

Right to information Act, 2005

4 THE GAZETTER OF INDIA EXTRAORDINARY [PART II-4]

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CHAPTER II

Right to information and obligation of public authorities

3. Subject to the provisions of this Act, all citizens shall have the right to information.

4. (1) Every public authority shall-

c) maintain all its records duly catalogued and indexed in a manner and the form which facilitates the right to information under this Act and ensure that all records that are appropriate to be computerized are, within a reasonable time and subject to availability of resources, computerized and connected through a network all over the country on different systems so that access to such records is facilitated:

d) publish within one hundred and twenty days from the enactment of this Act

(i) The particulars of its organization, functions and duties:

Organization:

SERI-BIOTECH RESEARCH LABORATORY
CENTRAL SILK BOARD, MINISTRY OF TEXTILES
GOVERNMENT OF INDIA, CARMELRAM P.O.
SARJAPUR ROAD, KODATHI
BENGALURU – 560 035, KARNATAKA, INDIA

Mandate:

The Seri-Biotech Research Laboratory [SBRL] was established during 1993 under the World Bank aided National Sericulture Project as per the advice of a high level committee headed by Prof. Lynn Riddiford, University of Washington, USA to carry out research in the frontier areas of biology for the development of the sericulture industry. The following are the broad mandates of the laboratory:

- To conduct research in frontier areas of modern biology and to seek potential applications of these work towards improving silk productivity.
- To interact with other institutions doing basic or applied research in areas related to sericulture and other allied areas.
- To disseminate technology developed to the target groups through the other R & D constituents of CSB.

Functions:

Presently the laboratory is implementing externally funded and in-house research projects in four main areas as indicated below:

Silkworm Genomics

The focus is on identification of silkworm genes and their functions associated with resistance to viral and fungal pathogens, development of NPV tolerant silkworm lines based on marker assisted selection and RNAi technique, regulation of yolk proteins, characterization of RNA dependent RNA polymerase gene, characterization of oviposition stimulating factors in silkworms and Identification of molecular markers associated with filament characters and its use in improvement of multivoltine breeds, whole genome sequencing and transcriptome analysis of golden silk moth etc.

Host Plant Genomics

Work was carried out related to molecular characterization and identification of various mulberry species and other host plants, development of microsatellites for mulberry, characterization of drought resistant genes etc.

Proteomics

The focus is on identification of immune response proteins and their interactions, under stress from pests like uzi fly, under microsporidia infection etc.

Molecular Pathology

Focus is on identification and molecular characterization of various pathogens like virus, bacteria, microsporidia etc. infecting silkworms and development of diagnostic tools for their easy and early detection. Development of Densovirus resistant productive breeds through marker assisted selection and Transkingdom RNA interference (*tkRNAi*) approach for resistance against BmNPV infection in silkworm.

Silk Biomaterials

Programmes on Characterization of Sericin for Cosmetic Applications in collaboration with CSTR, Bangalore, M/s Hindustan Lever and Development of fibroin fusion silk with antimicrobial, antioxidant and UV protective properties have been initiated.

1. Significant achievements

SBRL has implemented more than 14 DBT- and 33 CSB-funded projects. The brief achievements since inception are as indicated below:

1.1. Research highlights

- Identified and characterized several Simple Sequence Repeats (SSR) and Inter-simple sequence repeats (ISSR) for the first time from tropical strains of the silkworm *B.mori*.

- Identified markers viz. RAPD, RFLP, SSR and ISSR were utilized for characterizing 60 multivoltine and 90 bivoltine *B.mori* using specific primers.
- One hundred and fifty mulberry germplasm were characterized using various DNA marker systems to determine their taxonomic status and association of the markers with important characters.
- Twenty eight SSR markers were developed for characterization of diapausing and non diapausing silkworms for higher & lower cocoon characters.
- Silkworm DNA markers for yield attributes and larval duration (one) with potential use in Marker Assisted Breeding program were identified.
- Studies were attempted for the first time to understand the genetic relationship of the ecoraces of muga and tasar silkworms using well defined marker systems like SSRs.
- Fifteen eri silkworm populations studied showed genetic homogeneity and less variability with positive correlation of genetic distance between populations with geographic distance and negative with altitude.
- Localized differentiation of eri silkworm subpopulations noticed and recommended eri population increase by widening area of localized populations.
- Wild tasar ecorace, Jatta Daba was identified as a primitive strain from which other strains have originated by adapting to different environment in Jharkhand and the muga Selsela population from the West Garo Hills as heterogenous population, both of which need to be protected from natural disasters.
- ISSR marker studies revealed taxonomic complexities of mulberry germplasm identifying highly divergent cultivars based on genetic distance for use as ideal material for breeding program
- First mulberry genetic linkage map was constructed with S36 x V1 mapping populations based on which dense genetic linkage map

can be developed and association as well as linkage mapping studies can be taken up.

- Fifty five ISSR and 179 RAPD putative/species specific markers were identified for existence of microsporidians in addition to *Nosema bombycis*.
- Twenty five RAPD putative/species specific markers were identified to detect various microsporidians.
- A PCR based multiplex detection system has been developed for the simultaneous detection of microsporidia, nucleopolyhedrosis virus, and densovirus. The technology has been filed for patenting with NRDC, New Delhi. No. 1746/CHE/2008 and published in Patent Journal by NRDC: 29/01/2012. The technique is being used in NSSO Basic Seed Farm Mysore to diagnose pebrine disease in the silkworm seed.
- Silkworm brain-specific lipophorin receptor (a key molecule functioning in reproduction and development) variant gene (LpR4) identified to have a role in signal transduction apart from uptake of lipids which is a new finding in insect lipoprotein research aiding in future related studies.
- Diapause specific genes have been identified in diapause induced multivoltine silkworms through semi-quantitative polymerase chain reaction (PCR), Suppressive Subtractive Hybridization and Microarray analysis. The multivoltine silkworm germplasm can be screened based on expression of these genes and subjected to diapause induction for cost effective conservation.
- DNA markers viz. Nag 34, Nag 65, Nag 84 and Nag 88 were identified to be associated with NPV resistance and were mapped on chromosome numbers 12, 5, 7 and 3. Introgression of these markers in NPV susceptible CSR2 lines through Marker Assisted Selection to develop NPV tolerant bivoltine lines and their field trials are in progress so that, they can be utilized as parents for making commercial F1 hybrids.

- Hsp70 was identified as a major stress protein induced after uzi fly infection in the integument and hemocytes of *B. mori* larvae.
- Twenty four host-response and immune proteins from uzi infected *B. mori* and 3 from *S. ricini* were identified, while, 3 proteins were observed to interact with Hsp70 a major stress protein induced after uzi fly infection in the integument and hemocytes most of which were activated in the early stages of infection and based on this outcome, immunocompetent *B. mori* strains can be identified for breeding programs.
- The eri silkworm larvae exhibited innate defense mechanism by forming cysts around the infected uzi maggot killing it by inhibiting growth.
- SSU-rRNA gene sequence was found to be highly useful to decipher the correct taxonomic status of the 14 different microsporidians identified from the silkworms and different insect pests harboring various mulberry fields, the latter possibly being the main source for cross infecting silkworms.
- Six different microsporidians identified from tasar silkworms had clear homology with *Nosema* species.
- RNAi silencing of yolk protein receptors disrupted ovary growth, yolk deposition and developments indicating their role in egg development. VgR gene expression levels were high in Pure Mysore, Sarupat, CSR2, CSR26 and NB4D2.
- The Indian isolate of DNV-2 was identified and found to be severely widespread under field conditions causing flacherie disease.
- DNV-2 infection in *B.mori* destructively damaged the midgut tissue suggesting the necessity to carry out systematic survey for DNV-2 in flacherie prone areas to devise appropriate control measures.
- *B.mori* germplasm possessing the *nsd-2* gene for resistance to DNV-2 was identified that can be utilized to strengthen silkworm breeding programmes.
- Utilizing RNAi technique NPV resistance gene from NPV resistant

transgenic Nistari multivoltine lines has been introgressed to NPV susceptible CSR4 and CSR27 bivoltine lines which revealed 30% enhanced resistance to NPV.

- The immune response genes *viz.* Gloverin, SERPIN, *Hsp* 23.7 and *Hsp* 40 revealed significant up-regulation in NPV resistant genotype [Sarupat] suggesting that these genes could play an important role in baculovirus resistance in *B. mori*.

1.2. Publications

SBRL, Kodathi has published more than 79 research papers in peer reviewed international and national journals (Attached as Annexure 1), copies of which can be obtained on request.

2. LIST OF R & D PROJECTS (1994 – Sept. 2017)

S.No	Project Code	Project Title	Project Period
1.	CSB	Genome analysis of silkworm, <i>Bombyx mori</i>	Jan.94 – Mar.98
2.	DBT	Molecular characterization of silkworm varieties using micro and minisatellite DNA	Dec.94 - Dec.97
3.	DBT	RFLP polymorphism analysis for NPV resistance in silkworm, <i>Bombyx mori</i> .	Dec.95 – Nov.98
4.	CSB	Molecular characterization of mulberry and silkworm germplasm – Phase I	Apr.96 – Mar.99
5.	CSB	Molecular breeding in silkworm using DNA markers.	Apr.98 – Mar.01
6.	CSB	Dissection of mulberry genome: further studies on genetic variability and characterization of genes associated with productivity.	Apr.01- Mar.04
7.	CSB	Molecular genetics of differential growth and yield potential in silkworm <i>Bombyx mori</i>	Apr.01- Mar.04
8.	CSB	Studies on genetic basis of hardiness in silkworm and MAS program.	Apr.01- Mar.04
9.	DBT	Genetic analysis on <i>Wolbachia</i> affecting the natural parasites of domesticated silkworm, <i>Bombyx mori</i> and possibility on the analysis of its use as a vector) (In collaboration with Bangalore University, Bangalore).	Dec.01- Aug.03
10.	CSB	Genome Analysis in Muga silkworm host plants (Som & Soalu): DNA profiling of certain elite genotypes using molecular markers, development of mapping population and linkage map.(In Collaboration with CMERTI, Jorhat)	2004-2007
11.	CSB	Molecular characterization of microsporidian infecting commercial silkworms	Jun.04 – May'09
12.	DBT	Identification of DNA markers for baculovirus resistance in silkworm, <i>Bombyx mori</i> L. (Network project with collaboration from CDFD, Hyderabad; CSRTI, Mysore; APSSDI, Hindupur and KSSDI, Bangalore).	Dec.04 – Mar.08

13.	CSB	Characterization of Eri silkworms (<i>Samia ricini</i>) with morphological characters and molecular markers (In collaboration with CEMRTI, Jorhat).	Apr.05 – Mar.08
14.	CSB	Construction of genetic linkage maps and QTL analysis of economically important traits in mulberry.	2005-2008
15.	ARP-3351 CSB	Studies on the morphology, life cycle and pathogenicity of some microsporidia infecting silkworm, <i>Bombyx mori</i> L. and their identification (Collaborative project with CSR&TI, Berhampore)	Jul.05 – May'08
16.	DBT	Phylogeography of <i>Antheraea mylitta</i> (tropical tasar silkworm) and <i>Antheraea assamensis</i> (muga silkworm) (In collaboration with CDFD, Hyderabad; CMERTI, Jorhat and CTRTI, Ranchi).	Oct.05 – Oct.08
17.	CSB	Functional Characterization of a brain-specific lipophorin receptor variant from the silkworm, <i>Bombyx mori</i>	2006-2010
18.	Pilot Project CSB	PCR-based detection of silkworm diseases	2006-2009
19.	AIG 3426 DBT	Identification and mapping of DNA markers linked to NPV resistance in silkworm <i>Bombyx mori</i> L. [Jointly with APSSRDI, Hindupur]	Jun.09 – Jun.12
20.	AIT 3427 DBT	Studies on diapauses related gene expression in diapauses induced eggs of multivoltine silkworm races of <i>Bombyx mori</i> .	Jun.09 – Jun.12
21.	AIT 3428 DBT	Molecular mechanism of stress in silkworms <i>Bombyx mori</i> and <i>Samia cynthia ricini</i>	2009-2012
22.	ARP 3429 DBT	Biology of microsporidians infecting silk moth [<i>Bombyx mori</i> and <i>Antheraea mylitta</i>]	Jun.09 – May'12
23.	AIT 3446 DBT	Cloning, expression and characterization of yolk protein receptors from Indian silkworms.	Jun.10 – May'13
24.	AIT 3448 CSB	Studies on differential gene expression profiling of <i>Bombyx mori</i> Nucleopolyhedrovirus (BmNPV) resistant and susceptible <i>Bombyx mori</i> silkworm strains.	Oct.10 – Mar.15
25.	ARP 3453 CSB	Identification, isolation and molecular characterization of major pathogens associated with flacherie disease in <i>Bombyx mori</i> .	Apr.11 – Mar.13

26.	PIG-3465 CSB	Isolation and characterization of Microsatellites in mulberry (<i>Morus</i> spp.) genome.	2011-2014
27.	AIG 3473 CSB	Molecular characterization of the flacherie causing virus in <i>Bombyx mori</i> with specific reference to RdRp (RNA Dependent RNA polymerase) gene and the regulatory elements in the viral genome.	Jan.12 – Dec.14
28.	AIT 3468 DBT	Development of RNA interference (RNAi) based nuclear polyhedrosis virus resistance transgenic silk moth. [(Jointly with CDFD, Hyderabad, APSSRDI, Hindupur) (Under Center of excellence on Genetics and Genomics of Silk moth to CDFD Hyderabad-Phase II)]	Sep.11 – March.17
29.	ARP 3477 CSB	Therapeutic control of microsporidiosis in mulberry silkworm through characterization of methionine amino peptidase enzyme genes (MetAP2) in <i>Nosema bombycis</i> (in collaboration with CSR&TI Mysore)	Jul.12 – Jun.15
30.	ARP 3489 CSB	Identification and molecular characterization of major pathogens associated with flacherie disease in <i>Antheraea mylitta</i> (in collaboration with CTR&TI Ranchi)	Oct.12 - Sep.15
31.	ARP 3494 DBT	Host-parasite interaction: Transcriptome responses to parasitism in the silkworm <i>Bombyx mori</i> . [Jan.13-Dec.16]	Jan.13 - July16
32.	ARP 3495 CSB	Development of immuno-molecular techniques for early diagnosis of major infectious pathogens of silkworm, <i>Bombyx mori</i> L.	Feb.13 - Jan.16
33.	AIB 3503 CSB	Identification of autumn-specific silkworm breeds/hybrids suitable for sub-tropical zones of North and North West India (CSB funded - with CSR&TI Pampore, NSSO Bangalore, CSTRI Bangalore)	Nov.13 - Oct.16
34.	SBRL004 CSB	Discerning (Exploring) the mechanism of resistance and its pathways using microarray technique in silkworm <i>Bombyx mori</i> associated with nucleopolyhedrovirus (<i>BmNPV</i>)	Apr.14 - Mar.15
35.	ARP 3513 DST-JSPS	Molecular characterization of Indian isolate (s) of Densovirus (DNV) and viral resistance gene in the host silkworm, <i>Bombyx mori</i> (SBRL Kodathi, National Institute of Agrobiological Sciences, Japan)	Jun.14 - May'16

36.	ARP 3158 CSB	Expression profiling of genes associated with resistance to <i>Beauveria bassiana</i> in <i>Bombyx mori</i> strains (SBRL & CSGRC)	Oct.14 - Sep.17
37.	SBRL001 CSB	Cloning and expression of three drought resistance genes in mulberry (<i>Morus</i> spp.)	Oct.14 - Sep.15
38.	SBRL002 CSB Pilot study	Male Accessory Gland proteome analysis and characterization of Oviposition Stimulating substances (OSS) from Tasar Silkworm, <i>Antheraea mylitta</i>	Oct.14 - Sep.16
39.	SBRL003 CSB Pilot study	Identification of uzifly maggot tissue protein that induces toxicity in silkworm <i>Bombyx mori</i>	Dec.14 - Nov.15
40.	AIT-3538 CSB	Development of fibroin fusion silk with antimicrobial, antioxidant and UV protective properties	Apr.15 – Mar.19
41.	AIT 3540 CSB	Development of transgenic silkworms for the over expression of disease-resistant genes for enhanced immunity [in collaboration with IISc, Bangalore]	Apr.15 – Mar.18
42.	ARP-3522 CSB	Isolation, Cloning and Characterization of Antibacterial Protein (s) from Silkworm, <i>Bombyx mori</i> (CSR&TI, Berhampore & SBRL)	Apr.15 – Mar.18
43.	CFC-7064 CSB	Characterization of Sericin for Cosmetic Applications (CSTRI, Bangalore, SBRL, M/s Hindustan Lever)	Apr.15 – Mar.16
44.	AIT-3583 CSB	Transkingdom RNA interference (<i>tkRNAi</i>) approach for resistance against BmNPV infection in silkworm <i>Bombyx mori L</i> (in collaboration with University of Delhi)	Sept. 16 – Aug. 19
45.	AIT-3584 CSB	Identification of molecular markers associated with filament characters and its use in improvement of multivoltine breeds (<i>In collaboration with CSTRI, Bangalore</i>)	Sept. 16 – Aug. 19
46.	AIT-3582 CSB	Development of Densovirus Resistant productive Bivoltine Silkworm breeds through Marker Assisted Selection	Sept. 16 – Aug. 18
47.	ARP 3605 DBT	Validation of the DNA markers in silkworm breed developed by introgression of DNA markers associated with NPV resistance using marker Assisted Selection Breeding and large scale field trial of the breed	Feb. 2017- Feb. 2020
48.	ARP 3606 DBT	Development of diagnostic tool for early detection of baculovirus causing tiger band disease in <i>Antheraea Proylei</i>	Feb. 2017- Feb. 2020

3. Training

SBRL, Kodathi conducts training programmes that include project dissertation works and molecular biology techniques for M.Sc / B.Tech / M.Tech students on charge basis depending on the type of programme. Under specified projects research fellows are appointed for the project period and are permitted to do Ph.D under the University of Mysore as per the University rules and regulations.

4. Library

SBRL Kodathi is subscribing to three international scientific journals viz. Genome, Insect Molecular Biology and Insect Biochemistry and Molecular Biology along with Sericologia for reference by the scientists of the institute and other CSB institutes. The library facility is available for reference purpose during working hours for scientists of other CSB institutes and recognized academic institutions on permission from the Director.

(ii) The powers and duties of officers and employees

S.No.	Designation	Power and duties
1	Director	Over all in-charge of Research and Administration of the laboratory
2	Scientist-D	Research and development works connected with technical aspects and administration
3	Scientist-C	Research and development works connected with technical aspects and administration
4	Scientist-B	Research and development works connected with technical aspects and administration
5	Asst. Director	Over all in-charge of administration, Accounts etc.
6	Asst. Superintendent	FAS, PRS and processing all the purchase proposals, settlement of TA/TTA/LTC/Medical reimbursement bills, Maintenance of SR, dead stock/Assets register etc.
7	Technical Assistants	Technical assistance and support in all Research and Development works
8	Asst. Technician	Diary, despatch, circulars circulations and operating Xerox machine
9	Staff Car Driver	Driving car for official work for staff and visiting experts/dignitaries, maintenance of vehicle and its utilization record
10	Multi Tasking Staff	Maintenance of cleanliness in around laboratory and office premises

Research Scholars on contract basis

11	Junior Research Fellow/ Research Scholar	Assisting in Research and Development works related to research projects
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ORGANIZATION CHART

(Attached as Annexure 2)

(iii) The norms set by it for the discharge of its functions;

As Provided under RTI Act/Rules

(iv) The rules and regulations, instructions, manuals and records, held by it or under its control or used by its employees for discharging its functions;

General Financial Rules, Fundamental Rules and Supplementary Rules Part-I, II & III and CCA/CCS Conduct Rules etc.

(v) A statement of the categories of documents that are held by it or under its control;

Accounts	:	Cash book, Day book, Ledger, Financial statement of Accounts, Assets register
Establishment	:	Personal files, Service Records, Correspondence files
General Administration	:	Purchase files, stock registers, dispatch And dairy registers, general correspondence files

(vi) The particulars of any arrangement that exists for consultation with, or representation by, the members of the public in relation to the formulation of its policy or implementation thereof;

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NA -

(vii) A statement of the boards, councils, committees and other bodies consisting of two or more persons constituted as its part or for the purpose of its advice and as to whether meetings of those boards, councils, committees and other bodies are open to the public, or the minutes of such meetings are accessible for public;

Research Advisory Committee

Prof. P.N. Rangarajan
Dept. of Biochemistry,
Indian Institute of Science
Bangalore – 560 012

CHAIRPERSON

Dr. Anitha Peter
Dept. of Biotechnology
University of Agricultural Sciences
GKVK, Bangalore-560065

Member

Dr. Malali Gowda
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Member

Dr. Upendra Nongthomba
Developmental and Biomedical Genetics Laboratory
Dept. of Molecular Reproduction,
Development and Genetics (MRDG)
Indian Institute of Science
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Member

Director (Tech.)
Central Silk Board
CSB Complex, Madivala
Bangalore-560068

Member

Director
SBRL, Kodathi
Bangalore-560035

Member-Convenor

Research Council

Director
All Scientists

Chairperson

Members

Stores Purchase Committee

Dr. K.M. Ponnuvel, Scientist- D	Member
Dr. G. Ravikumar, Scientist – D	Member
Dr. A.R. Pradeep, Scientist- D	Member
Smt. Shyamala S. Murthy, Asst. Director (A&A)	Member

(viii) A directory of its officers and employees;

A directory of Officers and employees is enclosed (Attached as Annexure 3)

(ix) The monthly remuneration received by each of its officers and employees, including the system of compensation as provided in its regulations;

The monthly remuneration received by each Officer / employee is enclosed (Attached as Annexure 4)

Annexure 1

List of research publications

1. Tulsi Naik K, S., Ponnuvel K,M., & Awasthi A,K., (2017) “Transkingdom RNA interference approach to improve resistance against grasserie disease in Bombyx mori. L A review” *Sericologia* 57(1), 1-9
2. Pooja M, Pradeep AR, Hungund SP, Sagar C, Ponnuvel KM, Awasthi AK and Trivedy K (2017b) Oxidative stress and cytotoxicity elicited lipid peroxidation in hemocytes of Bombyx mori larva infested with dipteran parasitoid, *Exorista bombycis*. **Acta Parasitologica**, 2017, 62(4), 000–000; ISSN 1230-2821. DOI: 10.1515/ap-2017-00 (**In Press**)
3. Pooja M, Pradeep AR, Hungund SP, Ponnuvel KM, and Trivedy K. (2017a) The dipteran parasitoid *Exorista Bombycis* induces pro- and anti-oxidatiive reactions in the silkworm *Bombyx mori*: Enzymatic and genetic analysis. **Archives of Insect Biochemistry & Physiology** (2017) Feb; 94(2). doi: 10.1002/arch.21373. Epub 2017 Jan 17.
4. Pradeep ANR, Asea A, Kaur P (2016) Nucleolin Transports Hsp72 to the Plasma Membrane Preparatory to its Release into the Microenvironment. **Journal of Cell Science & Therapy** 7: 254. doi: 10.4172/2157-7013.1000254
5. Rajni Bala, Ulfath Saba, Meenakshi Varma, Dyna Susan Thomas, Deepak Kumar Sinha, Guruprasad Rao, KanikaTrivedy, Vijayan Kunjupillai and Ravikumar Gopalapillai (2016). Cloning and Functional Characterization of a Vertebrate Low-Density Lipoprotein Receptor Homolog from Eri Silkmoth, *Samia ricini*. **Journal of Molecular Biochemistry** 5: 87-94.

6. Dyna Susan Thomas, Chitra Manoharan, Kanika Trivedy, Kunjupillai Vijayan, Ravikumar Gopalapillai (2016) Lipophorin and its Immunological Properties of Eri Silkworm, *Samia ricini*. **Sericologia** 56: 74-83.
7. Lekha, G., Gupta, T., Vijyagowri, E., Awasthi, A.K., Ponnuel, K. M. (2015) Genome-wide identification, characterization of sugar transporter genes in the silkworm *Bombyx mori* and role in *Bombyx mori* Nuclear Polyhedrovirus (BmNPV) infection. **Gene** 579: 162-171
8. Lekha G., Gupta T, Awasthi A.K, Murthy, G.N., Trivedy K. and Ponnuvel K.M. (2015) Genome wide microarray based expression profiles associated with BmNPV resistance and susceptibility in Indian silkworm races of *Bombyx mori*. **Genomics** 106: 393–403.
9. Pradeep A.R, Anitha J, Panda A, Pooja, M., Awasthi A.K., Geetha N.M., Ponnuvel KM and Trivedy K (2015). Phylogeny of host response proteins activated in silkworm *Bombyx mori* in response to infestation by Dipteran endoparasitoid revealed functional divergence and temporal molecular adaptive evolution. **J Clin Cell Immunol** 6:5
10. Gupta T., Kadono-Okudo K., Ito K., Trivedy K. and Ponnuvel K.M. (2015). Densovirus infection in silkworm *Bombyx mori* and genes associated with disease resistance. **Invertebrate Survival Journal** 12: 118-128.
11. Bhuvaneshwari G. and Surendra Nath B. (2015). Molecular characterization and phylogenetic relationships among microsporidia cross infecting silkworm *Bombyx mori* isolated from seven Lepidopteran pests of mulberry gardens based on small subunit rRNA (SSU-rRNA) gene sequence analysis. **Clon. Transgen.** 4:1
12. Bhuvaneshwari G. and Surendra Nath B. (2015). Molecular characterization and phylogenetic relationships of seven microsporidian isolates from different Lepidopteran pests cross infecting silkworm *Bombyx mori* based on Intergenic spacer

- sequence analysis. **Journal of Entomology and Zoology Studies** 3(2):324-330
13. Wazid Hassan and Surendra Nath B. (2015). Genetic characterization of microsporidians infection Indian non-mulberry silkworms (*Antheraea assamensis* and *Samia Cynthia ricini*) by using PCR based ISSR and RAPD marker assay. **Int. J. Indust. Entomol.** 30 (1): 6-16
 14. Ponnuvel K. M., Sasibhushan S., Geetha N. Murthy and Rao C.G.P. (2015). Diapause-Related Gene Expression in Eggs of Multivoltine *Bombyx mori* L. Silkworm Races. Chapter in **New Horizons in Insect Science: Towards Sustainable Pest Management**, A. K. Chakravarthy (ed.), pp 187-198.
 15. Hassan W, Nath BS. (2015). Genetic characterization of microsporidia infecting Indian tasar silkworm, *Antheraea mylitta* by using morphology and inter simple sequence repeat-PCR (ISSR-PCR). **Folia parasitologica** 62: 034
 16. Lekha G, T. Gupta, K.Trivedy and KM Ponnuvel (2015). Paralogous gene conversion, allelic divergence of attacin genes and its expression profile in response to *BmNPV* infection in silkworm *B.mori*. **Invertebrate Survival J.** 12: 214-224
 17. Rati Sudha, Geetha N. Murthy, Arvind K. Awasthi, Kangayam M. Ponnuvel (2015). Attacin gene sequence variations in different ecoraces of tasar silkworm *Antheraea mylitta* **Bioinformatics** 11(10): 481-483
 18. Chandrakanth N, K.M.Ponnuvel, S.M.Moorthy, S. Sasibhushan and V.Sivaprasad (2015) analysis of trasncrypt of heat shock protein genes in silkworm, *Bombyx mori* (Lepidoptera: Bombycidae). **Eur J Entomol** 112 (4) 676-687.
 19. Chandrakanth N, , S. M. Moorthy, K. M.Ponnuvel and V.Sivaprasad (2015) Identification of microsatellite markers linked to thermotolearnace in silkworm by bulk segregant analysis and *IV SILCO* mapping. **Genetika** 47(3) 1063-1078.

20. Chandrakanth N, S. M. Moorthy, Kariyappa, K. M. Ponnuvel and V. Sivaprasad (2015) Reeling performance of F2 and backcross populations under high temperature conditions. **Journal of Entomology and Zoological Studies**. 3(6) 219-222.
21. Wazid Hassan and B. Surendra Nath (2014). Genetic diversity and phylogenetic relationships among microsporidian isolates from the Indian tasar silkworm *Antheraea mylitta*, as revealed by RAPD fingerprinting technique. **Intl. J. Indus. Ento.** 29(2): 169-178
22. Lekha G, Vijaya Gowri E, Sasibhushan S, Sivaprasad V, Ponnuvel KM (2014). Differential level of host gene expression associated with nucleopolyhedrovirus infection in silkworm races of *Bombyx mori*. **Intl. J. Indus. Ento.** 29(2): 145-152
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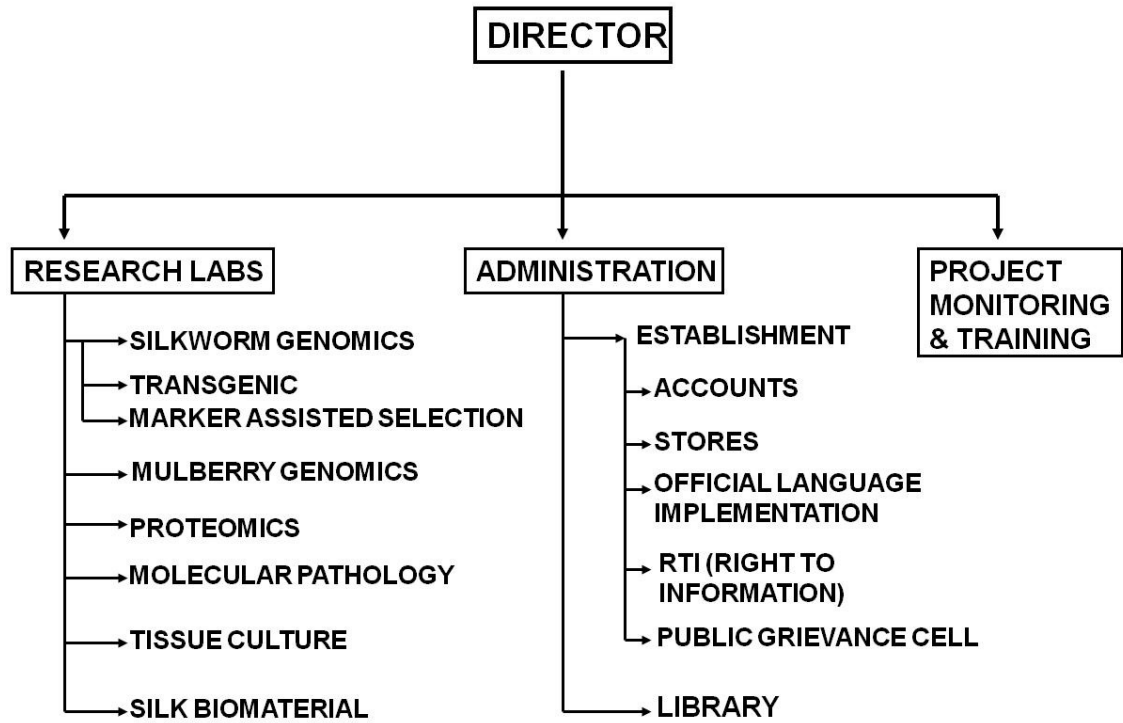
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Annexure 2

ORGANIZATION CHART



Annexure 3**Directory of officers and employees**

S.N.	NAME	DESIGNATION
1	Dr. Kalidas Mandal	Director (additional charge)
2	Dr. K.M. Ponnuvel	Scientist-D
3	Dr. G. Ravikumar	Scientist-D
4	Dr. A.R. Pradeep	Scientist-D
5	Dr. K.S. Tulsi Naik	Scientist-B
6	Dr. A. Ramesha	Scientist-B
7	Smt. Shymala S. Murthy	Asst .Dir. (A&A)
8	Sri Mohanraju	Asst. Supdt. (Admin)
9	Sri Chandrasekhar Rao	Asst. Supdt. (Admin)
10	Sri S.N. Gundu Rao	Tech. Asst.
11	Sri G. Sumanthkumar	Tech. Asst.
12	Sri. R.N. Sreekantaiah	Tech. Asst.
13	Sri S. Nagesh	Staff car driver
14	Sri A. Mallesh	Asst. Tech.
15	Sri Kenchappa	MTS
16	Sri Hombalaiah	Skilled Farm Worker (TS)
17	Sri N. Pillappa	Skilled Farm Worker (TS)
18	Sri E. Shivanna	Skilled Farm Worker (TS)
19	Sri M. Krishnappa	Skilled Farm Worker (TS)
20	Sri L.P. Sampangi Rao	Skilled Farm Worker
21	Smt. C. Lakshamma	TSF Worker

Annexure 4**Monthly remuneration received by each Officer / employee****[As on Aug. 2017]**

S.N.	NAME	DESIGNATION	Gross Salary (Rs.)
1	Dr. K.M. Ponnuvel	Scientist-D	122453.00
2	Dr. G. Ravikumar	Scientist-D	122453.00
3	Dr. A.R. Pradeep	Scientist-D	122453.00
4	Dr. K.S. Tulsi Naik	Scientist-B	76221.00
5	Dr. A. Ramesha	Scientist-B	75921.00
6	Smt. Shyamala S. Murthy	Asst .Dir. (A&A)	97036.00
7	Sri Mohanraju	Asst. Supdt.	79793.00
8	Sri Chandrasekhar Rao	Asst. Supdt.	71239.00
9	Sri S.N. Gundu Rao	Tech. Asst.	81356.00
10	Sri G. Sumanth kumar	Tech. Asst.	73363.00
11	Sri R.N. Sreekantaiah	Tech. Asst.	65553.00
12	Sri S. Nagesh	Staff car driver	61963.00
13	Sri A. Mallesh	Asst. Tech.	40602.00
14	Sri Kenchappa	MTS	38586.00
15	Sri Hombalaiah	Skilled Farm Worker (TS)	21680.00
16	Sri N. Pillappa	Skilled Farm Worker (TS)	21095.00
17	Sri E. Shivanna	Skilled Farm Worker (TS)	21095.00
18	Sri M. Krishnappa	Skilled Farm Worker (TS)	21095.00
19	Sri L.P. Sampangi Rao	Skilled Farm Worker	11966.00
20	Smt. C. Lakshamma	TSF Worker	9532.00