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रेशमकीट बीज प्रौद्योगिकी प्रयोगशाला
राष्ट्रीय रेशमकीट बीज संगठन
केन्द्रीय रेशम बोर्ड, वस्त्र मंत्रालय, भारत सरकार
करमेलराम डाक, कोडति, बेंगलूर - 560035

SILKWORM SEED TECHNOLOGY LABORATORY
NATIONAL SILKWORM SEED ORGANIZATION
Central Silk Board, Ministry of Textiles, Govt. of India
Carmelram Post, Kodathi, Bengaluru - 560 035
Email : sstlban.csb@nic.in



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Published by :

Dr. S. Manthira Moorthy
Director
National Silkworm Seed Organization,
Central Silk Board,
Bangalore-560068.
e-mail: nssoban.csb@nic.in

Edited & compiled by:

Dr. Sailaja Bandam, Scientist - C
Dr. R. Saravana kumar, Scientist - C
Dr. Mala N, Scientist - C
Sri. H.N. Harish, FA

Hindi translation:

Dr. Mala N, Scientist – C

Cover Page Design:

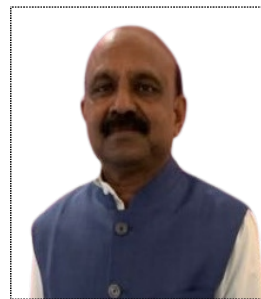
Dr. R. Saravanakumar, Scientist-C

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Mobile No.: 9448446415



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प्रस्तावना

मुझे रेशमकीट बीज प्रौद्योगिकी प्रयोगशाला की वर्ष २०२३-२४ का वार्षिक प्रतिवेदन प्रस्तुत करते हुए प्रसन्नता हो रही है। यह संस्थान, राष्ट्रीय रेशमकीट बीज संगठन के अंतर्गत एक अग्रणी संस्थान है जो शहतूत और वन्या रेशमकीट बीजों से संबंधित अनुसंधान और विकास पर ध्यान केंद्रित करता है। एस टी एल ने रेशम उत्पादन विभाग के सहयोग से कर्नाटक, आंध्र प्रदेश और तमिलनाडु में रोग सर्वेक्षण और बीज गुणन केंद्रों की निगरानी के माध्यम से पेब्रिन रोग के प्रबंधन में महत्वपूर्ण भूमिका निभाता है। इसके अतिरिक्त, एसएसटीएल सक्रिय रूप से विस्तार गतिविधियों में संलग्न है और इसने मानव संसाधन विकास कार्यक्रम के एक भाग के रूप में कर्नाटक, आंध्र प्रदेश और तमिलनाडु के रेशम उत्पादन विभाग के कार्मिकों को प्रशिक्षण प्रदान किया है, जिसमें बीज उत्पादन प्रौद्योगिकी और पेब्राइन रोग प्रबंधन पर ध्यान केंद्रित किया गया है। एसएसटीएल ने बीज अधिनियम के तहत हितधारकों को पंजीकृत बीज उत्पादक बनने के लिए प्रशिक्षित भी किया है। मैं बीज उत्पादन प्रौद्योगिकी में उनके बहुमूल्य समर्थन और योगदान के लिए अधिकारियों के समर्पण और कड़ी मेहनत की सराहना करता हूँ।

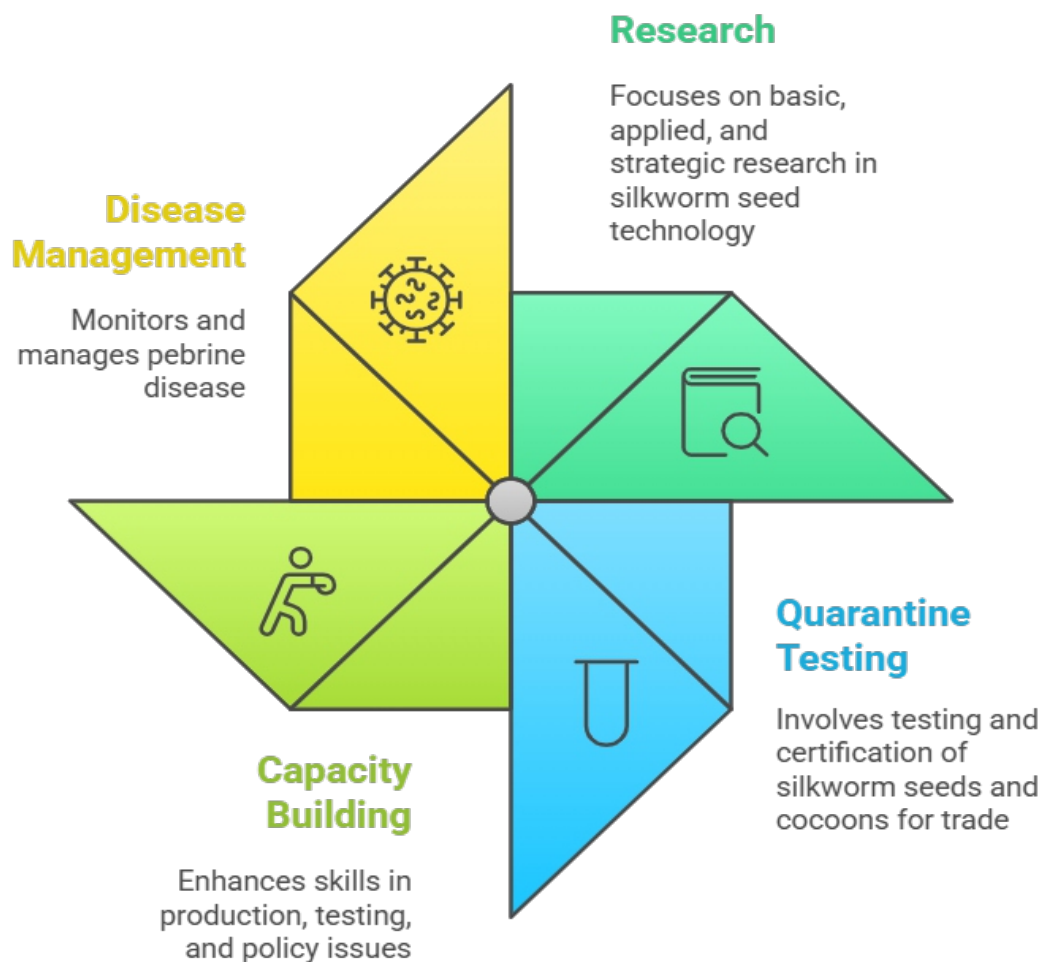
डॉ. एस. मंथिरा मूर्ति
निदेशक

FOREWORD

I am delighted to present the annual report of the Silkworm Seed Technology Laboratory for the year 2023-24. The SSTL is a leading institute within the National Silkworm Seed Organization that focuses on research and development related to Mulberry and Vanya silkworm seeds. The SSTL plays a crucial role in managing Pebrine disease through disease surveys and monitoring seed multiplication centers in Karnataka, Andhra Pradesh, and Tamil Nadu in collaboration with the Department of Sericulture. Additionally, the SSTL is actively engaged in extension activities and has provided training to Department of Sericulture personnel from Karnataka, Andhra Pradesh, and Tamil Nadu as part of the Human Resource Development program focusing on seed production technology and Pebrine disease management. The SSTL has also trained stakeholders under the Seed Act to become Registered Seed Producers. I commend the dedication and hard work of the officials for their valuable support and contributions to seed production technology.

Dr. S. Manthira Moorthy
Director, NSSO

MANDATE OF THE INSTITUTE



HUMAN RESOURCES

Director	Dr. S. Manthira Moorthy
Scientist-D & Head	Dr. Chandrashekar R Hegde (VRS on 01.09.2023)
Scientist-C & Incharge	Dr. Sailaja Bandam (From 01.09.2023)
Scientist-C	Dr. R. Saravanakumar Dr. Mala N.
Senior Technical Assistant	Mr. V. Chandrashekara Reddy (Retired on 30.11.2023) Mr. J. N. Chandrashekar Mr. B.V. Raviprasad Mrs. K. R. Rathnamma
Field Assistant	Mr. H. N. Harish
Driver	Mr. Shivaji
Multi Task Staff	Mr. L. H. Hemanna Gowda Mr. Lakshminarayana
Junior Research Fellow	Mr. M. Sharath (From 07.03.2024)

RESEARCH ADVISORY COMMITTEE (RAC)

CHAIRMAN

Prof. G. Subramanya,

Dept. of Studies in Sericulture Science,

University of Mysore,

Mysore, Karnataka Mobile: 9448600178

email : subramanyag2000@yahoo.co.in/ subramanyag2000@gmail.com

MEMBERS

Dr. V. Shyam Kumar,

Professor, Department of Microbiology and Biotechnology, Karnataka University,

Pavate Nagar, Dharwad-570003, Karnataka.

Contact No. 9880322743

email : vootlashyam@gmail.com / vootalashyam@kud.ac.in

Dr. Biram Sahab,

Scientist-D (Rtd.), Central Silk Board,

No. 303, Navaruthu Apartments, Basavanapura Main Road,

Near Lakshminarayana Bhavan, Bhattarahalli, K.R. Puram, Bengaluru-560049, Karnataka.

Contact No. 9448872681

email : biramsaheb1951@gmail.com

Director,

Central Sericulture Research & Training Institute, Central Silk Board,

Mananthavadi road, Srirampura, Mahadevapura, Mysuru-570 008, Karnataka.

Contact No.+91821-2362406 / 2362757

email: csrtimys.csb@nic.in / csrtimys@gmail.com

Commissioner of Sericulture,

Department of Sericulture, Govt. of Karnataka,

M.S building, Bengaluru-560001, Karnataka.

Contact No. +9180-22253856

email: teamsilk.tech01@gmail.com / commseri-kar@nic.in

Scientist D & Head,

Silkworm Seed Technology Laboratory, NSSO, Central Silk Board,

Carmelram post, Kodathi, Bengaluru-560035, Karnataka.

Contact No. 080-29519991/ 29519990

email : sstlban.csb@nic.in / sstlbng@yahoo.com

Director (Tech),

Central Silk Board, CSB complex, BTM Layout,

Madiwala, Bengaluru-560 068, Karnataka.

Contact No. 080-26282698

email: dirtech.csb@nic.in

Scientist D & Head,

Research Coordination Section, Central Silk Board,

CSB Complex, BTM Layout, Madiwala, Bengaluru-560068, Karnataka.

Contact No. 080-2628635

MEMBER-CONVENER

Director,

National Silkworm Seed Organization (NSSO), Central Silk Board,

CSB complex, BTM Layout, Madiwala, Bengaluru-560 068, Karnataka.

Contact No. 080-26683251 / 26282400 /26680387

email: nssoban.csb@nic.in

वर्ष के दौरान किये गए अनुसंधान एवं विकास कार्यों की प्रमुख उपलब्धियाँ

- ❖ आपातकालीन या अप्रत्याशित जलवायु परिस्थितियों में तसर के अंडों को १५ दिनों तक १५°C पर संरक्षित करने से अंडे सेने में देरी हो सकती है।
- ❖ अनियमित रूप से निकलने वाले पतंगों द्वारा दिए गए अंडों के साथ-साथ समान रूप से निकलने वाले पतंगों द्वारा दिए गए अंडों को संरक्षित करके, पहले दिए गए अंडों की बर्बादी को कम किया जा सकता है।
- ❖ मेजबान पादप वाष्पशील के उपयोग से, एनबी4डी2, सीएसआर26 और सीएसआर6 में, बाइवोल्टाइन रेशमकीटों में अंडों की प्राप्ति क्रमशः ५.४%, ५.६% और ७.३% बढ़ गई।
- ❖ इरी रेशमकीट के विभिन्न आकार-प्रकार, जिनमें पीला सादा, पीला धब्बेदार, पीला ज़ेबरा, हरा नीला सादा, हरा नीला धब्बेदार और हरा नीला ज़ेबरा शामिल हैं, सात पीढ़ियों तक बनाए रखे गए।
- ❖ जैवपरीक्षण अध्ययनों के माध्यम से कुल ३८ बीडीवी और ४१ एनपीवी सहिष्णु रेशमकीट प्रजातियों को मान्य किया गया।
- ❖ कर्नाटक, तमिलनाडु और आंध्र प्रदेश में रेशमकीट रोग निगरानी सर्वेक्षण किए गए, जिसमें ५१५० नमूनों का परीक्षण किया गया।
- ❖ सीबीटी और सीड एक्ट प्रशिक्षण कार्यक्रमों के अंतर्गत प्रशिक्षण कार्यक्रम आयोजित किए गए, जिसमें ९४ व्यक्तियों को विभिन्न विषयों पर प्रशिक्षित किया गया।
- ❖ सात विस्तार और संचार कार्यक्रम आयोजित किए गए, जिनमें १८६ हितधारकों तक पहुंच बनाई गई।
- ❖ हितधारकों को गुणवत्ता मानकों और पेब्राइन मुक्तता पर तकनीकी सेवाएं प्रदान की गईं, जिसमें ३२० नमूनों का परीक्षण किया गया।
- ❖ अनुसंधान एवं विकास उत्पादों, प्रशिक्षण और नमूना परीक्षण शुल्क से रॉयल्टी के माध्यम से २०.४५ लाख रुपये का राजस्व उत्पन्न हुआ।

HIGHLIGHTS OF ACTIVITIES

- ❖ Preserving Tasar eggs at 15°C for 15 days can delay hatching in emergency or unpredictable climatic conditions.
- ❖ By preserving eggs laid by moths that emerge erratically along with those laid by moths that emerge uniformly, wastage of early laid eggs can be reduced.
- ❖ The recovery of eggs in bivoltine silkworms was enhanced by 5.4%, 5.6%, and 7.3% in NB4D2, CSR26, and CSR6, respectively, through the use of host plant volatiles.
- ❖ Various morphotypes of Eri Silkworms, including Yellow Plain, Yellow Spotted, Yellow Zebra, Greenish Blue Plain, Greenish Blue Spotted, and Greenish Blue Zebra, were maintained for seven generations.
- ❖ A total of 38 BDV and 41 NPV tolerant silkworm races were validated through bioassay studies.
- ❖ Silkworm Disease Monitoring Surveys were carried out in Karnataka, Tamil Nadu, and Andhra Pradesh, with 5150 samples tested.
- ❖ Training programs were conducted under CBT and Seed Act training programs, with 94 individuals trained on various topics.
- ❖ Seven Extension and communication programs were conducted, reaching 186 stakeholders.
- ❖ Stakeholders were provided with technical services on quality standards and pebrine freeness, with 320 samples tested.
- ❖ A revenue of Rs. 20.45 lakhs generated through royalties from R&D products, training, and sample testing charges.

PART I: ON-GOING RESEARCH PROJECTS

1. APS 09002MI: Diapause induction in Muga Silkworm (*Antheraea assamensis* Helfer)

Dr. R. Saravana Kumar, Dr. Rajal Debnath*, Dr. K. Indira Kumar**,
Shri. M. Majumder**, Dr. Vikram Kumar**,
(In collaboration with SBRL*, Bangalore and MESSO**) (June 2022- May 2025)

The goal of this research is to establish a method for preserving seed cocoons over the long term by inducing pupal diapause to avoid unfavorable conditions. Muga silkworm rearing during unfavorable conditions to generate pre-seed and seeds for commercial crops is not very productive. The lack of seeds for commercial crops has a direct impact on the overall Muga silk production in India.

Objectives:

1. To determine effective diapause mechanism (classical/ molecular) in Muga silkworm.
2. To develop protocol for induction of pupal diapause in Muga silkworm

Muga seed cocoons were treated by varying temperatures and photoperiods (5°, 10°, 12° C with 6h L: 18h D, 10L: 14D) for different durations (10, 15, and 20 days). Treated cocoons kept at 25° C and moth emergences were observed after 14 days of incubation.

2. APS 09003MI: Evaluation of reproductive performance of Eri silkworm, *Samia ricini* (Donovan).

(In Collaboration with *ESSPC, Hosur & **P2 EBSF, Topatoli, Assam)
(June 2022- May 2024).

Dr. Mala N, Dr. Sailaja. B, Dr. Pratheesh Kumar P.M*, Dr. Lalitha N**

To strengthen eri silk production, CSB has proposed to tap the existing potential through encouraging agro-sericulture concept for increasing production of eri silk under the Central Sector Scheme Silk Samagra-II implemented during 2021-22 to 2025-26. With a view of expanding eri-culture in non-traditional area like Tamil Nadu having 14000 ha area under castor cultivation which is the primary food plant of eri silkworm and about 30% of foliage can be utilized for rearing of eri silkworm without foregoing economic seed yield. Hence, the particular study has undertaken with a view to gain insight about effectiveness of eri silkworm seed production in Tamil Nadu through comparative assessment of cocoon yield attributes with Assam provinces at the level of Adopted Seed Rearers (ASRs).

Objectives:

1. Analysis of eri seed crop performance in traditional and non-traditional areas
2. Fixation of reproductive fitness traits for eri silkworm, *Samia ricini*

A total of four batches of seed cocoon rearings were conducted with eri silkworms which were reared on the primary host plant (Castor) under different climatic zones at the selected ASRs level. The data on different seed cocoon rearing and reproductive parameters were recorded for every rearing and pooled season-wise for comparison. The cocoon and grainage parameters were recorded separately and depicted in Tables 1 and 2.

Table 1: Rearing performance of C2 breed at different locations

Crops/ parameters	Hatching (%)		Larval duration (Days)		ERR (%)		Cocoon yield / 100dfls	
	Assam	Tamil Nadu	Assam	Tamil Nadu	Assam	Tamil Nadu	Assam	Tamil Nadu
Crop 1	64.50	95.09	15.00	19.36	23.24	84.72	14.09	63.19
Crop 2	86.50	93.31	15.83	19.20	85.95	81.41	59.59	61.80
Crop 3	74.89	92.25	31.50	18.50	75.00	78.50	41.53	56.75
Crop 4	80.00	94.70	17.00	18.30	75.50	81.91	46.67	63.19
Mean	76.47	93.84	19.83	18.84	64.92	81.64	40.47	61.23

Table 2: Grainage performance of C2 breed at different locations

Crops/ parameters	Actual cocoons (kg)		Good cocoons (kg)		Dfl:cocoon ratio		Cocoon:dfls ratio	
	Assam	Tamil Nadu	Assam	Tamil Nadu	Assam	Tamil Nadu	Assam	Tamil Nadu
Crop 1	6.65	18.95	5.63	18.39	42	228	5.9	3.0
Crop 2	19.27	18.54	16.15	17.84	173	223	4.6	2.8
Crop 3	14.50	17.02	14.10	16.29	143	204	5.0	3.4
Crop 4	15.88	18.95	13.38	18.30	141	228	4.3	3.1
Mean	14.07	18.37	12.31	17.70	125	221	4.9	3.1

**3. SPPO9004MNC: Studies on virulence status of different
microsporidian species in Silkworm (*Bombyx mori* L).
(Collaborative project of SSTL¹, SBRL², KSSRDI³, APSSRDI⁴, CSR&TI-Mysore⁵).
(Jan 2024 to Dec 2026). Budget: Rs. 86.25 Lakhs**

¹Dr. R. Saravana Kumar, ¹Dr. Sailaja Bandam, ²Dr. G. Subrahmanyam,
³Dr. N. B. Jyothi, ⁴Dr. J. Seetharamulu, ⁵Dr. G. Mallikarjun.
Dr. S. Manthira moorthy¹

Introduction

Pebrine is the most destructive disease of silkworm, *Bombyx mori* L. as it is transovarially transmitted to the next generation and inflicts crop loss. Outbreak of pebrine continues to pose a constant threat to sericulture industry in India. These microsporidian strains differ in their pathogenicity, rate of spread, mode of transmission. This has recently become a serious concern to the seed producers in India. The proposed project aims to discriminate of different microsporidian species from the field and understand their virulence status for clarifying the confusion of crop loss.

Objective:

- 1.To identify different microsporidian pathogens infecting silkworm (*Bombyx mori* L)
- 2.To study the virulence character of various microsporidia
- 3.To detect virulent and non-virulent microsporidia to ascertain crop loss

Disease survey conducted in sericulture areas of Karnataka, Andhra Pradesh and Tamil Nadu. A total of 15 microsporidia isolates collected from field and multiplied for bioassay studies.

PART II: CONCLUDED RESEARCH PROJECT

1. MOE09001 MI: EVALUATION OF NEW TECHNOLOGIES FOR SEED PRODUCTION IMPROVEMENT

Component 1: Test verification of technologies developed for seed /seed cocoon preservation and regulation of erratic moth emergence in Tasar silkworm (*Antheraea mylitta*, D).

Dr. Sailaja Bandam¹, Dr. G.V. Vishaka² and Dr. J.P. Pandey³

¹Silkworm Seed Technology Laboratory, Kodathi, Bangalore

²BTSSO, Bilaspur, ³CTR&TI, Ranchi.

Introduction

The pupal diapause and moth emergence pattern of the tropical Tasar silkworm, *Antheraea mylitta* D, are significantly affected by abiotic factors, making grainage operations complex. By manipulating temperature and light conditions (one month before the expected moth emergence), the rhythm of moth emergence can be altered, leading to a reduction in the duration of grainage operations. Erratic moth emergence during seed cocoon preservation is often caused by sudden changes in climate, such as fluctuations in temperature and relative humidity. Moths that emerge early may lay eggs that are not viable for rearing and end up being wasted. In some cases, delaying hatching is necessary to address issues related to synchronized brushing, depending on the season and availability of suitable foliage (Pandey *et al.*, 1992). Technologies developed for preserving Tasar seed cocoons (by adjusting photoperiod and temperature one month before normal emergence) and Tasar egg preservation for 18 days can help address these challenges. These technologies thoroughly validated in On Station Trials to assess their effectiveness.

Objective

1. To study the rearing performance of preserved Tasar seed at different localities / units of BTSSO.



Initial Research

Scientists at SSTL conducted initial research on Tasar silkworm egg handling techniques .



Technology Development

Tasar short-term egg preservation technology is developed.



Technology Validation

The technology is validated at selected stations of BTSSO and CTR&TI.



Egg Procurement

DTV and DBV eggs are procured from BSMTCs of BTSSO Bilaspur.



Egg Preservation

Eggs are preserved at 15°C with 80-85% RH for 15 days in dark conditions.



Egg Incubation

Preserved eggs are incubated at 25°C with 80-85% RH.



OST Studies

OST studies are conducted using the preserved eggs at nested units of BTSSO, Bilaspur and CTR&TI, Ranchi.



Results

I. Performance of Tasar Preserved Seed during 2023 at CTR&TI, Ranchi

3 Performance of II DTV (2023) Rearing carried under Collaborative OST by CTR&TI, Ranchi														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Ccn harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
CTR&TI, RANCHI	77	75	30	30	33	33.3	1475	1350	8.31	9.76	0.84	0.89	10.09	9.13
RSRS BHARIPADA	58	62	31	30	37	36.7	84	223	10.3	10.6	1	1.1	9.7	10.38
RSRS JAGADALPUR	66	69	30	31	31	32	1910	2050	11.1	10.98	1.15	1.15	10.36	10.47
RSRS BHANDARA	53	49	35	35	27	25	597	581	9.15	9.12	1.05	0.98	11.48	10.75
Mean ± S.D.	63.5±10	63.75±11	31.5±2	31.5±2	32±4	31.75±5	1016.5±827	1051±815	9.7±1	10.1±1	1.01±0.1	1.03±0.1	10.4±1	10.18±1
t Value	NS		NS		NS		0.9549*		NS		NS		NS	

4 Performance of III DTV (2023) Rearing carried under Collaborative OST by CTR&TI, Ranchi															
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Ccn harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %		
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	
RSRS BHARIPADA	48	66	33	30	32	33	130	440	10.6	10.4	1	1	9.4	9.6	
RSRS JAGADALPUR	82	83	46	47	33	34	1404	1500	11.89	12	1.23	1.44	10.34	12	
CTR&TI, RANCHI	45	50	32	30	35	34	225	350	11.5	11.2	1.2	1.5	10.4	13.3	
CTR&TI, RANCHI	71	73	45	40	34	35	1000	1100	10.98	10.2	1.13	1.12	10.3	10.9	
Mean ± S.D.	61.5±18	68± 14	39± 8	36.75± 8	33.5± 1	34± 1	689±615	847± 549	11± 1	10.9± 1	1.14± 0.10	1.27± 0.25	10.11± 0.48	11.45± 1.56	
t Value	0.570*		NS		NS		0.383*		NS		NS		NS		

5 Performance of I DBV (2023) Rearing carried under Collaborative OST by CTR&TI, Ranchi														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Cen harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
CTR&TI, Ranchi	82	80	30	30	34	33.6	1305	1217	9.2	9.7	1	0.84	10.9	8.6
RSRS, Bharipada	58	61	31	31	36	36.5	75	211	11.2	11.17	1.4	1.5	12.5	13.4
RSRS, Dumka	70	75	38	37	38	38.5	612	428	14.2	14.09	2.12	2.02	14.9	14.3
RSRS, Jagadalpur	43	68	31	30	32	32	725	1010	11.3	11.25	1.25	1.25	11.06	11.11
Mean ± S.D.	63.25± 17	71± 8	32.5± 4	32± 3	35± 3	35.15±3	679± 504	716.5±474	11.5±2	11.5± 2	1.4± 0.48	1.4± 0.5	12.34±1.9	11.85± 2.6
t Value	0.825*		NS		NS		0.107*		NS		NS		NS	

I. Tasar preserved eggs rearing at SBT section and RSRS units of CTR&TI Ranchi.



II. Rearing Performance of Preserved Tasar Seed during 2023 at BTSSO, Bilaspur



6 Performance of I DTV (2023) Rearing carried under Collaborative OST by BTSSO, Bilaspur														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Cen harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
BSM&TC, Pali	79	80	31	29	30.5	31.23	789	962	9.01	9.23	0.95	1.03	10.54	11.15
BSM&TC, Boirdadar	78	81	32	30	31.3	32.13	791	992	9	9.32	0.91	1.07	10.11	11.48
BSM&TC, Bastar	80	84	31	28	30.54	32.32	803	996	9.15	9.53	1.09	1.11	11.91	11.64
BSM&TC, Bhandara	78	80	31	32	31.03	32.67	776	921	9	9.29	0.98	1.03	10.88	11.08
BSM&TC, Balaghat	80	80	29	30	30.16	31.51	743	913	9.02	9.31	0.89	1.04	9.86	11.17
Mean ± S.D.	(79 ± 1.00)	(81 ± 1.73)	(31 ± 1.10)	(30 ± 1.48)	(30.71 ± 0.45)	(31.97 ± 0.59)	(780 ± 23.00)	(957 ± 38.74)	(9.04 ± 0.06)	(9.34 ± 0.11)	(0.96 ± 0.08)	(1.06 ± 0.03)	(10.66 ± 0.80)	(11.30 ± 0.24)
t Value	NS		NS		NS		**		NS		NS		NS	
7 Performance of I DBV (2023) Rearing carried under Collaborative OST by BTSSO, Bilaspur														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Cen harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
BSM&TC, Pali	81	82	35	32	32.6	33.1	880	1050	10.1	10.51	1.06	1.21	10.49	11.51
BSM&TC, Boirdadar	80	83	32	33	30.15	31.5	810	976	10.02	10.36	1.09	1.32	10.87	12.74
BSM&TC, Bastar	81	83	30	30	32.3	33.56	932	1106	10.13	10.67	1.04	1.37	10.26	12.83
BSM&TC, Bhandara	80	82	33	31	31.67	32.48	864	996	10.01	10.49	1.1	1.32	10.98	12.58
BSM&TC, Balaghat	80	83	32	30	31.28	32.45	884	978	10	10.47	1.13	1.42	11.3	13.56
Mean ± S.D.	(80 ± 0.55)	(83 ± 0.55)	(32 ± 1.82)	(31 ± 1.30)	(31.60 ± 0.96)	(32.62 ± 0.78)	(874 ± 43.86)	(1021 ± 56.05)	(10.05 ± 0.06)	(10.50 ± 0.11)	(1.08 ± 0.04)	(1.33 ± 0.08)	(10.78 ± 0.41)	(12.64 ± 0.74)
t Value	NS		NS		NS		**		NS		NS		NS	
8 Performance of II DBV (2023) Rearing carried under Collaborative OST by BTSSO, Bilaspur														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Cen harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
BSM&TC, Pali	83	85	40	41	37.1	38.03	1045	1110	9.86	10.16	1.6	1.9	16.22	18.7
BSM&TC, Boirdadar	87	87	44	41	38.06	38.53	1121	1124	11.08	11.64	1.56	1.75	14.07	15.03
BSM&TC, Bastar	85	86	50	46	38.45	39.62	1190	1275	13.01	13.4	1.59	1.6	12.22	11.94
BSM&TC, Bhandara	82	85	43	41	36.51	37.13	1236	1375	12.5	12.76	1.73	1.81	13.84	14.18
BSM&TC, Balaghat	82	85	44	41	36.81	38.43	1126	1286	11.98	12.47	1.65	1.76	14.12	14.11
Mean ± S.D.	(84 ± 2.17)	(86 ± 0.89)	(44 ± 3.63)	(42 ± 2.24)	(37.39 ± 0.83)	(38.35 ± 0.90)	(1144 ± 72.86)	(1234 ± 113.73)	(11.69 ± 1.25)	(12.09 ± 1.25)	(1.63 ± 0.07)	(1.76 ± 0.11)	(14.09 ± 1.42)	(14.79 ± 2.46)
t Value	NS		NS		NS		**		NS		NS		NS	
9 Performance of II DTV (2023) Rearing carried under Collaborative OST by BTSSO, Bilaspur														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Cen harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
BSM&TC, Pali	86	86	33	35	31	33.08	400	416	9.87	10.1	1	1.2	10.13	11.95
BSM&TC, Boirdadar	89	90	34	35	31.01	33.1	580	625	9.46	9.57	1.05	1.15	11.09	11.91
BSM&TC, Bastar	84	84	35	34	31.86	34.91	1236	1375	10.84	10.96	1.25	1.38	11.53	12.59
BSM&TC, Bhandara	80	81	30	30	31.21	32.47	250	246	10.04	10.8	1	1.22	9.96	11.3
BSM&TC, Balaghat	80	80	30	30	31.09	32.21	360	371	10.09	10.59	1.07	1.19	10.6	11.23
Mean ± S.D.	(84 ± 3.90)	(84 ± 4.02)	(32 ± 2.30)	(33 ± 2.59)	(31.23 ± 0.36)	(33.15 ± 1.05)	(565 ± 393.36)	(607 ± 450.73)	(10.06 ± 0.50)	(10.40 ± 0.57)	(1.07 ± 0.10)	(1.23 ± 0.09)	(10.66 ± 0.66)	(11.80 ± 0.56)
t Value	NS		NS		NS		**		NS		NS		NS	
10 Performance of III DTV (2023) Rearing carried under Collaborative OST by BTSSO, Bilaspur														
Centre	Hatching %		Larval Duration (D:H)		V Inst. Larval Wt. (g)		No. of Cen harvested		Avg. Cocoon Weight (g)		Avg. Shell Weight (g)		SR %	
	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control	OST	Control
BSM&TC, Pali	86	86	40	42	33.43	34.58	1225	1320	11.35	11.39	1.4	1.47	12.33	12.9
BSM&TC, Boirdadar	89	92	47	46	33.24	34.36	1412	1425	9.3	9.96	1	1.25	10.75	12.55
BSM&TC, Bastar	85	87	46	46	32.13	34.86	1110	1125	11.2	11.46	1.09	1.25	9.73	10.9
BSM&TC, Bhandara	83	83	47	46	32.89	34.19	1218	1220	11.08	11.35	1.03	1.24	9.29	10.92
BSM&TC, Balaghat	82	83	46	47	33.01	34.19	1404	1500	11.89	12	1.23	1.44	10.34	12
Mean ± S.D.	(85 ± 2.74)	(86 ± 3.70)	(45 ± 2.95)	(45 ± 1.95)	(32.94 ± 0.50)	(34.44 ± 0.29)	(1274 ± 130.74)	(1318 ± 151.19)	(10.96 ± 0.98)	(11.23 ± 0.76)	(1.15 ± 0.17)	(1.33 ± 0.11)	(10.49 ± 1.17)	(11.85 ± 0.92)
t Value	NS		NS		NS		**		NS		NS		NS	
* - Significant at 5 % level														
** - Significant at 1 % level														

CTR&TI, Ranchi, and its units RSRS Jagadapur, RSRS Bhandara, REC Champa, BSM&TC, Baripada, and RSRS Dumka conducted a total of 3 trials during 2023. The results showed no significant differences between the control and treatment (OST Batches) groups (Table I). In CTR&TI, Ranchi, and its units RSRS Jagadapur, RSRS Bhandara, REC Champa, BSM&TC, Baripada, and RSRS Dumka and in BTSSO, Bilaspur units of BSM&TC-Pali, BSM&TC-Boirdadar, BSM&TC-Bastar, BSM&TC-Bhandara, BSM&TC-Balaghat the technology validated. Results indicated that there are no significant variations in the rearing parameters (Table I and II) and the technology can be utilised during emergency and as per the requirement of the Tasar seed sector.

Conclusion

- Preserving eggs at 15°C for 15 days postpone hatching / brushing 15 days as compared to existing practice in Tasar during emergency conditions / unpredictable climatic situations.
- Eggs laid by erratically emerged moths can be preserved and brushed along with the eggs laid by uniformly emerged moths through this early laid eggs wastage can be minimised.

Component -2: Test verification of synthetic blend (volatiles) developed for bivoltine silkworm seed production.

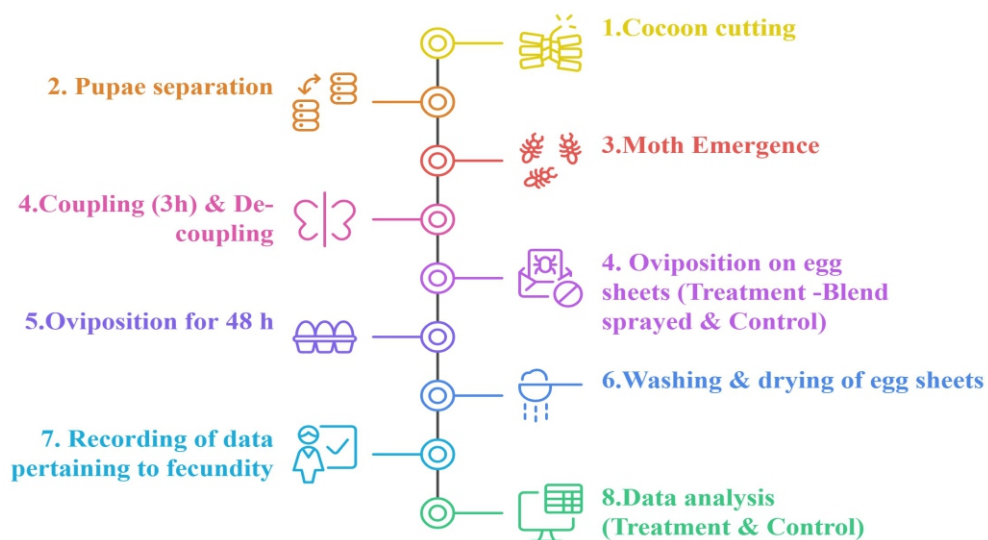
(Collaborative project of 1 Silkworm seed Technology Laboratory, Kodathi, Bangalore. ²SSPC, NSSO, K.R. Nagar; ³P2 BSF, Sheeshambara.

Dr. R. Saravana Kumar¹, Dr. Chandrashekara R. Hegde¹, Dr. K. Chandrasekharan² and Dr. Sahadev Chouhan³

Introduction

The Silkworm Seed Technology Laboratory (SSTL), in collaboration with IIHR, developed a blend for enhancing fecundity for FC1xFC2. These results were verified by conducting large-scale on-station trials (OST) for FC1xFC2 in the commercial SSPCs of NSSO, namely SSPC Hosur, SSPC Vijayapura, and SSPC Bangalore, where the egg yield per kilogram of cocoons improved by 11%. To determine the impact of the blend, the present study was conducted on other pure races, namely CSR6, CSR26, SH6, and NB4D2, to improve egg yield.

METHODOLOGY



Results

The mulberry volatile identified and its synthetic chemical blend standardized for Bivoltine hybrid (FC1 x FC2) was test verified in the bivoltine pure races (CSR6, CSR26, SH6, and NB4D2) to enhance silkworm egg production. Details mentioned in below tables (1,2,3&4).

Table 1. Mean of 2 trials on egg laying with the effect of volatile in bivoltine race **SH6**

Treatment	Wt. of egg /100 DFLs (g) (Mean $\pm$ SD)	Improvement (g) (Mean $\pm$ SD)	Percentage (Mean $\pm$ SD)	Eggs laid /moth (Mean $\pm$ SD)	Eggs Retained/ moth (Mean $\pm$ SD)	Hatching % (Mean $\pm$ SD)
Treated	30.87 $\pm$ 0.198	-1.56 $\pm$ 0.308	-4.80 $\pm$ 0.935	623 $\pm$ 14.284	25 $\pm$ 3.536	96 $\pm$ 0.354
Control	32.42 $\pm$ 0.110			637 $\pm$ 13.718	15 $\pm$ 8.485	95 $\pm$ 1.414
<i>p. value</i>	0.0105	-	-	NS	NS	NS

Table 2. Mean of 2 trials on egg laying with the effect of volatile in bivoltine race **NB4D2**

Treatment	Wt. of egg (g) /100 DFLs (Mean $\pm$ SD)	Improvement (g) (Mean $\pm$ SD)	Percentage (Mean $\pm$ SD)	Eggs laid /moth (Mean $\pm$ SD)	Eggs Retained/ moth (Mean $\pm$ SD)	Hatching % (Mean $\pm$ SD)
Treated	32.58 $\pm$ 1.068	1.68 $\pm$ 0.774	5.44 $\pm$ 2.455	527 $\pm$ 9.051	19 $\pm$ 3.536	96 $\pm$ 0.707
Control	30.89 $\pm$ 0.294			515 $\pm$ 16.122	31 $\pm$ 9.192	96 $\pm$ 0.283
<i>p. value</i>	NS	-	-	NS	NS	NS

Table 3. Mean of 4 trials on egg laying with the effect of volatile in bivoltine race **CSR6**

Treatment	Wt. of egg (g) /100 DFLs (Mean $\pm$ SD)	Improvement (g) (Mean $\pm$ SD)	Percentage (Mean $\pm$ SD)	Eggs laid /moth (Mean $\pm$ SD)	Eggs Retained/ moth (Mean $\pm$ SD)	Hatching % (Mean $\pm$ SD)
Treated	32.55 $\pm$ 2.005	2.19 $\pm$ 0.751	7.30 $\pm$ 2.846	499 $\pm$ 15.149	16 $\pm$ 5.500	96 $\pm$ 0.816
Control	30.36 $\pm$ 2.192			466 $\pm$ 32.483	30 $\pm$ 13.598	96 $\pm$ 0.816
<i>p. value</i>	NS	-	-	0.0478	0.0415	NS

Table 4. Mean of 3 trials on egg laying with the effect of volatile in bivoltine race **CSR26**

Treatment	Wt. of egg (g) /100 DFLs (Mean $\pm$ SD)	Improvement (g) (Mean $\pm$ SD)	Percentage (Mean $\pm$ SD)	Eggs laid /moth (Mean $\pm$ SD)	Eggs Retained/ moth (Mean $\pm$ SD)	Hatching % (Mean $\pm$ SD)
Treated	28.41 $\pm$ 2.793	1.560 $\pm$ 0.932	5.68 $\pm$ 3.20	469 $\pm$ 15.227	17 $\pm$ 5.508	95.33 $\pm$ 0.577
Control	26.85 $\pm$ 1.936			434 $\pm$ 15.948	39 $\pm$ 5.686	95.33 $\pm$ 1.155
<i>p. value</i>	NS	-	-	0.003	0.001	NS

Values represented as Mean $\pm$ SD of weight of egg (g) and fecundity in number, NS - Non significant, Significance at $P < 0.05$

Conclusion

The study's findings will help boost egg recovery in grainages and increase egg production by 5.4%, 5.68%, and 7.3% in NB4D2, CSR26, and CSR6, respectively. The implementation of the Oviposition Stimulant Blend technology will directly contribute to the rise in egg production and will be embraced by Silkworm Seed Production units to enhance revenue. The innovative approach of using mulberry volatiles to stimulate silkworm egg laying for bivoltine production will significantly increase egg production. This technology is expected to be widely adopted by Silkworm Seed Production units to boost their earnings.

PART III: COLLABORATIVE RESEARCH PROJECT

1. Ongoing project: AIB08007MI Development and evaluation of Eri Silkworm (*Samia ricini* Donovan) Breeds/Hybrids with improved productivity

(Collaborative project of SBRL*, ²MESSO, ³CMER&TI and SSTL¹ as CI)

Dr. Rajal Debnath*, Dr. Ramesha*, Dr. Himanshu Dubey*, **Dr. Mala N¹**, Dr. Lalitha N²,
Dr. Reeta Luikham³, Dr. Pratheesh Kumar²

Eri silk has shown potential by drawing significant attention from stakeholders. Thus, improvement in the production and productivity of Eri silk is one of the major mandates of socio-economic development of marginal farmers practicing Ericulture. The project outcome tries to support this by developing eri breeds with improved silk/protein trait by utilizing the genetic variability existing in silkworm strains/morphotypes.

Objectives

1. Generation of stable breeding lines of Eri silkworm strains/morphotypes
2. Utilization of molecular markers to develop and characterize eri hybrids with economic value

The cellular rearing of different strains/morphotypes viz., YP (Yellow Plain), YS (Yellow Spotted), YZ (Yellow Zebra), GBP (Greenish Blue Plain), GBS (Greenish Blue Spotted), and GBZ (Greenish Blue Zebra) were continued for seven generations. The parameters were recorded separately for all morphotypes (Table 1).

Table 1: Rearing performance of different strains/morphotypes of eri silkworm

Morphotype	Hatching %	Larval duration (days)	Larval wt. (g)	Cocoon wt. (g)	Shell wt. (g)	Pupal wt. (g)	Shell ratio %
YP	97.72	15	6.45	2.94	0.36	2.58	12.24
GBP	94.50	15	7.01	2.86	0.40	2.44	13.98
YZ	96.72	15	8.23	3.46	0.45	3.01	13.01
GBZ	97.85	15	8.14	3.48	0.43	3.05	12.35
YS	87.20	15	7.34	3.04	0.38	2.66	12.5
GBS	93.61	15	7.43	3.17	0.39	2.79	12.3

2. Concluded project: AIT06006MI Marker assisted screening to identify silkworm Genetic resources tolerant to BmNPV and BmBDV

(Collaborative project of CSGRC¹, Hosur and ²SSTL as CI) (Nov 2020- Jan 2024).
Dr. Ritwika sur Chaudhuri¹, Dr. G. Punithavathy¹, Dr. G. Lokesh¹, Dr. G. Ravikumar¹ and
Dr. R. Saravanakumar²

The project aimed to screen the silkworm germplasm stock for the presence of BmNPV and BmBDV tolerance genes using molecular markers and to validate the identified stocks through bioassay. The study aimed to identify silkworm germplasm breeds with better disease resistance that can be utilized to develop improved silkworm hybrids.

Objectives

1. To validate disease tolerance of the accessions through bioassay studies.

38 BDV- and 41 NPV-tolerant silkworm races were validated through bioassay studies which were identified by CSGRC, Hosur. Virus inoculum was prepared using BDV-infected larvae collected and confirmed for the presence of viruses in the supernatant of midgut homogenate through PCR amplification. NPV concentration was quantified and optimized to 10^6 polyhedra/ml. The viruses were inoculated on 3rd instar 1st day larvae, and rearing was conducted up to spinning. Three replications were maintained, with each replication having 200 larvae for rearing. Larval and pupal survival percentages were recorded as an average of the three replications for tolerance level.

Table 1: Survival of BDV tolerant silkworm breeds after calculating corrected mortality percentage

Sl No.	Accession No.	Larval survival % (Mean±SD)	Pupal survival % (Mean±SD)
1.	BBE-0027	97.67±0.76	87.68±5.51
2.	BBE-0267	97.00±1.00	87.14±6.01
3.	BMI-0077	76.33±3.06	74.12±3.22
4.	BMI-0076	79.67±6.11	73.68±3.50
5.	BBE-0216	79.67±5.49	70.35±9.29
6.	BBI-0382	78.50±0.87	68.32±9.24
7.	BBI-0337	84.83±4.65	60.51±5.84
8.	BBE-0014	70.50±6.50	60.33±6.95
9.	BBE-0266	79.83±1.26	54.44±5.39
10.	BBE-0190	53.67±6.81	43.75±4.00
11.	BBI-0336	75.33±6.03	38.24±4.54
12.	BBI-0371	44.00±4.50	34.73±2.78
13.	BBE-0035	63.83±10.37	32.61±6.53

14.	BBE-0177	48.00±6.06	26.00±5.64
15.	BBI-0369	65.00±7.09	24.24±3.78
16.	BBE-0008	60.83±7.37	22.84±2.75
17.	BBI-0358	22.00±2.78	21.35±2.64
18.	BBI-0338	30.33±8.28	20.45±2.93
19.	BBE-0178	53.33±3.88	16.26±1.53
20.	BBI-0378	17.50±3.04	16.11±3.97
21.	BBE-0225	26.00±4.58	12.68±2.47
22.	BBI-0325	11.50±1.32	10.80±2.50
23.	BBI-0128	22.00±5.22	7.47±2.29
24.	BBE-0031	7.50±2.29	7.30±2.60
25.	BBE-0224	41.50±7.55	7.08±1.76
26.	BBI-0126	18.17±4.86	6.29±2.29
27.	BBE-0198	12.50±4.77	2.90±2.52
28.	BBE-0226	30.00±5.50	2.17±1.80
29.	BBI-0345	21.33±2.36	1.75±1.80
30.	BBI-0124	8.83±1.26	1.05±1.04
31.	BBE-0227	34.50±6.87	0
32.	BBI-0334	16.83±4.07	0
33.	BBI-0365	12.47±3.36	0
34.	BBE-0223	8.17±3.88	0
35.	BBE-0206	7.00±3.28	0
36.	BBI-0074	6.83±3.22	0
37.	BBI-0064	5.67±1.53	0
38.	BBE-0166	5.17±1.26	0

Table 2: Survival of NPV tolerant silkworm breeds after calculating corrected mortality percentage

Sl No.	Accession No.	Larval survival % (Mean±SD)	Pupal survival % (Mean±SD)
1.	BMI-0018	62.67±5.51	57.27±6.25
2.	BMI-0019	59.83±3.79	53.33±2.26
3.	BBI-0371	67.67±5.84	52.90±4.04
4.	BBI-0370	60.33±4.48	39.01±5.11
5.	BBI-0078	46.67±8.74	31.21±6.33
6.	BBE-0179	57.50±10.54	25.72±3.01
7.	BBI-0376	64.00±5.00	20.79±5.13
8.	BBE-0182	20.50±4.09	18.00±4.25
9.	BBI-0276	28.00±3.12	14.44±2.50
10.	BME-0012	19.50±2.78	13.79±3.01
11.	BBI-0237	16.00±3.28	13.26±3.82
12.	BBE-0206	41.83±3.88	12.68±4.51
13.	BBI-0258	56.17±6.60	11.96±3.97
14.	BBE-0185	53.67±5.20	11.72±0.76
15.	BBE-0029	28.00±4.82	10.93±4.19
16.	BBI-0052	31.67±8.51	9.78±3.50
17.	BBI-0275	25.17±9.07	9.32±1.89
18.	BBE-0171	47.67±4.48	9.26±2.08
19.	BBE-0189	35.67±1.53	9.14±1.80

20.	BBI-0100	61.17±9.22	8.52±4.44
21.	BBE-0186	39.17±2.26	8.24±0.87
22.	BBE-0226	11.33±1.53	7.54±1.53
23.	BBE-0170	45.83 ± 2.25	4.68±1.26
24.	BBE-0030	16.00±7.76	4.21±1.16
25.	BMI-0080	7.00±0.87	4.04±1.26
26.	BBE-0245	20.67±1.44	3.22±2.26
27.	BBE-0195	46.5±1.80	3.08±1.16
28.	BBI-0257	4.83±4.25	2.88±2.36
29.	BBE-0212	31.00±5.27	2.49±0.76
30.	BBE-0196	44.17±4.51	2.04±1.89
31.	BBI-0204	4.83±0.76	1.65±0.50
32.	BMI-0073	6.17±1.26	1.46±1.04
33.	BBI-0096	39.00±6.5	1.31±2.02
34.	BBE-0177	3.67±1.76	1.3±2.02
35.	BBE-0197	39.17±5.75	0.73±0.29
36.	BBE-0191	7.17±1.53	0.57±0.50
37.	BBI-0380	5.00±2.00	0.36±0.58
38.	BBE-0028	6.00±1.73	0
39.	BBE-0209	0	0
40.	BBE-0217	0	0
41.	BBE-0238	0	0

PART IV: PROGRAMMES OF THE INSTITUTE

1. Capacity building and Training on silkworm seed production

Dr. Sailaja B, Dr. R. Saravana Kumar, Dr. Mala N, B.V. Raviprasad, K.R. Rathnamma

Eleven training programs were organized for stakeholders under CBT on different aspects of seed technology, covering 94 stakeholders (Table 1). Five training programs under the Central Seed Act were conducted on different activities of grainages for the RSPs recommended by NSSO, Bangalore, to issue a certificate to initiate a new private grainage. In addition to the regular training programs, two trainings were exclusively conducted for RSPs/CRCs.

Table 1: Details of Training programmes conducted under CBT and Central Seed Act

#	Name of the training	Period	Total Number of Trainees				
			KA	TN	AP	TOTAL	
Capsule / regular training programmes (approved by CBT of CSB)							
1	Pebrine Detection in Silkworm (I Batch)	12-14/09/2023	12	5	-	17	
2	Seed Production Techniques	17-19/10/2023	09	-	-	09	
3	Pebrine Detection in Silkworm (II Batch)	22-24/11/2023	13	5	-	18	
4	Pebrine Detection in Silkworm (IV Batch)	09-11/01/2024	12	2	-	14	
	Sub total		46	12	-	58	
Training programmes conducted under Central Seed Act for RSPs							
			KA	TN	AP	MH	TOTAL
1	I Batch: Silkworm Seed Production Techniques (3 Months)	27.02.2023 to 27.05.2023	1	-	-	-	1
2	II Batch: Silkworm Seed Production Techniques (3 Months)	08.05.2023 to 05.08.2023	2	1	-	2	5
3	III Batch: Silkworm Seed Production Techniques (3 Months)	07.07.2023 to 30.09.2023	4	-	-	-	4
4	IV Batch: Silkworm Seed Production Techniques (3 Months)	06.07.2023 to 03.10.2023	2	-	-	-	2
5	V Batch: Silkworm Seed Production Techniques (3 Months)	17.10.2023 to 16.01.2024	2	-	-	-	2
Sub total			11	1	-	2	14
Training programmes conducted for RSPs/CRCs							
			KA	TN	AP		TOTAL
1	Pebrine detection in Silkworm (I Batch)	06-08/02/2024	10	-	-		10
2	Pebrine detection in Silkworm (II Batch)	19-21/02/2024	12	-	-		12
	Sub total		22	-	-		22
			KA	TN	AP	MH	TOTAL
	GRAND TOTAL		79	13	-	02	94



2. SILKWORM DISEASE SURVEYS

Dr. Sailaja B, Dr. R. Saravana Kumar, B.V. Ravi Prasad, Rathnamma

SSSL scientists were involved in a disease survey in three southern states: Karnataka, Tamil Nadu, and Andhra Pradesh, along with scientists from APSSRDI and KSSRDI. They inspected seed crops, ASR crops, and DoS Farms.

2.1. Joint Silkworm Disease Monitoring Survey (JSDMS)

SSSL Scientists visited seed areas in three southern states (Karnataka - Kunigal / Magadi, Anekal, and Attibele; Andhra Pradesh - Madanapalli / Hindupur; Tamil Nadu - Hosur / Denkanikottai) in different seasons.

Sl.No	Place of visit	No. of Lots	No. of samples	Disease incidence
1	Karnataka	396	806	-
2	Andhra Pradesh	18	52	
3	Tamil Nadu	28	56	-
4	Additional survey; Karnataka	-	572	0.35 %
	Total	442	1486	0.35 %

2.2. Silkworm disease monitoring surveys of seed and commercial crop of south Indian states (Collaboration with CSR&TI, Mysuru, NSSO and DoS, Karnataka, Tamil Nadu)

1. Silkworm Disease Monitoring at BSF's/ Grainage

Sl. No	Date of visit	Place of visit	No. of lots	No. of samples	Disease incidence	Name of scientist attended
1	19/08/23	P1 Grainage	2	8	Nil	Dr. Sailaja B
	07/09/23	Chandapura	4	16		Dr. Saravana Kumar
2	07/09/23	P3 BSF Berigai	2	4	Nil	Dr. Saravana Kumar
3	27/09/23	P3 BSF Avalapalli	4	12	Nil	Dr. Saravana Kumar
Total			12	40		

2. Moth and Egg Shell Testing at CSGRC, Hosur

#	Date of visit	Race	Stage	No. of Accn.	No. of sample	Disease incidence	Name of the scientist attended
1	5/06/23	MV	Moth	63	1200	Nil	Dr. Sailaja B Dr. Saravana kumar
2	20/06/23	BV	Egg shell	143	143	Nil	Dr. Sailaja B
3	01/08/23	BV	Moth	37	809	Nil	Dr. Sailaja B Dr. Saravana kumar
4	30/09/23	BV	Egg shell	157	157	Nil	Dr. Saravana kumar
5	18/11/23	BV	Moth	23	457	Nil	Dr. Saravana kumar
6	25/11/23	MV	Moth	25	486	Nil	Dr. Saravana kumar
7	06/01/24	BV	Egg shell	153	153	Nil	Dr. Saravana kumar
8	07/03/24	MV	Moth	16	235	Nil	Dr. N. Mala
Total				617	3640	Nil	



Crop inspection in Kunigal and Magadi seed areas of Karnataka



Pebrine Disease monitoring



Moth testing at CSGRC, Hosur

3. EXTENSION COMMUNICATION PROGRAMMES

Dr. R. Saravanakumar and Dr. Sailaja Bandam

During the reporting period, 02 Awareness and 05 Technology Demonstration programs were conducted for the benefit of Sericulture Department staff in the southern States. A total of **186** persons were sensitized.

Details of Extension Communication Programmes

Programmes	No. of events	Persons sensitized
AWARENESS PROGRAMME		
1. Silkworm disease management at Kanakapura, Anekal seed area	01	53
2. Silkworm disease management at Malur, Kolar	01	54
Total	02	107

Technologies Demonstration		
1. Pebrine detection methods in silkworm	01	25
2. Pebrine detection methods in silkworm	01	15
3. Pebrine diseases management and disinfection	01	11
4. Pebrine disease management and disinfection	01	15
5. Pebrine detection methods in silkworm	01	13
Total	05	79
Grand Total	07	186



Awareness program conducted at Kothigutanahalli village, Malur on 14.12.2023

4. TECHNICAL SERVICES TO THE STAKEHOLDERS

Dr. R. Saravanakumar, Smt. K.R. Rathnamma

The Silkworm Seed Technology Laboratory is recognized under the Central Seed Act to conduct quarantine testing and issue quarantine certificates for exporting silkworm eggs to other countries. The SSTL provides services to stakeholders by testing disinfectants and samples of larvae, pupae, and eggshells in the Silkworm Seed Pathology division.

4.1 Quarantine testing of Silkworm eggs

Silkworm seeds were tested for quarantine certification to export seeds to foreign countries and certificates were issued to the stakeholders.

S.No	Address of the exporter	Country to export	No. of boxes/layings tested
1	M. Ramachandra Gowda VSSPC, Bengaluru-04	AI, Ardh AI Khadra Ajman, UAE	02
2	M. Ramachandra Gowda VSSPC, Bengaluru-04	M/s. MAUQAH Technology Abu Dhabi, UAE	02
3	M. Ramachandra Gowda VSSPC, Bengaluru-04	M/s. CLARA France	10
4	M. Ramachandra Gowda VSSPC, Bengaluru-04	SERICYNE, 1265, Bagard, France	10
5	M. Ramachandra Gowda VSSPC, Bengaluru-04	M/s. MAVQAH technology Abu Dhabi, UAE	02
6	M/s. R.A Silks Silkworm seed grainage, Jangaon, Telangana	M/s. Victoria silk Kampala, Uganda, East Africa	25
TOTAL			51 Boxes

4.2 Quality standards testing of disinfectants

Decol disinfectant Samples received from M/s. Kamath Chlorotech, M/s. Sri Durga Biotech and DoS Karnataka were tested for quality standards.

Sl. No	Stakeholders	No. of Samples
1	DOS Sericulture, Mandya	02
2	Assistant Director (Sericulture) Kudagi	02
3	M/s. Kamat Chlorotech, Bangalore	04
4	M/s. Shri Durga Biotech	02
Total		10

4.3 Egg shell testing

Samples of egg shells from P2 BSF and P3 BSF were tested for pebrine disease freeness.

#	Name of the unit	Race	No. of lots	No. of samples	Disease incidence
1	P2 BSF, Yelagirihills	CSR6 CSR26	16	160	Nil
2	P3 BSF, Avalapalli	CSR2 CSR27	1	5	Nil

4.4 Sample testing for farmers

Larval and Pupal samples received from different farmers, DoS Karnataka, Tamil Nadu and Andhra Pradesh were tested and reported.

Sl. No	Stakeholders	No. of Farmers	No. of Samples	No. of Positive Sample	Pebrine incidence
1	DoS, Karnataka	13	52	5	6.3 %
2	DoS, Tamil Nadu	14	40	1	
3	DoS, Andhra Pradesh	01	02	Nil	
	Total	28	94	6	

PART V: GENERAL / OTHER ACTIVITIES

1. Farm Management

Maintenance of approximately 4 acres of cultivable land to accommodate mulberry and non-mulberry host plants to meet the leaf requirements for ongoing or proposed new projects and conducting rearings.



Castor plantation



Mulberry plantation

2. Bivoltine Seed Cocoon Production

Dr. Sailaja Bandam, B.V. Raviprasad and K. R. Rathnamma

FC1 and FC2 seed crops of bivoltine were reared. The seed cocoons generated were supplied to the Ramanagara cocoon market and SSPC, NSSO.



3. Tree Plantation maintenance

Economically important trees such as Jamun, Jackfruit, Pongamia, Shivane, Beete Mara, Tore Matti, Kadu Badami, etc. (total 1,700 tree saplings) were maintained in 12 hectares of area as part of soil conservation in the vacant area. The maintenance of these tree plantations continued during the year 2023-2024 with the cooperation of the Forest Department.

4. राजभाषा कार्यान्वयन/ Official Language Implementation

डॉ. माला. एन और बी. वी. रविप्रसाद

संस्थान ने अपने प्रयासों के माध्यम से भारत सरकार, गृह मंत्रालय, राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम के अनुसार केंद्र सरकार के कार्यालयों में हिंदी नोटिंग सहित निर्धारित 55% लक्ष्य के तुलना में 79.39% का लक्ष्य प्राप्त किया है। इस संस्थान द्वारा दिनांक 30.06.2023 को हिन्दी कार्यशाला का आयोजन किया। हिन्दी पखवाडा/दिवस दिनांक 14.09.2022 से 27.09.2022 तक रेशमकीट बीज प्रौद्योगिकी प्रयोगशाला द्वारा आयोजित किया गया। रेशमकीट बीज प्रौद्योगिकी प्रयोगशाला में क्रमशः 30.06.2022, 14.09.2022, 26.12.2022 और 25.03.2023 को चार राजभाषा कार्यान्वयन समिति के बैठकें आयोजित की गईं। श्रीमती मीना एस. कामत, सहायक निदेशक (राजभाषा), सीओ-सीएसबी, बेंगलुरु और उनकी टीम ने राजभाषा नीति, नियमों, आदेशों/निर्देशों के प्रभावी अनुपालन के लिए राजभाषा निरीक्षण हेतु 27.03.2024 को एसएसटीएल का दौरा किया और संस्थान के समग्र राजभाषा कार्यों की सराहना की। डॉ. आर. सरवणकुमार, श्री. बी.वी. रवि प्रसाद और श्रीमती रत्नम्मा ने 02.08.2023 को केंद्रीय कार्यालय, सीएसबी, बेंगलुरु में हिंदी कार्यशाला में भाग लिया।

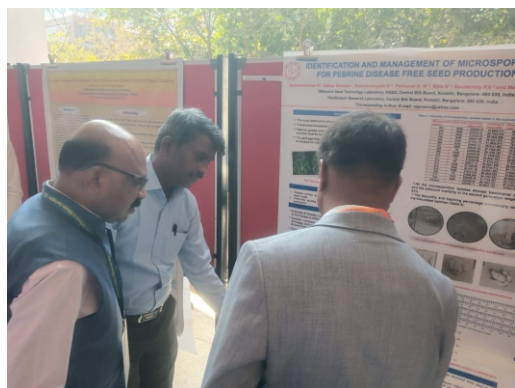
The Institute has achieved 79.39% of the assigned target of 55% along with notations towards the Hindi correspondences to Central Government offices as per OLIC Annual programs of the Ministry of Home Affairs. A Hindi workshop was organized by this Institute on 30.06.2023. SSTL organized Hindi Pakhwada / Hindi Fortnight from 14.09.2022 to 26.09.2023. A total of four OLIC meetings were conducted at SSTL on 30.06.2023, 25.09.2023, 26.12.2023 and 22.03.2024 respectively. Smt. Meena. S. Kamat, Assistant Director (OL), CO-CSB, Bengaluru and team visited SSTL on 27.03.2024 for Official Language inspection for effective compliance of official language policy, rules, orders/instructions and appreciated the overall official language works of institute. Dr. R. Saravanakumar, Sri. B.V. Ravi Prasad and Smt. Rathnamma attended Hindi workshop at central office, CSB, Bangalore on 02.08.2023.



Official Language Inspection at SSTL, Kodathi.



17th RAC meeting of SSTL



Scientist presented research papers in Seed con 2024. International conference on Silkworm Seed Industry: Opportunities and future prospects 30-31st Jan, 2024.

SWACHH BHARAT ACTIVITIES



All officials and farm workers of SSTL were actively involved in Swachh Bharat activities, cleaning the roads and surroundings near the Institute and campus.

VISITORS



RAC Chairman Prof. Subramanya visited the CSB-SSTL campus



100 students from **Trio School**, Whitefield, Bangalore representing 7 faculties, visited the CSB-SSTL campus for a sericulture exposure on August 26, 2023.



68 students and 5 staff members from **EISB School**, Singena Agrahara, Bangalore visited CSB-SSTL for a sericulture exposure campus on September 8, 2023.



Visit of Member Secretary to CSB -SSTL



Visit of Director, NSSO to CSB -SSTL

PART VI: PUBLICATIONS

1. Research publication

1. Sailaja Bandam, Saravanakumar, R., Gogoi. D.K., Rajesh Kumar, Sudhakara Rao, Mala. N., Soudaminy. P.V., Vijayakumari. K.M. and Manthira Moorthy, S. 2024. Muga embryonic chart: a morphological marker for developing muga egg handling techniques. Silkworm SeedCon-2024 - International conference on Silkworm Seed Industry: Opportunities and future prospects 30-31st Jan, 2024 (Abstract), pp-165.

2. Saravanakumar. R., Sailaja Bandam, Subramaniyam. G., Ponnuvel. K.M., Mala. N., Soudaminy. P.V. and Manthira Moorthy, S. 2024. Identification and management of microsporidia for pebrine disease free seed production. Silkworm SeedCon-2024 - International conference on Silkworm Seed Industry: Opportunities and future prospects 30-31st Jan, 2024 (Abstract), pp-89.

3. Mala. N., Fatima Sadatulla, Sailaja Bandam, Saravanakumar. R., Soudaminy. P.V. and Manthira Moorthy, S. 2024. Impact of medicinal phyto extracts on rearing performance of silkworm (*Bombyx mori* L) seed crop. Silkworm SeedCon-2024 - International conference on Silkworm Seed Industry: Opportunities and future prospects 30-31st Jan, 2024 (Abstract), pp-115.

4. Jena, K. Chakrapani, Prabhu, I.G., Mala, N. and Chowdary, N.B. 2024. Influence of soil nutrients and host plant nutrition on fecundity of tropical tasar silkworm *Antheraea mylitta* . Silkworm SeedCon-2024 - International conference on Silkworm Seed Industry: Opportunities and future prospects 30-31st Jan, 2024 (Abstract), pp-24.

2. SEMINARS / TRAININGS / WORKSHOPS/ PROGRAMMES

#	Title of Programme	Venue and Date	Persons Participated
1	22 nd Pebrine monitoring committee meeting and delivered talk on “Infectivity of different microsporidia in Silkworm, <i>Bombyx mori</i> ” during.	CSR&TI, Mysuru, 03.04.2023	Dr. R. Saravanakumar
2	Technical review meeting	NSSO, CSB, Bangalore, 20.04.23	Dr. Sailaja Bandam
3	Hands on Training programme on eSubMIS web portal of CSB	CSB, Bangalore, 24.04.2023	Dr. R. Saravanakumar
4	Online workshop on “Development of diversified Seri bi-products; recent achievements and future perspectives	CSR&TI, Mysuru, 20.05.2023.	Dr. C. R. Hegde Dr. Sailaja Bandam, Dr. R. Saravanakumar
5	Hindi workshop	CSB, Bangalore, 02.08.2023	Dr. R. Saravanakumar Sri. Ravi Prasad Smt. Rathnamma

6	Silk day celebration	SSTL, 20.09.2023.	SSTL officials / staff
7	International conference on silkworm seed industry: opportunities and future prospects	NIFT campus, Bangalore, 30/31.01.2024	Dr. Sailaja Bandam Dr. R. Saravanakumar Dr. Mala N
8	Hindi inspection	SSTL, Kodathi, 27.03.2024	AD (OL), CO-CSB
9	Hindi Workshop	SSTL, Kodathi 30.06.2023	SSTL officials / officers
10	Hindi Fortnight/Hindi Diwas	SSTL, Kodathi	SSTL officials / staff
11	69 th RCC meeting	Guwahati, Assam, 7/8/9.11.2023	Dr. Sailaja Bandam
12	Action plan meeting for the year 2024-2025	14/15.03.2024	Dr. Sailaja Bandam Dr. R. Saravanakumar
13	17 th RAC meeting of SSTL	CSB, Bangalore 16-10-2023	RAC Members and SSTL Scientists
14	Crop inspection	Bagalur village, TN 03.08.2023 P3 Berigai, TN 07.09.2023 P3 Avalapally, TN 27.09.2023	Dr. R. Saravanakumar

PART VII: REVENUE GENERATION

A sum of Rs. **20.45** lakhs generated as revenue from different sources for the financial year 2023-24 and remitted to Central Office.

#	Particulars	Amount (Rs. in lakhs)
1	Royalty received for Decol and CRH	18.42
2	Quality analysis/ testing of products	0.035
3	Cut cocoons	0.27
4	Income from Hostel rent Training course fee, etc.	3.0
	Total	20.45

RETIREMENT OF OFFICIALS DURING 2023-24



Sri. Chandreshekara Reddy, STA



Dr. Chandreshekar R Hegde, Scientist- D (VRS)