny based on 4 micro-morphological and 5 biochemical features has been completed.
c. Establishment of progeny for artificial epiphytotics study has been initiated [as per advice of 4th DBT Task Force held on 18-09-2012]
d. Completed DNA profiling of selected (~ 20 nos) PM resistant and susceptible progenies with 20 each of RAPD and ISSR primers.

2. Development of DNA marker based genetic linkage map of mulberry and QTL analysis for agronomically important *planta* traits [*in collaboration with CCMB, Hyderabad]*

Objectives :

1. *In Planta* characterization and evaluation of F1 mapping population for important agronomic traits.
2. Evaluation of important foliar disease responses in existing mapping population.
3. Identification/crossing of some promising progeny plants for possible trait refinement and/or mapping validation.

Status

a. *In planta* evaluation of 150 mapping population derived from Mysore local x V-1 has been completed in 5 seasons for 22 morphometric traits.
b. Two rounds assessment of 4 micro-morphological and 5 biochemical traits and one round of *in situ* physiological gas exchange features have also been completed.
c. Three round evaluations each of *Xanthomona*s and *Myrothesium* leaf spot and Powdery mildew diseases have been completed.
d. Identification of 3-4 promising lines for subsequent utilization in crossing programme has been done.

e. Completed DNA profiling of selected progeny (~ 20 nos) contrast responsive to foliage yield with 10 each of RAPD and ISSR primers

SBRL, KODATHI

1. Cloning, expression, and characterization of yolk protein receptors from Indian silkworms (July 2010-June 2013)

Objectives:

1) cDNA cloning of Lp and Vg receptors, PCR based cloning using degenerative primers based on the conserved regions of yolk protein receptors
2) Tissue and stage specific expression patterns of LpR and VgR transcripts, semi-quantitative (RT-PCR) and quantitative expression (Real Time) levels of both receptor transcripts.
3) Expression of recombinant receptor proteins in yeast or insect cell lines. For characterization of the proteins need to be expressed in suitable expression system to yield functional proteins
4) Functional expression of the receptor by ligand-binding experiments. Binding experiments to confirm the function of the receptor proteins by their ligands.
5) Differential gene expression of VgR and LpR in various races of the silkowrms and identify the elite race(s) in terms of viable eggs to use them for selective breeding program.

2. Development of RNA interference (RNAi) based nuclear polyhedrosis virus (NPV) resistance transgenic silk moths

Objectives:

1) Introgression of transgenes through backcross breeding coupled with marker assisted selection.
2) Conduct of small scale filed trials to short list better performing transgenic lines.
3) Conduct of large scale field trials with framers covering different eco-climatic zones and different seasons.
4) Maintenance of transgenic lines and evaluation of their transgenic stability.

3. Host-parasite interaction: Transcriptome response to parasitism in silkworm *Bombyx mori*

Objectives:

a) To Identify host-response proteins activated in homocytes of *Bombyx mori* after uzifly and microsporidian infection.

b) To reveal the variations in transcriptiome responses of hemocytes of *B. mori* after uzifly and microsporidian infection.

c) To analyze the cellular response of hemocytes of *B. mori* after uzifly and microsporidian infection.

CMER&TI LAHDOIGARH

1. **Screening of microbial flora (potential biofertilizer) of castor rhizosphere and development of INM package in ericulture (funded by DST, New Delhi).**

   Objectives:

   - Benchmark survey for biofertilizer potentialities microorganisms and analysis of soil biological properties of experimental virgin plot.
   - Isolation, selection and identification of potential strains and formulation of biofertilizer package with different treatment combinations in RBD for field trial.
   - Study of various growth parameters in specific time period of the growing castor plant.

2. **Molecular approaches in characterization and utilization of gut microflora from Muga Silkworm *Antheraea assamensis* for enhancing productivity of Muga culture in North Eastern India.**

   Objectives:

   - Isolation of bacterial pathogens through standardization of cultural media from diseased cadavers of muga silkworm.
   - To study the biochemical and molecular characterization of the pathogens.
   - To study the epidemiology of the disease

3. **Studies on the insect fauna associated with muga ecosystem in North East India with emphasis on the illustrated diagnostics .**

   Objective:

   - Exploration, collection and preservation of insect fauna associated with Muga-ecosystem in North East India.
   - Identification, morphological characterization and documentation.
   - Development of computerized diagnostic tools and inventorization of insect fauna

4. **Establishment of Institutional Biotech Hub (DBT Funded).**

   Objective:

   - The institutional biotech hubs will be providing basic biotechnology infrastructure facility for the students, faculties and researchers of individual institutions as well as nearby institutions

5. **Characterization, transmission and cyto-pathology of infectious flacherie and cytoplasmic polyhedrosis virus in muga silkworm, *Antheraea assamensis* Helfer (funded by DBT, New Delhi).**

   Objective:

   - Characterization of infectious flacherie and cytoplasmic polyhydropsis virus in muga silkworm.
   - To study the transmission pattern of the viral agents.
   - To study the cyto-pathology of midgut and silk gland from infected larvae.

6. **Etiology of bacterial diseases and molecular characterization of the pathogens of muga Silkworm (*Antheraea assamensis* Helfer) from North East India (funded by DST, New Delhi).**

   Objective:

   - Isolation of bacterial pathogens through standardization of cultural media from diseased cadavers of muga silkworm.
   - To study the biochemical and molecular characterization of the pathogens.
   - To study the epidemiology of the disease.

7. **Sustainable Eri Silkworm rearing: Evaluation of *Ailanthus* species (funded by DST)**

   Objective:

   - To evaluate and biochemical analysis of different *Ailanthus* Germplasm.
   - To evaluate and redefine superior genotype(s)/ species of *Ailanthus* through bioassay.
   - To extend the information on silkworm nutrition of different *Ailanthus* species.

8. **Sustainable rural livelihood: adoption and refinement of improved technologies of eri culture in Brahmaputra valley of Assam (DST sponsored Women Scientist Fellowship Scheme)**

   Objective:

   - To enhance the productivity in ericulture through adoption of improved technologies and assess adoption refinement and validation of improved technologies at farmers' level.

   - To develop new products and diversify the erculture to improve income and employment generation.