वार्षिक प्रतिवेदन

Annual Report 2024-25

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान

केंद्रीय रेशम बोर्ड, वस्त्र मंत्रालय – भारत सरकार

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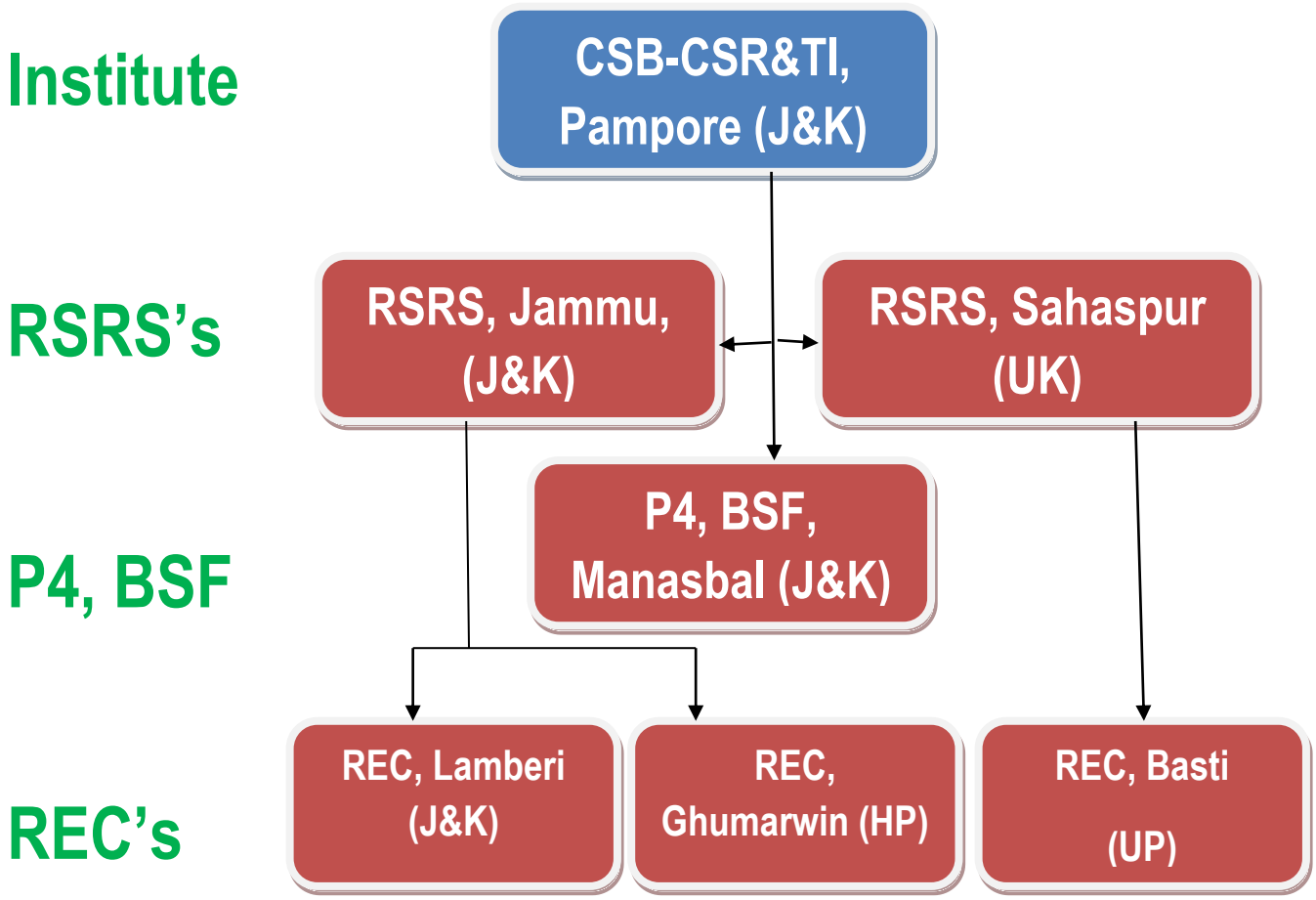

Shri Chetan Singh Jauramajra, Hon'ble Horticulture Minister, Govt. of Punjab visited CSB-CSR&TI, Pampore on 25-

Visit of Joint Advisor (Plantation), NHAI Head Quarter, New Delhi & Joint Advisor (Plantation), NHAI, Dehradun (UK) and Member Secretary, CSB, Bangalore to CSB-NHAI project site NH-72A & NH-73

Celebration of Republic Day 26th January, 2025 at CSR&TI, Pampore

Resham Krishi Mela organized by CSB-CSR&TI, Pampore (J&K)

Resham Krishi Mela organized by CSB-RSRS, Sahaspur, Dehradun & CSB-RSRS, Miransahib, Jammu

48th RAC Meeting of CSR&TI, Pampore

Shri P. Sivakumar, Member Secretary, CSB, Bangalore visited RSRS, Sahaspur,

सं.No. 31

वार्षिक अनुसंधान एवं प्रशासनिक प्रतिवेदन
ANNUAL RESEARCH & ADMINISTRATIVE REPORT
2024-25

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान,
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अनुक्रमणिका/INDEX

प्रस्तावना

मुझे केरेबो-केंद्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर की वर्ष 2024-25 की वार्षिक रिपोर्ट प्रस्तुत करते हुए अत्यंत प्रसन्नता हो रही है। यह वर्ष वैज्ञानिक दृढ़ता, तकनीकी प्रगति और जम्मू-कश्मीर तथा भारत के उत्तर-पश्चिमी क्षेत्र में रेशम उत्पादन क्षेत्र को सुदृढ़ बनाने के उद्देश्य से किए गए प्रभावशाली क्षेत्रीय हस्तक्षेपों के लिए उल्लेखनीय रहा है।

केरेबो-केंरेउअवप्रसं, पाम्पोर ने शीतोष्ण रेशम उत्पादन की अनूठी चुनौतियों का समाधान करने के लिए क्षेत्र-विशिष्ट तकनीकों के विकास के अपने कार्य को जारी रखा। वर्ष के दौरान, संस्थान ने तीन केंद्रित अनुसंधान परियोजनाएँ शुरू कीं, जिनका लक्ष्य था (i) कश्मीर में स्थायी मृदा स्वास्थ्य प्रबंधन के लिए जिंक और सल्फर-घुलनशील जीवाणुओं की पहचान, (ii) लद्दाख में शहतूत रेशम उत्पादन का विकास, और (iii) विभिन्न जलवायु परिस्थितियों में शहतूत पारिस्थितिकी प्रणालियों में कार्बन अवशोषण क्षमता का आकलन। इसके समानांतर, पाँच चल रही अनुसंधान परियोजनाओं ने उल्लेखनीय प्रगति की, जिनमें नव विकसित शहतूत संकरों के प्राथमिक उपज परीक्षण, इन-विट्रो उत्परिवर्तन-संचालित फसल सुधार और उपोष्णकटिबंधीय क्षेत्रों के लिए उच्च उपज देने वाली शहतूत किस्मों का विकास जैसे विषय शामिल थे।

संस्थान ने दैहिक शहतूत संकर (SH2 और SH3) के विकास पर एक महत्वपूर्ण परियोजना को सफलतापूर्वक पूरा किया है, जो प्रजनन चक्र को काफ़ी कम करने और बेहतर जैव-क्रियात्मक और जैवरासायनिक गुण प्रदान करने का वादा करती है। हमारे शोध प्रयासों का विस्तार अनुवादात्मक परिणामों तक भी हुआ है – विशेष रूप से एक अभिनव CSB-NHAI सहयोगी परियोजना के कार्यान्वयन में, जिसके तहत उत्तराखंड, उत्तर प्रदेश और जम्मू-कश्मीर में राष्ट्रीय राजमार्गों के निर्धारित खंडों पर 25,000 से अधिक शहतूत के पेड़ लगाए गए हैं। उल्लेखनीय रूप से, NH-72A/73 खंडो पर किए गए पहले परीक्षण पालन में 68 किग्रा/100 DFL की उत्साहजनक औसत कोकून उपज दर्ज की गई, जिसने हरित कोरिडोर के साथ रेशम उत्पादन-आधारित आजीविका की व्यवहार्यता को प्रदर्शित किया।

संस्थान ने जन्नद्रव्य संरक्षण के प्रति अपनी दृढ़ प्रतिबद्धता बनाए रखी, जिसके पास देश के सबसे समृद्ध शीतोष्ण संग्रहों में से एक है। केरेबो-केंरेउअवप्रसं, पाम्पोरऔर मानसबल स्थित केरेबो-पी4मूल बीज फार्म ने 141 शहतूत और 111द्विपज रेशमकीट प्रविष्टियोंको संरक्षित किया, जिसके पूरक के रूप में केरेबो-क्षेरेउअकें-जम्मू और केरेबो-क्षेरेउअकें-सहसपुर में अतिरिक्त संग्रह बनाए गए। ये आनुवंशिक संसाधन भविष्य के प्रजनन और फसल सुधार कार्यक्रमों की रीढ़ हैं।

संस्थान द्वारा 65 विस्तार प्रसार कार्यक्रम आयोजित किए गए, जिनके माध्यम से 3700 से अधिक लाभार्थियों को लाभ पहुचाया गया। इसी प्रकार, 48 क्षमता संवर्धन और विशेष प्रशिक्षण कार्यक्रम आयोजित किए गए, जिनसे अतिरिक्त 922 लाभार्थियों को लाभ प्राप्त हुआ। किसानों, उद्यमियों और क्षेत्रीय कार्यकर्ताओं के बीच वैज्ञानिक रेशम उत्पादन पद्धतियोंके प्रसार में प्रदर्शन यात्राओं, जागरूकता कार्यक्रमों और प्रौद्योगिकी प्रदर्शनों ने महत्वपूर्ण भूमिका निभाई।

हमारे वैज्ञानिकों ने शहतूत सुधार, मृदा स्वास्थ्य, पादप जैव प्रौद्योगिकी, कीट प्रबंधन और सतत रेशम उत्पादन प्रणालियों जैसे विविध क्षेत्रों को कवर करने वाले शोध प्रकाशनों, समीक्षा लेखों, पुस्तक अध्यायों, लोकप्रिय लेखों और तकनीकी पुस्तिकाओं के माध्यम से वैज्ञानिक समुदाय में उल्लेखनीय योगदान दिया है।

इस वार्षिक रिपोर्ट में प्रस्तुत संचयी उपलब्धियाँ केरेबो-केंरेउअवप्रसं, पाम्पोरकी संपूर्ण टीम के समर्पण, दृढ़ता और वैज्ञानिक उत्कृष्टता को दर्शाती हैं। मैं अनुसंधान सलाहकार समिति के अध्यक्ष और सदस्यों के साथ-साथ केंद्रीय रेशम बोर्ड के सदस्य सचिव के प्रति उनके निरंतर मार्गदर्शन और समर्थन के लिए हार्दिक आभार व्यक्त करता हूँ। मैं जम्मू-कश्मीर, उत्तराखंड, हिमाचल प्रदेश, पंजाब, हरियाणा, उत्तर प्रदेश और लद्दाख हिल काउंसिल के रेशम उत्पादन विभागों और केरेबो के हमारे सहयोगी संस्थानों द्वारा दिए गए घनिष्ठ सहयोग की भी सराहना करता हूँ, जिनकी साझेदारी अमूल्य रही है।

जैसे-जैसे हम आगे बढ़ रहे हैं, केरेबो-केंरेउअवप्रसं, पाम्पोर रेशम उत्पादन अनुसंधान को आगे बढ़ाने, नवीन तकनीकों को बढ़ावा देने और हिमालयी एवं उप-हिमालयी क्षेत्रों में सतत आजीविका विकास में योगदान देने के लिए अपनी प्रतिबद्धता की पुष्टि करता है। मुझे विश्वास है कि यह वार्षिक रिपोर्ट हमारी प्रगति का एक व्यापक रिकॉर्ड बनेगी और इस क्षेत्र में आगे की प्रगति के लिए प्रेरणा देगी।

(डॉ. सरदार सिंह)
निदेशक

FOREWORD

It gives me immense pleasure to present the *Annual Report of the CSB-Central Sericultural Research & Training Institute (CSR&TI), Pampore* for the year 2024–25. This year has been marked by scientific rigour, technological advancement and impactful field-level interventions aimed at strengthening the sericulture sector across Jammu & Kashmir and the North-West region of India.

CSB-CSR&TI, Pampore continued its mandate of developing region-specific technologies to address the unique challenges of temperate sericulture. During the year, the Institute initiated three focused research projects, targeting (i) the identification of zinc and sulphur-solubilizing bacteria for sustainable soil health management in Kashmir, (ii) development of mulberry sericulture in Ladakh, and (iii) assessment of carbon sequestration potential in mulberry ecosystems under varying climatic regimes. In parallel, five ongoing research projects made significant progress, covering themes such as primary yield trials of newly evolved mulberry hybrids, in vitro mutagenesis-driven crop improvement and development of high-yielding mulberry varieties for subtropical zones.

The Institute successfully concluded a key project on the development of somatic mulberry hybrids (SH2 and SH3), which promise to substantially reduce breeding cycles while offering superior physiological and biochemical traits. Our research efforts also extended to translational outcomes – particularly the implementation of an innovative CSB–NHAI collaborative project, under which more than 25,000 mulberry trees have been established along designated stretches of national highways in Uttarakhand, Uttar Pradesh and Jammu & Kashmir. Notably, the first trial rearing conducted on the NH-72A/73 stretch recorded an encouraging average cocoon yield of 68 kg/100 DFLs, demonstrating the viability of sericulture-based livelihoods along the green corridor.

The Institute maintained its strong commitment to germplasm conservation, holding one of the richest temperate collections in the country. CSB-CSR&TI, Pampore and CSB-P4 Basic Seed Farm at Manasbal preserved 150 mulberry and 111 bivoltine silkworm accessions, complemented by additional collections maintained at CSB-RSRS-Jammu and CSB-RSRS-Sahaspur. These genetic resources form the backbone of future breeding and crop-improvement programmes.

The institute organized 65 extension and outreach programs, through which more than 3,700 beneficiaries were reached. In addition, 48 capacity-building and specialized training programs were conducted, benefiting an additional 922 beneficiaries. Exposure visits, awareness programmes, and technology demonstrations played a vital role in disseminating scientific sericulture practices among farmers, entrepreneurs and field functionaries.

Our scientists have made noteworthy contributions to the scientific community, with research publications, review articles, book chapters, popular articles and technical pamphlets covering diverse domains such as mulberry improvement, soil health, plant biotechnology, pest management and sustainable sericulture systems.

The cumulative achievements presented in this Annual Report reflect the dedication, perseverance and scientific excellence of the entire CSB-CSR&TI, Pampore team. I express my sincere gratitude to the Chairman and members of the Research Advisory Committee, as well as the Member Secretary of the Central Silk Board, for their continuous guidance and support. I also appreciate the close cooperation extended by the Departments of Sericulture of J&K, Uttarakhand, Himachal Pradesh, Punjab, Haryana, Uttar Pradesh and Ladakh Hill Council, and our sister institutes of CSB, whose partnership has been invaluable.

As we move ahead, CSB-CSR&TI, Pampore reaffirms its commitment to advancing sericulture research, promoting innovative technologies and contributing to sustainable livelihood development in the Himalayan and sub-Himalayan regions. I am confident that this Annual Report will serve as a comprehensive record of our progress and inspire further advancements in the sector.

(Dr. Sardar Singh)
Director

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर

केंद्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर, केंद्रीय रेशम बोर्ड, वस्त्र मंत्रालय, भारत सरकार के प्रमुख संस्थानों में से एक है, जिसेउत्तर भारत में शहतूत रेशम उत्पादन के अनुसंधान एवं विकास का कार्य सौंपा गया है। सकी स्थापना वर्ष 1958 में द्विपज बीज केंद्र के रूप में की गई थी, जिसे 1984 में उन्नत कर क्षेत्रीय रेशम अनुसंधान केंद्र बनाया गया तथा वर्ष 1991 में इसे केंद्रीय रेशम अनुसंधान एवं प्रशिक्षण संस्थान के रूप में स्थापित किया गया।संस्थान के अंतर्गत दो क्षेत्रीय रेशम उत्पादन अनुसंधान केंद्र, मिरानसाहिब, जम्मू (जम्मू और कश्मीर) एवं सहसपुर,देहरादून (उत्तराखंड), तीनअनुसंधान विस्तार केंद्र और एक पी4 मूल बीज फार्म, मानसबल (कश्मीर) आतें हैं।संस्थान उत्तर भारत के छह राज्यों हिमाचल प्रदेश, उत्तर प्रदेश, उत्तराखंड, पंजाब, जम्मू-कश्मीर और हरियाणा को आवश्यकता आधारित अनुसंधान, विस्तार एवं प्रशिक्षण सहायता प्रदान करता है।

उत्तर भारत के रेशम उद्योग को बढ़ावा देने और पुनर्जीवित करने के प्राथमिक उद्देश्य के साथ, संस्थान ने शहतूत, रेशमकीट सुधार, रेशमकीट फसल प्रबंधन, आदि में कई अनुसंधान परियोजनाओं को लागू किया है जिससे शहतूत रेशम उत्पादन को बढ़ाने के लिए क्षेत्र / मौसम विशिष्ट प्रौद्योगिकियों का विकास किया जा सके। उत्तर भारत में गुणात्मक और मात्रात्मक रूप से रेशम उत्पादन हेतु यह संस्थान 111 रेशमकीट नस्लों और शीतोष्ण मूल के 82 शहतूत प्रजातियों का संवर्धन एवं संरक्षण करता है।

संस्थान श्रीनगर–जम्मू राष्ट्रीय राजमार्ग पर श्रीनगर शहर से लगभग 12 किलोमीटर की दूरी पर गालंदर, पंपोर में स्थित है। निकटतम हवाई अड्डा श्रीनगर है जबकि निकटतम रेलवे स्टेशन नौगाम, श्रीनगर है, जो 5 किमी की दूरी पर है।

दृष्टि:

- उत्तरी भारत में उत्कृष्ट प्रमुख रेशम उत्पादनअनु संधानसंस्थान के रूप में उभरे।

ध्येय:

- उत्पादन,उत्पादकता एवं द्विप्रज रेशम की गुणवत्ता में वृद्धि हेतु रेशम उत्पादन अनुसंधान, प्रशिक्षण एवं विस्तार गतिविधियों में व्यावसायिकता को बढ़ावा देने के लिए प्रतिबद्ध है।
- पर्यावरण, गरीब एवं महिलाओं के अनुकूलप्रौद्योगिकियों को सृजित कर रेशम उत्पादन को एकव्यवहार्य उद्यम में रूपांतरण करना।
- ग्रामीण जनसंख्या के समावे शीविकास संबंधी राष्ट्रीय कार्यवृत में विशेषकर महिलाओं एवं गरीबग्रामीणों की आय सृजन करने की क्षमता में वृद्धि के माध्यम से योगदान करना।

अधिदेश

- भारतीय रेशम की उत्पादन, उत्पादकता एवं गुणवत्ता में वृद्धि करने के लिए वैज्ञानिक, तकनीकी एवं लाभदायक अनुसंधान का संचालन करना।
- भोज्यपौधा, रेशमकीटपालन, कोसोत्तर प्रौद्योगिकी एवं इसके प्रसार के लिए कार्यपद्धति पैकेज विकसित करना।
- उत्पाद एवं प्रौद्योगिकियों तथा उद्योग इंटरफेश का व्यवसायीकरण।
- लागत आय एवं कठिन परिश्रम को कम करने एवं उप–उत्पादों का उपयोग कर शुद्ध आय एवं उत्पादकता में वृद्धि करना।
- आयात प्रतिस्थापन और विदेशी मुद्रा अर्जित करने के लिए अन्तरराष्ट्रीय ग्रेड रेशम के उत्पादन में वृद्धि।
- मानव संसाधन विकास।
- रेशमकीट/शहतूत प्रजनक स्टॉक का संरक्षण।
- रोग एवं पीड़क अनुवीक्षण तथा पूर्वानुमान एवं पूर्वसूचना।

- सूचना संचार प्रौद्योगिकी उपकरणों के माध्यम से ज्ञान का प्रसार,अनुसंधान व विकास नवाचार एवं कार्यपद्धति पैकेज का प्रसार करना।

- प्रतिष्ठित राष्ट्रीय और अंतरराष्ट्रीय संस्थानों के सहयोग से अनुसंधान कार्यक्रम/परियोजनाओं पर कार्य करना।

- वर्तमान अनुसंधान, सहयोगी गतिविधियों,वैज्ञानिक और तकनीकी गतिविधियों को संबल करने के लिए संस्थागत ढांचे को सुदृढ़ करना।

- बेहतर तालमेल के लिए अंतरसंस्थागतसहयोगकरना।

- रेशम उत्पादन प्रौद्योगिकियों की तकनीकी-आर्थिक व्यवहार्यता पर अध्ययन।

- तकनीकी और परामर्श सेवाएं प्रदान करना।

About CSR&TI, Pampore

Central Sericultural Research & Training Institute, Pampore is one among the premier institutes of Central Silk Board, Ministry of Textiles, Govt. of India entrusted with Research & Development of mulberry sericulture in North India. It was established as Bivoltine Seed Station in 1958, upgraded as Regional Sericultural Research Station (RSRS) in 1984 and established as Central Sericultural Research & Training Institute in 1991.The Institute has two Regional Sericultural Research Stations (RSRS's) at Miransahib, Jammu (J&K) and Dehradun (U.K.), Three Research Extension Centres (REC's) and one P4 Basic Seed Farm (BSF) Station at Manasbal (J&K). The Institute provides need based Research, Development/Extension and HRD support to the states of North India *viz.* Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Uttarakhand, Punjab and Haryana.

With the primary aim to boost and revitalize the silk industry of North India, the Institute has implemented a number of research projects in mulberry, silkworm improvement, silkworm crop management etc., so that, region/season specific technologies could be developed to increase the mulberry sericulture qualitatively& quantitatively in North India. The Institute maintains a rich germplasm of 111 silkworm races and 82 mulberry accessions of temperate origin for conservation and utilization.

The Institute is located at Gallandar, Pampore at a distance of approximately 12 km from Srinagar city on the Srinagar - Jammu National Highway. The nearest airport is Srinagar while as the nearest railway station is Nowgam, Srinagar, which is at a distance of 290 km.

VISION:

- To emerge as a premier sericulture research institute of excellence in Northern India.

MISSION:

- Committed to promote professionalism in sericulture research, training and extension activities leading to enhancing production, productivity and quality of bivoltine silk.
- To generate eco-friendly, pro-poor and women friendly technologies for transforming sericulture as a viable enterprise.
- Contribute to the national agenda of inclusive development of rural population especially women and rural poor by enhancing their income generation capability.

MANDATE:

- Conduct scientific, technical and economic research to enhance production, productivity and quality of Indian Silk.
- Development of package of practices for Host Plant, Silkworm Rearing, Post Cocoon Technology and its dissemination.
- Commercialization of products & technologies and industry interface.
- Efforts to reduce input cost & drudgery and by-product utilization to increase net income and productivity.
- Enhance production of international grade silk for import substitution and earning foreign exchange.
- Human Resource Development.
- Maintenance of Breeders Stock.
- Disease & Pest Monitoring and Forecasting & Forewarning.
- Dissemination of knowledge, R&D innovations and package of practices through ICT tools.
- Undertake collaborative Research Programmes/Projects with reputed National and International R&D Institutions.
- Strengthening Institutional framework to support ongoing research, allied activities, scientific and technical activities.
- Inter Institutional collaboration for better synergy.
- Studies on techno-economic feasibility of sericulture technologies.
- Providing technical and consultancy services.

अनुसंधान मुख्यबिंदु

1. शहतूत के जीनप्रारूपों का मूल्यांकन (PIE03009SI)

- शरद ऋतु 2024 में सात परीक्षण जीनप्रारूपों तथा तीन मानक किस्मों [S-146, C-2038 & G4] का वृद्धि, पत्ते की उपज, उपज में योगदान देने वाले लक्षण और रोग/कीट संक्रमण के लिए मूल्यांकन किया गया।
- सभी जीनप्रारूपों में महत्वपूर्ण भिन्नताएँ देखी गईं।
- पत्ते की अधिकतम उपज: PPY-6 (0.662 किग्रा/पौधा), PPY-3 (0.616 किग्रा) और PPY-7 (0.504 किग्रा), जो मानक किस्मों से श्रेष्ठ हैं।

2. वंशज पंक्ति परीक्षण (PIB03013SI)

- CSR&TI बहरामपुर के पॉलीक्लोनल सीड ऑर्चर्ड से बीज एकत्र कर RSRS, जम्मू में नियंत्रित परिस्थितियों में बोए गए।
- संरचनात्मक लक्षणों के आधार पर कुल 605 हाइब्रिड पौधों का चयन कर मुख्य खेत में ऑगमेंटेड डिज़ाइन में प्रत्यारोपित किया गया।

3. सूखा-प्रतिरोधी जीनप्रारूपों का मूल्यांकन

- PYT के तहत सूखा-प्रतिरोधी शहतूत जीनप्रारूपों का पत्ते की उपज और कृषि लक्षणों के लिए मूल्यांकन।
- नौ जीनप्रारूपों को नर्सरी में रोपित किया गया और अनुशंसित अंतर-संस्कृति संचालन किए गए।
- श्रेष्ठ जीनप्रारूपों का आगे जैव रासायनिक विश्लेषण और रेशम कीट मोल्टिंग परीक्षण के माध्यम से मूल्यांकन किया गया।

4. शहतूत दैहिक संकरो (PIE-03012SI)

- तीन दैहिक संकर (SH1, SH2, SH3) प्रोटोप्लास्ट पृथक्करण, फ्यूज़न और पुनर्जीवन के माध्यम से विकसित किए गए।
- SH2 और SH3 को टेट्राप्लॉइड के रूप में पहचाना गया; SH2 ने सबसे जल्दी अंकुरित किया और Chinese White नियंत्रण के समान प्रदर्शन किया।
- **आर्द्रता धारण क्षमता:** SH1 और SH2 श्रेष्ठ; SH2 Ichinose के समान।
- **जैव रासायनिक लक्षण:** SH2 में उच्च TSP (49.19 mg/g) और अच्छा TSC (301.52 mg/g); SH3 में उच्चतम क्लोरोफिल सामग्री (6.10 mg/g)।
- सभी संकर मोल्टिंग टेस्ट पास कर चुके हैं और मानक किस्मों के समान प्रदर्शन किया।

5. समशीतोष्ण क्षेत्र के लिए कक्षीय उत्परिवर्तन परीक्षण (PIC-03014SI)

- कॉलस (Callus) का निर्माण सबसे अधिक सफल रहा: 2.0 mg/L 2,4-D और 2.5 mg/L NAA का उपयोग किया गया।
- कॉलस को चार बार सबकल्चर किया गया और छह प्रकार के रासायनिक उत्परिवर्तन एजेंटों (Mutagens) की विभिन्न सांद्रताओं में उपचारित किया गया। कम सांद्रता में वृद्धि हुई, जबकि उच्च सांद्रता पर कॉलस की जीवन शक्ति कम हो गई।
- शूट (Shoot) पुनर्जनन TDZ और mT (0.5–1.0 mg/L) के माध्यम से अनुकूल रहा।

- सायटोकिनिन संयोजन (BAP + mT – Chinese White, BAP + TDZ – PPR-1) व्यक्तिगत उपचार की तुलना में अधिक प्रभावी साबित हुआ।

6. शहतूत वंशजों की प्रारंभिक उपज परीक्षण (PIE030016SIC)

- पांच चयनित संकर (हाइब्रिड्स) (S-19, S-35, S-37, S-39, S-40) को नियंत्रण किस्मों के साथ कश्मीर घाटी में शीतोष्ण परिस्थितियों में रोपा गया।
- मूल्यांकन के मानदंड: वृद्धि, पत्तियों की उपज, उपज संबंधी लक्षण और प्रजनन क्षमता।

7. उत्तर-पश्चिम भारत में कोकून फसल में वृद्धि (MOE03010SI)

- कोकून फसल की संख्या 2 से बढ़ाकर 3 (वसंत, ग्रीष्म, शरद) की गई।
- चयनित संकरों और ब्रशिंग समय-सारणी के अनुसार वसंत और शरद ऋतु के बीच ग्रीष्मकालीन फसल संभव है।
- ग्रीष्मकालीन उपज: HP – 50 किग्रा/100 DFLs, जम्मू – 46 किग्रा/100 DFLs, उत्तराखंड (पौड़ी जिला) – 50.40 किग्रा/100 DFLs (SH6xNB4D2)।

8. ग्लूटामिक एसिड द्वारा शहतूत के पत्तों का फोर्टिफिकेशन (PIN-3608)

- J&K, HP, और उत्तराखंड में शरद ऋतु पालन में 6% से अधिक कोकून उत्पादन वृद्धि।

9. पैक्लोबुट्राजोल (20 mg/L) का प्रयोग (PIP-3543)

- पत्ते की उपज में 38.42% वृद्धि।

10. शरद ऋतु-विशिष्ट हाइब्रिड (ASH14: Line18xLine6) (AIB03007SI)

- स्टेशन पर परीक्षण (CSR&TI पंपोर, RSRS जम्मू, साहसपुर)
  - औसत उपज: ASH14 – 63 किग्रा/100 DFLs; SH6xNB4D2 – 54 किग्रा/100 DFLs।
  - नियंत्रण से 14.81% सुधार।

11. करगिल, लद्दाख में शहतूत रेशम उत्पादन का प्रचार (MOT03011MI)

- बटालिक सेक्टर में फील्ड सर्वेक्षण।
- 100 किसानों को CSR&TI यात्राओं के माध्यम से प्रशिक्षण
- 100 DFLs ब्रशिंग से 44.26 किग्रा/100 DFLs कोकून उपज।

12. मौसमी-विशिष्ट पोषणानुवंशिक संकर (AIB03008SI)

- तीन चयनित हाइब्रिड्स: CSR50×B.CON1 (वसंत एवं शरद), CSR50×B.CON4 (वसंत), RSJ14×B.CON4 (शरद)।
- On-Station Trials में वसंत: 63.55–66.36 किग्रा/100 DFLs, शरद: 61.42–65.68 किग्रा/100 DFLs, नियंत्रण से श्रेष्ठ।

13. Indo-Uzbekistan सहयोगी अनुसंधान परियोजना (AIB03006CI)

- उज़्बेकिस्तान के ताशकंद स्थित SRIS से रेशम कीड़ा प्रजातियों के आयात के लिए आयात अनुमति (Import Permit) DPPQS, फरीदाबाद से प्राप्त कर ली गई है।
- आयातक-निर्यातक कोड (Importer-Exporter Code) विदेश व्यापार महानिदेशालय (DGFT) से प्राप्त किया गया है।
- शहतूत आनुवंशिक संसाधनों के आयात के लिए नई आयात अनुमति ICAR-राष्ट्रीय पौध आनुवंशिक संसाधन ब्यूरो, नई दिल्ली से प्राप्त की गई है।
- राष्ट्रीय जैव विविधता प्राधिकरण, चेन्नई से भी अनुमोदन/क्लीयरेंस प्राप्त किया गया है।

14. उत्तराखंड और जम्मू-कश्मीर में राष्ट्रीय राजमार्ग के मार्ग किनारों पर शहतूत (Morus spp.) की बागवानी का विकास

- नवोन्मेषी CSB-NHAI परियोजनाएँ भारत की राष्ट्रीय राजमार्ग प्राधिकरण (NHAI) के साथ उत्तराखंड, उत्तर प्रदेश और जम्मू-कश्मीर **में** हरित राजमार्ग नीति (Green Highway Policy) **के** अंतर्गत लागू की जा रही हैं। इनका दोहरा उद्देश्य है: हरित राजमार्ग का विकास और रेशम उत्पादन आधारित आजीविका के अवसरों का सृजन।

<u>जम्मू और कश्मीर</u>

- NH-44 (श्रीनगर-बनिहाल खंड) के किनारे 4000 शहतूत के पेड़ों के साथ एक मॉडल नया पैच विकसित किया जा रहा है।

<u>उत्तराखंड और उत्तर प्रदेश</u>

- परियोजना NHAI के निर्दिष्ट खंडों में लागू की जा रही है।
- **उत्तराखंड में:** NH-72A, NH-125 और NH-87 के तीन खंडों के किनारे लगभग 24,000 शहतूत के पेड़ लगाए गए हैं।
- **उत्तर प्रदेश में:** NH-74 के एक खंड में शहतूत के पेड़ लगाए गए हैं।

15. P-4, बेसिक सीड फार्म, मानसबल से गुरेज घाटी (गिलगित क्षेत्र) तक रेशम पर्यटन-भारत का प्राचीन रेशमी मार्ग

- कश्मीर घाटी में सेरी-टूरिज़्म की गतिविधियाँ प्रारंभ।

16. क्षमता निर्माण एवं विस्तार कार्यक्रम

- लगभग 48 कार्यक्रम आयोजित; 922 से अधिक हितधारकों को मल्बेरी और रेशम पालन में प्रशिक्षित किया गया।
- 3723 से अधिक हितधारकों को नवीनतम तकनीकों के प्रति संवेदनशील बनाया।
- CSR&TI, पंपोर के अधीन नव स्थापित 04 SRC's।

Research Highlights

1. Evaluation of Mulberry Genotypes (PIE03009SI)

- Seven test genotypes along with three checks [S-146, C-2038 & G4] were evaluated for growth, leaf yield, yield-contributing traits, and pest/disease incidence during the autumn 2024 season.
- Significant differences were observed among all genotypes.
- Highest in PPY-6 (0.662 kg/plant), followed by PPY-3 (0.616 kg) and PPY-7 (0.504 kg), outperforming the check varieties.

2. Progeny Row Trial (PIB03013SI)

- Seeds collected from a polyclonal seed orchard at CSR&TI, Berhampore, were sown at RSRS Jammu under controlled conditions.
- Based on morphological characters, 605 hybrid seedlings were selected and transplanted in the main field under an augmented design for further evaluation.

3. Evaluation of Drought-Tolerant Genotypes

- Assess drought-tolerant mulberry genotypes for leaf yield and agronomic traits under PYT.
- Nine genotypes were planted in the nursery with recommended intercultural operations.
- Superior genotypes were further assessed through biochemical analysis and silkworm moulting tests.

4. Mulberry Somatic Hybrids (PIE-03012SI)

- Three somatic hybrids (SH1, SH2, SH3) were developed via protoplast isolation, fusion, and regeneration.
- SH2 and SH3 identified as tetraploids; SH2 sprouted earliest and closely matched the Chinese White control.
- **Moisture Retention:** SH1 & SH2 superior; SH2 comparable to Ichinose.
- **Biochemical Traits:** SH2 had high TSP (49.19 mg/g) and good TSC (301.52 mg/g); SH3 showed highest chlorophyll content (6.10 mg/g).
- All hybrids passed the moulting test, performing comparably to control varieties.

5. In Vitro Mutagenesis for Temperate Varieties (PIC-03014SI)

- Callus induction most successful with 2.0 mg/L 2,4-D and 2.5 mg/L NAA on leaf explants.
- Callus sub-cultured four times; treated with six chemical mutagens. Low concentrations promoted multiplication; higher concentrations reduced viability.
- Shoot regeneration optimized using TDZ and mT (0.5–1.0 mg/L).
- Cytokinin combinations (BAP + mT for Chinese White, BAP + TDZ for PPR-1) were more effective than single treatments.

6. Performance Evaluation of Newly Evolved Hybrids (PIE030016SIC)

- Stem cuttings of five shortlisted hybrids (S-19, S-35, S-37, S-39, S-40) were planted with control varieties under temperate conditions in Kashmir Valley.
- Evaluated for growth, leaf yield, yield traits, and propagation efficiency.

7. Increase in Cocoon Crops in North-West India (Outcome of MOE03010SI)

- Number of cocoon crops increased from two to three (spring, summer, autumn) using shortlisted hybrids and brushing schedules.
- Summer crop yields: HP – 50 kg/100 DFLs, Jammu – 46 kg/100 DFLs, Uttarakhand – 50.40 kg/100 DFLs (SH6xNB4D2).

8. Fortification of Mulberry Leaves with Glutamic Acid (PIN-3608)

- Autumn rearing in J&K, HP, and Uttarakhand showed >6% increase in cocoon production.

9. Paclobutrazol Application (20 mg/L) (Outcome of PIP-3543)

- Leaf yield per plant increased by 38.42% compared to control.

10. Autumn-Specific Hybrid (ASH14: Line18xLine6) (AIB03007SI)

- On-Station Trials at CSR&TI Pampore, RSRS Jammu, and Sahaspur:
    - Mean yield: ASH14 – 63 kg/100 DFLs; SH6xNB4D2 (control) – 54 kg/100 DFLs.
    - Improvement of 14.81% over control.

11. Promotion of Mulberry Sericulture in Kargil, Ladakh (MOT03011MI)

- Field survey in Batalik Sector to assess feasibility.
- 100 farmers exposed to sericulture through CSR&TI visits; hands-on brushing of 100 DFLs achieved 44.26 kg/100 DFLs cocoon yield.

12. Season-Specific Nutrigenetic Hybrids (AIB03008SI)

- Three hybrids shortlisted: CSR50×B.CON1 (Spring & Autumn), CSR50×B.CON4 (Spring), RSJ14×B.CON4 (Autumn).
- On-Station Trials showed superior yields in both spring (63.55–66.36 kg/100 DFLs) and autumn (61.42–65.68 kg/100 DFLs) compared to control.

13. Indo-Uzbekistan Collaborative Research Project (AIB03006CI)

- Import Permit for the import of silkworm breeds from SRIS, Tashkent, Uzbekistan has been obtained from DPPQS, Faridabad.
- Importer-exporter Code has been obtained from Directorate General of Foreign Trade.
- A new import permit for the import of mulberry genetic resources has been obtained from ICAR-National Bureau of Plant genetic resources, New Delhi.
- Clerance from National Biodiveristy, Chennai also obtained.

14. Development of Mulberry (Morus spp.) plantation on National Highway on the sides of carriageways in Uttarakhand& J&K

- Innovative CSB-NHAI project(s) are being implemented with National Highway authority of India in Uttarakhand, Uttar Pradesh and Jammu & Kashmir under green highway policy with dual objective of green highway and scope of sericulture based livelihood opportunities.

Jammu & Kashmir

- A model new patch with 4000 mulberry trees on NH -44 (Srinagar- Banihal section) is being developed on the sideways.

Uttarakhand& Uttar Pradesh

- Project is being implemented on designated stretches of NHAI in Uttarakhand and Uttar Pradesh.03 stretch of NH 72 A , NH 125, and NH 87 in Uttarakhand and 01 stretch on NH 74 in Uttar Pradesh has been developed with about 24000 mulberry trees on sideways.

15. Seri Tourism at P-4, Basic Seed Farm, Manasbal to Gurez Valley (Gilgit Sector)– An Ancient Silk Route of India

- P-4 Basic Seed Farm, Manasbal → Gurez Valley (Gilgit Sector).
- Activities for Seri-tourism initiated in Kashmir Valley.

16. Capacity Building & Extension Programs

- About 48 programs conducted; >922 stakeholders trained in mulberry cultivation and silkworm rearing.
- A total of 3723 stakeholders sensitized to latest technologies via extension programs.
- Four new SRCs established under CSR&TI, Pampore.

New research projects initiated as PI during 2024-25 (CSB Coded)

#	Project Code	Project Title	Period	Investigator(s)
1.	PIN03018 MIC	Identification of Zinc and Sulphur Solubilizing Bacteria: A Soil Reclamation Approach for Sustainable Sericulture in Kashmir Region	Dec, 2024 - Nov, 2027	Syam S Plabani Roy Basanagouda Gonal
2.	MOE03019 SNC	Development of Mulberry Sericulture in Ladakh Duration:	March 2025 to Feb 2028 (3 years)	N. Bharatkumar Gulzar Ahmad Khan Irfan Illahi
3	PIP03017 MIC	Studies on Carbon Sequestration in Mulberry Cultivation Under Different Climatic Conditions	December, 2024 - November, 2027	Plabani Roy Shivam Bhardwaj S. Syam Amit Kumar Yalavarthi Nagaraju

Research projects continued as PI during 2024-25 (CSB Coded)

#	Project Code	Project Title	Period	Investigator(s)
1.	PIE 03015 SIC	Evaluation of drought tolerant mulberry genotypes through preliminary yield trial for rainfed sericulture in Jammu region	Dec 2023 to May 2027	Santoshkumar Magadum
1.	PIE03016SIC	Primary Yield Trial (PYT) of newly evolved mulberry hybrids under temperate conditions of Kashmir Valley.	Mar 2024 to Feb 2028	Pawan Saini Basana Gawda Gulab Khan Rohila
2.	AIB03006CI	Indo-Uzbekistan Collaborative Research Project on Improvement of Mulberry and Silkworm Breeding in Temperate Regions of India and Uzbekistan.	Aug., 2020 - July, 2026	N. K. Bhatia M. Maheshwari Sardar Singh Pawan Saini, Bharath Kumar Neelaboina, Santoshkumar Magadum
3.	PIB03014SI	Evolving superior mulberry varieties for temperate region through in vitro mutagenesis.	June, 2022-May, 2027	Gulab Khan Rohela Pawan Saini Ashok Kumar Kasukurthi S. Syam
4.	PIB03013SI	Development of high yielding quality mulberry (*Morus* spp.) genotypes under sub-tropical conditions of Northern India	June, 2022-May,2026	Santoshkumar Magadum
5.	PIE03009SI	Evaluation of mulberry genotypes for improvement in productivity and quality under sub-tropical conditions of Jammu.	October, 2021-Nov.2024	Santoshkumar Magadum

Research projects concluded as PI during 2024-25 (CSB Coded)

#	Project Code	Project Title	Period	Investigator(s)
1.	PIE03012SI	Evaluation of mulberry Somatic Hybrids.	March, 2022-Feb., 2025	Gulab Khan Rohela Pawan Saini Ashok Kumar Kasukurthi S. Syam

New research projects initiated as C.I DURING 2023-24 (CSB coded)

#	Project Code	Project Title	Period	Investigator(s)
1.	SIB01038MGC	Utilization of Japanese Silkworm genetic resources for the development of productive Bivoltine hybrids	Jan-24 to Mar-28	Kumaresan P
2.	MOE02022MIC	Vulnerability of Sericulture to Climate Change in India	Mar-24 to Aug-26	Plabani Roy

Research projects continued as C.I during 2024-25 (CSB Coded)

#	Project Code	Project Title	Period	Investigator(s)
1.	PIE01001MI	All India coordinated experimental trial for mulberry (AICEM-Phase IV)	2019-2025	N. K. Bhatia M. Maheswri Sardar Singh Pawan Saini, Santoshkumar Magadum, Chhattar Pal Rajesh Kumar
2.	ARE01028MI	Recommendations of novel fungicidal and insecticidal applications for mulberry	May, 2022 – April, 2025	Pawan Saini, Chhattar Pal
3.	AIB02019MI	Development of bivoltine hybrids with higher productivity and high temperature & and humidity tolerance through Marker assisted selection	June, 2022 – May, 2025	Kiran R, Santoshkumar Magadum, Sunil
4.	MTL01025MI	Life cycle assessment of Mulberry Silk: A National assessment	March, 2022 – January 2026	Kiran R
5.	MTS13002MI	Impact assessment of mulberry sericulture technologies in India	July, 2022 – June, 2025	Shivan Bhardwaj
6.	MOE02015MI	Evaluation of high yielding and low temperature stress tolerance mulberry varieties C-01 & C-11	Feb, 2022-January 2025	Santoshkumar Magadum, Chhattar Pal

Continuous programmes

#	Programme Code	Progamme Title	Period	Investigator(s)
1.	SS Pam-01	Nutrient analysis of soils & mulberry under temperate conditions	Continuous	Plabani Roy S Syam Gulab Khan Rohela
2.	PIB-Pam 1	Acquisition, Conservation, Characterization and Utilization of mulberry germplasm under temperate conditions	Continuous	Pawan Saini Basanagauda
3.	AIE -3056	Maintenance of Silkworm germplasm	Continuous	P. Kumaresan, Bharath Kumar Neelaboina, R. Kiran
4.	AIE -3202	Maintenance of Silkworm Breeders' stock.	Continuous	P. Kumaresan, Bharath Kumar Neelaboina R. Kiran
5.	AIB 2016	Maintenance and Evaluation of Silkworm Germplasm Bank [with Maintenance of Parental Lines and Breeders' Stock]	Continuous	Arasakumar, E
6.	OFT-PAM-17	Evaluation and characterization of silkworm germplasm under Sub-tropical conditions of J&K.	Continuous	Santoshkumar Magadum, Kiran R
7.	Evaluation and maintenance of sub-tropical mulberry germplasm at RSRS, Jammu		Continuous	Santoshkumar Magadum
8.	Maintenance of Mulberry Germplasms at P4 Manasbal		Continuous	Rajesh Kumar
9.	Maintenance of Silkworm Breeds at P4 Manasbal		Continuous	Rajesh Kumar

NEW RESEARCH PROJECTS INITIATED AS PI DURING 2024-25 (CSB CODED)

1. **Project Title & code: Identification of Zinc and Sulphur Solubilizing Bacteria: A Soil Reclamation Approach for Sustainable Sericulture in Kashmir Region (PIN03018MIC)**

Duration: Dec, 2024 - Nov, 2027
Investigator(s): Syam S, Plabani Roy, Basanagouda Gonal

Objectives:

1. Isolation of Zinc and Sulphur Solubilising Bacteria using required media
2. Identification and molecular characterization of most promising Zinc and Sulphur Solubilising microbes
3. Mass multiplication and evaluation of potential isolates on mulberry growth by pot trial experiments

Progress Achieved: The project was sanctioned recently at the end of Dec, 2024. From Jan-Mar, 2025; the indents related to chemicals and instruments were prepared and submitted. In 2025-26, collection of soil samples, serial dilutions, and isolation of microbes with morphological, biochemical and molecular characterization will be carried out.

2. **Project Title & code: Development of Mulberry Sericulture in Ladakh (MOE03019SNC)**

Duration: March 2025 to Feb 2028 (3 years)
Investigator(s): Gulzar Ahmad Khan (PI) & Irfan Illahi (CI)

Objectives:

- To align and improve sericulture knowledge and skills through trainings and demonstrations.
- To improve mulberry wealth in Union Territory of Ladakh.
- To explore different areas of Ladakh for mass awareness and capacity development.

Progress Achieved: Project has been initiated and MOU's were signed between CSB & University of Ladakh (UT) and Central Wool Development Board.

3. **Project Code & Title: Studies on Carbon Sequestration in Mulberry Cultivation Under Different Climatic Conditions (PIP03017MIC)**

Project Duration: December, 2024 - November, 2027
Investigator(s): Plabani Roy (PI), Shivam Bhardwaj (CI), S. Syam (CI) , Amit Kumar (Co-PI), Yalavarthi Nagaraju (Co-PI)

Objectives:

1) To assess carbon (C) dynamics in soil under different climatic conditions
2) To evaluate different C pools and C cycling enzymes as effected by different methods of mulberry cultivation
3) Correlation between climatic variation with Mulberry leaf quality parameters

Progress

In March 2024, the project was upgraded by incorporating detailed information of all Co-Principal Investigators (Co-PIs) from CSRTI-Berhampore and CSRTI-Mysuru, and the RMIS-02 form was duly finalized and submitted. Extensive consultations were held with the nominated Co-PIs and finalized the sampling procedures to determine the appropriate timeline for soil sampling. Following the financial approval of the project in March 2025, soil sampling was successfully carried out at CSB-CSRTI Pampore and RSRS Dehradun (total 64 samples) as part of the initial phase of field data collection.

RESEARCH PROJECTS CONTINUED AS PI DURING 2024-25 (CSB CODED)

Project Title: Evolving Superior Mulberry Varieties for Temperate Region through in Vitro Mutagenesis

Project code: PIC03014SI
Duration: June, 2022 - May, 2025
Investigator(s): Gulab Khan Rohela, Pawan Saini, Ashok Kumar Kasukurthi (up to 31-08-2024) and Syam (*w.e.f.* 01.09.2024)

Objectives:

1. Induction of callus from different explants
2. *In vitro* mutagenesis (treatment of induced callus with mutagenic agents).
3. Raising of mutant mulberry lines from mutated callus through in *vitro* regeneration.
4. Screening of mutants for better leaf yield and rooting abilities over existing ruling varieties of temperate region (PRT Trials).

Progress Achieved:

1. Effect of Individual Plant Growth Regulators (Cytokinins) on Shoot Regeneration (mutants) from Leaf Callus pre-treated with different chemical mutagens:

The shoot regeneration response from leaf callus of different mulberry genotypes pretreated with specific chemical mutagens varied significantly depending on the type and concentration of individual plant growth regulators (PGRs) (**BAP**-6-benzyl amino purine, **Kn**-Kinetin, **TDZ**-Thidiazuron, and **mT**-meta-Topolin) used in the Murashige and Skoog (MS) medium (**Fig.1**).

a. In **PPR-1 (pretreated with 0.01% EMS)**, the highest number of shoots (7.16 ± 0.47) was recorded on medium supplemented with **1.0 mg/L mT (Table 9)**. Moderate regeneration (6.28 ± 0.42) was also observed with **0.5 mg/L TDZ**, indicating a strong influence of mT and TDZ on shoot induction. Lower responses were observed with BAP and Kn, with the highest being 3.12 ± 0.35 shoots on **2.0 mg/L Kn**. Media supplemented with higher concentrations (≥2.5 mg/L) of any PGR generally showed reduced regeneration.

b. In **Goshoerami (pretreated with 0.01% MMS)**, shoot regeneration was exclusively observed with TDZ and mT. Maximum shoot formation (3.55 ± 0.28) occurred on medium containing **0.5 mg/L TDZ**, followed by 3.36 ± 0.38 shoots on **2.5 mg/L mT** and 3.11 ± 0.37 shoots on **1.5 mg/L mT (Table 1)**. No regeneration was observed in BAP and

Kn supplemented media, indicating genotype-specific PGR responses and the efficiency of TDZ and mT in shoot induction for this genotype.

c. In **Chinese white (pretreated with 0.02% NEU)**, the best response (6.80 ± 0.39 shoots) was observed on **0.5 mg/L TDZ**, followed closely by **1.0 mg/L mT** (6.33 ± 0.44) **(Table 1)**. A gradual decline in shoot numbers was observed with increasing concentrations of TDZ, mT, or other PGRs. This genotype responded comparatively well across a wider range of PGRs than Goshoerami.

d. In **Ichinose (pretreated with 0.02% EMS)**, the highest number of shoots (4.12 ± 0.48) was observed with **1.0 mg/L mT**, followed by 4.00 ± 0.56 shoots on **1.5 mg/L mT** and 3.60 ± 0.32 shoots on **0.5 mg/L mT (Table 1)**. Notably, BAP and Kn induced very limited shoot formation, and TDZ showed moderate effect (2.87 ± 0.22 shoots with 0.5 mg/L TDZ). Overall, **mT and TDZ were found to be the most effective PGRs** for shoot regeneration across all genotypes tested. Regeneration efficiency decreased with higher concentrations of any PGR beyond the optimum levels. Additionally, the interaction between genotype, mutagen pretreatment, and PGR type/concentration significantly influenced shoot regeneration outcomes.

2. Effect of Combination of Plant Growth Regulators (Cytokinins) on Shoot Regeneration (mutants) from Leaf Callus pre-treated with different chemical mutagens:

The influence of various combinations (BAP+TDZ, BAP+mT) TDZ+mT, Kn+mT) of plant growth regulators (PGRs) on shoot regeneration from leaf callus of different mulberry genotypes, pre-treated with chemical mutagens, was evaluated after 5 weeks of culture. The results revealed distinct responses depending on the type and concentration of PGR combinations, as well as the mutagenic treatment and genotype (**Fig.2**).

a. Among all treatments, the maximum number of shoots (22.31 ± 1.89) was recorded in the **Chinese white** genotype pre-treated with 0.02% NEU when cultured on TDZ (2.0 mg/L) + mT (1.0 mg/L) supplemented medium **(Table 2)**. This was followed by 20.25 ± 1.56 and 19.48 ± 1.45 shoots regenerated at TDZ (2.5 and 3.0 mg/L) + mT (1.0 mg/L) in the same genotype, indicating a synergistic effect of TDZ and mT in promoting shoot regeneration.

b. In the **PPR-1** genotype pre-treated with 0.01% EMS, the best response (18.41 ± 1.46 shoots) was observed on medium fortified with BAP (2.0 mg/L) + TDZ (0.5 mg/L) **(Table 10)**. Lower but significant shoot regeneration was also noted at BAP (1.5 mg/L) + TDZ (0.5 mg/L) and BAP (2.5 mg/L) + TDZ (0.5 mg/L), with 12.52 ± 1.21 and 12.22 ± 0.56 shoots, respectively.

c. For **Goshoerami** leaf callus pre-treated with 0.01% MMS, the highest shoot regeneration (8.40 ± 0.47) was obtained on medium containing TDZ (0.5 mg/L) + mT (0.5 mg/L), followed by 5.23 ± 0.56 and 4.35 ± 0.58 shoots with increasing mT concentrations in combination with TDZ or Kn **(Table 2)**. However, responses generally remained lower compared to other genotypes, indicating genotype-specific sensitivity to mutagen and PGR interactions.

d. In the **Ichinose** genotype pre-treated with 0.02% EMS, the optimal shoot response (4.93 ± 0.46) was observed at BAP (2.0 mg/L) + mT (1.0 mg/L) **(Table 2)**. Other notable responses included 4.53 ± 0.35 shoots at BAP (2.0 mg/L) + TDZ (0.5 mg/L) and 3.60 ± 0.29 shoots at Kn (3.0 mg/L) + mT (1.0 mg/L). Overall, **TDZ and mT combinations** emerged as the most effective PGRs for enhancing shoot regeneration from mutagen-treated calli, particularly in **Chinese White and PPR-1** genotypes. The response was both **genotype- and treatment-specific**, underscoring the importance of optimizing hormonal regimes tailored to each genotype and mutagenic pre-treatment.

3. Rooting of Regenerated Shoots (mutants) on Individual and combination of Plant Growth Regulators (Auxins) supplemented media

The effect of individual auxins, **Indole-3-acetic acid (IAA)** and **Indole-3-butyric acid (IBA)**, on root induction from regenerated shoots of different mulberry genotypes was evaluated after 5 weeks of culture. The rooting response varied significantly among genotypes and auxin types as well as concentrations (**Fig.3**).

a. Among the two auxins tested, **IBA (2.0 mg/L)** was found to be the most effective for promoting rooting across all genotypes **(Table 3)**. The **PPR-1** genotype exhibited 100.00 ± 0.00% rooting on IBA supplemented medium at 2.0 mg/L, followed closely by **Chinese White** (74.24 ± 3.22%), **Ichinose** (88.22 ± 2.82%), and **Goshoerami** (95.10 ± 2.62%) at the same concentration **(Table 3)**.

b. In general, IBA was more effective than IAA in inducing roots in all genotypes. For instance, in **Chinese White**, the highest rooting (90.35 ± 1.90%) was recorded at 1.5 mg/L IBA, which was superior to the 70.34 ± 4.16% rooting achieved at 2.0 mg/L IAA. Similarly, **Ichinose** responded best to IBA (88.22 ± 2.82% at 2.0 mg/L) compared to a maximum of 46.21 ± 3.27% rooting with IAA (2.5 mg/L) **(Table 3)**.

c. **PPR-1** also showed superior rooting with IBA across all concentrations, with a progressive increase peaking at 2.0 mg/L (100%) followed by a gradual decline. Conversely, IAA-induced rooting in PPR-1 peaked at 1.0 mg/L (65.13 ± 1.71%) but decreased with higher concentrations **(Table 3)**.

d. In **Goshoerami**, IBA at 2.0 mg/L induced a high rooting percentage (95.10 ± 2.62%), while the best rooting with IAA was relatively lower at 45.33 ± 3.45% (2.0 mg/L). IBA at 1.5 mg/L also showed promising results (66.33 ± 2.11%) in this genotype **(Table 11)**. The overall trend indicated that **IBA was significantly more efficient than IAA** in inducing rooting in all four mulberry genotypes studied. The optimal concentration of IBA was 2.0 mg/L, beyond which the rooting percentage declined, indicating a possible inhibitory effect at higher levels. Rooting performance also demonstrated genotype-specific variations, with **PPR-1 and Chinese White** showing the best rooting efficiency under IBA treatment.

Conclusion: The study demonstrated that both shoot regeneration and root induction in mulberry are significantly influenced by the type and concentration of plant growth regulators (PGRs), the genotype, and the mutagenic pre-treatment applied. Among the cytokinins tested individually, *meta-Topolin (mT)* and *Thidiazuron (TDZ)* were the most effective in inducing shoot regeneration across genotypes, especially in PPR-1 and Chinese white. In combination, TDZ + mT (particularly TDZ 2.0 mg/L + mT 1.0 mg/L) showed a synergistic effect, resulting

in the highest shoot numbers, especially in Chinese white (22.31 ± 1.89). For rooting, *Indole-3-butyric acid (IBA)* at 2.0 mg/L proved most efficient across all genotypes, with PPR-1 showing 100% rooting and Goshoerami, Chinese White, and Ichinose also performing well. In contrast, IAA was comparatively less effective. The overall findings suggest that optimized cytokinin-auxin regimes tailored to specific genotype-mutagen interactions can greatly enhance the regeneration potential in mulberry. These results have important implications for mutagenesis-based improvement and in vitro propagation protocols aimed at developing elite mulberry cultivars with superior traits. In 2025-2026 and 2026-27, the raised *in vitro* plantlets (mutants) of ruling varieties will be acclimatized to field conditions; confirmation of the mutants through molecular marker based PCR analysis and mutants will be subjected to PRT trials.

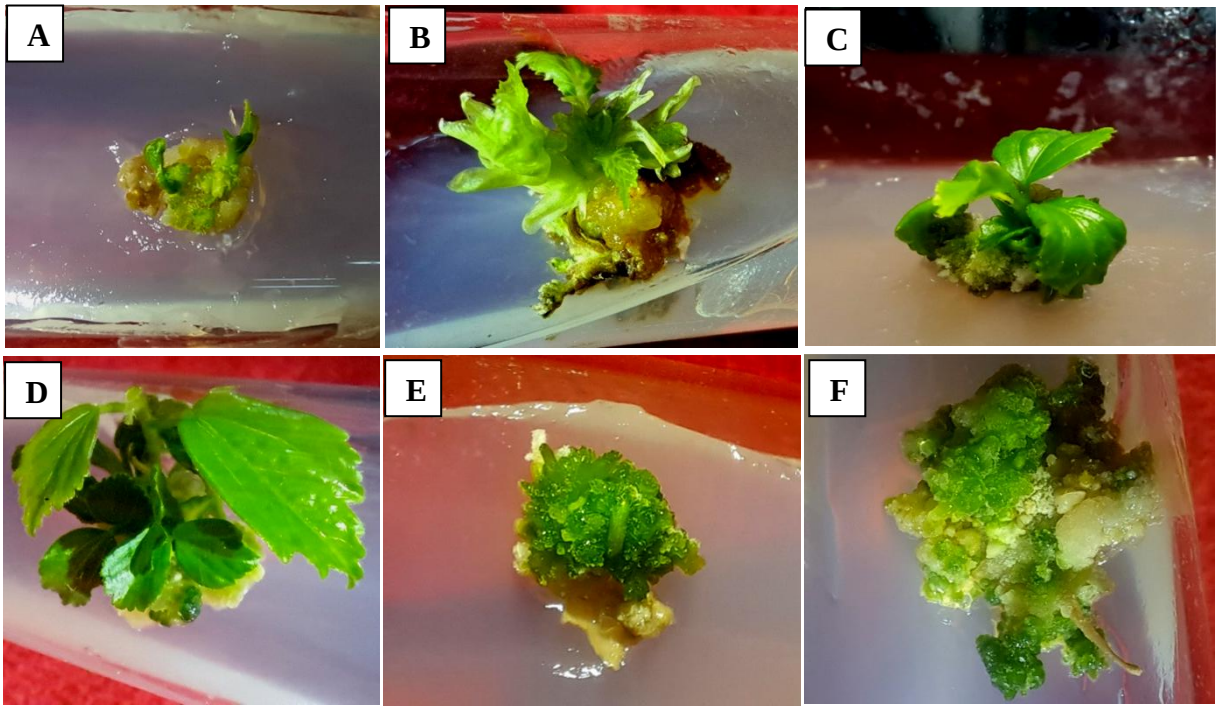


Fig.1: Shoot regeneration (mutants) from leaf callus of different mulberry genotypes which were pre-treated with different chemical mutagens on MS media supplemented with individual cytokinins (After 5 Weeks of Culture).

a) Regeneration of shoots (mutants) from leaf derived callus of PPR-1 which were pre-treated with 0.01% EMS on MS + BAP (1.5 mg/L), after 5 weeks of culture.
b) Regeneration of shoots (mutants) from leaf derived callus of Chinese white which were pre-treated with 0.02% NEU on MS + Kn (2.0 mg/L), after 5 weeks of culture.
c) Regeneration of shoots (mutants) from leaf derived callus of Ichinose which were pre-treated with 0.02% EMS on MS + Kn (2.0 mg/L), after 5 weeks of culture.
d) Regeneration of shoots (mutants) from leaf derived callus of PPR-1 which were pre-treated with 0.01% EMS on MS + mT (1.0 mg/L), after 5 weeks of culture.
e) Regeneration of micro shoots (mutants) from leaf derived callus of Chinese white which were pre-treated with 0.02% NEU on MS + TDZ (0.5 mg/L), after 5 weeks of culture.
f) Regeneration of shoots (mutants) from leaf derived callus of PPR-1 which were pre-treated with 0.01% EMS on MS + TDZ (0.5 mg/L), after 5 weeks of culture.

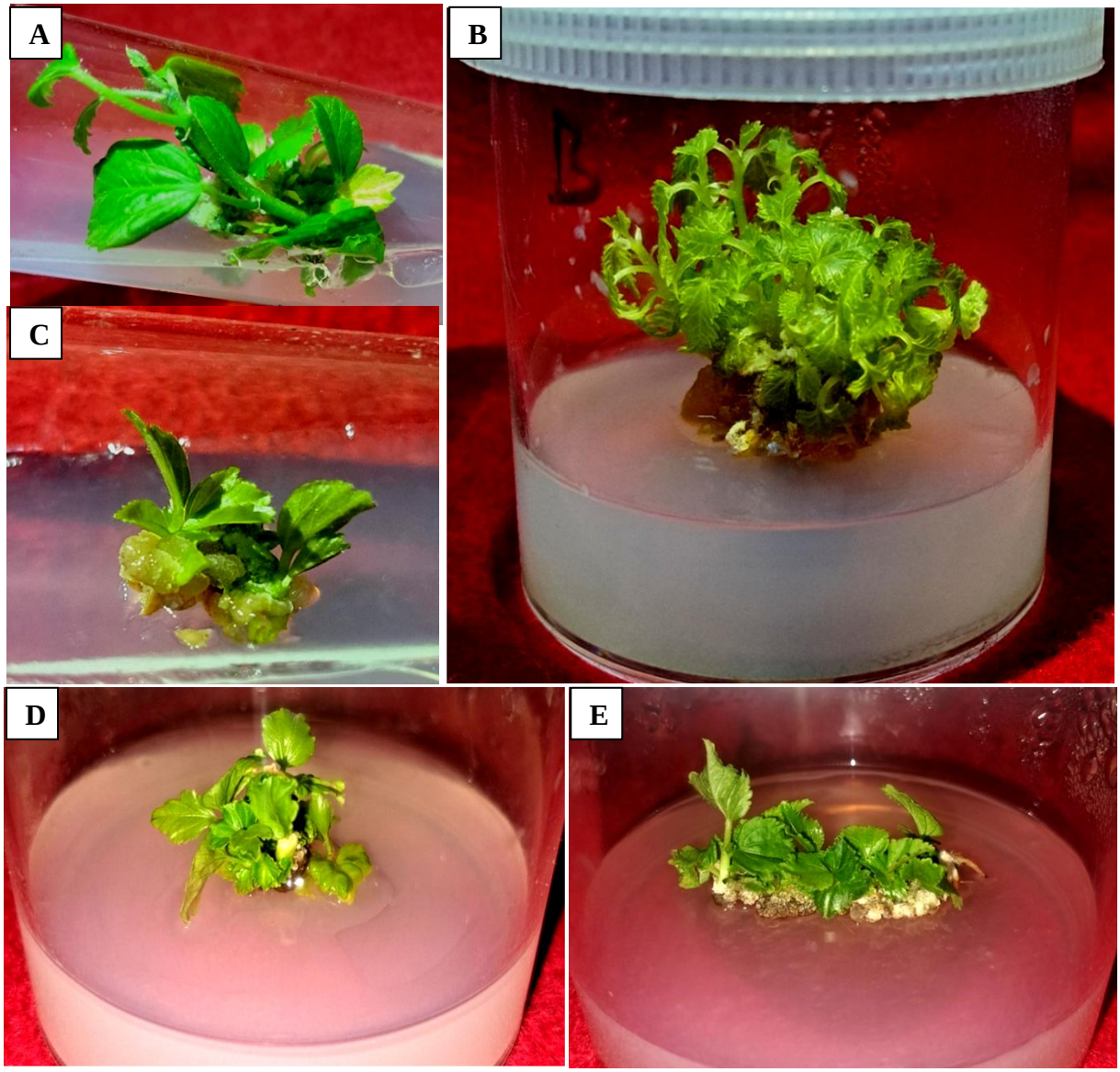


Fig.2: Multiple shoot regeneration (mutants) from leaf callus of different mulberry genotypes which were pre-treated with different chemical mutagens on MS media supplemented with combinations of cytokinins (After 5 Weeks of Culture)

a) Regeneration of multiple shoots (mutants) from leaf derived callus of PPR-1 which were pre-treated with 0.01% EMS on MS + BAP (2.0 mg/L) + mT(1.0 mg/L), after 5 weeks of culture.

b) Regeneration of multiple shoots (mutants) from leaf derived callus of Chinese white which were pre-treated with 0.02% NEU on MS + BAP (2.0 mg/L) + mT(1.0 mg/L), after 5 weeks of culture.

c) Regeneration of multiple shoots (mutants) from leaf derived callus of Ichinose which were pre-treated with 0.02% EMS on MS +BAP (2.0 mg/L) + mT(1.0 mg/L), after 5 weeks of culture.

d) Regeneration of multiple shoots (mutants) from leaf derived callus of PPR-1 which were pre-treated with 0.01% EMS on MS + TDZ (0.5 mg/L) + mT (0.5 mg/L), after 5 weeks of culture.

e) Regeneration of multiple shoots (mutants) from leaf derived callus of Chinese white which were pre-treated with 0.02% NEU on MS +Kn (1.5 mg/L) + mT(1.0 mg/L), after 5 weeks of culture.

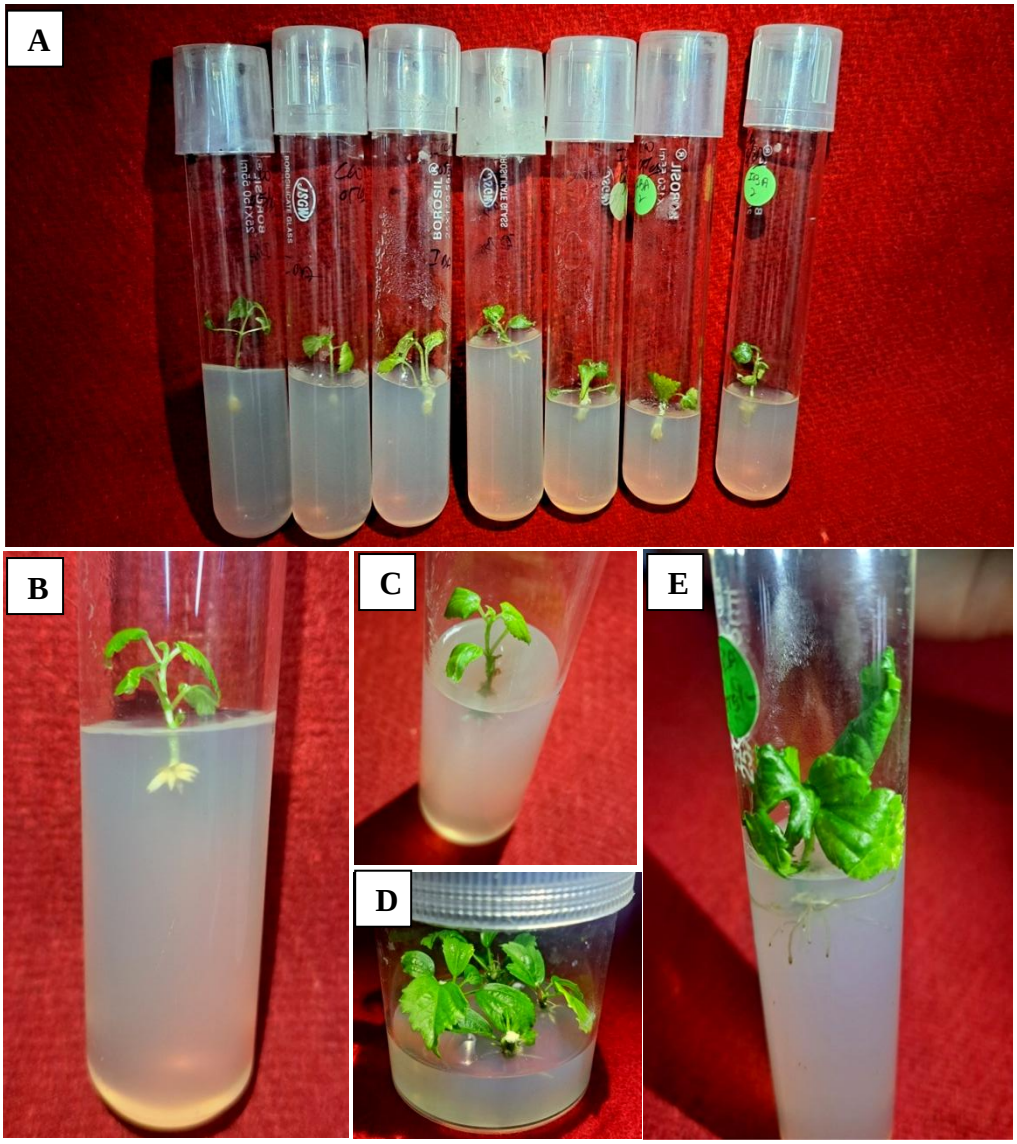


Fig.3: Root induction from regenerated shoots (mutants) of different mulberry genotypes on MS media supplemented with auxins (After 5 Weeks of Culture)

a) Rooting of regenerated shoots (mutants) of different mulberry genotypes on MS media supplemented with Auxins (IAA/IBA), after 5 weeks of culture.
b) Rooting of regenerated shoot (mutant) of PPR-1 on MS + IBA (2.0 mg/L), after 5 weeks of culture.
c) Rooting of regenerated shoot of Chinese white (mutant) on MS + IBA (1.5 mg/L), after 5 weeks of culture.
d) Rooting of regenerated shoot (mutant) of Ichinose on MS + IBA (2.0 mg/L), after 5 weeks of culture.
e) Rooting of regenerated shoot (mutant) of Goshoerami on MS + IBA (2.0 mg/L), after 5 weeks of culture.

Table 1: Effect of Individual Plant Growth Regulators (Cytokinins) Supplemented Media on Shoot Regeneration (mutants) from Leaf Callus which were pre-treated with different chemical mutagens (After 5 Weeks of Culture)

≠	Plant Growth Regulators (mg/L)				No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.01 EMS)of PPR-1 (Mean ± SE)	No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.01 MMS) of Goshoerami (Mean ± SE)	No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.02NEU) of Chinese white (Mean ± SE)	No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.02 EMS) of Ichinose (Mean ± SE)
	BAP	Kn	TDZ	mT				
1	0.5				01.30±0.10	00.00±0.00	00.55±0.05	00.00±0.00
2	1.0				02.20±0.25	00.00±0.00	01.44±0.11	00.00±0.00
3	1.5				**02.22**±0.28	00.00±0.00	01.90±0.15	00.60±0.06
4	2.0				01.56±0.14	00.00±0.00	**03.10**±0.32	**02.16**±0.16
5	2.5				01.20±0.09	00.00±0.00	02.40±0.26	01.04±0.13
6	3.0				00.54±0.06	00.00±0.00	01.00±0.20	00.00±0.00
7		0.5			00.00±0.00	00.00±0.00	00.00±0.00	00.00±0.00
8		1.0			01.08±0.05	00.00±0.00	01.50±0.13	01.05±0.15
9		1.5			02.08±0.12	00.00±0.00	02.20±0.32	01.30±0.18
10		2.0			**03.12**±0.35	00.00±0.00	**04.12**±0.44	**03.50**±0.33
11		2.5			01.40±0.20	00.00±0.00	02.48±0.26	00.60±0.04
12		3.0			01.05±0.18	00.00±0.00	02.12±0.22	00.00±0.00
13			0.5		**06.28**±0.42	**03.55**±0.28	**06.80**±0.39	**02.87**±0.22
14			1.0		04.12±0.27	02.12±0.20	04.73±0.32	02.02±0.30
15			1.5		04.01±0.33	01.03±0.10	04.20±0.26	01.06±0.10
16			2.0		02.16±0.16	00.00±0.00	03.35±0.30	00.00±0.00
17			2.5		01.24±0.13	00.00±0.00	02.20±0.36	00.00±0.00
18			3.0		00.50±0.08	00.00±0.00	01.80±0.12	00.00±0.00
19				0.5	03.45±0.32	00.00±0.00	02.12±0.23	03.60±0.32
20				1.0	**07.16**±0.47	02.22±0.25	**06.33**±0.44	**04.12**±0.48
21				1.5	05.60±0.42	**03.11**±0.37	04.28±0.56	04.00±0.56
22				2.0	03.47±0.31	03.02±0.40	02.47±0.15	02.16±0.24
23				2.5	00.54±0.06	03.36±0.38	02.35±0.22	01.02±0.11
24				3.0	00.00±0.00	01.20±0.07	01.32±0.09	03.60±0.29

Table 2: Effect of Combination of Plant Growth Regulators (Cytokinins) Supplemented Media on Shoot Regeneration (mutants) from Leaf Callus which were pre-treated with different chemical mutagens (After 5 Weeks of Culture)

≠	Plant Growth Regulators (mg/L)				No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.01 EMS) of PPR-1 (Mean ± SE)	No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.01 MMS) of Goshoerami (Mean ± SE)	No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.02NEU)of Chinese white (Mean ± SE)	No. of Shoots Regenerated from Leaf Callus (pre-treated with 0.02 EMS)of Ichinose (Mean ± SE)
	BAP+TDZ	BAP+mT	TDZ+mT	Kn+mT				
1	0.5+0.5				00.00±0.00	00.00±0.00	**13.50**±0.48	00.00±0.00
2	1.0+0.5				06.10±0.45	02.32±0.13	11.69±0.75	01.06±0.12
3	1.5+0.5				12.52±1.21	03.14±0.35	09.13±0.32	02.30±0.16
4	2.0+0.5				**18.41**±1.46	**03.18**±0.16	08.04±0.58	**04.53**±0.35
5	2.5+0.5				12.22±0.56	02.04±0.14	05.28±0.45	02.54±0.22
6	3.0+0.5				04.34±0.18	01.06±0.18	02.18±0.10	00.00±0.00
7		0.5+1.0			03.52±0.25	00.58±0.05	06.25±0.34	00.00±0.00

8		1.0+1.0			05.25±0.31	02.24±0.11	03.22±0.18	02.17±0.13
9		1.5+1.0			08.12±0.22	**02.46**±0.12	05.16±0.37	02.38±0.29
10		2.0+1.0			**13.70**±0.78	02.22±0.22	**22.31**±1.89	**04.93**±0.46
11		2.5+1.0			08.12±0.17	01.46±0.06	20.25±1.56	02.80±0.12
12		3.0+1.0			05.36±0.24	01.00±0.08	19.48±1.45	01.22±0.09
13			0.5+0.5		**12.24**±0.45	**08.40**±0.47	03.22±0.27	01.05±0.28
14			0.5+1.0		10.52±0.34	05.23±0.56	**18.14**±1.50	01.56±0.26
15			0.5+1.5		08.40±0.72	04.12±0.34	16.65±1.58	**03.44**±0.45
16			0.5+2.0		04.34±0.24	01.05±0.21	10.83±0.67	02.18±0.17
17			0.5+2.5		04.20±0.18	00.00±0.00	10.14±0.43	00.90±0.08
18			0.5+3.0		03.58±0.42	00.00±0.00	06.42±0.50	00.60±0.07
19				0.5+1.0	05.84±0.26	01.50±0.11	07.14±0.44	02.58±0.14
20				1.0+1.0	**09.44**±0.37	03.14±0.38	10.77±0.35	03.12±0.33
21				1.5+1.0	08.67±0.58	04.27±0.32	**12.00**±0.72	**03.43**±0.30
22				2.0+1.0	05.25±0.46	**04.35**±0.58	08.11±0.44	03.02±0.42
23				25+1.0	03.22±0.62	03.46±0.14	06.48±0.32	02.66±0.24
24				3.0+1.0	02.56±0.44	02.12±0.25	02.65±0.48	01.44±0.08

Table 3: **Effect of Individual Plant Growth Regulators (Auxins) Supplemented Media on Root Induction from Regenerated Shoots (mutants) (After 5 Weeks of Culture)**

≠	Plant Growth Regulators (mg/L)		Rooting % of Regenerated Shoots of PPR-1 (Mean ± SE)	Rooting % of Regenerated Shoots of Goshoerami (Mean ± SE)	Rooting % of Regenerated Shoots of Chinese white (Mean ± SE)	Rooting % of Regenerated Shoots of Ichinose (Mean ± SE)
	IAA	IBA				
1	0.5		34.22±0.22	08.03±0.22	36.34±1.24	22.47±1.22
2	1.0		**65.13±1.71**	10.35±0.46	48.54±1.35	26.12±1.14
3	1.5		45.33±1.67	32.26±1.29	**59.40±3.20**	32.25±2.35
4	2.0		35.34±1.20	**45.33±3.45**	70.34±4.16	38.16±3.18
5	2.5		32.33±0.14	34.22±1.30	52.15±2.22	**46.21±3.27**
6	3.0		18.11±0.52	25.17±2.14	46.39±2.18	35.12±2.33
7		0.5	57.22±1.05	12.12±0.08	42.16±2.13	12.34±0.60
8		1.0	64.13±2.33	34.67±1.12	88.28±2.02	33.16±1.20
9		1.5	76.33±1.41	66.33±2.11	**90.35±1.90**	69.34±1.46
10		2.0	**100.00±0.00**	**95.10±2.62**	74.24±3.22	**88.22±2.82**
11		2.5	62.37±2.14	72.47±2.10	67.36±1.09	64.36±2.58
12		3.0	59.23±2.52	55.13±1.77	47.44±2.23	34.67±1.35

Project code and title: PIE03009SI: **Evaluation of mulberry genotypes for improvement in productivity and quality under sub-tropical conditions of Jammu**

Investigators involved: Santoshkumar Magadum (PI)
Project period: December, 2021 -November, 2025

Objectives:

- To evaluate newly developed mulberry genotypes for leaf yield and associated agronomic characters.
- To assess leaf quality traits through physio-biochemical parameters and silkworm rearing for prospective commercial utilization.

Progress achieved:

- Seven test genotypes (PPY-3, PPY-6, PPY-7, A-6, A-9, D-33and S-106) along with three controls (S-146, C-2038 & G-4) were evaluated for growth, leaf yield and yield contributing characters during spring, summer and autumn season 2024.
- PPY-6 and PPY-3 found to be early sprouting, high yielding with better quality leaves as compared to all the check varieties.
- Bioassay study of all test genotypes by silkworm rearing during Spring 2025 completed.
- All the test genotypes were maintained appropriately in main field by following all the recommended cultural practices.

Evaluation of test genotypes during Spring, 2024: All the test genotypes along with check varieties were evaluated for growth, yield and leaf quality characters during Spring season 2024. It has been observed that there is significant difference among all the test genotypes for all the characters studied, except diameter of the shoot. It has been recorded that leaf yield per plant (kg) was highest in PPY-6 (1.728 kg) followed by PPY-3 (1.546 kg) and PPY-7 (1.474 kg) and were out performing as compared to three check varieties. Number of leaves per meter of shoot was higher in D-33 (25) followed by PPY-6 (24) and A-6 (23). Similarly, leaf moisture content (%) was highest in PPY-6 (76.42%) followed by PPY-3 (74.07%) and PPY-7 (73.85%) [Table 4].

Table 4.Data recorded on growth, yield and leaf quality characters of test genotypes during Spring, 2024

Sl. No	Genotype	No. of days for sprouting after winter pruning	No. of new shoots/ plant	Longest shoot length (cm)	No. of leaves/ meter	Inter-nodal distance (cm)	Diameter of shoot (cm)
1	PPY-3	27	18	133	22	4.5	4.2
2	PPY-6	25	20	141	24	4.2	4.4
3	PPY-7	27	16	124	22	4.5	4.1
4	A-6	29	14	113	23	4.3	4.0
5	A-9	31	13	128	19	5. 3	3.8
6	D-33	33	14	115	25	4.0	3.6
7	S-106	48	10	110	17	5.9	3.8
8	S-146 (ch)	36	14	105	20	5.0	3.4
9	C-2038 (ch)	38	13	120	18	5.5	3.6
10	G-4 (ch)	35	13	117	19	5.3	3.9
	CD at 5%	0.514	1.315	16.430	0.908	0.255	NA
	SE.m±	0.113	0.461	5.850	0.358	0.088	0.148
	SE(d)	0.276	0.654	7.283	0.524	0.124	0.227
	CV (%)	7.621	9.184	7.721	2.874	3.284	7.687

Continued

Sl. No	Genotype	Total shoot length/ plant (cm)	Leaf yield/ plant (Kg)	Leaf area (cm^2)	Petiole length (cm)	Weight of 10 fresh leaves (g)	Leaf Moisture Content (%)	Moisture Retention Content (%)
1	PPY-3	2160	1.546	235	3.4	38.26	74.07	70.15
2	PPY-6	2640	1.728	290	3.5	41.57	76.42	72.34
3	PPY-7	1840	1.474	331	3.3	40.48	73.85	69.28
4	A-6	1550	1.369	305	4.2	36.04	71.48	66.41
5	A-9	1595	1.313	271	4.0	40.01	72.40	68.18

6	D-33	1512	1.404	195	3.2	31.28	72.87	65.24
7	S-106	1040	0.925	432	5.2	54.18	70.36	64.47
8	S-146 (ch)	1372	0.739	224	4.0	30.04	68.17	59.14
9	C-2038 (ch)	1456	1.107	295	5.4	38.18	70.03	64.81
10	G-4 (ch)	1470	0.876	255	4.2	33.74	67.26	59.15
	CD at 5%	192.146	0.104	51.348	0.504	4.764	0.831	2.249
	SE.m±	65.728	0.031	16.194	0.161	1.609	0.292	0.694
	SE(d)	92.327	0.048	23.871	0.228	2.193	0.386	1.071
	CV (%)	14.824	14.468	9.964	7.187	7.622	0.667	2.348

Evaluation of test genotypes during Summer, 2024: All the test genotypes along with check varieties were evaluated for growth, yield and leaf quality characters during Summer season 2024. It has been observed that there is significant difference among all the test genotypes for all the characters studied. It has been recorded that leaf yield per plant (kg) was highest in PPY-6 (0.595 kg) followed by PPY-3 (0.571 kg) and PPY-7 (0.534 kg) and were out performing as compared to three check varieties. Number of leaves per meter of shoot was higher in D-33 (25) followed by A-6 (23) and PPY-6 (22). Similarly, leaf moisture content (%) was highest in PPY-6 (73.19%) followed by PPY-7 (71.52%) and A-9 (71.28%) [Table 5].

Table 5.Data recorded on growth, yield and leaf quality characters of test genotypes during Summer, 2024

Sl. No	Genotype	No. of new shoots/ plant	Longest shoot length (cm)	No. of leaves/ meter	Inter-nodal distance (cm)	Diameter of shoot (cm)
1	PPY-3	12	117	20	5.0	3.5
2	PPY-6	13	128	22	4.5	3.4
3	PPY-7	11	120	20	5.0	3.7
4	A-6	10	85	23	4.3	3.2
5	A-9	10	100	20	5.0	3.3
6	D-33	11	96	25	4.0	3.0
7	S-106	8	80	18	5.5	3.5
8	S-146 (ch)	10	82	20	5.0	3.3
9	C-2038 (ch)	11	95	20	5.0	3.3
10	G-4 (ch)	10	90	19	5.3	3.1
	CD at 5%	1.114	13.548	0.882	0.188	0.334
	SE.m±	0.341	4.469	0.294	0.061	0.126
	SE(d)	0.479	6.318	0.421	0.084	0.171
	CV (%)	8.821	5.675	2.386	2.248	5.384

Continued

Sl. No	Genotype	Total shoot length/ plant (cm)	Leaf yield/ plant (Kg)	Leaf area (cm^2)	Petiole length (cm)	Weight of 10 fresh leaves (g)	Leaf Moisture Content (%)	Moisture Retention Content (%)
1	PPY-3	1320	0.571	262	3.2	29.18	70.54	60.38
2	PPY-6	1560	0.595	282	3.3	33.88	73.19	61.49
3	PPY-7	1254	0.534	261	3.1	40.42	71.52	60.88
4	A-6	825	0.431	290	3.4	30.22	69.27	58.31
5	A-9	930	0.518	228	4.1	41.38	71.28	59.47
6	D-33	980	0.394	166	2.6	23.65	68.86	45.38

7	S-106	610	0.425	354	4.1	50.28	69.73	54.67
8	S-146 (ch)	760	0.384	232	4.2	28.19	66.24	48.92
9	C-2038 (ch)	1012	0.447	284	4.6	35.29	69.41	53.44
10	G-4 (ch)	830	0.393	231	3.2	34.17	67.45	51.26
	CD at 5%	198.344	0.126	55.214	0.419	5.323	1.732	8.218
	SE.m±	66.252	0.035	18.591	0.128	1.741	0.539	2.637
	SE(d)	94.716	0.051	26.431	0.182	2.523	0.791	3.851
	CV (%)	13.218	13.852	11.146	6.671	7.864	1.484	8.117

Evaluation of test genotypes during Autumn, 2024: All the test genotypes along with check varieties were evaluated for growth, yield and leaf quality characters during Autumn season 2024. It has been observed that there is significant difference among all the test genotypes for all the characters studied. It has been recorded that leaf yield per plant (kg) was highest in PPY-6 (0.922 kg) followed by PPY-3 (0.884 kg) and PPY-7 (0.828 kg) and were out performing as compared to three check varieties. Number of leaves per meter of shoot was higher in D-33 (25) followed by A-6 (22) and PPY-6 (22). Similarly, leaf moisture content (%) was highest in PPY-6 (76.49%) followed by PPY-7 (74.35%) and A-9 (73.18) [Table 6].

Table 6.Data recorded on growth, yield and leaf quality characters of test genotypes during Autumn, 2024

Sl. No	Genotype	No. of new shoots/ plant	Longest shoot length (cm)	No. of leaves/ meter	Inter-nodal distance (cm)	Diameter of shoot (cm)
1	PPY-3	10	135	20	5.0	3.5
2	PPY-6	11	141	22	4.5	3.8
3	PPY-7	9	130	21	4.7	3.6
4	A-6	8	122	22	4.5	3.4
5	A-9	9	120	21	4.7	3.5
6	D-33	8	110	25	4.0	3.2
7	S-106	6	105	19	5.3	3.5
8	S-146 (ch)	8	115	18	5.5	3.1
9	C-2038 (ch)	9	126	20	5.0	3.5
10	G-4 (ch)	8	122	19	5.3	3.4
	CD at 5%	1.594	17.648	0.942	0.289	0.324
	SE.m±	0.491	5.881	0.329	0.094	0.132
	SE(d)	0.718	8.491	0.476	0.138	0.195
	CV (%)	10.749	7.829	2.728	3.511	7.451

Continued

Sl. No	Genotype	Total shoot length/ plant (cm)	Leaf yield/ plant (Kg)	Leaf area (cm^2)	Petiole length (cm)	Weight of 10 fresh leaves (g)	Leaf Moisture Content (%)	Moisture Retention Content (%)
1	PPY-3	1320	0.884	210	3.4	34.25	72.87	65.25
2	PPY-6	1490	0.922	261	3.3	39.91	76.49	68.39
3	PPY-7	1125	0.828	295	3.2	38.87	74.35	67.13
4	A-6	944	0.749	273	4.2	35.13	71.56	60.64
5	A-9	1050	0.712	268	4.1	40.64	73.18	58.11
6	D-33	895	0.674	171	3.3	28.84	69.34	60.67

7	S-106	574	0.521	385	5.5	54.21	68.68	62.79
8	S-146 (ch)	890	0.582	225	4.3	32.67	65.75	58.81
9	C-2038 (ch)	1020	0.675	330	5.6	41.89	70.38	64.77
10	G-4 (ch)	910	0.644	245	4.2	33.38	69.46	58.22
	CD at 5%	168.483	0.134	45.828	0.476	4.594	0.917	2.049
	SE.m±	57.742	0.041	16.890	0.158	1.437	0.291	0.703
	SE(d)	84.479	0.059	22.317	0.211	2.184	0.457	1.027
	CV (%)	11.147	13.641	9.248	7.248	7.563	0.718	1.964

Maintenance and supervision of test genotypes in main field.

Project title and code: Evaluation of drought tolerant mulberry genotypes through preliminary yield trial for rainfed sericulture in Jammu region (PIE 03015 SIC)

Investigators involved: Dr. Santosh kumar Magadum (PI)
Project period: December, 2023 - May, 2027

Objective:

- Evaluation of newly developed drought tolerant genotypes for leaf yield and associated agronomic traits under PYT.
- Qualitative assessment of superior genotypes through biochemical and silkworm moulting test.

Progress achieved:

- Saplings of nine shortlisted drought tolerant genotypes along with check varieties (S-146 and C-2038) were raised in nursery at RSRS, Jammu.
- Saplings of C-1730 variety were collected from CSR&TI, Berhampore which has also been used as a drought tolerant check for evaluation during PYT trial.
- All the test genotypes along with three check varieties (S-146, C-2038 and C-1730) were transplanted in main field in Randomized Block Design for further evaluation under Preliminary Yield Trial.
- FYM and inorganic fertilizers applied. Necessary irrigation provided. Weeding and digging carried out. All the test genotypes are being maintained appropriately by following all the local cultural practices for better establishment in main field.

Table 7. List of shortlisted drought tolerant genotypes and checks for PYT evaluation

Sl No.	Cross Combination	Selected Progeny/ Plant number
1	ME-0256 × MI-0836	P-7
2	MI-0827 × MI-0836	P-19
3	ME-0256× MI-0440	P-40
4	MI-0853 × MI-0836	P-15
5	MI-0853 × MI-0836	P-17
6	MI-0458 × ME-0125	P-8
7	MI-0324× MI-0313	P-15
8	MI-0310 × MI-0012	P-11
9	MI-0439 × MI-0012	P-40
10	S-146	Local Check
11	C-2038	National Check
12	C-1730	Drought tolerant Check (from CSR&TI, Berhampore)






Raising of saplings of test genotypes in nursery





Transplanting and establishment of test genotypes in main field

Project title and code: Primary Yield Trial (PYT) of newly evolved mulberry hybrids under temperate conditions of Kashmir valley (PIE0300016SIC)

Investigator(s): Pawan Saini, Gulab Khan Rohela and Basanagouda Gonal
Project Duration: March 2024 – February 2028

Objectives:

1. Evaluation of short-listed mulberry hybrids for growth leaf yield and yield attributing traits and propagation efficiency.
2. Bioassay of the mulberry progenies through silkworm rearing.

Progress: The nursery of stem cuttings of five short-listed selections from PIB-3586 research project viz., 1- 19, 2-35, 2-37, 3-39 and 3-40 has been planted in nursery beds during March 2024 was maintained through advocated intercultural operations i.e. weeding, irrigation, fertilizers, etc. Except 1-19 other selections (2-35. 2-37, 3-39 and 3-40 were transplanted in randomized block design (RBD) in experimental plots in three replications during March 2025.

Table 8: Details of number of stem cuttings of short-listed selections planted during March 2024 in nursery and their survival rate

#	Mulberry Progeny Number	Number of Cuttings Planted	Number of Cuttings Survived	Survival rate (%)
1	1-19	32	04	12
2	2-35	37	02	6.25
3	2-37	10	27	72
4	3-39	70	15	21
5	3-40	107	59	55

1. **Project title and code:** Indo-Uzbekistan collaborative research project for improvement of mulberry and silkworm breeding in temperate regions of India and Uzbekistan (AIB03006CI)

Investigator(s): Sardar Singh (PI), Pawan Saini (CI); Bharath Kumar Neelaboina (CI) and Santosh Kumar Magadum(CI)
Project Duration: August 2020 – July 2030

Objectives:

1. To identify silkworm breeds / hybrids and mulberry varieties/ lines that are suitable for the temperate regions of India and the sharply continental climate of Uzbekistan.
2. To use exotic breeds to produce silkworm hybrids (*Bombyx mori* L.) to increase the silk content in cocoons and their productivity.
3. To utilize and develop exotic mulberry (*Morus* spp.) varieties/ lines for high leaf nutrients and yield.

Progress:

Legal and Regulatory Compliance: Affidavit jointly signed by the Director, CSR&TI, Pampore and Director, SRIS, Tashkent submitted to the National Biodiversity Authority (NBA), Chennai for exemption under Section 5 of BDA 2002. Original affidavit physically submitted to NBA for final approval. Exemption for the collaborative research project received from NBA, Chennai, enabling exchange of silkworm and mulberry genetic resources.

PQMS and IEC Formalities: Importer Exporter Code (IEC) obtained from DGFT, Ministry of Commerce & Industry, in the name of Dr. Sardar Singh, Director CSR\&TI, Pampore (16.11.2024). Account created on PQMS portal using IEC. Online application for silkworm import submitted through PQMS. Deficiencies marked by DPPQS resolved and application resubmitted.

Import/Export Permissions: Four applications for renewal of Import Permit for silkworm breeds submitted to DPPQS, Faridabad with payment receipts. Import Permit application for mulberry varieties submitted to ICAR-NBPGR, New Delhi along with a list and payment.
Import Permits granted: Mulberry: ICAR-NBPGR (28.11.2024); Silkworm: DPPQS, Faridabad (27.11.2024)

Communication with SRIS, Tashkent: Second Web meeting conducted on 27th September 2024 to coordinate visit plans and exchange protocols. Mail sent to SRIS, Tashkent on 28.11.2024 requesting confirmation on silkworm seed supply. Confirmation received for exchange of genetic resources in February 2025.

Post Entry Quarantine (PEQ) Facility Coordination: Requests for PEQ facility approval submitted to ICAR-NBPGR, New Delhi (Mulberry) and ICAR-NBAIR, Bengaluru (Silkworm). Discussions held with ICAR-CITH, Srinagar for mulberry PEQ. Consent for PEQ facility received for Mulberry from SKUAST-K, Shuhama and for Silkworm at CSR&TI, Mysore / RSRS, Jammu from ICAR-NBAIR, Bengaluru. Application for PEQ in Form 18 submitted to ICAR-NBPGR for Shuhama inspection. Coordination and correspondence maintained with PEQ Coordinator, SKUAST-K, Shalimar regarding fees and bank details.

Ministry-Level Compliance and Support: Request for export of genetic material submitted to Ministry of Textiles *via* CSB-CO, Bengaluru, along with all consents, communication from SRIS, and MTAs.

Project Documentation and Approvals: Full-length revised project document with updated milestones and timelines submitted to Competent Authority.

Scientist Visit and International Collaboration: Proposal for scientist visit to SRIS, Tashkent submitted and approved by CSB-CO, Bengaluru. Confirmation received from SRIS, Tashkent regarding visit and milestone extension.

Project title and code: Development of high yielding quality mulberry (*Morus* spp.) genotypes under sub-tropical conditions of Northern India (PIB03013SI)

Investigators involved: Santoshkumar Magadum (PI) and Yallappa H. (CI)
Project period: June, 2022 - May, 2026

Objective:

- To develop promising mulberry genotypes with better productivity and leaf quality over the existing ruling variety in North West India.

Progress achieved:

- Hybrid progeny seeds were harvested from 16 female parents present in Polyclonal Seed Orchard at CSR&TI, Berhampore and were sown in controlled condition at RSRS, Jammu.
- More than 5000 seedlings were raised under controlled conditions. A total of 936 hybrid progenies were selected based on different morphological characters *viz*., leaf greenness, leaf smoothness, leaf thickness, leaf entireness (lobation), leaf erectness, better plant health/height, plant erectness etc.
- All the selected hybrid progeny seedlingswere transplanted in main field in Augmented Block Design by using four check varieties (S-146, S-1635, C-2038 and C-1360) for further evaluation under Progeny Row Trial.
- FYM and inorganic fertilizers applied. Necessary irrigation provided. Weeding and digging carried out.All the hybrid progenies are being maintained appropriately by following all the local cultural practices in main field.
- All the selected hybrid progenies along with check varieties were evaluated for growth, leaf yield and yield contributing characters during Summer and Autumn season 2024.
- High variability among the hybrid progenies was observed in terms leaf shape, leaf size, plant type, number of shoots, internodal distance, leaf yield etc.

Establishment and maintenance of hybrid progenies in main field






Variation recorded among hybrid progenies in main field

RESEARCH PROJECTS CONCLUDED AS PI DURING 2024-25 (CSB CODED):

1) Project Title: EVALUATION OF MULBERRY SOMATIC HYBRIDS

Project code: PIE03012SI
Duration: March, 2022-Feb, 2025
Investigator(s): Gulab Khan Rohela, Pawan Saini, Ashok Kumar Kasukurthi (up to 31-08-2024) and Syam (*w.e.f.* 01.09.2024)

Objectives:

1. Karyotyping and evaluation of somatic hybrids for yield and yield associated traits
2. Analysis of biochemical characters in somatic hybrids
3. Bioassay of somatic hybrids to determine their suitability for rearing

Progress: In 2024–25, comprehensive evaluations including sprouting behavior, biochemical profiling, bioassay performance, post-cocoon analysis, leaf yield assessment, and frost damage studies were conducted on somatic hybrids and control mulberry varieties.

1. **Sprouting behavior:** The sprouting behavior of somatic hybrids (SH1, SH2, SH3) and control mulberry varieties (Chinese White, PPR1, Goshoerami, Ichinose) was recorded (from 20th February to 08th April, 2025) across six developmental stages during the spring of 2025 (**Table 9**). Clear differences were observed among the varieties in terms of sprouting initiation and progression through various stages. The somatic hybrids, especially SH2, and SH3 exhibited significantly earlier progression through all sprouting stages compared to the control varieties. Among controls, Chinese white and PPR1 showed moderate earliness, while Goshoerami and Ichinose exhibited delayed sprouting phenology. These results suggest that the somatic hybrids, particularly SH2, possess an early sprouting trait, potentially offering advantages for early leaf availability in temperate sericulture systems. The sprouting stage, which marks the end of dormancy and the onset of active growth, varied significantly among the somatic hybrids and control mulberry varieties during the spring season of 2025. Among the somatic hybrids, SH2 exhibited the earliest sprouting, with complete sprouting observed by 18th March 2025, followed by SH3 on 21st March 2025, and SH1 on 27th March 2025 (**Table 10**). The early sprouting behavior of SH2 suggests a rapid transition from dormancy to active growth, potentially beneficial for early leaf production under temperate conditions. In contrast, the control and parental mulberry varieties showed varied sprouting times. Chinese white and PPR-1 demonstrated moderate earliness, with sprouting completed by 19th March 2025. However, the Japanese temperate varieties Goshoerami and Ichinose were considerably delayed, sprouting on 7th April 2025 and 8th April 2025, respectively (Table 2). The late sprouting nature of these varieties aligns with their adaptation to cooler temperate climates and extended dormancy requirements.

2. **Biochemical Analysis**: During the spring season of 2024, moisture retention capacity (MRC) and moisture content (MC) varied among mulberry somatic hybrids and control varieties. Among hybrids, SH-2 showed the highest MRC (80.47%) and SH-1 had the highest MC (74.19%) (**Table 11**). Among controls, Ichinose recorded the highest MRC (82.79%) and PPR-1 showed the highest MC (79.36%). Overall, SH-1 and SH-2 exhibited favorable moisture-related traits comparable to the ruling varieties. Biochemical analysis of mulberry somatic hybrids evaluated during the spring season of 2024 revealed significant variation in total soluble carbohydrates (TSC), total soluble proteins (TSP),

and total chlorophyll content (TCC) among the genotypes. Among the hybrids, SH2 exhibited the highest levels of TSC (301.52 mg/g dwt) and TSP (49.19 mg/g dwt), indicating enhanced metabolic activity and nutrient accumulation, while SH3 recorded the highest TCC (6.10 mg/g dwt), suggesting superior photosynthetic potential (**Table 12**).. In comparison with control varieties, SH2 showed TSC and TSP values comparable to PPR-1, while SH3 exceeded all other genotypes in chlorophyll content. Chinese White and PPR-1 displayed moderate TCC (5.75 and 5.95 mg/g dwt, respectively), whereas Goshoerami, despite having the highest carbohydrate content (393.14 mg/g dwt), showed relatively lower protein (40.37 mg/g dwt) and chlorophyll (4.80 mg/g dwt) levels. Overall, SH2 and SH3 demonstrated promising biochemical profiles comparable or superior to ruling mulberry varieties (**Table 13**).

3. **Bioassay Studies (Rearing Performance):** During 2024–25, bioassay studies (**Fig.**) and post-cocoon analysis were conducted on silkworms reared with leaves from three mulberry somatic hybrids and four control varieties using Bivoltine Double Hybrid (FC1 × FC2) silkworm seed. All groups recorded a consistent larval duration of 27 days. Among somatic hybrids, SH-2 exhibited the highest number of cocoons harvested (247/250 larvae) and the highest pupation rate (95%), while SH-1 and SH-3 followed closely with high cocoon yield and pupation rates (94% each). SH-3 recorded the highest single cocoon weight (SCW: 2.08 g) and shell weight (SSW: 0.45 g), along with a good shell ratio (21.66%) (**Table 13**). In comparison, among controls, Goshoerami showed superior performance with the highest cocoon yield (512 g), SCW (2.09 g), and a shell ratio of 21.65%, followed by PPR-1 with a shell ratio of 22.52%. Chinese white recorded the lowest performance in cocoon weight and shell ratio (1.93 g and 19.92%, respectively). Overall, somatic hybrids, especially SH-2 and SH-3, performed on par with ruling mulberry varieties, demonstrating their potential for silkworm rearing and cocoon production (**Table 13**).

4. **Post-Cocoon Analysis:** The post-cocoon analysis conducted during 2024–25 revealed notable differences among somatic hybrids and control mulberry-fed batches in raw silk yield and related traits. Among somatic hybrids, SH-2 recorded the highest average filament length (17.87 m) and maximum raw silk percentage (48.46%), followed closely by SH-3 with 18.20 m filament length and 41.18% raw silk yield (**Table 14**). SH-1 showed good reelability (83%) and comparable raw silk percentage (34.53%) with minimal silk waste (5.56%). Among controls, Ichinose showed the longest filament length (19.26 m) and highest total weight of filament (8.71 g) with a raw silk yield of 45.26%. Chinese white exhibited the highest reelability (95%), though its raw silk output (39.00%) was moderate. PPR-1 and Goshoerami demonstrated good filament lengths (18.50 m and 16.23 m respectively) and decent raw silk percentages (33.95% and 37.25%).Overall, SH-2 and SH-3 stood out among somatic hybrids, showing performance on par with or better than control varieties in raw silk yield, filament length, and denier, affirming their potential for commercial rearing.

5. **Leaf Yield Data:** Leaf Yield and Yield attributing parameters such as number of shoots per plant, total shoot length, number of leaves per méter, intermodal distance, total shoot weight etc. were recorded among the three somatic hybrids and four control mulberry varieties during Spring season of 2024 (First Year) and Spring season of 2025 (Second Year).

Leaf Yield Performance (Spring 2024)-First Year Data: The leaf yield and yield attributing parameters were recorded during spring, 2024 (First Year Data) revealed statistically significant differences among the evaluated mulberry somatic hybrids and control varieties (**Fig.**). Among all tested entries, the control variety Goshoerami exhibited the highest total leaf yield (NPY) of 14.88 kg per 36 plants, corresponding to an average of 0.413 kg per plant, indicating its established vigor and productivity. Notably, the somatic hybrids SH-3 and SH-2 closely followed Goshoerami in performance, with SH-3 recording a total yield (NPY) of 14.80 kg (0.411 kg/plant) and SH-2 yielding 14.72 kg (0.410 kg/plant), demonstrating their comparable leaf productivity (**Table 15**). SH-1 also showed appreciable performance, with a yield (NPY) of 14.18 kg (0.393 kg/plant), further supporting the agronomic potential of the somatic hybrids under temperate conditions (**Table 15**). Among the control entries, Chinese white recorded the lowest total yield of 9.22 kg (0.260 kg/plant), indicating relatively poor adaptability or productivity under the given conditions. PPR-1 and Ichinose registered moderate yields of 12.42 kg (0.350 kg/plant) and 11.56 kg (0.320 kg/plant), respectively, suggesting average performance.

Leaf Yield Performance (Spring 2025)-Second Year Data: The leaf yield and associated yield-attributing parameters recorded during Spring (May), 2025 (Second Year Data) revealed clear and statistically relevant differences among the tested somatic hybrids and control varieties. Among all entries, the control variety Goshoerami continued to excel with the highest total leaf yield (NPY) of 23.94 kg per 36 plants, corresponding to 0.67 kg per plant, reaffirming its superior productivity under temperate conditions. Among the somatic hybrids, SH-3 and PPR-1 recorded identical NPY values of 23.40 kg (0.65 kg/plant and 0.63 kg/plant, respectively), closely matching the performance of Goshoerami and underscoring their potential for high leaf biomass (**Table 16**). SH-2 also performed well with an NPY of 22.07 kg (0.61 kg/plant), followed by SH-1 with 21.13 kg (0.582 kg/plant). In contrast, the control variety Chinese White yielded the lowest at 14.58 kg (0.40 kg/plant), while Ichinose showed modest performance with 15.44 kg (0.43 kg/plant) (**Table 8**). These findings highlight the consistent and promising productivity of somatic hybrids, particularly SH-3 and PPR-1, which are on par with elite control varieties and suitable for temperate sericulture regions.

6. **Frost Damage Assessment:** The frost damage evaluation of somatic hybrids and control mulberry varieties was carried in Feb and March, of 2025 (**Fig.**). Analysis has indicated that SH2 had the lowest frost damage (22.02%), followed by SH1 (24.49%) and SH3 (27.84%), showcasing better cold tolerance among the somatic hybrids (**Table 16)**. In contrast, the control varieties experienced higher frost damage, with Control-2 (PPR-1) recording the highest at 34.82%, followed by Control-4 (Goshoerami) at 34.49%, Control-3 (Ichinose) at 33.25%, and Control-1 (Chinese White) at 33.23% (**Table 17).** The healthy shoot portions were also higher in SH2 (77.98 cm), SH1 (75.51 cm), and SH3 (72.16 cm), confirming superior frost resilience of the somatic hybrids over traditional control varieties.

Conclusion: The comprehensive evaluation of somatic hybrids (SH1, SH2, SH3) during 2024–25 revealed their significant potential for temperate sericulture, with SH2 and SH3 emerging as superior performers. SH2 exhibited the earliest sprouting (by 18th March), enabling early leaf availability—an advantageous trait in temperate conditions. Biochemical profiling indicated enhanced metabolic vigor in SH2 (highest total soluble carbohydrates and proteins), while SH3 recorded the highest chlorophyll content, indicating superior photosynthetic efficiency. In bioassay studies, SH2 achieved the highest pupation rate (95%)

and cocoon yield, while SH3 showed maximum cocoon and shell weights. Post-cocoon analysis confirmed their commercial promise, with SH2 and SH3 displaying high filament lengths and raw silk yields comparable to or exceeding standard varieties. Leaf yield data further highlighted their productivity, with SH2 and SH3 yielding nearly as much as the best-performing control, Goshoerami. Notably, frost damage assessment revealed SH2 had the lowest damage (22.02%), followed by SH1 and SH3, underscoring their cold resilience. In contrast, control varieties showed higher susceptibility to frost.

Recommendation: Overall, SH2 and SH3 demonstrated a balanced combination of early sprouting, high leaf yield, silk productivity, and frost tolerance, supporting their suitability for temperate regions and for further trials of FYT and multilocational trials need to be undertaken on SH2 and SH3 somatic hybrids.

Table .9: SPROUTING DATA OF SOMATIC HYBRIDS AND CONTROL MULBERRY VARIETIES RECORDED IN FEB, MARCH & APRIL, 2025

#	Mulberry Variety/Hybr	20/02	21/02	22/02	23/02	2402	25/02	26/02	27/02	28/02	01/03	02/03	03/03	04/03	05/03	06/03	07/03
1	SH1 (PPR1-ICHINOSE)	Dormant															
2	SH2 (PPR1-CW)	Dormant				BB							GT				
3	SH3 (PPR1-PPR1)	Dormant												BB			
4	CONTROL-1 (CHINESE WHITE)	Dormant				BB							GT				
5	CONTROL-2 (PPR1)	Dormant													BB		
6	CONTROL-3 (GOSHOERAMI)	Dormant															
7	CONTROL-4 (ICHINOSE)	Dormant															

D=Dormant

1) BB=Bud Break
2) GT=Green Tip
3) BK=Beaking
4) LE=Leaf Emergence
5) FE=Floral Emergence
6) SP=Sprouted

Cont. Table. 9: SPROUTING DATA OF SOMATIC HYBRIDS AND CONTROL MULBERRY VARIETIES RECORDED IN FEB, MARCH & APRIL, 2025

#	Mulberry Variety/Hybr	08/03	09/03	10/03	11/03	12/03	13/03	14/03	15/03	16/03	17/03	18/03	19/03	20/03	21/03	22/03	23/03
1	SH1 (PPR1-ICHINOSE)	BB						GT		BK						LE+FE	
2	SH2 (PPR1-CW)	GT			BK						LE	SP					
3	SH3 (PPR1-PPR1)	BB		GT					BK				LE		SP		
4	CONTROL-1 (CHINESE WHITE)	GT				BK					FE		SP				
5	CONTROL-2 (PPR1)	GT							BK		LE		SP				
6	CONTROL-3 (GOSHOERAMI)	Dormant															
7	CONTROL-4 (ICHINOSE)	Dormant															

D=Dormant

1) BB=Bud Break
2) GT=Green Tip
3) BK=Beaking
4) LE=Leaf Emergence
5) FE=Floral Emergence
6) SP=Sprouted

Cont. Table. 9: SPROUTING DATA OF SOMATIC HYBRIDS AND CONTROL MULBERRY VARIETIES RECORDED IN FEB, MARCH & APRIL, 2025

#	Mulberry Variety/Hybr	24/03	25/03	26/03	27/03	28/03	29/03	30/03	31/03	01/04	02/04	03/04	04/04	05/04	06/04	07/04	08/04
1	SH1 (PPR1-ICHINOSE)	LE+FE			SP												
2	SH2 (PPR1-CW)	SP															
3	SH3 (PPR1-PPR1)	SP															
4	CONTROL-1 (CHINESE WHITE)	SP															
5	CONTROL-2 (PPR1)	SP															
6	CONTROL-3 (GOSHOERAMI)	BB				GT			BK				LE			SP	
7	CONTROL-4 (ICHINOSE)	BB					GT			BK					LE		SP

D=Dormant

1) BB=Bud Break 2) GT=Green Tip 3) BK=Beaking 4) LE=Leaf Emergence 5) FE=Floral Emergence 6) SP=Sprouted

Table. 10: Sprouting Data of Somatic Hybrids and Control Mulberry Varieties During, 2025

		SOMATIC HYRBIDS			CONTROL MULBERRY VARIETIES			
##	Stages	SH1	SH2	SH3	Chinese white	PPR1	Goshoerami	Ichinose
1	Dormant	Up to 07-03-2025	Up to 23-02-2025	Up to 03-03-2025	Up to 23-02-2025	Up to 04-03-2025	Up to 23-03-2025	Up to 23-03-2025
2	Bud Break	08/03/2025	24/02/2025	04/03/2025	24/02/2025	05/03/2025	24/03/2025	24/03/2025
3	Green Tip	14/03/2025	03/03/2025	10/03/2025	03/03/2025	08/03/2025	28/03/2025	29/03/2025
4	Beaking	16/03/2025	11/03/2025	15/03/2025	12/03/2025	15/03/2025	31/04/2025	01/04/2025
5	Leaf Emergence/ Floral Emergence	22/03/2025	17/03/2025	19/03/2025	17/03/2025	17/03/2025	04/04/2025	06/04/2025
6	Sprouted	27/03/2025	18/03/2025	21/03/2025	19/03/2025	19/03/2025	07/04/2025	08/04/2025

Table 11: Moisture Content and Moisture Retention Capacity of Somatic Hybrids & Control Mulberry Varieties during Spring Season, 2024

#	Somatic Hybrids	Leaf Harvesting Date	Fresh Weight (gr) of 10 Leaves (04/05/24)	Weight of Leaf after 6 hours of preservation under room temperature (22.0° C)	Moisture Retention Capacity (%)	Dry Weight (gr) of 10 Leaves (15/05/24)	Moisture Content (%)
1	SH-1 (PPR1-Ichinose)	04-05-2024	12.03	9.51	79.05	3.105	74.19
2	SH-2 (PPR1-Chinese white)	04-05-2024	11.06	8.90	80.47	3.192	71.16
3	SH-3 (PPR1-PPR-1)	04-05-2024	7.60	5.71	75.13	2.225	70.74
4	CONTROL-1 (Chinese white)	04-05-2024	16.75	12.50	74.61	3.80	77.32
5	CONTROL-2 (PPR-1)	04-05-2024	40.39	30.67	75.93	8.33	79.36
6	CONTROL-3 (Ichinose)	04-05-2024	22.73	18.82	82.79	5.15	77.34
7	CONTROL-4 (Goshoerami)	04-05-2024	23.45	17.10	72.89	5.20	77.80

Moisture Retention Capacity (%) = Weight of leaf after 6 hours of preservation×100/ Fresh weight of Leaf

Moisture Content (%) = Fresh weight of Leaf-Dry weight of Leaf /Fresh weight of Leaf×100

Table 12: Biochemical analysis of Mulberry Somatic Hybrids under PIE03012SI during Spring Season, 2024 (Average values of three replicates of each variety was represented below)

Sl.No	Variety	Total Soluble Carbohydrate (TSC) (mg/g dwt)	Total Soluble Protein (TSP) (mg/g dwt)	Total Chlorophyll Content (TCC) (mg/g dwt)
1	SH1	265.99	45.02	4.83
2	SH2	301.52	49.19	4.15
3	SH3	263.70	44.87	6.10
4	Chinese white (Control-1)	237.31	34.80	5.75
5	PPR-1 (Control-2)	302.57	48.94	5.95
6	Ichinose (Control-3)	277.40	51.55	5.59
7	Goshoerami (Control-4)	393.14	40.37	4.80

	FIRST HIGHEST
	SECOND HIGHEST
	THIRD HIGHEST
	FOURTH HIGHEST

Table.13: Silkworm Bioassay Studies (Rearing Performance) of Somatic Hybrids at CSR&TI, Pampore during Spring, 2024

Silkworm Hybrids Used: Bivoltine Double Hybrid **Rearing Method:** Leaf Feeding
Rearing period: 27Days, 00 Hours (27 Days) **Larval Retained After 3rd Moult:** 250

Varieties	Larval Duration	No. of cocoons harvested/250 larvae	Weight of cocoons harvested/250 larvae (g)	SCW (g)	SSW (g)	SR (%)	Pupation Rate (%)
SH-1	27:00:00	244	505	2.07	0.45	21.93	94
SH-2	27:00:00	247	501	2.03	0.43	21.4	95
SH-3	27:00:00	242	504	2.08	0.45	21.66	94
Chinese White (Control-1)	27:00:00	222	429	1.93	0.38	19.92	93
PPR-1	27:00:00	245	476	1.98	0.45	22.52	95
ICHINOSE(Control-3)	27:00:00	240	457	1.91	0.39	20.53	92
Goshoerami (Contro4)	27:00:00	245	512	2.09	0.45	21.65	94

Bioassay Studies of Somatic Hybrids (2024-25)

Table.14: Post Cocoon Analysis of Mono Cocoon Samples related to Silkworm Bioassay Studies (Rearing Performance) of Somatic Hybrids at CSR&TI, Pampore during spring, 2024

S. No	FC2 × FC1 fed with Hybrid/Variety of Mulberry	Total no .of Good cocoons.		Avg. Length of Filament per Cocoon (Mtrs.)	Total no. of Breaks	Avg. Non-Breakable filament length (Mtrs.)	Total Wt. of Flt. (gms)	Total Wt. of Silk waste (gms)	Average Denier	Estimated Renditta (DRY)	Reelability (%)	Raw-silk (%)	Waste (%)
		No.	Wt. in (gms)										
1	SH-1	20	16.95	900	4	750	5.85	0.326	2.94	2.89	83	34.53	5.56
2	SH-2	20	17.87	1047	7	775	7.59	0.478	3.27	2.35	74	48.46	6.2
3	SH-3	20	18.2	1003	7	743	7.49	0.547	3.36	2.42	74	41.18	7.28
4	Chinese whilte	20	15.75	942	1	897	6.15	0.319	2.94	2.56	95	39	5.18
5	PPR-1	20	18.5	939	4	783	6.28	0.456	3.01	2.95	83	33.95	7.26
6	Ichinose	20	19.26	1107	7	880	8.71	0.388	3.54	2.21	74	45.26	4.75

7	Goshoerami	20	16.23	851	2	774	6.73	0.349	3.03	2.66	90	37.25	6.08

Table.15: Leaf Yield Data of Somatic Hybrids and Control Mulberry Varieties recorded during Spring, 2024 (First Year Data)

Variety/Hybrid	TSL (M)	NLPM	SW (KG)	LW (kg)	LSR	NPY (Kg) 36 Plants	Total Leaf yield / ha (12000 Plants)
SH1	1.06	15.44	0.239	0.393	1.644	14.18	4716
SH2	0.88	14.55	0.25	0.41	1.663	14.72	4908
SH3	1.15	13.98	0.29	0.41	1.421	14.80	4932
Chinese white	1.19	14.32	0.22	0.26	1.225	9.22	3072
PPR-1	1.06	13.27	0.23	0.35	1.515	12.42	4140
Ichinose	0.82	20.23	0.14	0.32	2.34	11.56	3851
Goshoerami	0.77	15.04	0.17	0.41	2.43	14.88	4960
Variance	0.03	5.30	0.00	0.00	0.21	4.62	513358.62
CD 5%	0.20	14.09	14.09	14.09	14.09	14.09	14.09
CV	11.16	13.90	13.90	13.90	13.90	13.904	13.904
SE.m	0.06	17.13	17.13	17.13	17.13	17.134	17.134
F stat	0.15	0.06	0.01	0.04	0.10	4.00E-02	0.000421917

Leaf Yield Data of Somatic Hybrids and Control Mulberry Varieties recorded during Spring, 2024

Table.16: Leaf Yield Data of Somatic Hybrids and Control Mulberry Varieties recorded during Spring, 2025 (Second Year Data)

Variety/Hybrid	TSL (M)	NLPM	SW (KG)	LW (Kg)	LSR	NPY (Kg) 36 Plants	Total Leaf yield / ha (12000 Plants)
SH1	1.27	15.794	0.515	0.582	1.109	21.13	7044
SH2	1.16	15.31	0.48	0.61	1.287	22.07	7355
SH3	1.17	16.39	0.49	0.65	1.327	23.40	7800
Chinese White	1.42	15.63	0.44	0.40	0.947	14.58	4860
PPR-1	1.09	15.31	0.61	0.63	1.047	23.40	7799
Ichinose	1.10	19.18	0.15	0.43	2.3	15.44	5148
Goshoerami	0.92	17.95	0.28	0.67	2.41	23.94	7980
Variance	0.02	2.23	0.02	0.01	0.37	15.35	1704896.8
CD 5%	0.27	1.61	0.094	0.12	2.35	48.85	16282.42
CV	13.04	5.49	12.530	11.52	132.89	133.51	133.51
SE.m	0.09	0.52	0.031	0.04	0.76	15.85	5284.26
F stat	0.26	0.11	0.037	0.11	0.99	1.00	1.00
	3.17	8.12	26.32	8.16	0.09	0.06	0.06

Table.17: Frost Damage Assessment of Somatic Hybrids and Control Mulberry Varieties recorded during Feb and March, 2025

Variety/Hybrid	Total Shoot Length (Avg. Value)	Length of Frost Damaged Part (Avg. Value)	Healthy Portion (Avg. Value)	Frost Damage (%)
SH1	129.98	31.90	75.51	24.49
SH2	132.46	28.28	77.98	22.02
SH3	140.24	39.16	72.16	27.84
Control-1 (Chinese White)	132.20	43.81	66.77	33.23
Control-2 (PPR-1)	124.11	44.22	65.18	34.82
Control-3 (Ichinose)	108.77	36.66	66.75	33.25
Control-4 (Goshoerami)	73.57	25.71	65.51	34.49
CD (5%)	--	--	3.67	2.54
SE(M)	--	--	1.23	0.85
CV%	--	--	4.52	3.19
F-Value (ANOVA)	--	--	5.81	6.42
Significance	--	--	*Significant*	*Significant*

Frost Damage Assessment of Somatic Hybrids and Control Mulberry Varieties Recorded during Feb and March, 2025

Project code and title:MOE03010SI: Evaluation of improved mulberry silkworm hybrids and technologies for North and North West India

<u>Component-III</u>: Revalidation of induction of water stress tolerance in mulberry under rainfed condition by application triazole compound (Paclobutrazol) [Outcome of PIP-3543]

Investigators involved: Dr. Santoshkumar Magadum (PI)
Project period: March, 2022 -February, 2024

Objectives:

- To determine the effective concentration of paclobutrazol conferring maximum water stress tolerance in the existing mulberry trees.
- Quantitative and qualitative assessment of mulberry trees treated with different concentrations of paclobutrazol.
- Validation and popularization of economical and effective dose of triazole (paclobutrazol) at farmers' field condition.

Progress achieved:

On Farm Trial (OFT): The lead received from On Station Trial (OST)that 20 mg/litre paclobutrazol treatment found effective and significantly improved leaf biomass of mulberry plantations at all test sites. Therefore, for further validation and popularization of economical and effective dose of paclobutrazol at farmers' field condition, an On Farm Trial (OFT) was conducted in four locations *viz*., Lamberi (Rajouri district),Tanda (Reasi district), Tikri (Udhampur district) and Gurah Kalyal (Kathua district) covering 5 farmers at each location with a total of 20 farmers.

Remarks:

***Mulberry plantation*:** The existing mulberry trees of >10 years old were selected.
***Number of trees selected*:** 5 trees as treatment and 5 trees as control

Data recorded:

Data on various parameters were recorded for all five trees applied with effective dose of palcobutrazol (20 mg/litre) and also from control trees at all the selected farmers' field conditions. Treatment performed better than the control at all the test sites. Among the trees treated with paclobutrazol chemical, leaf yield per plant ranged from 8.615 kg to 16.552 kg with an average of 12.440 kg under treatment and 8.987 kg under control conditions [Table 18].

Data recorded was subjected to Paired t-test analysis. The extremely low p-values (close to zero) indicate that the means of the two groups are significantly different. The positive t-statistic suggests that the mean of the "Treatment" group is significantly higher than that of the "Control" group. The results of the paired t-test provide strong evidence that there is a significant difference between the two groups, with the "Treatment" group having a significantly higher mean than the "Control" group.

Table 18: Performance of leaf yield and quality characters over the control at all test sites under OFT

Characters	Control average	Treatment average	% increase over control
New shoots per plant	42.90	64.25	49.76
Leaf yield per plant (kg)	8.987	12.440	38.42
Weight of 10 fresh leaves (g)	33.67	46.27	37.39
Moisture content (%)	66.31	74.17	11.84
Moisture retention capacity (%)	64.08	81.41	27.04

Conclusion: The leaf yield per plant of mulberry trees treated with 20 mg/litre of paclobutrazol chemical recorded 38.42% increase over control. Similarly, new shoots per plant, weight of 10 fresh leaves, moisture content and moisture retention capacity of leaves recorded 49.76%, 37.39%, 11.84% and 27.04% increase over control, respectively. Therefore, based on the results of On Farm Trial (OFT) conducted at 20 farmers' field conditions, it may be concluded that 20 mg/litre paclobutrazol treatment found effective and significantly improved leaf biomass of mulberry plantations at all test sites.

This provides an economic, eco-friendly and easy technology to sericulture farmers of NW India for improvement of mulberry foliage under rainfed water stress condition and increase in quality silk production. Further, the technology needs to be popularized among sericulture farmers through extension activities of Department of Sericulture of different NW Indian states.

Component-V: Soil health based fertilizer recommendation for DOS farms in North India [Outcome of PPS-3603]

Investigators involved: Santoshkumar Magadum (PI), Gulab Khan Rohella (CI), Ram Lakhan Ram (CI) and Chhattar Pal (CI)

Project period: March, 2022 -February, 2024

Objectives:

- To validate and provide a soil nutrient status based balanced recommendation of fertilizer application for mulberry cultivation in NW India.

Progress achieved:

Experimental details: Soil samples were collected following standard soil sampling procedure from the DoS mulberry farms of Jammu region, Kashmir region, Himachal Pradesh, Punjab, Haryana, Uttarakhand and Uttar Pradesh. A total of 19 DoS farms were selected from the above location/state and five soil samples from each DOS farm were collected for analyzing soil nutrient status [Table 19].

Procedure of Soil Testing: Soil samples were analysed by following standard soil analysis procedure through outsourcing from Department of Agriculture, Govt. of J&K, Jammu and Department of Agriculture, Govt. of Uttarakhand, Dehradun. Further, samples collected from Kashmir division were analysed at Soil analysis Laboratory, CSR&TI, Pampore.All the soil samples were analysed to estimate 11 different soil parameters*viz*., pH, Electrical Conductivity (EC), Organic Carbon (OC), Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S), Zinc (Zn), Copper (Cu), Iron (Fe) and Manganese (Mn).

Recommendations: Data was analysed for availability of soil nutrient status and fertilizer application recommendations were given based on the soil nutrient status [Table 20].

Most of the mulberry bush plantations in NW India are being maintained under rainfed conditions. Therefore, the fertilizer recommendations for mulberry bush plantations under rainfed conditions as recommended by CSR&TI, Pampore (for sub-tropical conditions: N:P:K: 150:75:75 kg/ha/year, FYM@10 MT/ha/year and for temperate conditions: N:P:K: 250:120:120 kg/ha/year, FYM@10 MT/ha/year [nitrogen to be applied in two split doses]) were considered for calculation of fertilizer recommendations.

Table 19. Details of soil samples collected from different DoS farms of NW India.

#	State/UT	Selected DoS mulberry farms
1	Jammu region	Udhampur, Kathua, Reasi, Rajouri and Jammu
2	Kashmir region	Nunner, Yachi Hama,Chandigam and Lalpora
3	Punjab	Sujanpur and Mukerian
4	Himachal Pradesh	Ghumarwin and Nadaun
5	Haryana	Panchkula
6	Uttar Pradesh	Hathakhurd and Kajrikund
7	Uttarakhand	Sahaspur, Sabhawala and Selaqui
	Total	**19 DoS farms**

Table 20: Soil nutrient status analysis (average values) of 19 DoS farms of NW India

State/ UT	DoS Farm	pH	EC (ds/m)	OC (%)	N (kg/ha)	P (kg/ha)
Jammu division	Cherry, Udhampur	6.4	0.43	0.61	424.09	14.37
	Pouni, Reasi	6.7	0.49	0.31	219.13	11.70
	Nowshera, Rajouri	6.9	0.50	0.34	233.50	10.02
	Barnoti, Kathua	6.9	0.51	0.44	305.62	13.04
	Miran Sahib, Jammu	7.0	0.69	0.39	271.05	16.95
Kashmir division	Yachi Hama, Ganderbal	8.05	0.45	1.36	430	75.14
	Nunner, Ganderbal	7.24	0.67	1.27	399	63.47
	Chandigam, Kupwara	7.64	0.51	1.22	410	104.83
	Lalpora, Kupwara	7.28	0.31	1.25	252.66	13.3
Himachal Pradesh	Ghumarwin, Bilaspur	7.0	0.50	0.91	629.66	18.68
	Naduan, Hamirpur	7.0	0.68	1.01	699.16	18.02
Punjab	Mukerian, Hishiarpur	7.0	0.71	0.50	350.90	13.03
	Sujanpur, Pathankot	7.0	0.68	0.70	488.10	12.87
Haryana	Panchkula, Haryana	7.0	0.65	0.39	269.66	13.83
Uttarakhand	Sahaspur	5.75	0.14	0.43	-	46.89
	Sabhawala	6.05	0.11	0.49	-	50.18
	Selaqui	6.22	0.15	0.46	-	29.81
Uttar Pradesh	Hathakhurd	6.94	0.15	0.41	-	51.07
	Kajrikund	6.85	0.13	0.40	-	25.98

Continued.....

State/ UT	DoS Farm	K (kg/ha)	S (ppm)	Zn (ppm)	Fe (ppm)	Mn (ppm)	Cu (ppm)
Jammu division	Cherry, Udhampur	404.55	12.93	0.30	16.28	9.82	0.85
	Pouni, Reasi	328.33	13.25	0.99	17.22	11.34	1.01
	Nowshera, Rajouri	348.22	10.48	2.47	15.29	5.15	0.76
	Barnoti, Kathua	220.01	14.99	0.69	12.06	5.75	0.51
	Miran Sahib, Jammu	171.59	12.66	0.95	14.66	9.04	0.72
Kashmir division	Yachi Hama, Ganderbal	209.5	18.8	7.04	16.13	3.7	7.01
	Nunner, Ganderbal	175	16	4.84	18	7.77	6.45
	Chandigam, Kupwara	145.2	42.23	6.3	36.7	4.08	10.45
	Lalpora, Kupwara	164.3	15.1	7.31	31.7	8.61	11.9
Himachal Pradesh	Ghumarwin, Bilaspur	167.02	11.81	0.90	11.07	5.92	0.44
	Naduan, Hamirpur	183.19	12.40	0.72	14.20	6.71	0.85
Punjab	Mukerian, Hishiarpur	182.31	12.12	0.80	13.16	7.92	0.82
	Sujanpur, Pathankot	183.73	10.78	0.83	16.51	7.95	0.70
Haryana	Panchkula, Haryana	181.40	11.89	0.76	15.48	7.91	0.65
Uttarakhand	Sahaspur	165.40	11.17	0.97	21.48	6.54	1.12
	Sabhawala	164.33	6.21	0.92	15.90	2.56	0.43
	Selaqui	170.60	6.47	1.59	20.83	2.47	0.70
Uttar Pradesh	Hathakhurd	139.04	32.75	2.13	16.62	9.28	0.34
	Kajrikund	310.24	33.19	2.16	16.82	9.57	0.33

Conclusion: To maintain the overall soil health for the growth and maintenance of mulberry plants in selected DoS farms of North-West India, the following recommendations were provided based on the soil nutrient status of the respective sample.

Jammu and Kashmir UT

Jammu division: It has been observed that majority of soil samples analyzed of Jammu division reported to possess lower amounts of organic carbon, nitrogen, phosphorous and zinc. Hence, application of farm yard manure (FYM) of 13 t/ha, neem coated urea of 289 kg/ha, single super phosphate of 419 kg/ha and zinc sulphate of 15-25 kg/ha was recommended respectively for application to improve the soil nutrient status for mulberry cultivation.

Kashmir division: It has been observed that soil samples analyzed of DoS farm, Lalpora of Kashmir division reported to possess lower amounts of nitrogen and phosphorous. Hence, application of neem coated urea of 289 kg/ha and single super phosphate of 419 kg/ha was recommended respectively for application to improve the soil nutrient status for mulberry cultivation. Further, other selected DoS farms didn't show deficiency or low nutrient status for any soil nutrient.

Himachal Pradesh: It has been observed that soil samples collected from the selected DoS mulberry farms of Himachal Pradesh state recorded either medium or higher range of soil nutrient status for all the soil parameters analyzed. None of the selected DoS farm showed deficiency or low nutrient status for any soil nutrients.

Punjab: It has been observed that majority of soil samples analyzed from the selected DoS mulberry farms of Punjab state reported to possess lower amounts of organic carbon and phosphorous. Hence, application of farm yard manure (FYM) of 13 t/ha and single super phosphate of 419 kg/ha was recommended respectively for application to improve the soil nutrient status for mulberry cultivation.

Haryana: It has been observed that majority of soil samples analyzed from the selected DoS mulberry farms of Haryana state reported to possess lower amounts of organic carbon, nitrogen and phosphorous. Hence, application of farm yard manure (FYM) of 13 t/ha, neem coated urea of 289 kg/ha and single super phosphate of 419 kg/ha was recommended respectively for application to improve the soil nutrient status for mulberry cultivation.

Uttarakhand: It has been observed that majority of soil samples analyzed from the selected DoS mulberry farms of Uttarakhand state reported to possess lower amounts of organic carbon and sulphur. Hence, application of farm yard manure (FYM) of 13 t/ha and ammonium sulphate/ gypsum 10-25 kg/ha was recommended respectively for application to improve the soil nutrient status for mulberry cultivation.

Uttar Pradesh: It has been observed that majority of soil samples analyzed from the selected DoS mulberry farms of Uttar Pradesh state reported to possess lower amounts of organic carbon. Hence, application of farm yard manure (FYM) of 13 t/hawas recommended respectively for application to improve the soil nutrient status for mulberry cultivation.

Soil nutrient based fertilizer application to mulberry plantations will help in increasing soil fertility, productivity and sustainability. Soil nutrient based fertilizer application will help department of sericulture to understand nutrient status of soil, judicious application of fertilizers with minimum cost and less environmental pollution. Further, it will benefit the farmers in producing better quality and higher quantity of mulberry leaves with the application of recommended fertilizer doses.

RESEARCH PROJECTS CONTINUED AS C.I DURING 2024-25 (CSB CODED)

Project Code & Title: SIB-01038MGC: Utilization of Japanese Silkworm Genetic Resources for the Development of Bivoltine Hybrids for Robustness & High Productivity

Investigator: P. Kumaresan (CI)
Project Duration: 4 Years 4 Months (January, 2024- March,2028)

Objectives:

- To identify the informative markers associated with the productivity in silkworm genetic resources of Japan
- Development of robust and productive silkworm breeds and hybrids through marker assisted selection
- Evaluation of the hybrids

Progress:

Dfls of 4 hybrids *viz*., NCO, NCD, OWO and OWD collected from Japan by CSR&TI, Mysore was supplied to CSR&TI, Pampore during September, 2023. The hybrids were reared during Autumn, 2023 season. While rearing F2 generation, segregation was observed in larval pattern for NCO & NCD hybrids, accordingly, the population was segregated. A total 6 lines *viz.*, NCO, NCD, OWO, OWD, NCO(M) and NCD(M) were reared for F3 generation for Spring,24 crop. The moth samples of individual breeds were collected and submitted to concern PI of the project for the further biotechnological approach. Subsequently, 3 more sex limited breeds viz., AZO, AZD & AZPO were received from CSR&TI, Mysore and included in the experiment. Hence a total 9 breeds viz., NCO, NCD, OWO, OWD, NCO(M), NCD(M), AZO (SL), AZD(SL) & AZPO(SL) were included in the experiment in the summer crop,24 rearing. Autumn,24 rearing for F5 generation was brushed all the 9 breeds and the dfls prepared during Autumn,24 was preserved under cold storage at SDD, Srinagar, J&K.

The data recorded from spring, summer and autumn crops, 24 was statistically analysed for the important survival and productive traits and depicted in the Table 21,22 & 23, respectively. Besides, the data obtained from F2 to F5 generation was statistically analysed for the consistency in performance over the generation, which showed that except matured larval weight all other economic traits needs further stabilization for consistency.

Table 21: Mean Rearing performance of breeds/hybrids in Spring,24 crop (F3 Gen.)

Race/Hybrid	Fecundity	Larvae wt(g)	Yield/10,000 lar.by No.	Yield/10,000 lar.by Wt.(Kg)	S-Cocoon wt (g)	S-Shell wt. (g)	Shell ratio
OWO	310 (47.93)	38.18 (43.3)	5137 (31.67)	7.76 (31.78)	1.478 (39.1)	0.285 (31.71)	19.05 (29.96)
OWD	284 (43.27)	43.14 (64.91)	7348 (52.2)	12.76 (49.07)	1.74 (65.15)	0.363 (62.27)	20.96 (50.81)
NCO	344 (53.89)	39.55 (49.25)	7589 (54.43)	13.48 (51.57)	1.563 (47.61)	0.343 (54.44)	21.92 (61.19)
NCD	261 (39.2)	35.92 (33.44)	6568 (44.96)	13.05 (50.07)	1.548 (46.06)	0.325 (47.4)	21.05 (51.81)

NCO(M)	435 (70.0)	40.11 (51.7)	7359 (52.3)	13.4 (51.29)	1.49 (40.36)	0.321 (45.78)	21.63 (58.1)
NCD(M)	297 (45.69)	41.42 (57.41)	8667 (64.44)	17.72 (66.22)	1.705 (61.72)	0.353 (58.4)	20.72 (48.13)
Mean	321.67	39.72	7111.36	13.03	1.59	0.33	20.89
SD	56.49	2.29	1076.84	2.89	0.1	0.03	0.92
CD@5%	58.78	2.04	811.34	1.57	0.15	0.04	1.61
CD@1%	79.22	2.75	1093.45	2.12	1.2	0.05	2.18
P<0.05/01	**	**	**	**	**	**	**
CV%	17.56	5.76	15.14	22.18	6.29	9.09	4.4

Fig. in paranthesis indicates Mano's EI value of the individual traits

Table 22: Mean Rearing performance of breeds/hybrids in Summer,24 crop (F4 Gen.)

Race/ Hybrids	Fecundity	Larval Wt	Pupation rate (%)	Cocoon yield/10,000 larvae by No. & Wt.		Single cocoon weight	Single shell weight	Shell ration %
NCO	328 (53.68)	28.18 (50.18)	38.83 (59.29)	5073 (57.55)	5.24 (57.68)	0.86 (49.90)	0.17 (51.67)	20.30 (57.28)
NCD	323 (52.90)	27.62 (47.67)	43.78 (62.78)	5765 (62.24)	4.62 (54.26)	1.04 (59.40)	0.18 (52.31)	17.00 (40.72)
OWO	280 (46.11)	33.35 (73.44)	47.50 (65.40)	6080 (63.36)	7.47 (69.96)	1.30 (73.45)	0.27 (76.57)	21.078 (61.21)
OWD	310 (50.91)	29.83 (57.61)	13.15 (41.18)	2512 (40.21)	2.53 (42.77)	0.73 (42.29)	0.15 (44.83)	20.66 (59.11)
NCO(M)	350 (57.08)	28.80 (52.97)	20.12 (46.10)	3452 (46.58)	3.26 (46.79)	0.70 (41.02)	0.15 (45.74)	21.60 (63.82)
NCD(M)	340 (55.51)	27.18 (45.71)	35.25 (56.76)	4927 (56.56)	4.74 (54.89)	0.81 (46.87)	0.15 (44.67)	18.00 (45.74)
AZO	407 (66.08)	25.63 (38.73)	6.73 (36.65)	1576 (33.88)	0.96 (34.12)	0.84 (48.73)	0.14 (42.13)	15.71 (34.22)
AZD	208 (34.94)	26.30 (41.73)	7.16 (36.96)	2757 (41.87)	2.18 (40.82)	0.68 (39.57)	0.14 (42.93)	18.29 (47.19)
AZPO	195 (32.79)	26.35 (41.96)	18.42 (44.89)	3476 (46.74)	3.61 (48.71)	0.84 (48.77)	0.16 (49.15)	17.00 (40.71)
Mean	304.50	28.14	25.66	3957.52	3.85	0.87	0.17	18.85
SD	63.83	2.23	14.18	1477.50	1.82	0.18	0.04	1.99
CD at 5%	94.08	2.46	17.64	1743.73	1.70	NS	0.07	2.75
CD at 1%	126.79	3.31	23.78	2350.05	2.30	0.48	0.10	3.71
P<0.05/01	**	**	**	**	**	NS	*	**
CV%	20.96	7.92	55.26	37.33	47.27	20.69	23.53	10.56

Fig. in paranthesis indicates Mano's EI value of the individual traits

Table 23: Mean Rearing performance of breeds/hybrids in Autumn,24 crop (F5 Gen.)

Race/Hybrids	Fecundity	Larval weight	Pupation rate	Cocoon yield/10,000 larvae by No.&Wt.		S-CWT	S-SWT	SR%	Cumulative EI
NCO	308 (63)	26.0 (60)	90.93 (58)	6693 (69)	7.91 (64)	1.069 (48)	0.191 (40)	17.97 (34)	54
NCD	247 (40)	23.4 (49)	85.58 (50)	5133 (46)	5.7 (44)	1.056 (46)	0.202 (45)	19.08 (48)	46
OWO	257 (44)	25.2 (57)	88.2 (54)	6173 (61)	7.53 (61)	1.227 (64)	0.232 (63)	18.88 (46)	56
OWD	324 (69)	27.6 (67)	84.6 (49)	5667 (54)	7.62 (62)	1.244 (65)	0.231 (62)	18.67 (43)	59
NCO(M)	268 (48)	22.6 (46)	92.04 (59)	4840 (42)	5.3 (41)	1.019 (42)	0.211 (51)	20.87 (71)	50
NCD(M)	269 (48)	23.4 (49)	91.87 (59)	5440 (51)	6.28 (50)	1.094 (50)	0.206 (48)	18.87 (46)	50
AZO	276 (51)	23.1 (48)	70.98 (29)	4720 (40)	4.83 (37)	1.041 (45)	0.21 (50)	20.19 (62)	45
AZD	237 (36)	21.8 (43)	76.64 (37)	4360 (35)	5.05 (39)	0.917 (32)	0.176 (31)	19.19 (50)	38
AZPO	279 (52)	19.1 (31)	89.68 (56)	5520 (52)	6.64 (53)	1.172 (58)	0.226 (59)	19.25 (50)	51
MEAN	274	24	85.6	5394	6.3	1.09	0.21	19.2	
SD	26	2.3	6.89	690	1.1	0.99	0.17	0.8	
CV	9.5	9.9	8.05	12.8	18	9.04	8.33	4.17	
CD@5%/1%	NS	1.5	20.2	629	0.9	0.13	0.02	NS	
P<0.05/0.01	NS	**	NS	**	**	**	**	NS	

Project Code &Title: MOEQ2022MIC- Vulnerability of Sericulture to Climate Change in India

Project Duration: March, 2024-August, 2026

Investigator(s): Parameswaranaik J (PI), Rahul K (CI), Dr. Ravi Saini (CI) , Manjunatha G. R. (CI), Joycy Rani Dasari (Co-PI), Plabani Roy (Co-PI)

Objectives:

1. To assess the vulnerability and adaptation strategies of seri-farmers to climate change.
2. To explore the potential areas of sericulture based on climate factors.
3. To build the climate resilience among seri-farmers through extension approaches.

Progress

This collaborative research project has made significant progress across multiple components. The process of acquiring 70 years of climatic data (maximum temperature, minimum temperature, and humidity) from IMD, Delhi for the study area is currently underway. Concurrently, the development of the Vulnerability Index is in progress, with the selection of relevant indicators being finalized. Identification of suitable adaptation strategies, based on comprehensive literature review, is also ongoing. A major milestone achieved is the successful completion of extensive survey work across five states in North and Northwest India—Jammu & Kashmir, Punjab, Himachal Pradesh, Uttarakhand, and Uttar Pradesh. Against a target of 200 farmers, data from 365 farmers has been collected, surpassing the target by over 100%. This includes 100 farmers from Jammu & Kashmir, 75 from Punjab, 70 from Himachal Pradesh, 60 each from Uttarakhand and Uttar Pradesh. The collected data is now being systematically uploaded to Kobo Toolbox, a secure online data management platform, ensuring organized and accessible documentation for further analysis.

Project title and code: All India Coordinated Experimental Trials for Mulberry (AICEM) Phase – IV (PIE13001MI)

Zonal Coordinator: Dr. N. K. Bhatia (upto 08-07-2024), M. Maheshwari (15-07-2024 to 19-10-2024), Sardar Singh (w.e.f. 21-10-2024)

Investigator(s): Pawan Saini, Gulab Khan Rohela, Rajesh Kumar, Chhattar Pal and Santoshkumar Magadum

Project Duration: 2019-2025

Objectives: Identification of suitable mulberry variety for regional, zonal and national use based on their performance.

Progress:

The transplanted saplings of mulberry test entries/genotypes (CBP-01, CMY-01 and CPP-01) were maintained at all the four test sites (CSR&TI, Pampore; P4 BSF, Manasbal; RSRS, Miransahib, Jammu Division and RSRS, Sahaspur, Dehradun) of North-West India along with control varieties during 2024-25. Goshoerami was used as local check variety at CSR&TI, Pampore and P4 BSF, Manasbal test sites. At RSRS, Miransahib, Jammu test site; S-146 was used as local check variety. At RSRS, Sahaspur, Dehradun three checks were used viz., S-146 (local check), C-2038 (zonal check) and Vishala (national check).The advocated cultural practices such as fertilizer application, irrigation, weeding, FYM application. etc., were performed as per the scheduled activity calendar at each test site. The survival percentage of test entries along with check varieties was assessed after leaf sprouting (Table 24).

The data on leaf yield and yield attributing traits has been recorded during spring and autumn 2024 at all the test sites. The silkworm bioassay also conducted during spring and autumn 2024 at all the test sites.

Disease and Insect-Pest Incidence

During autumn 2024, disease and insect-pests incidence (Leaf spot, leaf rust, powdery mildew and leaf webber) was recorded at all the four test sites (Table 25). The incidence of disease and pests were recorded from longest shoot of five randomly selected plants as per the guidelines and grading was given. Based upon the grading using the Percent Damage Index (PDI) was computed and ranked as resistance/tolerance/susceptibility as per the Mulberry Germplasm Catalogue, Hosur. The PDI scale followed for ranking was: resistant (0.1 – 5.0%), moderately resistant (5.1 – 20.0%), susceptible (20.1 – 50.0) and highly susceptible (50.1 – 100.0%).

Analysis of soil health status of AICEM field

The soil samples were collected from four sites of Kashmir division viz., CSR&TI, Pampore; P4 BSF, Manasbal; RSRS, Miransahib, Jammu and RSRS, Sahaspur, Dehradun. The soil samples were analysed through mridaparikshak in Agronomy and Soil Science section and 12 parameters including macro- and micro-nutrients content were estimated (Table 26).

Table 24: Survival Percentage of Test Entries (as on 31-03-2025)

Mulberry Varieties	CSR&TI Pampore, Kashmir	P4 BSF Manasbal, Kashmir	RSRS Miransahib, Jammu	RSRS Sahaspur, Dehradun
C-1360	98.98	100.00	100.00	100.00
AGB-8	83.67	100.00	98.63	100.00
PPR-1	97.27	100.00	100.00	100.00
Goshoerami (Local check)	98.98	100.00	------	-------
S-146 (Local check)	------	------	100.00	100.00
Vishala (National check)	------	------	------	100.00
C-2038 (Zonal check)	------	------	------	100.00

Table 25: Disease and pest observation at four test sites if AICEM during Autumn 2024

Test Sites	Test Entry	Percent Damage Index (PDI)									
		Leaf Spot	Reaction	Leaf Rust	Reaction	Tukra	Reaction	Powdery Mildew	Reaction	Leaf Webber	Reaction
CSR&TI, Pampore (Temperate)	C-1360	28.21	S	------	-------	-------	-------	2.03	R	9.12	MR
	AGB-8	36.12	S	------	-------	-------	-------	17.32	MR	5.13	MR
	PPR-1	35.10	S	------	-------	-------	-------	19.12	MR	4.68	R
	Goshoerami	6.32	MR	------	-------	-------	-------	35.24	S	8.01	MR
P4 BSF, Manasbal (Temperate)	C-1360	15.11	MR	------	-------	-------	-------	5.96	MR	9.03	MR
	AGB-8	21.98	S	------	-------	-------	-------	20.00	MR	10.24	MR
	PPR-1	26.32	S	------	-------	-------	-------	17.45	MR	9.31	MR
	Goshoerami	18.03	MR	------	-------	-------	-------	20.00	MR	32.54	S

Test Sites	Test Entry	Percent Damage Index (PDI)									
		Leaf Spot	Reaction	Leaf Rust	Reaction	Tukra	Reaction	Powdery Mildew	Reaction	Leaf Webber	Reaction
RSRS, Miransahib Jammu (Sub-tropical)	C-1360	19.1	MR	------	-------	-------	-------	11.63	MR	16.07	MR
	AGB-8	11.12	MR	------	-------	-------	-------	8.25	MR	12.05	MR
	PPR-1	7.69	MR	------	-------	-------	-------	11.21	MR	13.36	MR
	S-146	18.45	MR	------	-------	-------	-------	11.98	MR	12.34	MR
RSRS, Sahaspur, Dehradun (Sub-tropical)	C-1360	8.05	MR	------	-------	0.41	R	0.00	R	5.96	MR
	AGB-8	10.36	MR	------	-------	0.78	R	0.96	R	4.97	R
	PPR-1	8.11	MR	------	-------	0.43	R	0.97	R	7.06	MR
	Vishala	11.06	MR	------	-------	0.00	R	0.65	R	6.32	MR
	C-2038	9.33	MR	------	-------	0.00	R	1.98	R	7.09	MR
	S-146	15.96	MR	------	-------	0.51	R	2.01	R	9.01	MR

Table 26: Soil health status of four test sites during spring 2023

Test Sites	pH	EC (dS/m)	OC (%)	N (Kg/ha)	P_2O_5 (Kg/ha)	K_2O (Kg/ha)
CSR&TI, Pampore, Kashmir	7.35	0.53	1.41	470	86	210
P4 BSF, Manasbal, Kashmir	7.12	0.55	1.31	410	72	185
RSRS, Miransahib, Jammu	7.14	0.82	0.87	310	50.3	111.2
RSRS, Sahaspur, Dehradun	6.81	0.95	1.09	306	22.2	150.25

Test Sites	S (mg/kg)	Zn (mg/kg)	B (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Cu (mg/kg)
CSR&TI, Pampore, Kashmir	35	1.1	15.5	11.1	5.56	4.23
P4 BSF, Manasbal, Kashmir	15	0.52	18.2	14.8	7.80	4.5
RSRS, Miransahib, Jammu	18.5	1.2	11.2	16.2	8.10	5.10
RSRS, Sahaspur, Dehradun	38.5	1.15	10.8	16.5	5.6	5.21

Project Code and Title: ARE01028MI: Recommendation of Novel Fungicidal and Insecticidal Applications in Mulberry

Investigator(s): Pawan Saini, and Chattar Pal
Project Fellow(s): Danishta Aziz (JRF) and Zakiya Saif (PA)
Project Duration: May 2022 – April 2025

Objectives: 1. To identify suitable novel fungicide/nematicide and insecticide molecule under in vitro studies against mulberry pathogens and pests.
2. *In vivo* evaluation of identified novel fungicide/nematicide and insecticide molecule against mulberry pathogens.
3. To study the safety of novel fungicide/nematicide/insecticides on silkworm.

Progress:

Bioassay of selected insecticides on leaf webber reared in laboratory
The leaf dip bioassay experiment on leaf webber in mulberry carried out at host plant section of CSR&TI, Pampore (table 27) revealed that Novaluron 5.25+ Indoxacarb 4.5 SC and Chlorfenapyr 10 SC caused 100 per cent mortality in leaf webber after fed with insecticide treated leaves in all the three concentrations, however no mortality was reported in leaf webber treated with all three concentrations of insecticide, Afidopyropen g/l DC. In case of Novaluron 5.25+ Indoxacarb 4.5 SC and Chlorfenapyr 10 SC, there was difference in exposure time to cause 100 % mortality in different concentrations. In Novaluron 5.25+ Indoxacarb 4.5 SC, 100 per cent mortality was seen at exposure time 24 hrs and 48 hrs, 48 hrs in concentrations 0.03% & 0.02, 0.01%, respectively, while in Chlorfenapyr 10 SC, 100 per cent mortality was seen at exposure time 24 hrs, 48 hrs and 72 hrs in concentrations 0.03%, 0.02 & 0.01%, respectively.

Table 27. Mortality of leaf webber after feeding on insecticide treated mulberry leaves

Treatment	Concentration	Per cent Survival (%)				
		24 hrs	48 hrs	72 hrs	96 hrs	120 hrs
Novaluron 5.25+ Indoxacarb 4.5 SC	0.03%	100	-	-	-	-
	0.02%	0	100	-	-	-
	0.01%	0	100	-	-	-
Chlorfenapyr 10 SC	0.03%	100	-	-	-	-
	0.02%	66	100	-	-	-
	0.01%	0	66	100	-	-
Afidopyropen g/l DC	0.15%	0	0	0	0	0
	0.1%	0	0	0	0	0
	0.05%	0	0	0	0	0
Control		0	0	0	0	0

Efficacy of selected fungicides against leaf spot pathogen under laboratory conditions
Three different concentrations each of fungicides Difenoconazole 25 EC, Myclobutanil 10 WP and Metrafenone 50 SC were tested in laboratory against leaf spot pathogen in mulberry for their efficacy in inhibiting colony growth. Data presented in table 8 clearly showed that all the fungicides taken were effective against leaf spot as compared to control and significantly inhibited colony growth radially *in vitro* at different concentrations. Out of the

selected fungicides, Difenoconazole 25 EC caused highest percent inhibition in growth of colony as 78.35%, 78.48% and 77.47 & at concentrations 0.0125%, 0.0075 % and 0.0025 %, respectively, followed by Myclobutanil 10 WP as 77.21%, 68.60% and 65.82% at concentrations 0.002%, 0.006% and 0.004%, respectively. Metrafenone 50 SC also outperformed control in inhibiting colony growth by 66.45%, 51.26% and 67.72% at conentrations 0.25%, 0.15% and 0.05%, respectively.

Table 28: Efficacy of selected fungicides against leaf spot pathogen of mulberry

Treatment	Concentration	Colony diameter (mm)	Percent Growth Inhibition (%)
Difenoconazole 25 EC	0.0125%	17.1	78.35
	0.0075 %	17.0	78.48
	0.0025 %	17.8	77.47
Myclobutanil 10 WP	0.006%	24.8	68.60
	0.004%	27.0	65.82
	0.002%	18.0	77.21
Metrafenone 50 SC	0.25 %	26.5	66.45
	0.15 %	38.5	51.26
	0.05 %	25.5	67.72
Control		79.0	

Evaluation of field performance of selected fungicides

Three different concentrations each of fungicides Difenoconazole 25 EC, Myclobutanil 10 WP and Metrafenone 50 SC were tested in field for their efficacy in controlling powdery mildew and leaf spot infection in mulberry at CSR&TI, Pampore. The results presented in table 9 revelaed that all the selected fungicides were effective in controlling the infection caused by powdery mildew pathogen as compared to control. Among all the chemicals, Metrafenone 50 SC at concentration 0.25% give highest percent reduction in powdery mildew infection (52.78%) over control, followed by Myclobutanil 10 WP (34.32%) at concentration 0.006%, Difenoconazole 25 EC (33.49) at concentration 0.0125%. Similarly, the results presented in table 10 show the efficacy of selected fungicides in controlling leaf spot infection in mulberry. Among all the chemicals, Metrafenone 50 SC at concentration 0.25% give highest percent reduction in leaf spot infection (25.73%) over control, followed by Myclobutanil 10 WP (24.76%) at concentration 0.006%, Difenoconazole 25 EC (21.23) at concentration 0.0125%.

Table 29. Efficacy of selected fungicides on reducing powdery mildew infection in mulberry

Treatment	Concentration	Pre-count	Powdery mildew disease intensity						Cumulative Mean	% reduction over control
			1 DAS	3 DAS	5 DAS	7 DAS	10 DAS	15 DAS		
Difenoconazole 25 EC	0.0125%	2.25	4.75	5.50	6.25	6.42	6.92	7.25	5.62	33.49
	0.0075%	3.83	5.83	6.75	7.50	7.83	8.00	8.25	6.86	18.82
	0.0025%	5.00	6.50	6.92	7.17	7.33	7.67	8.08	6.95	17.75
Myclobutanil 10 WP	0.006%	2.92	5.25	5.83	6.08	6.17	6.17	6.42	5.55	34.32
	0.004%	3.08	5.17	6.50	8.67	9.08	9.67	9.98	7.45	11.83

	0.002%	5.42	6.92	7.35	7.58	7.92	7.98	8.25	7.35	13.02
Metrafenone 50 SC	0.25%	1.25	3.42	4.08	4.58	4.75	4.83	5.00	3.99	52.78
	0.15%	2.67	4.42	5.42	6.67	6.83	7.00	7.17	5.74	32.07
	0.05%	5.83	5.94	6.12	6.56	7.09	7.43	7.68	6.66	21.18
Control		1.67	6.25	8.25	9.67	10.42	10.95	11.96	8.45	

Table 30. Efficacy of selected fungicides on reducing leaf spot infection in mulberry

Treatment	**Concentration**	**Pre-count**	**Leaf spot disease intensity**						**Cumulative Mean**	**% reduction over control**
			1 DAS	**3 DAS**	**5 DAS**	**7 DAS**	**10 DAS**	**15 DAS**		
Difenoconazole 25 EC	0.0125%	8.17	8.42	8..83	8.83	9.17	9.58	9.58	8.94	21.23
	0.0075 %	8.83	9.08	9.08	9.42	9.75	9.58	10.08	9.40	17.18
	0.0025 %	9.67	9.92	10.08	10.25	10.33	10.50	10.50	10.18	10.31
Myclobutanil 10 WP	0.006%	7.67	8.17	8.25	8.58	8.75	9.08	9.25	8.54	24.76
	0.004%	8.67	9.08	9.33	9.33	9.67	9.83	10.00	9.42	17.00
	0.002%	10.42	10.58	10.67	10.75	11.00	11.17	11.33	10.85	4.40
Metrafenone 50 SC	0.25 %	7.50	7.83	8.08	8.50	8.83	9.08	9.17	8.43	25.73
	0.15 %	8.50	8.67	8.83	9.00	9.17	9.42	9.58	9.02	20.53
	0.05 %	9.67	9.83	10.00	10.08	10.17	10.50	10.50	10.11	10.93
Control		10.17	10.58	11.25	11.33	11.75	12.08	12.25	11.35	

Evaluation of field performance of insecticides

Three different concentrations of each insecticide, Novaluron 5.25+ Indoxacarb 4.5 SC, Chlorfenapyr 10 SC and Afidopyropen g/l DC were tested in field for their efficacy in controlling leaf webber infestation in mulberry at CSR&TI, Pampore. The results presented in table 11 revelaed that all the selected insecticides were effective in controlling leaf webber infestation in mulberry, however the highest percent reduction in infestation over control was seen in Chlorfenapyr 10 SC (53.58%) at concentration 0.03%, followed by Novaluron 5.25+ Indoxacarb 4.5 SC (48.81%, 48.81%) at concentrations 0.03% and 0.02%, and least control was seen in case of Afidopyropen g/l DC (2.38%) at concentration 0.05%.

Table 31. Efficacy of selected insecticides on reducing leaf webber infestation in mulberry

Treatment	**Concentration**	**Pre-count**	**Leaf webber infestation**						**Cumulative Mean**	**% reduction over control**
			1 DAS	**3 DAS**	**5 DAS**	**7 DAS**	**10 DAS**	**15 DAS**		
Novaluron 5.25+ Indoxacarb 4.5 SC	0.03%	1.75	1.83	1.83	1.83	1.83	2.08	2.33	1.93	48.81
	0.02%	1.33	1.83	1.83	1.83	1.92	2.33	2.42	1.93	48.81
	0.01%	1.75	2.17	2.17	2.17	2.33	2.25	2.83	2.24	40.58
Chlorfenapyr 10 SC	0.03%	1.17	1.75	1.75	1.75	1.83	1.92	2.08	1.75	53.58
	0.02%	1.67	1.92	1.92	1.92	2.17	2.33	2.50	2.06	45.36
	0.01%	2.83	3.00	3.00	3.00	3.08	3.17	3.17	3.04	19.36
Afidopyropen g/l DC	0.15%	1.00	1.98	2.08	2.78	3.17	4.33	6.67	3.14	16.71
	0.1%	1.25	1.53	2.33	3.38	3.75	4.83	5.00	3.15	16.45
	0.05%	1.83	2.51	3.03	3.82	4.38	4.97	5.25	3.68	2.38
Control		3.33	3.33	3.42	3.75	4.00	4.08	4.50	3.77	

Project code and title: MOE02015MI: Evaluation of Promising Mulberry Varieties, Bed disinfectant and Low Cost Drip Fertigation System for Eastern and North-Eastern India

<u>Component - II:</u> Evaluation of high yielding and low temperature stress tolerant C-01 & C-11(in collaboration with CSR&TI, Berhampore)

Investigators involved: Santoshkumar Magadum, Co-I (RSRS, Jammu) & Chhattar Pal, CoI (RSRS, Sahaspur)

Project period: February, 2022 -January, 2025

Objectives:

- To evaluate promising high yielding and low temperature stress tolerant genotypes C-01 and C-11 in sub-tropical condition.

Progress achieved:

RSRS, Jammu:

- Two test genotypes C-2060 [C-01]&C-2065 [C-11] along with check variety C-2038 and S-146 are being maintained in main field in Randomized Block Design with 3 replications.
- All the necessary cultural operations, pruning and training were carried out at appropriate time for better establishment of experimental plantation.
- Soil samples were collected from all the experimental plots and analyzed and appropriate quantity of farm yard manure and inorganic fertilizers were applied.
- All the test genotypes were maintained appropriately in main field by following all the recommended cultural practices [Figure].
- All the test genotypes along with check varieties were evaluated for growth, yield and leaf quality parameters during Spring, Summer and Autumn seasons in 2024 and submitted to Director, CSR&TI, Pampore for onward submission to PI of the project at CSR&TI, Berhampore [Table 32].
- Further, Bioassay study of all test genotypes conducted by rearing FC1xFC2 silkworm hybrid during Springand Autumn 2024 [Table 33].
- Based on the data analysis, it has been observed that C-2065 [C-11] has been found to be high yielding and low temperature stress tolerant during all the three seasons followed by C-2060 [C-01] as compared to both the control varieties.

Table 32.Growth and yield attributing parameters of test genotypes recorded during Spring, Summer and Autumn seasons 2024

Season	Genotypes	Days to sprout after pruning (days)	Leaves per meter shoot length (Nos)	Leaf moisture (%)	Primary shoots per plant (Nos)	Length of the longest shoot (cm)	Leaf yield (g/plant)	Leaf yield (kg/plot)
Spring, 2024	C-2060 [C-01]	26	16	73.03	21	99.20	0.617	30.217
	C-2065 [C-11]	29	17	73.22	21	92.93	0.703	34.434
	C-2038 (C)	34	15	71.99	18	86.27	0.564	27.659
	S-146 (C)	30	15	71.45	20	85.93	0.497	24.330
Summer, 2024	C-2060 [C-01]	10	19	71.30	15	136	0.618	30.282
	C-2065 [C-11]	9	19	73.03	18	128	0.695	34.055
	C-2038 (C)	10	17	70.39	13	120	0.563	27.603
	S-146 (C)	12	16	69.54	17	128	0.522	25.578
Autumn, 2024	C-2060 [C-01]	16	20	73.08	11	145	0.760	37.256
	C-2065 [C-11]	18	19	76.83	13	140	0.816	39.968
	C-2038 (C)	21	18	71.89	10	126	0.653	31.981
	S-146 (C)	24	18	71.45	11	137	0.612	30.004

Table 33. Bioassay studies conducted and parameters recorded during Spring and Autumn seasons 2024

Season	Test genotype	No. of larvae retained after 3rd moult	Total larval duration (D:H)	Wt. of 10 matured Larvae	SSC (g)	SSW (g)	SR %	ERR / 10,000 Larvae		Leaf cocoon ratio
								By No.	By wt. (Kg)	
Spring 2024	C-2060 [C-01]	250	24-23	0.58	2.01	0.40	19.97	9680	19.55	20.45
	C-2065 [C-11]	250	24-19	0.60	2.07	0.42	20.45	9733	19.99	20.13
	C-2038 (C)	250	24-22	0.57	1.91	0.39	20.20	9707	18.51	21.16
	S-146 (C)	250	25-00	0.58	1.88	0.37	19.78	9640	18.01	21.37
Autumn 2024	C-2060 [C-01]	250	24-22	52.33	1.75	0.33	19.15	9300	15.99	22.08
	C-2065 [C-11]	250	24-18	56.00	1.80	0.35	19.51	9403	16.22	21.64
	C-2038 (C)	250	24-22	51.33	1.73	0.33	19.09	9333	15.63	22.46
	S-146 (C)	250	25-00	1.69	0.32	18.68	9233	15.51	1.69	22.91

Maintenance of experimental plantation in main field

Bioassay studies of test genotypes by rearing FC1xFC2 silkworm hybrid

RSRS, Sahaspur:

Progress: The plantation of two mulberry varieties viz. C-01 (C2060) & C-11 (C-2065) as test entries and C-2038 and S-146 as check varieties was done during January'2022 with Randomized Block Design. 147 saplings of each variety were planted in three replication (49 plants each replication) by adopting the spacing 3' x 3'. The plantation is being maintained as per the recommended package of practices of RSRS, Sahaspur.

Data on economic traits i.e. days to sprout after pruning (days), leaves per meter shoot length (Nos.) primary shoots per plant (Nos.), length of the longest shoot (cm), leaf yield (kg/plant), leaf yield (kg/plot), leaf moisture (%), moisture retention capacity (%) and leaf senescence (%) were recorded during Autumn'2024 (Table 34).

Overview of On Station Trial plantation

Table 34. Morphological, leaf yield and biochemical parameters recorded during Autumn'2024

Variety	Days to sprout after pruning (days)	Leaves per meter shoot length (Nos)	Primary shoots per plant (Nos)	Length of the longest shoot (cm)	Leaf yield (kg/ plant)	Leaf Yield (kg/ plot)	leaf Moisture (%)	MRC (%)	Leaf senescence (%)
C-01	6.133	19.533	9.067	218.600	1.267	62.061	84.647	51.104	54.067
C-11	8.067	18.600	9.467	176.267	1.378	67.503	86.540	48.522	58.561
C-2038	13.000	17.467	9.067	187.600	1.155	56.615	80.953	63.603	54.299
S-146	7.600	18.400	9.867	196.933	1.306	64.080	80.357	58.214	67.977
Mean	8.700	18.500	9.367	194.850	1.276	62.565	83.124	55.361	58.726
SD	2.583	0.734	0.332	15.543	0.080	3.948	2.567	5.936	5.633
CD@5%	0.297	0.040	0.035	0.080	0.063	0.063	0.031	0.107	0.096
SEM±	0.746	0.212	0.096	4.487	0.023	1.140	0.741	1.714	1.626

Bioassay study under MOE 02015 MI

Bioassay study was conducted for test entries along with check varieties during Autumn'2024 under MOE02015 MI project. The double hybrid silkworm breed FC1 × FC2 was used for conducting the bioassay study. The results showed that there was significant difference was recorded in the economic parameters of the silkworm, *viz.*, larval duration (D:H), larval weight (g), No. of cocoons harvested, Effective rate of rearing (By weight (kg) and by number), average single cocoon weight (g), average single shell weight (g), shell ratio (%) and leaf cocoon ratio were recorded between the test entries and check varieties (Table 35).

Table 35. Bioassay study conducted during Autumn'2024 under MOE02015 MI

Test variety	Larval duration (D;h)	Larval weight 10 Nos. (g)	No. of cocoons harvested	Weight of cocoons harvested (kg)	ERR/10000 larvae		Av. SCW (g)	Av. SSW (g)	SR (%)
					By wt.	By No.			
C-1	21:08	49.61	242.33	0.56	23.05	9693.33	2.14	0.48	22.57
C-11	21:00	51.17	241.00	0.59	24.39	9640.00	2.18	0.51	23.20
C-2038	21:12	49.54	238.67	0.56	23.61	9546.67	2.08	0.47	22.40
S-146	22:00	49.40	235.67	0.52	22.24	9426.67	2.16	0.47	21.85
Mean	21:20	49.93	239.42	0.56	23.32	9576.67	2.14	0.48	22.50
SD	0.016	0.721	2.532	0.023	0.785	101.270	0.037	0.015	0.480
CD@5%	0.018	0.014	0.011	0.041	0.034	0.011	0.017	0.030	0.021
SEM±	0.005	0.208	0.731	0.007	0.227	29.234	0.011	0.004	0.139

1. **Project title and code: Development of bivoltine double hybrids suitable for different regions of India (AIB02019MI)**

Investigator: Kiran R (CSR&TI, Pampore), Santoshkumar Magadum (RSRS, Jammu) and Sunil (RSRS, Jammu) (w.e.f. 08.12.2024)
Project Fellow: Nadiya Ashraf

Objectives

- Development of bivoltine breeds with high temperature and humidity tolerance through Marker assisted selection
- Improvement of viability in the parents of FC1, FC2 through Marker assisted selection
- Evaluation and identification of productive bivoltine double hybrids with abiotic tolerance

Progress achieved at CSR&TI, Pampore:

Maintenance of Parental Lines: Ten silkworm lines – Oval (HH2, HH2A, HH2B, HH27, HH27A, HH27B) and Constricted (HH6, HH6A, HH26, HH26A) – were reared successfully during Spring, Summer and Autumn of 2024.

Hybrid Evaluation: These parental lines were crossed using a Partial Diallel mating system. In this system, two series (HH2, HH2A, HH2B) were crossed with the 27 series (HH27, HH27A, HH27B), and the 6 series (HH6, HH6A) were crossed with the 26 series (HH26, HH26A) to form nine oval (HFC1 to HFC9) and four constricted (HFC10 to HFC13) foundation crosses, respectively. The thirteen foundation crosses formed during the spring grainage were reared during the summer of 2024. Similarly, these foundation crosses were subsequently used to develop 20 Double hybrids (KD1 to KD20), where oval foundation crosses were crossed with constricted foundation crosses developed during the summer grainage and reared in Autumn 2024.

Table 36: Comparative rearing performance of 10 silkworm lines during spring seasonal rearing of 2024

Spring 2024	Fecundity (No) (Mean±SE)	Hatching (%) (Mean±SE)	Yld 10000 Kg (Mean±SE)	Single Cocoon Weight (g) (Mean±SE)	Single Shell Weight (g) (Mean±SE)	Shell Ratio (%) (Mean±SE)	Pupation (%) (Mean±SE)
HH2	468±33.26	97.83±0.20	14.40±0.73	1.89±0.03	0.36±0.01	19.25±0.56	86.78±4.26
HH2A	502±15.52	97.03±0.62	14.02±1.70	1.86±0.04	0.35±0.01	18.83±0.63	77.56±8.57
HH2B	512±10.37	98.03±0.37	14.39±0.26	1.92±0.04	0.35±0.02	18.16±1.43	85.67±0.84
HH27	566±25.15	96.67±1.03	14.89±0.52	1.85±0.03	0.35±0.00	18.84±0.33	88.44±2.11
HH27A	574±80.65	95.87±1.50	14.25±0.61	1.95±0.05	0.38±0.01	19.32±0.18	85.00±4.73
HH27B	532±17.07	95.97±0.86	14.06±0.45	1.96±0.04	0.34±0.02	17.57±1.10	87.22±2.54
HH6	550±21.07	96.20±0.90	13.06±0.53	1.93±0.05	0.39±0.02	20.17±0.49	75.67±1.39
HH6A	514±17.32	94.37±1.02	14.56±0.64	1.92±0.02	0.41±0.01	21.27±0.79	83.44±3.58
HH26	569±25.24	97.60±0.71	14.91±0.56	2.06±0.08	0.40±0.02	19.19±1.40	82.00±1.39
HH26A	559±16.01	96.57±1.17	11.15±0.20	1.78±0.04	0.35±0.01	19.48±0.46	76.22±0.56

Table 37: Comparative rearing performance of 10 silkworm lines during summer seasonal rearing of 2024

Summer2024	Fecundity (No) (Mean±SE)	Hatching (%) (Mean±SE)	Yld 10000 Kg (Mean±SE)	Single Cocoon Weight (g) (Mean±SE)	Single Shell Weight (g) (Mean±SE)	Shell Ratio (%) (Mean±SE)	Pupation (%) (Mean±SE)
HH2	493± 24.69	95.21±0.5	10.42±0.2	1.38±0.01	0.22±0.04	16.11±3.1	77.11±3.11
HH2A	490±37.99	92.91±1.2	10.56±0.3	1.5±0.00	0.24±0.00	16.18±0.1	70.44±2.3
HH2B	581.6±18.49	93.53±0.6	11.01±0.3	1.41±0.01	0.22±0.00	15.83±0.5	78.11±2.82

HH27	501.6±38.27	92.13±2.0	11.5±0.6	1.51±0.02	0.23±0.01	15.52±0.6	85.11±7.26
HH27A	444±11.14	91.36±1.4	12.18±0.1	1.51±0.07	0.27±0.01	18.52±1.9	86.22±1.06
HH27B	539.3±29.78	91.72±0.5	8.86±0.7	1.37±0.04	0.25±0.00	18.27±1.3	61.56±3.97
HH6	489.3±17.23	92.16±0.5	11.46±0.6	1.43±0.06	0.23±0.01	16.05±0.2	87.78±2.32
HH6A	525.3±13.48	93.86±0.9	11.51±0.1	1.47±0.07	0.23±0.02	15.69±0.9	80.67±1.5
HH26	513±26.65	91.41±1.3	11.95±0.09	1.48±0.05	0.23±0.00	15.94±0.2	83.22±2.91
HH26A	551.3±13.87	94.89±0.9	11.96±0.4	1.29±0.11	0.22±0.00	17.73±1.7	89.22±3.44

Table 38: Comparative rearing performance of 10 silkworm lines during autumn seasonal rearing of 2024

Autumn 2024	Fecundity (No) (Mean±SE)	Hatching (%) (Mean±SE)	Yld 10000 Kg (Mean±SE)	Single Cocoon Weight (g) (Mean±SE)	Single Shell Weight (g) (Mean±SE)	Shell Ratio (%) (Mean±SE)	Pupation (%) (Mean±SE)
HH2	469±0.7	91.77±0.87	9.6±0.83	1.36±0.04	0.23±0.02	17.02±0.78	80.67±5.99
HH2A	468±10.7	93.00±0.61	11.1±0.49	1.45±0.03	0.26±0.01	17.75±0.32	83.87±3.24
HH2B	451±3.0	92.98±0.96	10.9±0.05	1.45±0.03	0.25±0.01	17.45±0.32	91.6±3.72
HH27	446±2.6	93.13±0.08	11.6±0.15	1.55±0.04	0.26±0.00	16.62±0.59	86.67±6.87
HH27A	466±2.0	92.45±0.40	10.5±0.40	1.44±0.01	0.25±0.00	17.5±0.11	81.07±2.68
HH27B	462±3.5	94.57±0.54	8.5±0.05	1.37±0.05	0.23±0.01	16.65±0.31	64.8±1.22
HH6	450±1.2	92.01±0.31	10.1±0.51	1.47±0.01	0.25±0.01	17.09±0.50	70.53±0.71
HH6A	452±0.9	93.99±0.68	11.2±0.63	1.37±0.04	0.24±0.01	17.3±0.75	93.73±1.99
HH26	454±4.3	93.58±0.13	12.1±0.13	1.43±0.04	0.25±0.00	17.71±0.38	90.67±2.24
HH26A	437±3.5	92.38±1.25	9.7±0.34	1.48±0.00	0.26±0.00	17.84±0.30	80.27±6.54

Table 39: Comparative rearing performance of 13foundational during summer seasonal rearing of 2024

Summer 2024	Fecundity (No) (Mean±SD)	Hatching (%) (Mean±SE)	Yld 10000 Kg (Mean±SD)	Single Cocoon Weight (g) (Mean±SD)	Single Shell Weight (g) (Mean±SD)	Shell Ratio (%) (Mean±SD)	Pupation (%) (Mean±SD)
HFC1 (2x27)	461±22.10	93.39±0.93	12.28±0.52	1.50±0.06	0.27±0.01	17.74±0.74	86.44±2.89
HFC2(2x27A)	442±31.13	92.69±0.97	13.72±0.81	1.76±0.09	0.34±0.01	19.52±0.61	79.78±0.62
HFC3 (2x27B)	380±23.01	92.87±0.39	13.05±0.50	1.49±0.04	0.30±0.01	19.83±0.58	89.22±1.24
HFC4(2Ax27)	516±8.88	96.42±0.29	12.71±0.28	1.58±0.05	0.29±0.01	18.46±0.43	83.56±2.54
HFC5(2Ax27A)	500±19.13	95.79±0.52	12.17±0.35	1.68±0.05	0.36±0.03	21.12±1.23	73.00±3.02
HFC6(2Ax27B)	419±20.11	94.77±1.05	11.85±0.60	1.49±0.04	0.30±0.01	19.83±0.58	79.89±4.68
HFC7(2Bx27)	493±44.43	93.45±0.36	12.96±0.37	1.58±0.06	0.31±0.01	19.50±0.35	85.00±1.53
HFC8(2Bx27A)	489±32.54	92.70±1.13	12.62±0.61	1.56±0.07	0.29±0.01	18.82±0.46	87.33±3.79
HFC9(2Bx27B)	436±12.12	93.97±0.43	12.33±0.10	1.52±0.04	0.30±0.01	19.51±0.59	85.00±1.95
HFC10(6x26)	401±41.07	93.07±0.40	12.78±0.35	1.58±0.03	0.31±0.00	19.68±0.63	78.56±1.31
HFC11(6x26A)	412±38.80	94.93±0.72	11.97±0.51	1.53±0.02	0.29±0.00	19.25±0.07	74.89±4.78
HFC12(6Ax26)	475±18.99	93.58±0.54	13.73±0.60	1.51±0.03	0.28±0.01	18.38±0.43	79.11±5.00
HFC13(6Ax26A)	422±9.50	93.44±0.77	13.01±0.50	1.56±0.02	0.30±0.01	19.45±0.29	84.00±3.71

Table 40: Comparative rearing performance of 20double hybrids during autumn seasonal rearing of 2024

Autumn 2024	Fecundity (No) (Mean±SD)	Hatching (%) (Mean±SE)	Yld 10000 Kg (Mean±SD)	Single Cocoon Weight (g) (Mean±SD)	Single Shell Weight (g) (Mean±SD)	Shell Ratio (%) (Mean±SD)	Pupation (%) (Mean±SD)
KD1(7x10)	473±1.86	94.46±1.25	15.94±0.49	1.65±0.04	0.31±0.01	18.48±0.13	85.60±2.34
KD2(7x11)	495±24.03	94.18±0.44	11.92±0.11	1.62±0.01	0.32±0.01	19.48±0.31	78.40±4.51
KD3(7x12)	473±2.60	93.97±0.59	12.90±0.29	1.71±0.02	0.34±0.03	19.58±1.35	84.67±2.89
KD4(7x13)	455±4.63	94.46±0.56	14.16±0.29	1.67±0.01	0.30±0.00	17.78±0.30	89.47±1.64
KD5(2x10)	468±1.76	93.91±0.53	10.60±0.64	1.66±0.02	0.32±0.01	19.53±0.67	73.73±4.59
KD6(2x11)	499±31.80	94.99±0.68	11.39±0.60	1.67±0.04	0.31±0.01	18.56±0.09	79.07±9.76
KD7(2x12)	455±4.36	93.69±1.12	10.91±0.72	1.63±0.01	0.32±0.00	19.61±0.39	76.00±9.82
KD8(2x13)	463±1.53	94.61±0.60	12.77±0.49	1.65±0.02	0.32±0.00	19.15±0.19	90.93±5.90
KD9(5x10)	469±1.76	93.47±0.83	11.59±1.23	1.69±0.01	0.34±0.01	20.21±0.58	67.20±5.55
KD10(5x11)	456±5.21	95.43±0.67	10.91±0.96	1.62±0.03	0.31±0.00	19.00±0.43	77.87±9.13

Table 40: Conti.: Comparative rearing performance of 20double hybrids during autumn seasonal rearing of 2024.

Autumn 2024	Fecundity (No) (Mean±SD)	Hatching (%) (Mean±SE)	Yld 10000 Kg (Mean±SD)	Single Cocoon Weight (g) (Mean±SD)	Single Shell Weight (g) (Mean±SD)	Shell Ratio (%) (Mean±SD)	Pupation (%) (Mean±SD)
KD11(5x12)	465±2.03	95.36±0.50	12.44±0.41	1.66±0.01	0.32±0.01	19.22±0.42	83.33±4.33
KD12(5x13)	471±0.88	94.00±0.90	11.09±0.11	1.70±0.03	0.32±0.01	18.79±0.33	68.40±4.87
KD13(4x10)	479±1.33	94.59±0.68	12.06±0.29	1.65±0.06	0.31±0.00	18.61±0.85	71.07±1.27
KD14(4x11)	448±2.08	93.90±0.59	13.33±0.29	1.72±0.03	0.33±0.01	18.99±0.25	57.20±4.77
KD15(4x12)	475±2.08	94.40±1.11	9.76±0.64	1.67±0.01	0.32±0.01	19.22±0.40	55.60±5.68
KD16(4x13)	461±2.33	93.94±1.31	10.56±0.60	1.64±0.01	0.30±0.01	18.49±0.30	65.87±5.90
KD17(8x10)	472±3.21	95.55±0.31	10.08±0.72	1.69±0.03	0.33±0.01	19.28±0.43	78.40±5.29
KD18(8x11)	479±5.24	95.67±1.04	11.94±0.49	1.60±0.01	0.31±0.00	19.06±0.29	83.33±3.30
KD19(8x12)	468±1.20	94.11±0.06	10.76±1.23	1.63±0.02	0.32±0.00	19.30±0.36	84.80±0.23
KD20(8x13)	491±14.86	93.19±0.96	10.08±0.96	1.68±0.03	0.32±0.00	18.92±0.19	92.27±0.27

RSRS, Jammu:

Nine races were studied by rearing during Spring2024 to study high temperature and high humidity tolerance through marker assisted selection. Among these nine races, the fecundity observed washighest in HH26Ais 637& lowest in HH27A is 550 and all the races are showed non-significant among each other, whereas hatching percentage was highest in HH6 (97.27) and lowest in HH2 (92.84) and statistically non-significant among each other. Yield per 10,000 larvae by weight (Kg) recorded as highest of 16.31 Kg in HH6 and lowest of 15.04 Kg in HH2 showing statistically non-significant among all the races with regard to weight basis. The shell ratio (%) also shows statistically non-significant among all the races and was highest in HH27 (19.46) and lowest in HH2A (17.99), respectively. The pupation rate was recorded as maximum in HH6A (92.40 %) and lowest in HH27A (85.87 %) and showed statistically significant among all the breeds (Table 41).

Table 41.Evaluation of test hybrids during Spring season 2024

Sl. No.	Race	F.	H.%	Wt. of 10 Larvae	Larval Period	Yield/10000(ERR)		SCW (g)	SSW (g)	SR%	PR%
						No	Wt.				
1	HH27	600 (24.49)	95.65 (77.94)	45.00	27:05	9133 (95.57)	15.72	1.73	0.34	19.46 (26.17)	86.80 (68.71)
2	HH6	623 (24.97)	97.27 (80.50)	44.68	27:04	9426 (97.07)	16.31	1.70	0.32	18.88 (25.75)	92.27 (74.04)
3	HH2A	609 (24.69)	95.21 (77.39)	42.33	27:04	9373 (96.82)	15.8	1.67	0.3	17.99 (25.09)	90.40 (71.98)
4	HH26A	637 (25.26)	96.16 (78.69)	43.67	27:04	8880 (94.22)	15.04	1.67	0.31	18.74 (25.64)	85.87 (67.92)
5	HH27A	550 (23.46)	97.06 (80.11)	46.00	27:05	9000 (94.87)	15.28	1.72	0.33	18.92 (25.78)	85.87 (67.89)
6	HH6A	575 (23.94)	96.24 (78.85)	44.67	27:04	9346 (96.68)	16.01	1.72	0.33	19.30 (26.05)	92.40 (73.15)
7	HH2	548 (23.41)	92.84 (76.74)	45.67	27:04	9173 (95.77)	15.8	1.69	0.32	18.62 (25.54)	87.73 (69.48)
8	HH2B	572 (23.94)	95.37 (77.98)	45.00	27:04	9266 (96.26)	15.73	1.72	0.32	18.88 (25.74)	91.07 (72.62)
9	HH26	554 (23.55)	96.33 (78.96)	43.00	27:04	9133 (95.57)	15.33	1.66	0.31	18.46 (25.43)	91.33 (72.87)
	CD	-	-	-	0	-	-	-	-	-	3.576
	SE(m)	0.69	2.23	0.79	0	0.88	0.33	0.03	0.01	0.22	1.18
	CV	4.92	4.92	3.06	0	1.58	3.69	2.73	4.91	1.46	2.89

Note: F – Fecundity; H-Hatching; PR- pupation rate; SCW- Single cocoon weight; SSW- Single shell weight; SR – Shell ratio; Values in parentheses are statistically transformed

Nine races were studied by rearing during Autumn 2024 to study high temperature and high humidity tolerance through marker assisted selection. Among these nine races, the fecundity observed was highest in HH26is 573& lowest in HH2A is 430 and all the races are showed significant among each other, whereas hatching percentage was highest in HH27 is (96.92 %) and lowest in HH26A (93.09 %) and non-significant among each other. Yield per 10,000 larvae by weight (Kg) recorded as highest of 13.88 Kg in HH27A and lowest of 13.03 Kg in HH27 showing statistically non-significant among all the races with regard to weight basis. The shell ratio (%) was highest in HH27A is (18.02 %) and lowest in HH2 (16.87) and statistically non-significant among all races. The pupation rate was recorded as maximum in HH6A (84.33 %) and lowest in HH27 (77.00 %) and showed statistically non-significant among all the breeds (Table 42).

Table 42.Evaluation of test hybrids during Autumn season 2024

Sl. No.	Race	F.	H.%	Wt. of 10 Larvae	Larval Period	Yield/10000 (ERR)		SCW (g)	SSW (g)	SR%	PR%
						No	Wt				
1	HH27	498 (22.34)	96.92 (79.94)	43.68	24:05	8360 (91.43)	13.03	1.59	0.25	17.18 (24.34)	77 (62.96)
2	HH6	489.67 (22.12)	95.97 (78.45)	45.33	24:07	8440 (91.87)	13.36	1.59	0.27	17.51 (24.73)	79.67 (63.20)
3	HH2A	430.33 (20.73)	94.81 (77.00)	45.33	24:03	8693 (93.23)	13.71	1.60	0.26	17.18 (24.47)	81.33 (64.40)
4	HH26A	466 (21.61)	93.09 (74.81)	44.00	24:03	8666 (93.09)	13.64	1.59	0.26	17.44 (24.68)	83 (65.70)
5	HH27A	478 (21.90)	96.74 (79.62)	45.00	24:09	8653 (93.03)	13.88	1.60	0.28	18.02 (25.11)	83.33 (65.89)
6	HH6A	507 (22.55)	94.53 (76.59)	44.33	24:04	8586 (92.67)	13.68	1.59	0.26	17.10 (24.41)	82.67 (65.40)
7	HH2	504 (22.48)	93.52 (75.26)	43.67	24:03	8746 (93.53)	13.68	1.59	0.25	16.87 (24.24)	84.33 (66.70)
8	HH2B	529 (23.12)	95.35 (77.65)	43.67	24:03	8893 (94.30)	13.80	1.59	0.26	17.07 (24.39)	81.33 (64.44)
9	HH26	573 (23.96)	95.75 (78.14)	42.33	24:01	8720 (93.39)	13.35	1.59	0.26	17.22 (24.51)	81.00 (64.17)
	CD	1.55	-	-	0	-	-	-	-	-	-
	SE(m)	0.51	1.11	0.83	0	0.67	0.27	0.01	0.01	0.20	1.15
	CV	3.98	1.58	3.24	0	1.24	3.46	0.99	5.34	1.43	3.07

Note: F – Fecundity; H-Hatching; PR- pupation rate; SCW- Single cocoon weight; SSW- Single shell weight; SR – Shell ratio; Values in parentheses are statistically transformed.

Project Code & Title: MTL01025MI & Life Cycle Assessment of Mulberry Silk: A National Assessment

Investigator: Dr Kiran R
Project Fellow: Aroos Rauf Rafiqui

Objectives:

1. To assess GHGs emission, GWP, C, N, water and energy footprints in the life cycle of Mulberry silk systems.
2. To prepare life cycle Inventory of Mulberry silk and its products.
3. To identify alternative practices to mitigate GHGs emission and minimize the C, N, energy and water footprints in mulberry silk production system along with their socio-economic implication.

Progress during the year:

Soil samples: A total of 130 soil samples at a depth of 15cm from mulberry plantations maintained by State Sericulture Department, J&K, and farmer's field located atPahoo, Bhajwani,Bandgund,Sempora,Armulla, Tumulhaal, Pulwama; Chanchwara, Hirpora, Shopain; Chandigam, Lolab, Arampora, Radbugh, Sericulture Assistant Office, Kupwara; Mirgund, Watlab, Baramullawere collected and processed. All the samples were sent to CSR&TI, Mysore for analysis.

Irrigation samples: A total of 08 irrigation water samples (04 from SDD, Watlab, 02 from SDD, Pahoo and 02 from Silkworm Seed Station, Mirgund) were collected and sent to CSR&TI, Mysore for analysis.

Greenhouse Gas samples: A total of 468 Greenhouse Gas (GHG) samples were collected with 156 samples from each of three pre-identified sites located at CSR&TI, Pampore and SDD, Pahoo. All the samples were subsequently sent to IARI, New Delhi for analysis.

Measurements of mulberry trees using a clinometers: Measurements of mulberry trees using a clinometer were initiated with approximately 3904 trees measured across various districts of the valley (Srinagar: 1050; Ganderbal: 200; Pulwama: 1266; Baramulla: 300; Anantnag: 708; Kupwara: 380).

Surveys: Surveys were conducted on various aspects of the silk industry. This included a consumer survey with 229 participants, a survey of 100 sericulture farmers(Pulwama: 41; Bandipora: 17; Kupwara: 15; Anantnag:10; Ganderbal:10; Kulgam: 06; Baramulla: 01) and additional surveys focused on post-cocoon sector (weaving units: 02).

Project title and code: Impact Assessment of Mulberry Sericulture Technologies in India (MTS13002MI)

Project Duration: 03 years (July 2022-June 2025).
Investigators: Shivam Bhardwaj
Project Fellow: Iqra Rafiq

Objectives:

- To create a protocol for maintaining the data-base of technologies developed by CSB R&D institutes and enlisting all the technological interventions along with the expected impact.
- To understand the socio-economic aspects of the impact of sericulture technologies on seri-farmers' livelihoods from different regions.
- To work out comparative economics of sericulture vis a vis other commercial agricultural and horticultural enterprise in select regions.

Progress:

Field Visits and Data Collection:

Field visits were conducted to collect detailed information from sericulture farmers. Surveys of silkworm rearers were carried out across the states of Jammu & Kashmir, Himachal Pradesh, and Uttar Pradesh. For the year 2024–25, data from approximately 140 farmers across various districts of Jammu & Kashmir, including Pulwama, Shopian, Anantnag, Kulgam, Baramulla, Kupwara, Srinagar, Ganderbal, Kathua, and Rajouri, was collected and uploaded digitally using the Kobo Collect toolbox. In Himachal Pradesh, surveys and digital data uploads were conducted for around 100 farmers from the districts of Bilaspur, Kangra, Mandi, and Hamirpur. Additionally, data from 100 farmers from the districts of Shravasti, Gorakhpur, Bahraich, Gonda, Maharajganj, and Auraiya in Uttar Pradesh, previously surveyed under the tenure of Dr. Ashok Kasukurthi, Scientist-D (Retd.) was also uploaded to the Kobo Collect platform. In total, rearers (pre-cocoon) field surveys were completed for 240 silkworm rearers, and online digital forms with GPS-tagged photographs were uploaded for 340 seri-farmers. Additionally, post-cocoon survey was conducted for three reelers based in the districts Budgam, Srinagar, and Pulwama in the Kashmir division.

Coordination and Monitoring: Multiple review and planning meetings were held every month via Google Meet to monitor progress and ensure coordination across teams. Timely submission of both monthly financial and physical progress reports was ensured throughout the reporting period.

Technology Adoption: Preliminary findings from the field indicates that in Jammu & Kashmir, the mulberry variety *Goshoerami* showed a high adoption rate (70%) with tree-type plantation methods. The FC1×FC2 silkworm hybrid was adopted by 86% of rearers. In

Himachal Pradesh the mulberry variety *S146* under tree plantation systems was widely adopted, along with FC1×FC2 and SH6×NB4D2 bivoltine hybrids. Shelf rearing emerged as the predominant practice, in Himachal Pradesh and Tray/dalatype in Uttar Pradesh. The use of *Vijetha* as a bed disinfectant was reported to be universal (100%), while *Sanitech* adoption as a room disinfectant varied, being highest in Jammu & Kashmir (95%), followed by Himachal Pradesh (85%). These are preliminary findings, as the final analysis of the collected data is being carried out by the Principal Investigator of the project.

Table 43: Overall Data Collection Status (via Kobo Toolbox)

Institution	Pre-Cocoon (Rearers)		Post-Cocoon (Reelers)	
	Target	Achieved	Target	Achieved
CSB-CSRTI, Pampore	400	401 (100%)	20	03 (15%)

Table 44: State-Wise Data Collection Progress

#	State	Pre-cocoon survey (Rearers)		Post-cocoon survey (Reelers)	
		Target	Achievement	Target	Achievement
1	Jammu & Kashmir	200	201	3	3
2	Himachal Pradesh	100	100	2	0
3	Uttar Pradesh	100	100	10	0

CONTINEOUS PROGRAMMES

Programme Title and Code: AIE-3056: Maintenance of Silkworm Germplasm

Investigators: P. Kumaresan, Bharath Kumar Neelaboina, R. Kiran & Shivam Bhardwaj

Objectives: Characterization, Evaluation and Conservation of Temperate Silkworm

Genetic Resources

Progress: A total of 111 bivoltine silkworm genetic resources of different origins are maintained at Silkworm Division, CSR&TI, Pampore during the year, 2024-25 (Table 45). The races were brushed in composite pattern and at the the third age 300 larvae were maintained during spring crop, 2024. The data for important economic parameters were evaluated and presented in Table 46.

Table 45: Origin-wise breakup of exotic & indigenous races maintained under silkworm germplasm

Exotic races		Indigenous races	
Origin	Number of GRs	Origin	Number of GRs
European	04	Mirgund	10
Japanese	26	Dehradun	01
Chinese	13	Mysore	03
Russian	17	Assam	02
Total	**60**	Pampore	34
		Berhampore	01
		Total	**51**
Grand Total			**111**

Table 46: Mean performance of Silkworm Genetic resources during spring,2024-25

#	Acc.No.	Race/GPRs	Cocoon Yield/10,000 larvae By		PR %	SCW (g)	SSW (g)	SR%	Cocoon	
			No.	Wt.					Colour	Shape
1	GPB-PAM-001	Alps Jaune	5600	9.77	56.00	1.607	0.310	19.29	Flesh yellow	Dumbel
2	GPB-PAM-002	Alps Yellow	9000	11.90	90.00	1.368	0.220	16.12	Golden yellow	Oval
3	GPB-PAM-003	Cevenese Yellow	8233	13.51	82.33	1.561	0.247	15.84	Golden yellow	Oval
4	GPB-PAM-004	Ascoli Yellow	6633	8.79	66.33	1.433	0.205	14.29	Yellow	Dumbel
5	GPB-PAM-005	KN-2	9000	11.27	90.00	1.530	0.274	17.90	White	Dumbel
6	GPB-PAM-006	Meigetsu	8167	12.85	81.67	1.590	0.260	16.33	White	Oval
7	GPB-PAM-007	B-36	7600	13.36	76.00	1.874	0.310	16.52	White	Dumbel
8	GPB-PAM-008	B-37	9933	13.01	99.33	1.382	0.225	16.25	White	Oval
9	GPB-PAM-009	B-39	6733	10.01	67.33	1.562	0.230	14.75	White	Dumbel
10	GPB-PAM-010	B-40	9833	19.93	98.33	1.146	0.196	17.12	White	Dumbel

#	Acc.No.	Race/GPRs	Cocoon Yield/10,000 larvae By		PR %	SCW (g)	SSW (g)	SR%	Cocoon	
			No.	Wt.					Colour	Shape
11	GPB-PAM-013	Gunko Marie	8333	12.59	83.33	1.612	0.273	16.96	White	Oval
12	GPB-PAM-014	SS-4A	8300	13.00	83.00	1.586	0.269	16.96	White	Dumbel
13	GPB-PAM-015	SS-15A	7667	12.23	76.67	1.729	0.291	16.83	White	Dumbel
14	GPB-PAM-016	SS-17	9733	17.50	97.33	1.282	0.201	15.70	White	Dumbel
15	GPB-PAM-017	SS	9867	15.63	98.67	1.519	0.276	18.16	White	Dumbel
16	GPB-PAM-018	KY-I	8567	13.34	85.67	1.610	0.277	17.18	White	Dumbel
17	GPB-PAM-019	KY-II	5333	9.32	53.33	1.531	0.268	17.50	White	Dumbel
18	GPB-PAM-020	Taichoan x Hokoshingyako	7700	11.49	77.00	1.567	0.300	19.13	White	Oval
19	GPB-PAM-021	N124 X C124	6700	11.87	67.00	1.600	0.313	19.58	White	Dumbel
20	GPB-PAM-022	(N112 x C110) X (N124 x C124)	8733	12.01	87.33	1.189	0.217	18.29	White	Dumbel
21	GPB-PAM-023	Shoko Ginrei	8767	13.12	87.67	1.678	0.300	17.89	White	Dumbel
22	GPB-PAM-024	Fuji Sukara	8167	13.49	81.67	1.845	0.333	18.02	White	Dumbel
23	GPB-PAM-025	Taichoan	9767	14.91	97.67	1.534	0.302	19.71	White	Dumbel
24	GPB-PAM-026	Shogetsu Hosho	5467	9.60	54.67	1.733	0.316	18.23	White	Oval
25	GPB-PAM-027	Kyorie Shimpaku (P)	6467	9.20	64.67	1.523	0.282	18.50	White	Dumbel
26	GPB-PAM-028	Kyorie Shimpaku (M)	6500	10.61	65.00	1.826	0.353	19.34	White	Oval
27	GPB-PAM-029	Shinki Reyaku	6700	11.41	67.00	1.687	0.348	20.63	White	Dumbel
28	GPB-PAM-030	Shuneri Shogetsu	9733	16.55	97.33	1.613	0.283	17.52	White	Oval
29	GPB-PAM-034	SM-2	7500	10.95	75.00	1.377	0.257	18.63	White	Oval
30	GPB-PAM-038	Zebra	9833	12.45	98.33	1.397	0.170	12.18	Flesh yellow	Dumbel
31	GPB-PAM-039	Yakwei	7700	12.17	77.00	1.587	0.281	17.68	White	Oval
32	GPB-PAM-040	Chang Naung	6067	10.93	60.67	1.991	0.374	18.80	White	Oval
33	GPB-PAM-043	C-110	9333	13.57	93.33	1.663	0.270	16.24	White	Oval
34	GPB-PAM-044	Chukwei	6167	8.86	61.67	1.454	0.273	18.76	White	Oval
35	GPB-PAM-045	Chinese Farmer	6467	9.56	64.67	1.588	0.258	16.26	White	Oval
36	GPB-PAM-046	Chinese Golden-70	6700	9.95	67.00	1.532	0.259	16.92	Golden yellow	Dumbel
37	GPB-PAM-047	Chinese Golden-80	7700	11.27	77.00	1.496	0.242	16.19	Golden yellow	Dumbel

#	Acc.No.	Race/GPRs	Cocoon Yield/10,000 larvae By		PR %	SCW (g)	SSW (g)	SR%	Cocoon	
			No.	Wt.					Colour	Shape
38	GPB-PAM-048	Chinese Golden-90	6300	10.05	63.00	1.510	0.259	17.15	Golden yellow	Oval
39	GPB-PAM-049	Haulak	8367	12.46	83.67	1.600	0.270	16.88	White	Oval
40	GPB-PAM-050	King Haung	9367	13.75	93.67	1.457	0.284	19.52	White	Dumbel
41	GPB-PAM-051	Hauchi	7333	11.31	73.33	1.338	0.210	15.70	White	Oval
42	GPB-PAM-053	Nan Naung - 6A	7200	14.11	72.00	1.576	0.245	15.56	White	Oval
43	GPB-PAM-054	Chinese Yellow	5933	9.99	59.33	1.846	0.306	16.55	Golden yellow	Oval
44	GPB-PAM-055	M-III	6767	11.42	67.67	1.702	0.284	16.68	White	Oval
45	GPB-PAM-056	M-10	6833	11.99	68.33	1.748	0.302	17.28	White	Dumbel
46	GPB-PAM-057	M-42	8433	13.53	84.33	1.609	0.280	17.39	White	Oval
47	GPB-PAM-058	M-43	8733	13.56	87.33	1.552	0.285	18.36	White	Oval
48	GPB-PAM-059	M-45	7100	11.05	71.00	1.587	0.229	14.43	White	Oval
49	GPB-PAM-060	M-46	7933	10.61	79.33	1.499	0.215	14.34	White	Oval
50	GPB-PAM-061	MJ-20	6800	9.69	68.00	1.420	0.252	17.74	White	Dumbel
51	GPB-PAM-062	MJ-23	6800	10.50	68.00	1.382	0.227	16.46	White	Oval
52	GPB-PAM-063	MJ-103	7833	12.31	78.33	1.522	0.254	16.67	White	Dumbel
53	GPB-PAM-064	MJ-107	6067	10.19	60.67	1.417	0.265	18.73	White	Oval
54	GPB-PAM-072	Azad	7333	11.23	73.33	1.520	0.267	17.58	White	Dumbel
55	GPB-PAM-073	Azerbaijan	5700	9.59	57.00	1.748	0.294	16.84	White	Dumbel
56	GPB-PAM-074	Sanish-E1 (P)	6200	9.29	62.00	1.549	0.275	17.78	White	Dumbel
57	GPB-PAM-075	Sanish-E1 (M)	6300	10.51	63.00	1.648	0.265	16.08	White	Dumbel
58	GPB-PAM-076	Sanish-E2 (M)	6833	13.88	68.33	1.387	0.243	17.54	White	Dumbel
59	GPB-PAM-077	Sanish-8	5833	8.61	58.33	1.587	0.281	17.68	White	Dumbel
60	GPB-PAM-078	Sanish-17	6500	11.94	65.00	1.585	0.264	16.67	White	Dumbel
61	GPB-PAM-079	Sanish-18 (P)	7067	10.12	70.67	1.381	0.260	18.83	White	Dumbel
62	GPB-PAM-080	Sanish-18(M)	7467	12.22	74.67	1.816	0.287	15.78	White	Dumbel
63	GPB-PAM-081	Sanish-21 (P)	8067	13.33	80.67	1.719	0.306	17.79	White	Dumbel
64	GPB-PAM-082	Sanish-30	7833	12.63	78.33	1.668	0.286	17.14	White	Oval
65	GPB-PAM-	Sheiki-I	6867	10.93	68.67	1.561	0.272	17.39	White	Dumbel

#	Acc.No.	Race/GPRs	Cocoon Yield/10,000 larvae By		PR %	SCW (g)	SSW (g)	SR%	Cocoon	
			No.	Wt.					Colour	Shape
	083									
66	GPB-PAM-084	Sheiki-II	6067	9.69	60.67	1.831	0.257	14.05	White	Dumbel
67	GPB-PAM-085	Tashkash-112	9467	12.79	94.67	1.328	0.253	19.02	White	Dumbel
68	GPB-PAM-086	Gyandza	8833	15.25	88.33	1.727	0.279	16.13	White	Oval
69	GPB-PAM-087	Belkokona	8867	14.38	88.67	1.623	0.300	18.51	White	Dumbel
70	GPB-PAM-088	Merifa-7	9033	13.77	90.33	1.495	0.303	20.27	White	Dumbel
71	GPB-PAM-092	SH-6	5900	9.85	59.00	1.672	0.302	18.05	White	Oval
72	GPB-PAM-110	NB4D2	9633	14.87	96.33	1.688	0.285	16.89	White	Dumbel
73	GPB-PAM-116	CSR-2	9100	16.56	91.00	1.788	0.337	18.83	White	Oval
74	GPB-PAM-117	CSR-4	8067	11.83	80.67	1.520	0.283	18.62	White	Oval
75	GPB-PAM-124	PLF	9933	14.32	99.33	1.451	0.255	17.57	White	Dumbel
76	GPB-PAM-125	BL-1	8733	13.59	87.33	1.533	0.277	18.06	White	Oval
77	GPB-PAM-126	SF-17	9667	14.43	96.67	1.613	0.259	16.06	White	Dumbel
78	GPB-PAM-127	AT-4	8533	13.60	85.33	1.654	0.303	18.29	White	Dumbel
79	GPB-PAM-128	AT-9	8633	13.88	86.33	1.665	0.312	18.75	White	Oval
80	GPB-PAM-129	IB-2	6700	10.70	67.00	1.531	0.276	18.05	White	Dumbel
81	GPB-PAM-130	IB-3	7667	11.24	76.67	1.413	0.288	20.39	White	Oval
82	GPB-PAM-131	IB-9	6233	9.23	62.33	1.495	0.294	19.66	White	Dumbel
83	GPB-PAM-132	IB-11	8600	13.13	86.00	1.516	0.252	16.61	White	Oval
84	GPB-PAM-133	TA-3	9433	13.61	94.33	1.593	0.274	17.20	White	Dumbel
85	GPB-PAM-134	J-Plain	9800	15.44	98.00	1.533	0.252	16.44	White	Oval
86	GPB-PAM-135	J-Marked	7067	11.17	70.67	1.761	0.295	16.73	White	Oval
87	GPB-PAM-136	HS-6 (SL)	9833	16.05	98.33	1.519	0.233	15.36	White	Dumbel
88	GPB-PAM-137	C-Nichi (SL)	6333	9.64	63.33	1.407	0.261	18.55	White	Dumbel
89	GPB-PAM-138	RP-I	6900	10.55	69.00	1.466	0.256	17.44	White	Oval
90	GPB-PAM-139	RP-II	5400	9.06	54.00	1.535	0.265	17.25	White	Oval
91	GPB-PAM-140	Pam-101	8567	13.52	85.67	1.409	0.281	19.92	White	Oval
92	GPB-PAM-141	Pam-102	7333	12.47	73.33	1.508	0.250	16.55	White	Dumbel

#	Acc.No.	Race/GPRs	Cocoon Yield/10,000 larvae By		PR %	SCW (g)	SSW (g)	SR%	Cocoon	
			No.	Wt.					Colour	Shape
93	GPB-PAM-142	Pam-103	6900	8.22	69.00	1.751	0.295	16.86	White	Oval
94	GPB-PAM-143	Pam-104	8167	11.76	81.67	1.309	0.262	20.00	White	Dumbel
95	GPB-PAM-144	Pam-105	8433	13.43	84.33	1.508	0.283	18.74	White	Dumbel
96	GPB-PAM-145	Pam-106	7900	12.01	79.00	1.366	0.265	19.37	White	Dumbel
97	GPB-PAM-146	Pam-107	8133	15.35	81.33	1.566	0.258	16.48	White	Oval
98	GPB-PAM-147	Pam-108	5333	8.11	53.33	1.554	0.279	17.98	White	Oval
99	GPB-PAM-148	Pam-109	8633	14.39	86.33	1.743	0.301	17.25	White	Oval
100	GPB-PAM-149	Pam-110	9167	13.05	91.67	1.473	0.233	15.84	White	Oval
101	GPB-PAM-150	Pam-111	8233	13.78	82.33	1.476	0.284	19.24	White	Dumbel
102	GPB-PAM-151	Pam-112	7333	10.14	73.33	1.347	0.239	17.78	White	Dumbel
103	GPB-PAM-152	Pam-113	6667	9.25	66.67	1.538	0.301	19.56	White	Dumbel
104	GPB-PAM-153	Pam-114	7333	12.33	73.33	1.660	0.296	17.81	White	Dumbel
105	GPB-PAM-154	Pam-115	8333	13.18	83.33	1.423	0.275	19.35	White	Dumbel
106	GPB-PAM-155	Pam-116	7767	12.72	77.67	1.863	0.360	19.33	White	Dumbel
107	GPB-PAM-156	Pam-117	9267	14.08	92.67	1.669	0.283	16.93	White	Dumbel
108	GPB-PAM-157	CS-6	6300	10.31	63.00	1.636	0.299	18.30	White	Oval
109	GPB-PAM-122	Barapolu	9467	9.34	94.67	1.003	0.128	12.80	Golden yellow	Spindle
110	GPB-PAM-123	Borpat	8800	8.52	88.00	0.948	0.115	12.17	Greenish yellow	Spindle
111	GPB-PAM-158	S-36	7833	12.20	78.33	1.610	0.285	17.67	White	Oval
	Mean		**7755**	**12.07**	**77.55**	**1.554**	**0.271**	**17.40**		
	SD		**1272.98**	**2.17**	**12.73**	**0.17**	**0.039**	**1.61**		

BEST TEN ACCESSIONS FOR MAJOR ECONOMIC TRAITS OF SILKWORM GENOTYPES

Table 47a: Best ten silkworm genotypes for Fecundity (No.)

Sl.No.	Acc-No.	Race Name	Value
1	GPB-PAM-0110	NB4D2	691
2	GPB-PAM-0137	C-Nichi (SL)	623
3	GPB-PAM-0117	CSR4	620
4	GPB-PAM-0092	SH6	599
5	GPB-PAM-0029	ShinkiRayaku	587
6	GPB-PAM-0057	M-42	582

7	GPB-PAM-0024	FugiSukara	582
8	GPB-PAM-0025	Taichoan	577
9	GPB-PAM-0020	TaichoanX hokoshingyako	572
10	GPB-PAM-0136	HS-6 (SL)	567

Table 47b: Best ten silkworm genotypes for Cocoon yield/10,000 larvae by No.

Sl.No.	Acc-No.	Race Name	Value
1	GPB-PAM-0150	PAM-0111	9780
2	GPB-PAM-0140	Pam-101	9760
3	GPB-PAM-0143	Pam-104	9760
4	GPB-PAM-0156	Pam-117	9760
5	GPB-PAM-00092	SH6	9740
6	GPB-PAM-0116	CSR2	9740
7	GPB-PAM-0153	Pam-114	9740
8	GPB-PAM-0154	Pam-115	9740
9	GPB-PAM-0117	CSR4	9720
10	GPB-PAM-0130	IB-3	9720

Table 47c: Best ten silkworm genotypes for Cocoon yield/10,000 larvae by Wt.(Kg)

Sl.No.	Acc-No.	Race Name	Value
1	GPB-PAM-0063	MJ-103	17.87
2	GPB-PAM-0143	Pam-104	17.58
3	GPB-PAM-0019	KY-II	17.50
4	GPB-PAM-0001	Alps Jaune	17.49
5	GPB-PAM-0076	Sanish-E2(M)	17.31
6	GPB-PAM-0148	Pam-109	17.24
7	GPB-PAM-0134	J-Plain	17.22
8	GPB-PAM-0087	Belkokona-II	17.07
9	GPB-PAM-0083	Sheikhi-I	17.05
10	GPB-PAM-0131	IB-9	17.03

Table 47d: Best ten silkworm genotypes for Single cocoon wt.(gm)

Sl.No.	Acc-No.	Race Name	Value
1	GPB-PAM-0001	Alps Jaune	2.06
2	GPB-PAM-0063	MJ-103	2.02
3	GPB-PAM-0019	KY-II	2.01
4	GPB-PAM-0143	Pam-104	1.98
5	GPB-PAM-0148	Pam-109	1.98
6	GPB-PAM-0083	Sheikhi-I	1.96
7	GPB-PAM-0131	IB-9	1.95
8	GPB-PAM-0076	Sanish-E2(M)	1.94
9	GPB-PAM-0134	J-Plain	1.94
10	GPB-PAM-0087	Belkokona-II	1.93

Table 47e: Best ten silkworm genotypes for Single shell wt.(gm)

Sl.No.	Acc-No.	Race Name	Value
1	GPB-PAM-0010	B-40	0.77
2	GPB-PAM-0083	Sheikhi-I	0.39
3	GPB-PAM-0116	CSR2	0.38
4	GPB-PAM-0019	KY-II	0.37
5	GPB-PAM-0134	J-Plain	0.37
6	GPB-PAM-0156	Pam-117	0.37
7	GPB-PAM-0063	MJ-103	0.36
8	GPB-PAM-0076	Sanish-E2(M)	0.36
9	GPB-PAM-0131	IB-9	0.36
10	GPB-PAM-0140	Pam-101	0.36

Table 47f: Best ten silkworm genotypes for Shell ration (%)

Sl.No.	Acc-No.	Race Name	Value
1	GPB-PAM-0116	CSR2	22.22
2	GPB-PAM-0117	CSR4	21.47
3	GPB-PAM-0026	Shogetsu Hosho	21.18
4	GPB-PAM-0127	AT-4	21.10
5	GPB-PAM-0156	Pam-117	21.02
6	GPB-PAM-0130	IB-3	20.86
7	GPB-PAM-0028	Kyorie Shimpaku(M)	20.85
8	GPB-PAM-0154	Pam-115	20.81
9	GPB-PAM-0153	Pam-114	20.69
10	GPB-PAM-0010	B-40	17.21

Programme Title and Code: AIE-3202: Maintenance of Silkworm Breeders stocks
Investigators: P. Kumaresan, Bharath Kumar Neelaboina, R. Kiran & Shivam Bhardwaj

Objectives: Maintenance of silkworm breeders stocks to their original characteristics and to make supply of P3 layings for further utilization.

Progress: A total of 50 breeders stocks are maintained, which comprised of 13 old and 37 newly included are being utilized in the on-going and concluded research projects maintained and reared during spring crop, 2024-25. The characterization and evaluation of important economic parameters are evaluated and presented in Table 48.

Table 48: Mean performance of Breeders stocks of Silkworm genotypes during spring,2024-25

#	Acc.No.	Breeders stocks/Races	Cocoon yield/10,000 larvae by		SCW (g)	SSW (g)	SR %	Cocoon	
			Number	Weight				Colour	Shape
1	BS-PAM-001	CSR 2	8167	13.90	1.921	0.377	19.62	white	oval
2	BS-PAM-002	CSR 4	8467	12.43	1.565	0.284	18.14	white	dumbell
3	BS-PAM-003	CSR 6	9867	14.92	1.457	0.279	19.13	white	dumbell
4	BS-PAM-004	CSR 26	9933	16.89	1.399	0.277	19.83	white	dumbell
5	BS-PAM-005	CSR 27	7533	13.69	1.470	0.262	17.83	white	oval
6	BS-PAM-006	SH-6	6400	10.22	1.792	0.317	17.67	white	oval
7	BS-PAM-007	NB4D2	9867	16.21	1.537	0.256	16.67	white	dumbell
8	BS-PAM-008	CS 6	9833	15.57	1.412	0.284	20.13	white	oval
9	BS-PAM-009	Pam-101	9667	15.89	1.434	0.242	16.84	white	dumbell
10	BS-PAM-010	Pam-111	9800	14.65	1.347	0.258	19.17	white	dumbell
11	BS-PAM-011	Pam-114	9867	16.01	1.518	0.279	18.36	white	oval
12	BS-PAM-012	Pam-115	9533	16.49	1.528	0.259	16.97	white	dumbell
13	BS-PAM-013	Pam-117	9333	16.41	1.274	0.254	19.95	white	dumbell
14	BS-PAM-014	Pam-DR-1	9067	16.09	1.254	0.253	20.17	white	dumbell
15	BS-PAM-015	Pam-DR-4	7933	11.49	1.316	0.288	21.91	white	dumbell
16	BS-PAM-016	Pam-DR-6	7200	16.60	1.572	0.331	21.06	white	oval
17	BS-PAM-017	Pam-DR-7	8000	11.75	1.356	0.290	21.41	white	oval
18	BS-PAM-018	Pam-DR-8	9967	13.72	1.489	0.298	20.01	white	dumbell
19	BS-PAM-019	Pam-DR-9	9400	12.84	1.719	0.286	16.62	white	oval
20	BS-PAM-020	Pam-DR-12	3833	5.51	1.465	0.274	18.71	white	dumbell
21	BS-PAM-021	Pam-DR-16	6867	10.75	1.755	0.331	18.88	white	dumbell
22	BS-PAM-022	Pam-DR-18	9000	15.15	1.360	0.291	21.43	white	oval
23	BS-PAM-023	SO-4	7667	12.13	1.639	0.285	17.37	white	oval
24	BS-PAM-024	SO-10	7833	11.91	1.580	0.281	17.81	white	oval
25	BS-PAM-025	SO-14	9800	17.37	1.256	0.230	18.33	white	oval
26	BS-PAM-026	SO-20	9667	15.73	1.303	0.251	19.24	white	dumbell
27	BS-PAM-027	SO-30	9467	13.70	1.306	0.229	17.53	white	dumbell
28	BS-PAM-028	BP-1	9533	13.64	1.603	0.284	17.72	white	dumbell
29	BS-PAM-029	BP-3	8633	14.01	1.663	0.293	17.65	white	oval
30	BS-PAM-030	BP-4	9233	13.85	1.475	0.274	18.58	white	dumbell
31	BS-PAM-031	BP-5	9867	16.59	1.227	0.219	17.83	white	oval
32	BS-PAM-032	BP-7	9333	13.52	1.335	0.238	17.82	white	dumbell
33	BS-PAM-033	DBL-1	9700	15.07	1.548	0.282	18.21	white	oval
34	BS-PAM-034	DBL-7	8533	15.11	1.468	0.240	16.36	white	oval
35	BS-PAM-035	DBL-8	9567	14.95	1.229	0.191	15.52	white	oval
36	BS-PAM-036	DBL-14	9133	13.03	1.565	0.247	15.80	white	dumbell
37	BS-PAM-037	TDS-1	7000	12.17	1.796	0.306	17.05	white	oval
38	BS-PAM-038	TDS-2	6000	4.61	1.678	0.293	17.44	white	oval

39	BS-PAM-039	TDS-3	7167	11.53	1.690	0.353	20.91	white	oval
40	BS-PAM-040	TDS-4	8633	12.83	1.670	0.299	17.92	white	dumbell
41	BS-PAM-041	MASA-1	8567	13.73	1.514	0.314	20.76	white	dumbell
42	BS-PAM-042	MASA-2	7667	12.83	1.723	0.283	16.43	white	dumbell
43	BS-PAM-043	MASA-3	9467	14.31	1.625	0.307	18.92	white	oval
44	BS-PAM-044	MASA-7	6200	10.13	1.588	0.306	19.25	white	dumbell
45	BS-PAM-045	MASA-8	8400	13.67	1.462	0.308	21.06	white	dumbell
46	BS-PAM-046	MVR-PAM-117	8967	14.20	1.674	0.294	17.54	white	dumbell
47	BS-PAM-47	2C	7700	13.40	1.904	0.304	15.99	white	dumbell
48	BS-PAM-48	GEN1	9067	15.16	1.562	0.291	18.61	white	oval
49	BS-PAM-49	4S	8867	14.69	1.538	0.273	17.77	white	dumbell
50	BS-PAM-50	4D	9500	13.96	1.750	0.299	17.08	white	dumbell
	Mean		8614	13.70	1.526	0.281	18.460		
	SD		1273.79	2.48	0.17	0.03	1.58		

Project Title: Nutrient Analysis of Soil and Mulberry under Temperate Conditions
Project code: SS Pam-01
Duration: continuous project: since 2012
Investigator(s): Plabani Roy (PI), S Syam (CI), Gulab Khan Rohela (CI)

Objectives:

1. Evaluation of soil health status at CSR&TI, Pampore and nested units of the institute.
2. Biochemical analysis of mulberry varieties.

Progress:

Soil Nutrient Composition and Biochemical Content Analysis of Mulberry Cultivars in Temperate Conditions: During the spring and autumn of 2024, a comprehensive analysis was undertaken in temperate regions to assess the soil nutrient composition and the biochemical properties of leaves from selected superior mulberry cultivars. This evaluation aimed to gain deeper insights into the environmental factors influencing mulberry growth and to support the development of optimized cultivation practices tailored to temperate agro-climatic conditions.

Soil Sampling and Preparation: During the first week of April 2024, soil samples were meticulously collected from two distinct locations: the Central Sericultural Research & Training Institute (CSR&TI) in Pampore and the P4 Basic Seed Farm in Manasbal. These locations, renowned for their extensive mulberry cultivation, were strategically selected to ensure the relevance and applicability of the findings. Following collection, the soil samples underwent a series of standardized preparatory procedures—including air-drying, grinding, and sieving—to ensure accuracy and consistency in subsequent physicochemical and nutrient analyses.

1. **Drying**: The soil samples were air-dried at room temperature. This method helps preserve the soil's natural properties, ensuring the integrity of the subsequent analysis.

2. **Removal of Stony and Coarse Material**: To obtain a uniform sample for testing, all stony and coarse materials were carefully removed. This step ensures that the sample consists of fine soil particles, which are essential for precise testing.

3. **Powdering**: The cleaned soil was finely powdered to facilitate thorough mixing and accurate measurement of its properties.

4. **Soil Analysis Parameters:** The finely prepared soil samples were then analyzed for 12 crucial parameters in the Agronomy & Soil Science section laboratory at CSR&TI, Pampore. These parameters were chosen to provide a comprehensive profile of the soil's health and its suitability for mulberry cultivation. The parameters analyzed included:

Parameter	Purpose/Significance
pH	Assesses soil acidity or alkalinity; influences nutrient availability and microbial activity.
Electrical Conductivity (EC)	Measures soil salinity and ion content; indicates the soil's ability to conduct electrical current.
Organic Carbon (OC)	Evaluates organic matter content; crucial for soil fertility, structure, and microbial life.
Macronutrients	
– Nitrogen (N)	Supports plant growth; essential for leaf development and chlorophyll production.
– Phosphorus (P)	Promotes root development and energy transfer within plants.
– Potassium (K)	Enhances overall plant health; regulates water uptake and boosts disease resistance.
Micronutrients	
– Sulfur (S)	Involved in protein synthesis and chlorophyll formation.
– Iron (Fe)	Crucial for chlorophyll synthesis and enzymatic functions.
– Manganese (Mn)	Facilitates photosynthesis and nitrogen metabolism.
– Zinc (Zn)	Supports enzymatic functions and growth regulation.
– Copper (Cu)	Required for lignin synthesis and various metabolic processes.
– Boron (B)	Essential for cell wall formation and reproductive development.

Findings during 2024-25

The soil analysis indicated that, apart from zinc, all nutrient levels in the soils from CSR&TI, Pampore, and the P4 Basic Seed Farm, Manasbal, fell within the normal range (**Table 49**). This reflects a generally conducive environment for mulberry cultivation, with sufficient availability of key nutrients. However, the observed zinc deficiency highlights the necessity for specific fertilization interventions to correct this imbalance.

By integrating soil nutrient profiling with the biochemical analysis of mulberry leaves, this study offers valuable insights for refining mulberry cultivation practices under temperate climatic conditions. The findings will support the formulation of site-specific nutrient management strategies, thereby enhancing mulberry health and improving crop productivity in these regions.

Table 49: Soil analysis of soil samples collected from CSR&TI, Pampore and P4, Basic Seed Farm, Manasbal (Spring- 2024)

Location	Macronutrients							Micronutrients				
	pH	**EC** (dS/ m)	**OC** (%)	**N** (Kg/ ha)	**P** (Kg/ ha)	**K** (Kg/ ha)	**S** mg/kg	**Zn** mg/kg	**B** mg/kg	**Fe** mg/kg	**Mn** mg/kg	**Cu** mg/kg
CSR&TI, Pampore	7.41	0.36	1.61	482	21	230	28	1.87	16.24	16. 20	25.50	6.40
Soil Health Report	M	M	H	M	H	M	H	H	H	H	M	H
P4-Manasbal	7.22	0.48	1.45	362	25	162	18	0.42	24.32	24.12	32.50	12.45
Soil Health Report	M	M	M.H	M	H	M	M	L	H	H	H	H

L: Low; M:Medium; M.H: Medium High; H: High

Biochemical Analysis of Superior Mulberry Cultivars in Spring and Autumn 2024: To evaluate the biochemical characteristics of superior mulberry cultivars, an extensive analysis was carried out on leaf samples collected during the spring and autumn seasons of 2024. The primary objective of this study was to quantify critical biochemical constituents namely total soluble protein, total soluble carbohydrate, and total chlorophyll content across various mulberry varieties cultivated at CSR&TI, Pampore. This analysis aimed to provide insights into the physiological status and nutritional quality of the cultivars under temperate conditions.

Selection of Mulberry Cultivars: The following eight mulberry cultivars were chosen for their superior qualities and relevance to mulberry cultivation practices:

1) Goshoerami, 2) PPR1 3) Chinese White
4) Rokokuyasu 5) KNG 6) TR-10
7) Ichinose 8) Karioroso

Leaf samples from these cultivars were collected from the CSR&TI, Pampore mulberry farm during both the spring and autumn growing seasons, ensuring that seasonal variations in biochemical composition could be accurately assessed.

Biochemical Parameters and Methods Used

The collected leaf samples were subjected to biochemical analysis using the following methods:

1. **Total Soluble Protein Content**: The total soluble protein content in the mulberry leaves was measured using the Bradford method, a colorimetric assay based on the binding of Coomassie Brilliant Blue dye to protein molecules. This binding induces a color change, the intensity of which is directly proportional to the protein concentration in the sample. The resulting color intensity was quantified using a spectrophotometer, ensuring accurate estimation of protein levels.

2. **Total Soluble Carbohydrate Content**: The total soluble carbohydrate content was determined using the anthrone method, a widely employed colorimetric technique in plant biochemical analysis. In this method, carbohydrates react with the anthrone reagent under acidic conditions to form a green-colored complex. The intensity of the resulting color,

which is directly proportional to the carbohydrate concentration in the sample, was measured using a spectrophotometer to ensure precise quantification.

3. **Total Chlorophyll Content**: The total chlorophyll content was quantified using the acetone extraction method, wherein chlorophyll pigments were extracted from leaf tissues using acetone as a solvent. The absorbance of the resulting solution was then measured with a spectrophotometer at specific wavelengths. This method enables accurate estimation of chlorophyll concentration by assessing the intensity of light absorption, which is directly related to the pigment content in the sample.

Key Findings: The biochemical analysis revealed distinct differences in the biochemical content of mulberry leaves between the spring and autumn seasons, as detailed below:

1. **Higher Biochemical Content in Spring**: Across all eight cultivars, leaf chlorophyll, protein, and carbohydrate contents were higher in the spring season than in autumn (Table 2), indicating that spring conditions are more conducive to the accumulation of these important biochemical compounds.

2. **Chlorophyll Content**: Among the cultivars, Chinese White showed the highest chlorophyll content in spring, measuring 6.18 mg/g leaf. This elevated chlorophyll level indicates strong photosynthetic capacity, vital for the plant's growth and vigor.

3. **Carbohydrate Content**: The cultivars Goshoerami and PPR1 exhibited the highest total soluble carbohydrate content in spring, with concentrations of 301 mg/g dwt and 296 mg/g dwt of leaf, respectively. This elevated carbohydrate level reflects efficient energy storage and metabolic activity in these cultivars.

4. **Protein Content**: The cultivars Ichinose and KNG recorded the highest total soluble protein content in spring, measuring 54.45 mg/g dwt and 48.85 mg/g dwt of leaf, respectively. Elevated protein levels indicate superior leaf nutritional quality, which is essential for silk production in sericulture.

5. **Lower Biochemical Values in Autumn**: All cultivars exhibited lower biochemical levels in autumn compared to spring (Table 50), indicating that cooler temperatures and reduced daylight likely hinder the synthesis and accumulation of chlorophyll, carbohydrates, and proteins.

Conclusion: The study highlights the critical role of the spring season in cultivating superior mulberry cultivars, demonstrated by the significantly higher biochemical content in leaves during this time. These findings emphasize the importance of aligning cultivation and harvesting practices with seasonal variations to fully harness the biochemical potential of mulberry leaves. By recognizing these seasonal patterns, growers can optimize their strategies to enhance both the yield and quality of mulberry crops, which is especially beneficial for sericulture applications.

Table 50: Biochemical Analysis of Mulberry Leaves during Spring and Autumn 2024 (CSR&TI, Pampore)

Mulberry variety	Moisture Content (%)		Total Chlorophyll (mg/g leaf)		Total Carbohydrate (mg/g dwt leaf)		Total Protein (mg/g dwt leaf)	
	Spring	Autumn	Spring	Autumn	Spring	Autumn	Spring	Autumn
Goshoerami	76.50	70.65	4.51	4.12	325	280	42.50	35.30
KNG	82.06	70.50	4.50	4.45	255	235	48.85	40.05
Ichinose	87.25	68.45	5.12	4.34	280	255	52.45	48.50
Chinese White	72.50	71.85	6.25	5.21	265	220	40.50	35.20
PPR1	80.07	73.50	4.85	4.65	290	245	45.75	42.50
Tr-10	70.50	62.50	4.15	3.75	240	220	40.25	38.25
Rokokuyaso	65.00	60.50	4.45	4.15	196	185	45.50	42.35
Karioroso	74.50	62.15	4.05	3.85	220	222	42.75	40.10

Project Code and Title: PIB Pam – 1: Acquisition, Conservation, Characterization and Utilization of mulberry germplasm under temperate conditions

Project Duration: Continuous

Investigator(s): Pawan Saini and Basanagouda Gonal

Objectives: Collection of diverse genetic stocks; conservation and evaluation; consequent documentation and utilization in varied breeding programme

Progress:

- **Conservation:** The new mulberry germplasm bank (NGPB) comprised of 55 accessions (20 exotics, 32 indigenous and 3 combinations of somatic hybrids) representing 5 nations (India, China, Japan, France and Burma) are maintained as per the local intercultural operations at CSR&TI, Pampore. The working germplasm bank (WGPB) of mulberry have 80 accessions (37 exotics and 43 indigenous) of 11 countries namely India, China, Japan, Italy, France, Bangladesh, Russia, Paraguay, Zimbabwe, Indonesia and Burma which are maintained as per the recommended package of practices.
- **Leaf Sprouting Behaviour:** During March 2025, the leaf sprouting behaviour of mulberry accessions maintained in NGPB and WGPB were assessed with respect to the bud growth stages. During March 2025, due to sudden rise in the temperature, almost all the mulberry accessions sprouted within fortnightly from the date of recording of data (**Table 1 and 2**).

  Table 1: Leaf sprouting nature of mulberry germplasm accessions during Spring 2025 in NGPB

Date	Mulberry Accessions
16^{th} – 31^{st} March 2025	Ichinose, T-4, Enshatakasuke, $BC_2$59, TR-10, Almora Local, Kanva-2, S-1301, BR-2, C-4, S-146, ME-27, Goshoerami, English Black, T-10, S-54, Botatul, Mysore Local, Punjab Local, S-41, S-1708, S-1733, ME-58, AR-14, PPR-1, Tomeiso, Chinese White, Kokuso-27, Brentual Kashmir, Mandalay (S-1), Lajward, S-799, C-763, S-36, ME-53, K2/Kosen, Kasuga, Rokokiyaso, French, V-1, Zagtul, HP Local, S-1635, S-1531, C-778, Obowase, C-2038, Vishala, Senmatso, Chattatul, Shivalik, Okinowa

01st – 10th April 2025	PPR-1/PPR-1, PPR-1/CW, PPR-1/Ichinose

Table 2: Leaf sprouting nature of mulberry germplasm accessions during Spring 2025 in WGPB

Date	Mulberry Accessions
16th – 31st March 2025	
01st – 10th April 2025	Goshoerami, Rokokiyaso, Chinese White, Ichinose, Togawase, Italian Sarnal, Kasuga, Kokuso-20, Kokuso-21, Kokuso-27, Kairyorose, KNG, Shimanouchi, Obowase, Sanish5, Senmatso, Multicaulis, Tomeiso, Tsukasagawa, Limencina, Enshatakasuke, Ichechei, Shrim-5, Shrim-8, Serpentina, French, Muriaso, Kosen, HP Local, Chattatul, Chattatul Zangir, Brentul Kashmir, Zagtul, Botatul, Zangbad, Chinarpati, China-08, China-30, China-31, ME-53, FGDT, TR-10, TR-8, T-4, T-10, K-2, C-4, C-763, C-776, C-1733, Nadigam, Punjab Local, Mysore Local, $BC_2$59, S-1, S-30, S-36, S-41, S-54, S-146S-799, S-1301, S-1531, S-1635, S-1708, Lajward, AR-12, AR-14, BR-2, Almora Local, K2/Kosen, Female Local ME129, MS-2, Vishala, Okinowa, Narola, Saspol, English Black, V-1, Gurez

- **Maintenance of Breeding Selections:** A total of 58 breeding selection developed through PIB-3392 mulberry breeding project are maintained as per the advocated cultural practices. In addition to this, 11 elite selections are also maintained in breeding plot.

REGIONAL SERICULTURAL RESEARCH STATION, SAHASPUR, DEHRADUN (UK)

Regional Sericultural Research Station, Sahaspur, Dehradun (Uttarakhand) was established as Univoltine Research Substation in 1973 at Majra, Dehradun to provide Research and Development support to sericulture industry of five north western non-traditional states. It was upgraded to RSRS in 1985 and got shifted to Sahaspur at its present location in September, 1993. It is situated between Shivalik range at foothills of Himalayas at a latitude of $30^0$21'N and longitude of $77^0$52'E at an altitude of 516.5 metres above mean sea level. Soil is medium textured sandy silt in top layers and silty clay loam in deeper layers with pebbles having moderate permeability, pH range of 5.5 to 6.5 and average annual rainfall of about 1600 mm with >85% precipitation in monsoon. Temperature ranges from 2.8^0C in winter and 39.5^0C during summer. Area under station is 15.62 acre with 11.00 acres effective under mulberry plantation and rest for roads, rearing buildings, grainages, farmhouse, administrative cum technical block and staff quarters. The rich germplasm of 82 mulberry varieties and 77 mulberry silkworm races is being maintained by following maintenance protocol.

MANDATE:

- To maintain germplasm bank of mulberry genotypes, evaluate and recommend suitable mulberry variety for the region.
- To formulate research projects and adaptive research on horticulture and on silkworm aspects & their implementation.
- To provide cultivation technology for mulberry varieties for plain and hills
- To maintain germplasm bank of mulberry silkworms, evaluation, hybridization and evaluation of suitable hybrids for the region after thorough experimentation and field trials.
- To provide cost effective rearing technology to the farmers after thorough experimental field trials.
- To transfer the technology in the field, to study the yield gap and to suggest the measures to improve the cocoon productivity in different states.
- To provide training to technical staff of different states and silkworm farmers.

VISION

- Research & Development support for development of Sericulture Industry in Uttarakhand, Uttar Pradesh and Haryana.

MISSION

- Make continuous efforts in R&D and Technology Transfer to Uttarakhand, Uttar Pradesh, and Haryana as per their specific need.
- State specific efforts for greater opportunities in employment in sericulture and to improve the levels of income of farmers through sericulture.
- Productivity enhancement through region and season specific silkworm hybrids and mulberry varieties.
- Strengthening level of our efficiency through a commitment to quality support to sericulture farmers.
- Watch on soil health of sericulture farmers and its improvement through cost effective Integrated Nutrient management.

Maintenance of Mulberry & Silkworm Germplasm

- Eighty-two (82) mulberry accessions (10 exotic and 72 indigenous) were maintained at RSRS, Sahaspur as Sub-tropical Mulberry Germplasm.

- Seventy-seven (77) silkworm accessions *viz.,* 48 accessions - Germplasm Bank (GPB) and 29 accessions - Parental Breeders' Stock (PBS) were maintained at RSRS, Sahaspur during the year 2024-25. GPB maintenance was carried out spring to spring season while PBS was maintained under both spring and autumn schedule every year.

Maintenance of silkworm germplasm

Project code & Title: (AIB 2016)Maintenance and Evaluation of Silkworm Germplasm Bank [with Maintenance of Parental Lines and Breeders' Stock]

Project Duration: Continuous
Project Investigators: Arasakumar, E. and Sakshi Vaishnav

Objective:

1) *To maintain the basic gene pool for future utilization in breeding projects.*
2) *To serve as basic material for development of region and season specific hybrids for different eco-zones.*

1. Maintenance of Silkworm Germplasm Bank (GPB):

A total of 49 silkworm germplasm races were reared during Spring'2024 with 490 DFLs in respect to 49 races (each race 10 DFL's) viz. SM Series (2) : SM 1, SM 3; JP Series (3) : JP1A (P), JP1A(M), JP1B (M); PY Series (2) : PY 1, PY 5; AF Series (2) : AF 2, AF 6; C Series (2) : C 108, C 122; CP Series (2) CP1B (P), CP1B (M) J Series (2) : J 112, J 122; ATR Series (2): ATR 16, ATR 29, SH Series (1) : SH 2; YS Series (3) : YS 3, YS 5, YS 7; SF Series (4) : SF 2, SF 4, SF19, SF21; SL Series (6) : SL 3, SL6, SL 7, SL 9. SL 10, SL 11; Dun Series (3): Dun 12, Dun 19, Dun 21; Others (10): RB 8, AS. HAHI, JJ 5, SY 6, NS 6, JD 6, ADG 6, Su, NN6D, KA; Lines (4): Line 1, Line 4, Line 13 & Line 14. Brushing is done on 05-03-2024. Rearing and grainage activities were completed successfully. The produced disease-free laying's of 49 races were stored at cold storage plant under 10 months' hibernation schedule for next generations.

The following parameters, have been recorded for silkworm germplasm bank (49 races) during Spring'2024 rearing v*iz.,* Fecundity (Nos.), Hatching (%), Larval duration (D:H), Larval weight (g), Yield/10000 larvae by weight (kg), Yield/10000 larvae by number; Cocoon per litre (Nos.) Single cocoon weight (g), Single shell weight (g) and Shell Ratio (%). The data recorded is depicted in Table 51.

Table 51. Maintenance of Silkworm Germplasm Bank during Spring'2024

Name of the race	Fec. (Nos.)	Hat. (%)	Larval Period D:H	Wt. of 10 mature larvae (g)	Yield 10,000 larvae retained/ brushed		Cocoon per litre (No.)	SCW (g)	SSW (g)	SR (%)
					By wt. (kg)	By No.				
SM 1 (P)	489	97.34	27.02	38.50	15.499	9772	65	1.603	0.292	18.22
SM 3 (M)	493	97.76	27.02	38.50	13.257	9543	72	1.534	0.281	18.32
J P 1 A (P)	472	97.25	26.02	38.50	14.571	9814	74	1.515	0.283	18.68
J P 1 A (M)	463	97.62	27.02	38.50	14.885	9914	66	1.572	0.287	18.26
J P 1 B (P)	520	98.07	27.02	39.50	15.556	9871	78	1.505	0.278	18.47
J P 1 B (M)	476	98.53	26.02	38.50	15.399	9743	81	1.548	0.289	18.67
PY 1 (P)	496	98.58	27.02	39.50	14.686	9700	87	1.477	0.281	19.03
PY 5 (P)	477	98.11	27.02	38.50	13.414	9586	84	1.404	0.277	19.73
AF 2 (P)	468	98.5	26.02	38.50	12.528	9814	61	1.529	0.279	18.25
AF 6 (P)	492	97.96	27.02	38.50	13.557	9786	94	1.445	0.274	18.96
C 108 (P)	488	98.15	27.02	38.50	12.857	9799	84	1.543	0.292	18.92
C 122 (P)	489	98.16	27.02	39.50	15.643	9928	76	1.539	0.281	18.26
CP 1 B (P)	491	97.56	28.02	40.50	15.214	9828	84	1.442	0.276	19.14
CP 1 B (M)	494	97.77	27.02	39.50	14.943	9943	74	1.449	0.267	18.43
J112 (P)	498	97.99	27.02	38.50	15.014	9914	86	1.432	0.275	19.20
J122 (P)	494	97.97	27.02	38.50	15.043	9828	82	1.515	0.274	18.09
ATR 16 (P)	476	98.11	27.02	38.50	15.243	9843	61	1.508	0.276	18.30
ATR29 (M)	495	97.78	27.02	38.50	15.728	9900	81	1.520	0.275	18.09
SH 2 (M)	481	97.92	27.02	38.50	14.528	9586	72	1.526	0.286	18.74
YS 3 (P)	478	97.69	27.02	39.50	15.071	9886	71	1.531	0.280	18.29
YS 5 (M)	479	98.33	27.02	41.00	15.499	9000	62	1.484	0.275	18.53
YS 7 (M)	484	98.14	27.02	38.50	14.657	9757	62	1.471	0.277	18.83
SF 2 (M)	459	97.82	26.00	39.50	14.599	9686	63	1.529	0.281	18.38
SF 4 (M)	499	97.99	27.02	38.50	15.199	9857	68	1.555	0.282	18.14
SF 19 (P)	483	98.34	27.02	38.50	15.371	9872	79	1.520	0.277	18.22
SF 21 (M)	485	97.94	27.02	38.50	15.700	9943	54	1.616	0.295	18.25
SL 3 (P&M)	496	98.18	28.02	38.50	15.486	9886	74	1.524	0.279	18.31
SL 6 (P&M)	477	97.90	27.02	39.50	15.128	9772	91	1.526	0.278	18.22
SL 7 (P)	484	98.14	27.02	38.50	15.500	9900	92	1.516	0.275	18.14
SL 9 (P)	458	97.82	27.02	38.50	13.957	9472	65	1.476	0.278	18.83
SL 10 (P)	499	97.39	27.02	39.50	15.571	9900	67	1.492	0.278	18.63
SL 11 (P)	476	98.11	27.00	38.50	13.886	9743	70	1.487	0.276	18.56
DUN 12 (P)	485	98.35	27.00	38.50	14.614	9814	77	1.452	0.281	19.35
DUN 19 (M)	474	97.67	27.00	38.50	14.086	9743	78	1.438	0.281	19.54
DUN 21 (M)	464	97.84	28.02	38.50	15.243	9828	76	1.518	0.282	18.58
RB 8 (P)	497	98.19	27.02	38.50	15.271	9943	60	1.519	0.286	18.83
AS.HAHI (P)	453	98.23	27.02	39.50	15.371	9900	94	1.413	0.272	19.25
JJ5 (M)	487	98.56	27.02	38.50	14.972	9786	89	1.524	0.277	18.18
SY 6 (P)	477	97.69	26.02	39.00	14.728	9714	65	1.529	0.286	18.71
NS 6 (P)	519	98.26	26.02	39.50	15.014	9786	82	1.528	0.282	18.46
JD 6 (M)	532	98.31	28.02	39.50	15.200	9514	63	1.519	0.276	18.17
ADG 6 (P)	486	98.35	27.02	38.00	15.415	9914	60	1.455	0.285	19.59
SU (M)	426	97.88	27.02	39.50	15.228	9757	71	1.562	0.285	18.25

NN 6 D	481	97.71	27.02	38.50	15.271	9886	64	1.524	0.279	18.31
KA (P)	476	98.11	28.02	38.50	15.443	9900	57	1.539	0.282	18.32
Line – 1	492	97.76	27.02	38.50	15.528	9914	55	1.515	0.283	18.68
Line – 4	475	98.11	28.02	38.50	15.443	9843	57	1.521	0.28	18.41
Line – 13	486	98.15	28.02	39.50	15.757	9928	66	1.519	0.277	18.24
Line – 14	515	98.06	27.02	39.50	15.586	9900	64	1.518	0.285	18.77
Mean	484.37	98.00	27.04	38.88	14.93	9792.98	72.61	1.51	0.28	18.59
SD	17.541	0.305	0.516	0.602	0.756	161.561	10.836	0.044	0.005	0.419
CD @ 5%	0.036	0.003	0.019	0.015	0.051	0.016	0.149	0.029	0.019	0.023
SEM±	2.506	0.044	0.074	0.086	0.108	23.080	1.548	0.006	0.001	0.060

2. Maintenance of Parental lines and Breeders stock (PBS):

During Spring and Autumn rearing'2024, Parental Lines and Breeders Stock rearing was initiated with 290 DFL's in respect of 29 races / breeds @ 10 DFLs in each race, *viz.,* SH 6, NB4 D2, DUN 6, DUN 17, DUN 18, DUN 22, CSR 2, CSR 4, CSR 6, CSR 26, CSR 27, SK 6, SK 7, APS 5, APS 9, BBE-198, APS-4, Pam DR-1, Pam DR-4, Pam DR-6, Pam DR-7, Pam DR-8, Pam DR-9, Pam DR-12, Pam DR-16, Pam DR-18, MASN-4, MASN-6 and MASN-7 were brushed. Rearing and grainage activities were carried out successfully. The produced disease-free layings were stored at cold storage plant for next generation rearing. The following observations have been recorded during Spring and Autumn'2024 rearing, v*iz.*, Fecundity (Nos.), Hatching (%), Larval duration (D:H), Larval weight (g), Yield/10000 larvae by weight (kg), Yield/10000 larvae by number; Cocoon per litre (Nos.) Single cocoon weight (g), Single shell weight (g) and Shell Ratio (%). The data recorded is depicted in Table 52 and Table 53.

Table 52: Maintenance of Parental lines and breeder's stock during Spring'2024

Name of the race	Fec. (Nos.)	Hat. (%)	Larval Period D:H	Wt. of 10 mature larvae (g)	Yield 10,000 larvae retained/ brushed		Cocoon per litre (No.)	SCW (g)	SSW (g)	SR(%)
					By wt. (kg)	By No.				
SH6	508	98.23	26.00	39.00	15.472	9886	77	1.553	0.285	18.35
NB4D2	511	98.43	25.02	38.50	15.499	9886	77	1.539	0.290	18.84
DUN 6	483	98.55	26.00	38.50	15.557	9899	97	1.567	0.289	18.44
DUN 17	490	98.37	26.02	38.50	15.071	9514	86	1.560	0.289	18.53
DUN 18	496	98.18	25.02	38.50	15.600	9828	87	1.502	0.274	18.24
DUN 22	516	98.64	26.02	38.50	15.643	9871	88	1.474	0.275	18.66
CSR 2	527	97.91	26.02	38.50	15.015	9614	71	1.483	0.276	18.61
CSR 4	525	98.47	26.02	38.50	15.028	9843	72	1.507	0.282	18.71
CSR 6	523	98.66	26.02	38.50	14.475	9671	84	1.508	0.279	18.50
CSR 26	510	98.82	26.02	38.50	14.799	9500	97	1.516	0.282	18.60
CSR 27	522	98.46	26.02	38.50	15.086	9628	75	1.649	0.304	18.44
SK 6	493	98.38	26.02	38.50	15.457	9814	82	1.511	0.276	18.27
SK 7	499	97.99	26.02	38.50	15.499	9872	84	1.510	0.274	18.15
APS 4	506	98.02	26.02	39.50	15.300	9886	73	1.630	0.299	18.34
APS 5	496	97.78	26.02	38.50	15.543	9743	65	1.639	0.312	19.04
APS 9	504	98.02	26.02	39.50	15.314	9628	72	1.541	0.282	18.30
BBE 0198	477	97.69	25.02	38.50	14.972	9486	81	1.423	0.281	19.75
Pam DR 1	493	97.76	26.02	38.50	15.128	9843	81	1.420	0.279	19.65
Pam DR 4	500	97.40	26.02	38.50	15.657	9900	81	1.427	0.273	19.13
Pam DR 6	484	97.93	26.02	38.50	15.372	9914	84	1.460	0.282	19.32

Pam DR 7	487	97.54	27.02	38.50	15.300	9900	83	1.515	0.278	18.35
Pam DR 8	497	97.78	27.02	38.00	15.428	9828	98	1.408	0.284	20.17
Pam DR 9	486	97.53	27.02	38.00	15.200	9800	84	1.519	0.283	18.63
Pam DR 12	496	97.98	24.02	38.50	15.372	9686	77	1.526	0.279	18.28
Pam DR 16	498	97.59	24.02	38.50	15.499	9771	86	1.484	0.281	18.94
Pam DR 18	494	97.97	24.02	38.00	15.643	9443	96	1.518	0.282	18.58
MAS-N 4	504	98.02	26.02	38.50	15.157	9557	91	1.420	0.274	19.30
MAS-N 6	529	98.29	27.02	38.50	15.571	9828	74	1.536	0.282	18.36
MAS-N 7	521	97.50	27.02	38.50	15.443	9728	86	1.504	0.281	18.68
Mean	502.586	98.065	25.881	38.534	15.314	9750.586	82.379	1.512	0.283	18.729
SD	14.141	0.382	0.819	0.320	0.277	143.864	8.277	0.061	0.009	0.492
CD @ 5%	0.028	0.004	0.032	0.008	0.018	0.015	0.100	0.040	0.031	0.026
SEM±	2.626	0.071	0.152	0.059	0.051	26.715	1.537	0.011	0.002	0.091

Table 53: Maintenance of Parental lines and breeder's stock during Autumn'2024

Name of the race	Fec. (%)	Hat. (%)	Larval Period D:H	Wt. of 10 mature larvae (g)	Yield 10,000 larvae retained/brushed		Cocoon per litre (No.)	SSW (g)	SSW (g)	SR (%)
					By wt. (kgs)	By No.				
SH6	525	96.57	23:05	37.09	16.150	9950	72	1.571	0.302	19.22
NB4D2	524	96.75	23:02	37.54	15.134	9916	87	1.581	0.288	18.22
DUN 6	451	95.12	23:02	36.12	13.984	9850	78	1.668	0.315	18.88
DUN 17	520	96.54	23:02	36.95	13.416	9433	84	1.651	0.307	18.59
DUN 18	496	94.95	23:02	36.19	14.900	9734	82	1.546	0.304	19.66
DUN 22	500	95.80	23:03	34.08	13.966	9684	82	1.582	0.301	19.03
CSR 2	504	96.03	23:03	37.03	15.950	9916	62	1.636	0.326	19.93
CSR 4	421	97.62	23:02	36.93	14.566	9783	82	1.626	0.333	20.48
CSR 6	526	95.81	23:05	35.92	13.950	9750	92	1.592	0.296	18.59
CSR 26	528	97.72	23:02	37.26	14.134	9884	93	1.488	0.291	19.56
CSR 27	521	97.69	23:02	35.99	14.716	9716	63	1.721	0.321	18.65
SK 6	511	96.47	23:05	32.42	14.250	9784	86	1.526	0.284	18.61
SK 7	446	95.74	23:02	33.10	14.467	9467	91	1.469	0.277	18.86
APS 4	453	96.91	23:02	35.96	13.134	9916	82	1.474	0.281	19.06
APS 5	467	96.78	23:02	34.95	12.567	9416	73	1.581	0.300	18.98
APS 9	480	96.25	23:02	34.88	12.866	9483	71	1.612	0.307	19.04
BBE 0198	474	95.78	23:03	34.89	12.234	9734	74	1.452	0.291	20.04
Pam DR 1	492	96.95	23:02	35.95	13.966	9834	76	1.571	0.295	18.78
Pam DR 4	505	96.24	23:02	35.11	13.267	9516	78	1.466	0.274	18.69
Pam DR 6	484	95.66	23:02	36.86	13.617	9650	78	1.614	0.295	18.28
Pam DR 7	497	95.57	23:05	36.16	13.516	9416	74	1.623	0.304	18.73
Pam DR 8	488	97.54	23:02	35.27	14.384	9650	42	1.457	0.285	19.56
Pam DR 9	502	96.81	23:02	36.11	14.284	9866	82	1.396	0.279	19.99
Pam DR 12	520	97.31	23:02	33.20	15.416	9933	75	1.409	0.275	19.52
Pam DR 16	505	96.24	23:02	34.99	14.784	9850	68	1.575	0.295	18.73
Pam DR 18	544	95.96	23:02	36.25	13.983	9234	96	1.632	0.304	18.63
MAS-N 4	472	96.61	23:02	35.33	14.650	9366	66	1.659	0.305	18.38
MAS-N 6	505	97.43	23:03	34.35	14.900	9533	66	1.558	0.292	18.74
MAS-N 7	523	97.32	23:02	35.31	14.984	9516	70	1.562	0.302	19.33
Mean	496.000	96.489	0.960	35.593	14.212	9682.069	76.724	1.562	0.298	19.061
SD	28.360	0.759	0.001	1.265	0.907	199.513	11.004	0.080	0.014	0.562
CD@5%	0.057	0.008	0.001	0.036	0.064	0.021	0.143	0.051	0.048	0.029
SEM±	5.266	0.141	0.000	0.235	0.168	37.049	2.043	0.015	0.003	0.104

On Farm Trail

AIB-03002 SI: Development of Sustainable Bivoltine Silkworm Double Hybrids Suitable to North- West India" On Farm Trail at Uttarakhand region during spring and autumn'2024

Progress during Spring'2024:

The On Farm Trial was conducted under the AIB03002 SI project during spring season'2024 in Uttarakhand. The test hybrid BK20 × BK7 (500 Dfl's) and control hybrid FC1 × FC2 (100 Dfl's) were distributed to the farmers. The maximum yield 46.40 kg/100 Dfl's and minimum yield 41.80 kg/100 Dfl's were achieved in test hybrid and potential yield 46.40 kg/100 Dfl's was achieved. Whereas, the control hybrid showed 40.20 kg/100 Dfls which is lower compared to the test hybrid

On Farm Trail conducted in Uttarakhand under AIB 03002 SI project during Spring'2024

S. No.	Name of the farmer	Name of the village	Name of the silkworm hybrid	No. of dfl's distributed	Weight of cocoons harvested (kg)	Yield/100 dfl's (kg)
1	Sh. Suresh	Singiniwala	BK20 × BK 7	50	21.7	43.4
2	Sh. Rakesh	Singiniwala	BK20 × BK 7	50	23.2	46.4
3	Sh. Guttu	Singiniwala	BK20 × BK 7	50	20.9	41.8
4	Sh. Sanju	Singiniwala	BK20 × BK 7	50	22.4	44.8
5	Sh. Ranjith	Singiniwala	BK20 × BK 7	50	23.6	47.2
6	Smt. Ballo Devi	Sabhawala	BK20 × BK 7	50	21.6	43.2
7	Smt. Chando Devi	Sabhawala	BK20 × BK 7	50	22.9	45.8
8	Sh. Rohith	Sabhawala	BK20 × BK 7	50	21.7	43.4
9	Sh. Makhan	Sabhawala	BK20 × BK 7	50	20.9	41.8
10	Sh. Karan	Sabhawala	BK20 × BK 7	50	23.3	46.6
11	Smt. Sumna	Singiniwala	FC1× FC 2	50	20.1	40.2
12	Sh. Veesingh	Sabhawala	FC1 × FC 2	50	19.4	38.8
			Total/Average	**600**	**21.81**	**43.62**

Progress during Autumn'2024:

The On Farm Trial was conducted under the AIB03002 SI project during Autumn season'2024 in Uttarakhand. The test hybrid BK20 × BK7 (350 Dfl's) and control hybrid FC1 × FC2 (50 Dfl's) were distributed to the farmers. The maximum yield 41.60 kg/100 Dfl's and minimum yield 16.80 kg/100 Dfl's were achieved in test hybrid and potential yield 41.60 kg/100 Dfl's was achieved. Whereas, the control hybrid showed 73.60 kg/100 Dfls which is higher compared to the test hybrid.

On Farm Trail conducted in Uttarakhand under AIB 03002 SI project during Autumn'2024

#	Name of the farmer/ village	Name of the silkworm hybrid	No. of dfl's distributed	Weight of matured larvae 10 Nos. (g)	Weight of cocoons harvested (kg)	Yield/ 100 dfl's (kg)	Avg. SCW (g)	Av. SSW (g)	SR (%)
1.	Sh. Makhan Singh Sabhawala	BK20 × BK 7	50	33.61	8.43	16.85	1.501	0.257	17.12
2.	Sh. Anup kumar, Sabhawala		25	32.41	10.40	41.60	1.290	0.227	17.60
3.	Smt. Bollu Devi, Sabhawala		25	33.53	7.50	30.00	1.197	0.204	17.04
4.	Smt. Fooldhi, Dandapur		25	39.62	10.00	40.00	1.470	0.281	19.11
5.	Smt. Sumna, Sherpur		25	30.74	6.00	24.00	1.047	0.175	16.71
6.	Smt. Pushpa, Sherpur		25	31.34	7.79	31.16	1.233	0.199	16.14
7.	Smt. Mamta, Sherpur		25	30.58	5.18	20.72	1.187	0.208	17.52
8.	Sh. Rakesh, Singhniwala		50	34.34	11.80	23.60	1.433	0.251	17.51
9.	Smt. Fareeda Begum, Sahaspur		50	33.13	9.06	16.80	1.337	0.227	16.98
10.	RSRS, Sahaspur		50	37.04	15.70	31.40	1.568	0.296	18.88
11.	Smt. Hashina, Sahaspur	FC1 × FC2 (C)	25	34.64	21.06	73.60	1.434	0.267	18.62
12.	Sh. Beersingh, Sabhawala	FC1 × FC2 (C)	25	32.58	11.70	46.80	1.091	0.183	16.77
		Total/Average	**400**	**33.63**	**10.38**	**33.04**	**1.32**	**0.23**	**17.50**

AIB03008 SI: Evaluation of Nutrigenetically Superior Silkworm Hybrids under Sub-Tropical Conditions of North West India.

Progress during Autumn'2024:

To evaluate the performance of nutrigenetically superior silkworm hybrids in Uttar Pradesh the hybrids namely CSR 50 × B.Con 1 (300 dfl's) and RSJ-14 × B Con 1 (300 dfl's) along with control hybrid SH6 × NB4D2 (50 dfl's) were distributed to the farmers during Autumn'2024 in Bahraich district of Uttar Pradesh. The results showed that, the highest yield was obtained in test hybrid RSJ-14 × B.Con 1 (49 kg/100 dfl's) followed by CSR 50 × B. Con 1 (47 kg/100 dfl's) and control hybrid SH6 × NB4D2 showed 47 kg/100 dfl's.

Table 54 a. Performance of nutrigenetically superior silkworm hybrids in Uttar Pradesh

Sl. No.	Name of the farmer	Name of the breed reared	No. of DFLs reared	Wt. of 10 matured larvae (g)	SCW (g)	SSW (g)	SR (%)	Yield / 50 DFLs (kg)	Yield/ 100 DFLs (kg)
1.	Smt. Mangali	SH6 × NB4D2 (Control)	50	35.20	1.44	0.27	18.75	23.50	47.00
2.	Smt. Rangili	CSR 50 × B. Con 1	50	35.10	1.46	0.26	17.81	22.30	44.60
3.	Smt. Rajwati	CSR 50 × B. Con 1	50	35.30	1.40	0.28	20.00	23.50	47.00

4.	Smt. Vitana	CSR 50 × B. Con 1	50	36.10	1.47	0.27	18.37	21.10	42.20
5.	Smt. Phoolmati	CSR 50 × B. Con 1	50	35.60	1.41	0.31	21.99	20.20	40.40
6.	Shri Vidhyaran	CSR 50 × B. Con 1	50	36.20	1.39	0.28	20.14	22.50	45.00
7.	Smt. Sheela	CSR 50 × B. Con 1	50	34.80	1.40	0.31	22.14	19.00	38.00
8.	Smt. Anita	RSJ-14 × B Con 1	50	35.80	1.45	0.29	20.00	24.50	49.00
9.	Smt. Ramrati	RSJ-14 × B Con 1	50	34.70	1.46	0.31	21.23	23.20	46.40
10.	Sh. Chaudhary	RSJ-14 × B Con 1	50	33.30	1.44	0.28	19.44	20.50	41.00
11.	Smt. Kalawati	RSJ-14 × B Con 1	50	36.10	1.51	0.27	17.88	21.70	43.40
12.	Smt. Malti	RSJ-14 × B Con 1	100	35.50	1.52	0.31	20.39	22.15	44.30
		Total	**650**	**35.31**	**1.45**	**0.29**	**19.85**	**22.01**	**44.03**

Similarly, to evaluate the performance of nutrigenetically superior silkworm hybrids in Uttar Pradesh the hybrids namely CSR 50 × B.Con 1 (300 dfl's) and RSJ-14 × B Con 1 (300 dfl's) along with control hybrid SH6 × NB4D2 (50 dfl's) were distributed to the farmers during Autumn'2024 in Basti district of Uttar Pradesh. The results showed that, the highest yield was obtained in test hybrid RSJ-14 × B.Con 1 (33 kg/100 dfl's) followed by CSR 50 × B. Con 1 (32 kg/100 dfl's) and control hybrid SH6 × NB4D2 showed 31 kg/100 dfl's.

Table 54b. Performance of nutrigenetically superior silkworm hybrids in Uttar Pradesh

#	Name of the farmer	Name of the breed reared	No. of DFLs reared	Wt. of 10 matured larvae (g)	SCW (g)	SSW (g)	SR (%)	Yield / 50 DFLs (kg)	Yield/ 100 DFLs (kg)
1.	Smt. Maina	SH6 × NB4D2 (Control)	50	31.50	1.270	0.23	18.11	15.70	31.40
2.	Smt. Durgawati	CSR 50 × B. Con 1	50	30.90	1.240	0.21	16.94	12.50	25.00
3.	Smt. Dharma	CSR 50 × B. Con 1	50	32.50	1.290	0.24	18.60	12.90	25.80
4.	Smt. Vidyotama	CSR 50 × B. Con 1	50	33.00	1.320	0.23	17.42	11.20	22.40
5.	Smt Anara	CSR 50 × B. Con 1	50	30.10	1.200	0.21	17.50	10.30	20.60
6.	Smt. Sharda	CSR 50 × B. Con 1	50	31.20	1.240	0.24	19.35	13.20	26.40
7.	Smt. Kewala	CSR 50 × B. Con 1	50	34.50	1.380	0.23	16.67	16.10	32.20
8.	Shri Nirahu	RSJ-14 × B. Con 1	50	34.90	1.370	0.26	18.98	16.50	33.00
9.	Ms. Chandani	RSJ-14 × B. Con 1	50	33.00	1.320	0.27	20.45	13.80	27.60
10	Smt. Sarpatta	RSJ-14 × B. Con 1	50	33.30	1.320	0.28	21.21	12.50	25.00
11	Shri Deepak	RSJ-14 × B. Con 1	50	31.40	1.260	0.21	16.67	9.30	18.60
12	Smt. Kailashpati	RSJ-14 × B. Con 1	50	32.10	1.290	0.23	17.83	9.90	19.80
13	Ms. Kiran	RSJ-14 × B. Con 1	50	30.10	1.200	0.22	18.33	14.10	28.20
		Total	**650**	**32.19**	**1.28**	**0.24**	**18.31**	**12.92**	**25.85**

Maintenance and Characterization of mulberry gene pool

Project Code: PIB – 3212
Duration: Continuous
Investigators: Chhattar Pal

Objectives: To evaluate the mulberry cultivars for their performance ability.

Progress: 82 mulberry genotypes (10 exotic and 72 indigenous) were maintained in the mulberry Germplasm at RSRS, Sahaspur. 43 genotypes were planted and maintained with a spacing of 4'x 4' having 10 plants of each genotype whereas, 21 varieties planted and maintained with a spacing of 3'x3' having 24 plants each in two plots of each genotype. Rest of the 18 genotypes were maintained in scattered pattern having different number of genotypes by adopting the regular package of practices of this station. Phenotypic characters, *viz.*, No. of branch, shoot length, average internodal distance, moisture (%), weight of 100 leaves and average leaf yield (g) have been recorded during Autumn'2024 (Table 55).

Mulberry accessions (50 Nos.) received from CSB-Central Sericultural Germplasm Resource Centre, Hosur, Tamil Nadu 35 mulberry varieties viz. MI-0002, MI-0005, MI-0073, MI-0139, MI-0174, MI-0366, MI-0369, MI-0370, MI-0376, MI-0384, MI-0405, MI-0406, MI-0407, MI-0424, MI-0438, MI-0439, MI-0440, MI-0491, MI-0492, MI-0499, MI-0511, MI-0574, MI-0575, MI-0576, MI-0577, MI-0611, MI-0615, MI-0637, MI-0638 MI-0639, MI-0643, MI-0640, MI-0723, MI-0724 and MI-0741 are encompassing of *Morus indica, M. alba, M. laevigata, M. serrata and M. latifolia* species are being maintained as per the recommended package of practices followed by RSRS, Sahaspur.

Maintenance of Mulberry Germplasm Bank

Table 55. Morphological characters, biochemical and leaf yield during Autumn' 2024

Name of the Variety	No. of Branches	Shoot length (cm)	Avg. No. of Nodes	Wt. of 100 leaves (g)	Moisture (%)	Avg. leaf yield per plant (g)
China white	11.70	132.30	7.08	208.00	67.88	372.30
S-741	31.00	191.00	8.41	186.70	67.17	854.30
Rokokuyasa	-	-	-	-	-	-
MS-3	13.00	88.00	4.00	188.00	65.95	158.00
Local lobed	03.00	67.00	2.79	136.00	61.76	43.00
Kokuso-27	13.70	215.70	9.94	274.70	65.06	884.30
Majra-11	-	-	-	-	-	-
MS-2	25.70	172.70	7.50	206.70	65.18	888.30
LF-2	22.00	141.70	6.16	305.00	67.24	871.00
MS-8	11.00	77.00	3.50	168.00	66.66	206.00

MS-1	14.33	87.33	3.74	197.00	62.09	536.70
MS-5	25.33	167.70	7.18	161.33	62.80	805.70
S-642	26.50	127.50	5.31	212.00	63.32	643.00
MR-2	17.70	132.00	5.01	109.38	63.31	353.33
S- 799	15.70	137.33	5.56	284.00	61.04	475.33
MS-9	17.00	113.00	4.35	168.00	64.28	594.00
S-1096	17.33	108.33	3.45	241.70	67.72	637.33
S-523	14.70	109.00	3.98	201.33	60.28	451.00
Sujanpur	12.66	139.70	5.74	232.00	65.51	505.39
MS-6	13.00	134.00	5.02	176.00	61.36	352.60
C-776	12.70	128.70	4.95	193.33	64.14	457.00
S-31	12.66	90.70	3.20	218.70	65.86	307.70
S-1301	20.00	132.70	4.85	217.33	68.10	693.33
MS-7	06.50	86.50	3.26	114.00	61.40	76.00
C-763	16.70	126.00	4.84	268.00	66.67	558.00
C-741	8.33	73.33	2.82	138.70	61.58	269.70
K2(m)	16.30	129.00	4.72	170.70	62.52	395.70
Ichinose	14.30	129.70	5.55	192.00	66.66	517.70
LF-1	15.00	84.33	3.15	158.70	62.21	390.00
PGDTR-29	09.00	41.00	1.46	216.90	66.80	220.00
Kaiyorosao	-	-	-	-	-	-
C-1729	18.00	89.00	3.25	233.30	62.28	518.00
S-1635	09.00	101.00	4.04	320.00	63.75	297.00
C-1726	22.33	104.70	4.23	222.70	64.70	353.70
C-1730	18.70	77.00	3.03	216.00	69.14	409.00
Mandalay	13.33	110.70	4.14	158.00	60.55	249.33
S-1685	18.33	132.70	5.16	296.00	65.77	481.33
C-1608	03.00	72.00	3.00	180.00	64.44	65.00
C-1737	-	-	-	-	-	-
C-1690	23.70	103.00	3.76	190.70	67.16	635.00
Tr-4	-	-	-	-	-	-
S-1708	13.33	119.33	4.83	293.33	66.82	302.00
Tr-5	18.70	159.00	6.03	266.70	64.52	675.70
Tr-8	15.70	144.33	6.18	242.70	63.75	334.00
S-13	13.00	52.00	2.00	178.00	62.50	110.00
Philippines	11.00	210.70	8.89	253.33	67.37	298.00
Punjab Local	13.33	189.70	8.13	241.33	63.53	287.66
K2 (s)	11.00	137.00	5.63	218.70	62.20	221.70
S-799	17.00	142.33	5.40	269.00	72.77	309.00
L-4	12.33	159.70	5.56	246.70	67.56	412.00
S-146	13.70	150.33	5.84	316.00	70.88	415.00
L-6	16.00	173.70	7.14	208.00	68.59	447.00
China white (s)	14.33	191.70	9.12	338.70	68.12	671.33
S-41	15.33	150.70	5.51	273.33	69.76	508.33
S-1531	15.30	153.30	6.38	254.70	71.22	579.33
L-1	14.33	154.33	5.37	250.70	70.23	535.00
L-4	15.33	152.70	6.02	257.33	67.35	488.70
S-1	13.70	175.00	6.64	204.00	68.62	645.70

Tr-10	13.70	150.70	6.45	237.33	68.54	442.70
CM	13.00	135.70	5.42	269.00	70.29	386.33
S-54	18.70	133.00	4.47	314.70	70.35	713.00
Goshoerami	06.00	86.70	3.17	337.33	70.75	150.33
L-2	13.00	162.00	5.78	312.00	70.88	834.33
L-3	12.00	158.7	6.42	262.66	73.12	332.33
Kollegal	37.00	147.00	5.18	189.33	64.80	989.33
Mysore local	27.00	124.33	4.33	190.70	65.07	586.00
S-30	17.70	150.70	5.44	204.00	64.70	675.33
RFS-135	16.70	120.33	4.14	325.33	66.39	660.70
RFS-175	16.33	118.70	4.13	296.00	66.21	517.70
V 1	18.00	165.33	6.12	324.00	66.66	1268.00
Vishala	20.00	112.33	4.43	220.00	68.49	366.00
Kajli	-	-	-	-	-	-
Motigara	22.00	139.33	5.50	256.00	67.71	332.33
HP02/12	16.00	126.70	5.34	265.33	64.82	403.70
HP02/13	17.33	117.70	4.24	194.70	68.52	362.00
HP02/08	14.70	116.00	4.00	217.33	65.02	347.33
S-36	16.33	118.33	4.17	248.00	66.12	341.33
S-34	16.00	162.70	5.61	254.70	66.51	669.70
AR-12	17.70	101.00	4.44	313.33	65.96	523.00
AR-14	14.00	128.00	4.51	277.33	69.23	385.33
C-4	22.00	63.33	2.63	172.00	61.62	342.50
BR-2	15.00	130.00	4.64	322.70	69.85	617.33
Mean	14.72	118.75	4.68	215.58	61.22	439.17
SD	6.74	47.71	2.03	80.26	17.44	248.87
CD@5%	0.458	0.402	0.434	0.372	0.285	0.567
SEm±	0.744	5.269	0.224	8.863	1.926	27.483

CSB-NHAI : PILOT PROJECT

Implementation of NHAI project "Development of mulberry (*Morus spp*.) plantation on selected stretches of National Highways on the sides of carriageways in Uttarakhand".

Project Period : 2022-27

Project Nodal Officer : Sardar Singh, Director, CSR&TI, Pampore.
Project Implementation Scientist: Chhattar Pal

Objectives:

- To develop mulberry tree reserve in identified stretches on carriageways of NHAI
- To explore sericulture-based livelihood opportunities for the farmers residing on sides of carriageways.

Progress on NH- 72A & 73 (Roorkee-Chutmalpur)

- The plantations were maintained as per the recommended package of practices.
- Gap filling of 1750 saplings during January'2025 were completed and new plantations are under establishment phase.
- Application of Farm Yard Manure, chemical fertilizer application and irrigation were done.
- Trial silkworm rearing has been conducted with double hybrid silkworm breed FC1 × FC2 on the designated stretches successfully.
- During the month of March'2025 the survivability of the plantation was recorded about 91%.


Plantation at NH- 72A & 73 (Roorkee-Chhutmalpur)


Hybrid: FC1 × FC2
No. of DFL's brushed: 15 DFL's
Available mulberry trees: 6000
Quantity of leaf harvested: 2-3 kg/ tree

Plantation at NH-72 A & 73

Harvesting of mulberry leaves for feeding the silkworm



Visit made by NHAI officials during trail silkworm rearing

Trial Silkworm rearing in designated stretches at NH-72 A & 73 (Roorkee to Chhutmalpur)

Progress on NH- 74 (Najibabad-Nagina Bypass)

- The plantation was maintained as per the recommended package of practices.
- Gap filling of 5400 saplings during January, 2025 was completed and the new plantations are under establishment phase.
- The other intercultural operations like, application of FYM, chemical fertilizers and irrigation were completed.
- Fencing work around the mulberry plantation was completed in the designated stretches.
- During the month of March 2025, the survivability of the plantation was recorded about 91%.

Plantation on NH- 74 (Najibabad-Nagina Bypass)

Progress on NH- 125 (Sitarganj-Khatima bypass)

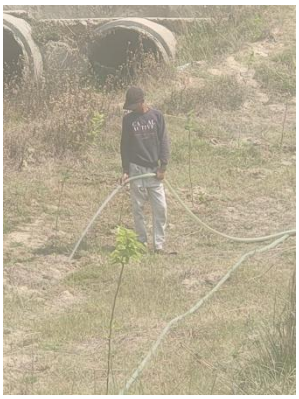
- The plantation was maintained as per the recommended package of practices.
- Gap filling of 1250 saplings during January, 2025 were completed and new plantations are under establishment phase.
- The intercultural operations such as, application of FYM, chemical fertilizer application and irrigation to the mulberry plantations were completed.
- During the month of March 2025, the survivability of the plantation was recorded about 95%.

Plantation on NH- 125 (Sitarganj-Khatima bypass)

Progress on NH-125 (In place of NH-87)

- The plantation of 1470 plants have been done on the selected stretches of NH-125 in place of NH-87. The plantation is under maintenance and establishment phase.
- At the end of March, the survivability of the plantation was recorded more than 96%.





Plantation on NH- 125 (In place of NH-87)

Other activities:

- Swatch Bharat Abiyan: Under this programme, the station has conducted following activities w.e.f. 01-17-09-2024 to 02-10-2024 viz.
  - Cleaning of office premises
  - White washing of trees & flowering pots
  - Cleanness of office rooms, office records periphels viz., computers, printers, table etc.
  - Cleaning of paths, roads, removal of weeds and grass grown in the pathways, lawn areas and roads.

- Platinum Jubilee Celebration of CSB: A 75th Year Celebration: On September 20, 2024, RSRS, Sahaspur has celebrated the **Platinum Jubilee** on the occasion of 75th year of Central silk Board.

- National sports day: The station has National Sports on 29th August, 2024, commemorates the birth anniversary of hockey legend Major Dhyan Chand. All the employees & Farm works participated in various games in connection with to promote the importance of physical activity and a healthy lifestyle.

REGIONAL SERICULTURAL RESEARCH STATION, MIRANSAHIB, JAMMU

Introduction: Central Silk Board, Ministry of Textiles established Regional Sericultural Research Station at Miransahib in Jammu district of J&K in the year 1994 for providing R&D support to the sericulture sector in the sub-tropical region of the J&K state and also for the similar agro-climatic areas of the adjoining states, *viz*; Punjab and Himachal Pradesh.

Land Area: The station is having a land area of 34.52 Acres comprising 27.50 Acres under effective mulberry plantation and 7.02 Acres under Roads & Buildings. Maintenance of 27.50 acres of active mulberry plantation effectively by conducting all the need based local cultural operations for producing better leaf yield.

Nested Units: The station is supported by two extension units, *viz*; REC, Lamberi in Rajouri district of Jammu Division and REC, Ghumarwin in Bilaspur district of Himachal Pradesh.

Mandates:

- To undertake research studies on mulberry and silkworm improvement suitable for sub-tropical conditions of NW India.
- Identify region specific problems, undertake research studies and feedback analysis in consultation with respective DOS and allied units.
- OST and OFT for test verifying the technologies developed by the main research institutes and suggest fine tuning / modifications of such technologies to provide solutions to region specific problems.
- Conduct on-farm trials (OFT) / demonstration of the selected technologies with selected farmers in coordination with DOS.
- Popularization the proven technologies using various extension methods through cluster area approach.
- Conduct training for both grass root level extension staff of DOS and farmers on advanced technological aspects.
- Crop monitoring and troubleshooting / crisis management.
- Conduct survey on crop yield, economics and disease & pest surveillance for forecasting / forewarning.
- Coordination of cluster Promotion programme.
- Soil health analysis and database maintenance of sericulture farmers.

On Station Trial: Development of Agro based mulberry plantation and intercropping modules"
Investigators involved: Santoshkumar Magadum
Duration: Continuous

Dwarf mulberry tree plantation of S-146 variety was raised in an area of 0.5 acre to demonstrate the Agro-based mulberry plantation and intercropping modules to farmers, DoS officials, students and stakeholders. Plantation was raised with wide spacing of 8'x18' and 8'x9'. During winter and summer seasons, wheat and maize, respectively were sown as intercrop along with mulberry tree plantation. Agriculture crop yields (intercrops) as well as mulberry leaf yield were estimated during spring and autumn season. The model was demonstrated to the farmers and DoS officials from Jammu division, Himachal Pradesh and Punjab. Further, it was recommended to adopt the model for increasing the famers' income by practicing silkworm rearing along with raising agriculture crops from the same patch of land available with the farmers.

Intercropping of wheat with dwarf mulberry plantation during winter season

Analysis of soil health status of sericulture farmers

A total of 75 soil samples were collected from sericulture farmers of Jammu division, Himachal Pradesh and Punjab. 25 soil samples from Udhampur district, 25 samples from Rajouri district and remaining 35 samples from Himachal Pradesh were collected. Further, 90soil samples from experimental plots of various research projects and other general plots of RSRS, Jammu during Spring and Autumn 2024 were also collected and processed for soil nutrient analysis. Soil samples will be analysed for 11 micro and macronutrients from Department of Agriculture, Govt. of J&K, Jammu through outsourcing basis.

SERICULTURE SECTION:

OFT of AIB03008SI: Evaluation of Nutrigenetically Superior Silkworm Hybrids under Sub-tropical Conditions of North West India

Investigators involved: Santoshkumar Magadum (PI), Kiran R. (CI), Ram Lakhan Ram (CI), Rita Singh (CI) and Sakshi Vaishnav (CI)

Project period: July, 2024 to June, 2025

Objectives:

- Field trial of three nutrigenetically superior hybrids JNH-1 (CSR50 x Bcon1), JNH-2 (CSR50 x Bcon4) and JNH-3 (RSJ14 x Bcon1) along with control SH6 x NB4D2.

Progress achieved:

- The parents of nutrigenetically superior hybrids were maintained at RSRS, Jammu.
- The required quantity of seed of three nutrigenetically superior hybrids were prepared at RSRS, Jammu and stored in cold storage at SSPC, Dehradun under appropriate preservation schedule.
- Seed of nutrigenetically superior hybrids was released from cold storage and supplied to all the test locations for conducting On Farm Trial under their respective states/UT.
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Season	Shortlisted hybrids	DFLs per location	Total DFLs	No. of farmers/ location	Locations (Five)
Autumn 2024	CSR-50 x B.Con-1 RSJ-14 x B.Con-1 SH6 x NB4D2	300 300 50 (Check)	600 + 50 (each location)	13 [50 dfls/ farmer]	*Jammu region* *Punjab* *Himachal Pradesh* *Uttar Pradesh* *Uttarakhand*
Spring 2025	CSR-50 x B.Con-1 CSR-50 x B.Con-4 SH6 x NB4D2	300 300 50 (Check)	600 + 50 (each location)	13 [50 dfls/ farmer]	

- Successfully conducted the On Farm Trial of 300 dfls each of JNH-1 (CSR50xBcon1) and JNH-3 (RSJ14xBcon1) along with 50 dfls of SH6xNB4D2 as control in each of the five different locations *viz*., Lamberi area of Rajouri district in J&K, Bhatwan area of Pathankot district in Punjab, Ghumarwin area of Himachal Pradesh, Basti and Bahraich areas of Uttar Pradesh during Autumn season 2024 [Table 56].

- Similarly, during Spring 2025, OFT of 300 dfls each ofJNH-1 (CSR50xBcon1) and JNH-2 (CSR50xBcon4) along with 50 DFLs of SH6 x NB4D2 as control in each of the five different locations *viz*., Lamberi area of Rajouri district and Dangara area of Kathua district in J&K, Ghumarwin area of Himachal Pradesh, Sahaspur area of Uttarakhand and Bahraich area of Uttar Pradesh is under progress.

Table 56: Performance of Nutrigenetically Superior Silkworm Hybrids under OFT trial during Autumn, 2024

Location	Nutrigenetic Silkworm Hybrids	Quantity of DFLs	No. of farmers	Wt. of 10 mature larvae	Average yield/100 DFLs	Average Single cocoon weight (g)	Average Single shell weight (g)	SR (%)
Jammu region (Lamberi)	JNH-1 (CSR50 x Bcon1)	300	6	38.93	36.40	1.483	0.280	18.88
	JNH-3 (RSJ14 x Bcon1)	300	6	38.13	35.50	1.462	0.274	18.74
	SH6 x NB4D2	50	1	37.16	34.00	1.402	0.264	18.83
Himachal Pradesh (Ghumarwin)	JNH-1 (CSR50 x Bcon1)	300	10	35.52	42.28	1.620	0.300	18.52
	JNH-3 (RSJ14 x Bcon1)	300	12	35.08	40.12	1.600	0.292	18.25
	SH6 x NB4D2	50	2	34.20	38.00	1.525	0.265	17.37
Punjab (Bhatwan)	JNH-1 (CSR50 x Bcon1)	300		34.22	32.85	1.542	0.274	17.77
	JNH-3 (RSJ14 x Bcon1)	300		33.61	32.04	1.511	0.260	17.21
	SH6 x NB4D2	50		33.50	31.43	1.480	0.254	17.16

OFT-PAM-17: Evaluation and characterization of silkworm germplasm under Sub-tropical conditions of J & K

Investigators involved: Santoshkumar Magadum (PI) and Sunil (CI)

Project period: Continuous

Objectives:

- Evaluation and characterization of silkworm germplasm under Sub-tropical conditions of J & K.

Progress achieved:

Fifty five breeds were studied by rearing during spring (2024) under germplasm maintenance programme. Among these 39 breeds maintained under germplasm, the fecundity observed was highest in SH6 is 599& lowest in JAM-124 is 334.00and all the breeds showed significantly different from each other whereas hatching percentage was highest in SH6 (98.47) and lowest in JAM-122 (92.98). Yield per 10,000 larvae by weight (Kg) recorded as highest of 15.35 Kg in JAM-121 and lowest of 12.85 Kg in RSJ5 showing statistically significant among all the breeds with regard to weight basis and showing statistically significant among all the breeds. The shell ratio (%) also shows statistically significant among all the breeds and was highest in CSR-26 (18.79) and lowest in RSJ-15 (16.00) respectively. The pupation rate was recorded as maximum in RSJ-1 (93.66 %) and lowest in JAM-127 (86.00 %) and showed statistically non-significant among all the breeds (Table 57).

Seven breeding lines were studied by rearing during spring (2024) under continuous maintenance programme. Among these breeds, the fecundity observed was highest in D2 is about 555 and lowest in O1 is 522 and all the breeds were non-significantly different from each other whereas, hatching percentage was highest in D1 (98.03) and lowest in 323

(95.86). Yield per 10,000 larvae by weight (Kg), the highest about 14.35 Kg in D1 and lowest of about 13.32 Kg in 322 showing statistically non-significant among all the breeds with regard to weight basis. The shell ratio (%) shows statistically non-significant among all the breeds and was highest in 322 (18.10) and lowest in O1 (16.22) respectively (Table 2). The pupation rate (%) was recorded as maximum in 322 (92.13 %) and lowest in O2 (88%) and showed statistically non-significant among all the breeds (Table 58).

Nine breeds were studied by rearing during spring (2024) under continuous maintenance programme. Among these breeds, the fecundity observed was highest in PAMDR 18 is 594 and lowest in PAMDR 9 is 462 and all the breeds were significantly different from each other whereas, hatching percentage was highest in PAMDR 12 (98.37) and lowest in PAMDR 6 (95.66). Yield per 10,000 larvae by weight (Kg), the highest about 14.60 Kg in PAMDR 7 and lowest of about 13.40 Kg in PAMDR 4 showing statistically non-significant among all the breeds with regard to weight basis and the shell ratio (%) shows statistically significant among all the breeds and was highest in PAMDR 8 (18.13) and lowest in PAMDR 12 (16.11) respectively. The pupation rate was recorded as maximum in PAMDR 16 (91.06) and lowest in PAMDR 4 (83.06%) and showed statistically non-significant among all the breeds (Table 59).

Table 57.Average data recorded (39 breeds) maintained under germplasm during Spring 2024

Race / Combination	F. (No.)	Hat. %	Total Larval Duration	5th age Larval duration	Wt. of 10 mature larvae (gm)	Yield /10000 larvae brushed		SCW (g)	SSW (g)	SR %	Pupation %
			D:H			By No.	By wt.				
JAM-1	395 (19.90)	95.86 (78.8)	25:11	6:00	42.33	9306 (96.47)	14.04	1.55	0.28	18.06 (25.14)	92.13 (73.62)
JAM-2	381 (19.55)	94.20 (76.10)	25:14	6:00	44.00	9453 (97.22)	15.31	1.61	0.28	17.23 (24.52)	90.66 (72.61)
JAM-10	363 (19.08)	93.12 (74.77)	25:12	6:17	44.00	9226 (96.06)	13.88	1.53	0.26	17.16 (24.46)	89.33 (71.04)
JAM-11	398 (19.98)	94.59 (76.61)	25:15	6:14	41.00	9306 (96.47)	13.16	1.45	0.26	18.06 (25.14)	92.33 (74.04)
JAM-18(M)	381 (19.55)	93.06 (74.71)	25:12	6:01	42.33	8986 (94.72)	13.71	1.55	0.27	17.25 (24.54)	88.4 (70.75)
JAM-18(P)	409 (20.24)	93.56 (75.28)	25:13	6:02	45.00	9173 (95.78)	14.92	1.61	0.29	17.97 (25.07)	88.8 (70.60)
JAM-21	377 (19.45)	93.68 (75.46)	25:11	6:00	42.00	9533 (97.64)	13.44	1.45	0.23	16.11 (23.65)	93.26 (75.29)
JAM-22	382 (19.57)	93.77 (75.56)	26:03	6:16	45.33	9133 (95.57)	14.69	1.65	0.27	16.61 (24.04)	88 (69.77)
JAM-23	447 (21.16)	94.86 (76.89)	25:09	6:06	42.67	9133 (95.57)	13.45	1.53	0.27	18.15 (25.21)	89.73 (71.36)
JAM-24	428 (20.67)	94.58 (76.80)	26:04	6:17	45.00	9293 (96.40)	14.96	1.62	0.29	18.17 (25.22)	90.46 (72.02)
JAM-25	383 (19.61)	93.98 (75.78)	25:22	6:11	42.33	9173 (95.78)	14.01	1.567	0.26	17 (24.34)	86.4 (68.34)
JAM-27	346 (18.62)	93.05 (74.70)	25:11	6:00	45.00	9306 (96.47)	14.75	1.61	0.29	18.02 (25.11)	91 (72.67)
JAM-103	370 (19.24)	93.24 (74.93)	25:20	6:09	42.67	9186 (95.85)	13.07	1.49	0.26	17.03 (24.37)	88 (69.75)

JAM-110	404 (20.13)	94.11 (75.99)	25:16	6:01	44.00	9320 (96.53)	14.09	1.57	0.27	17.16 (24.46)	89.33 (71.03)
JAM-118	400 (20.04)	93.55 (75.27)	25:05	5:18	45.00	9186 (95.85)	14.92	1.63	0.27	16.59 (24.03)	88.06 (69.78)
JAM-119	407 (20.19)	94.05 (75.89)	25:12	6:01	42.00	9253 (96.19)	13.19	1.44	0.23	16.06 (23.62)	86.66 (68.64)
JAM-121	424 (20.61)	93.21 (75.70)	25:05	5:18	44.00	9453 (97.22)	15.35	1.65	0.30	17.98 (25.08)	89.66 (71.66)
JAM-122	389 (19.76)	92.98 (74.62)	25:15	6:04	43.33	9400 (96.94)	14.48	1.55	0.28	17.98 (25.08)	91.13 (73.72)
JAM-124	334 (18.31)	96.39 (79.03)	25:22	6:02	44.67	9306 (96.47)	14.87	1.61	0.27	16.95 (24.30)	90.66 (72.20)
JAM-125	452 (21.26)	94.32 (76.23)	25:16	6:05	43.00	9213 (95.98)	15	1.61	0.28	17.06 (24.39)	87.46 (69.25)
JAM-127	380 (19.53)	94.13 (75.95)	25:17	6:06	43.67	9133 (95.57)	14.10	1.56	0.26	16.53 (23.98)	86 (68.14)
CSR-2	533 (23.11)	98.68 (83.43)	25:11	6:00	42.33	9066 (95.21)	13.76	1.523	0.25	16.08 (23.63)	88.06 (69.86)
CSR-4	520 (22.82)	97.06 (80.14)	26:02	6:15	43.67	9253 (96.20)	14.24	1.56	0.28	18.09 (25.17)	88.46 (70.01)
CSR-6	448 (21.19)	95.72 (78.29)	25:13	6:02	41.00	9266 (96.26)	13.52	1.467	0.25	17.02 (24.34)	87.46 (69.25)
CSR-26	504 (22.43)	98.68 (83.47)	25:21	6:10	43.67	9413 (97.02)	14.13	1.53	0.28	18.79 (25.68)	90.93 (72.59)
CSR-27	481 (21.95)	97.55 (81.18)	25:11	6:00	43.00	9053 (95.15)	13.8	1.56	0.28	18.33 (25.34)	85.86 (67.84)
RSJ-1	516 (22.74)	97.25 (80.59)	25:18	6:00	41.33	9466 (97.29)	13.45	1.44	0.26	18.09 (25.17)	93.66 (75.88)
RSJ-3	496 (22.29)	98.21 (82.53)	26:04	6:17	43.00	9346 (96.68)	13.92	1.50	0.27	17.98 (25.08)	89 (70.64)
RSJ-4	437 (20.91)	96.1 (78.93)	26:04	6:17	41.67	9133 (95.54)	13.05	1.47	0.24	16.09 (23.64)	87.46 (69.25)
RSJ-5	520 (22.81)	96.49 (79.51)	25:06	5:19	40.00	9213 (95.99)	12.85	1.41	0.24	17.02 (24.36)	90.53 (71.97)
RSJ-6	512 (22.64)	97.3 (80.80)	25:22	6:11	43.00	9226 (96.06)	13.4	1.49	0.25	17.17 (24.47)	86 (68.22)
RSJ-11	499 (22.36)	98.32 (82.56)	25:06	5:19	43.67	9106 (95.43)	13.53	1.55	0.28	17.98 (25.08)	88.8 (70.43)
RSJ-13	418 (20.47)	96.44 (79.43)	25:17	6:06	44.00	9626 (98.12)	14.47	1.54	0.28	18.07 (25.15)	92.66 (74.50)
RSJ-14	498 (22.33)	96.01 (79.09)	26:05	6:18	41.00	9506 (97.50)	13.45	1.48	0.27	18.06 (25.14)	90.53 (72.26)
RSJ-15	466 (21.57)	92.23 (73.95)	25:14	6:03	41.67	9506 (97.49)	13.68	1.47	0.24	16 (23.57)	93.33 (75.58)
RSJ-16	473 (21.78)	97.02 (80.05)	25:11	6:00	43.67	9240 (96.13)	13.64	1.52	0.26	17.13 (24.44)	92.13 (73.93)
RSJ-17	514 (22.70)	96.28 (78.99)	25:06	5:17	41.00	9413 (97.02)	13.27	1.46	0.26	18.01 (25.11)	88.66 (70.36)
SH6	599 (24.49)	98.47 (82.94)	26:06	6:19	43.67	9146 (95.63)	13.93	1.58	0.28	18.03 (25.09)	88.33 (70.37)
NB4D2	523 (22.89)	97.41 (80.79)	25:05	5:18	44.00	9160 (95.71)	14.2	1.56	0.28	17.97 (25.07)	89.4 (70.98)
C.D.	1.44	3.29	0.06	0.11	1.97	-	0.82	0.05	0.01	0.19	-
SE(m)	0.51	1.17	0.02	0.04	0.70	0.94	0.29	0.02	0.01	0.07	1.96
C.V. (%)	4.23	2.59	0.71	2.48	2.81	1.69	3.61	1.89	2.13	0.47	4.75

Note: F – Fecundity; H-Hatching; PR- pupation rate; SCW- Single cocoon weight; SSW- Single shell weight; SR – Shell ratio; Values in parentheses are statistically transformed.

Table 58: Average data recorded (7 germplasm breeding lines)during Spring2024

Race / Combination	F. (No.)	H. %	Total Larval Duration	5th age Larval duration	Wt. of 10 mature larvae (g)	Yield /10000 larvae brushed		SCW (g)	SSW (g)	SR %	Pupation %
			D:H			By No.	By wt.				
O-1	522 (22.84)	97.53 (80.95)	25:22	6:11	43	9360 (96.75)	13.8	1.517	0.25	16.22 (23.74)	90.66 (72.20)
O-2	540 (23.26)	97.63 (81.15)	25:23	6:12	43	9400 (96.95)	14.07	1.52	0.27	18 (25.11)	88 (69.75)
O-3	527 (22.96)	97.45 (81.43)	25:11	6:00	41.67	9320 (96.53)	13.93	1.48	0.25	16.99 (24.34)	88.30 (70.34)
D-1	490 (22.12)	98.03 (81.98)	25:12	6:01	42	9506 (97.49)	14.35	1.56	0.26	16.98 (24.33)	93.13 (75.05)
D-2	555 (23.59)	97.21 (80.43)	25:12	6:01	41.33	9253 (96.19)	13.93	1.50	0.27	17.65 (24.83)	89 (70.65)
322	534 (23.13)	97.07 (80.14)	25:12	6:01	42	9426 (97.09)	13.32	1.49	0.27	18.1 (25.17)	92.67 (74.29)
323	533 (23.11)	95.86 (78.24)	25:12	6:01	41	9280 (96.34)	14.07	1.56	0.27	17.40 (24.64)	92.13 (73.75)
C.D.	-	-	-	-	-	-	-	0.04	0.01	0.41	-
SE(m)	0.67	1.07	0.02	0.04	0.94	0.81	0.25	0.01	0.01	0.14	1.55
C.V.	5.05	2.31	0.67	2.45	3.89	1.45	3.05	1.58	1.95	0.95	3.71

Note: F – Fecundity; H-Hatching; PR- pupation rate; SCW- Single cocoon weight; SSW- Single shell weight; SR – Shell ratio; Values in parentheses are statistically transformed.

Table 59: Average data recorded (9 PAM Breeds) during Spring 2024

Race / Combination	F. (No.)	H %	Total Larval Duration	5th age Larval duration	Wt. of 10 mature larvae (g)	Yield /10000 larvae brushed		SCW (g)	SSW (g)	SR %	Pupation %
			D:H			By No.	By wt.				
PamDR-1	467.33 (21.64)	96.72 (79.54)	24:23	6:04	40.00	8789.00 (93.75)	12.99	1.54	0.26	17.13 (24.43)	92.67 (74.48)
PamDR-4	483.33 (22.00)	96.29 (79.01)	24:19	5:22	40.67	8911.00 (94.39)	12.06	1.44	0.26	17.68 (24.85)	93.00 (74.79)
PamDR-6	422.33 (20.57)	97.24 (80.40)	24:12	5:17	40.67	8711.33 (93.33)	11.91	1.54	0.28	18.18 (25.22)	92.67 (74.40)
PamDR-7	421.67 (20.55)	95.82 (78.19)	24:19	5:75	42.00	8333.33 (91.26)	11.22	1.46	0.26	17.99 (25.08)	90.67 (72.38)
PamDR-8	433.00 (20.83)	95.61 (77.89)	24:23	6:04	45.33	9055.33 (95.16)	13.11	1.55	0.25	16.19 (23.71)	92.00 (73.76)
PamDR-9	488.67 (22.12)	97.82 (81.51)	24:23	6:04	40.00	8866.33 (94.16)	11.69	1.43	0.25	17.46 (24.68)	93.00 (74.62)
PamDR-12	386.33 (19.67)	96.22 (78.82)	24:78	6:08	38.33	8844.33 (94.03)	11.75	1.35	0.25	18.18 (25.22)	90.00 (71.74)
PamDR-16	406.00 (20.17)	95.00 (77.06)	24:21	5:77	41.00	8800.33 (93.78)	12.42	1.54	0.28	18.05 (25.13)	93.33 (75.25)
PamDR-18	417.67 (20.46)	95.31 (77.57)	24:21	5:77	43.67	8688.67 (93.21)	12.91	1.53	0.28	18.00 (25.09)	89.33 (71.05)
C.D	0.385	2.338	0.255	0.252	1.882	-	0.781	0.034	0.01	0.365	-
SE(m)	0.129	0.781	0.085	0.084	0.629	0.984	0.261	0.011	0.003	0.122	1.795
C.V	1.066	1.714	0.593	2.41	2.636	1.189	3.694	1.337	2.102	0.851	2.539

Note: F – Fecundity; H-Hatching; PR- pupation rate; SCW- Single cocoon weight; SSW- Single shell weight; SR – Shell ratio; Values in parentheses are statistically transformed.

OFT: MOE03010SI: Evaluation of improved mulberry silkworm hybrids and technologies for North and North West India

Component-VII: On Farm Trial of *BmNPV* tolerant Silkworm Hybrids in North & North West India [Outcome of AIB-3569]

Investigators involved: Santoshkumar Magadum (CI)
Project period: March, 2022 - February, 2024
Objectives:

- To popularizing new developed BmNPV tolerant hybrid at farmers level in temperate and sub-tropical regions of North & North West India.

Progress achieved:

- Successfully conducted Spring 2024 field trial of 500 DFLs of PamDR7xPamDR8 along with 50 DFLs of SH6 x NB4D2 and 50 DFLs of FC1xFC2 as control at 12 farmers in Lamberi area of Rajouri district.
- Test hybrid PamDR7xPamDR8 recorded an average yield of 47 kg/100 dfls whereas control SH6 x NB4D2 recorded 44 kg/100 dfls and FC1xFC2 recorded an average yield of 42.00 kg/100 dfls [Table 60].
- Data was compiled, analysed and report has been submitted to PI of the project and Director, CSR&TI, Pampore.
- Further, RSRS, Jammu has supplied 500 DFLs of silkworm seed of test hybrid PamDR7xPamDR8, 50 DFLs of SH6 x NB4D2 (as control) and 50 DFLs of FC1 x FC2 (as control) to REC, Basti through RSRS, Sahaspur for conducting On Farm Trial in Uttar Pradesh during Spring 2024.

Table 60. Field trial of BmNPV tolerant silkworm hybrid conducted during Spring 2024

S. No.	Test hybrid	No. of farmers covered	Quantity of DFLs	Actual Yield (Kg.)	Av. Yield/ 100 DFLs (kg)	Av. Single Cocoon wt. (g)	Av. Single shell wt.	SR%
1	PamDR7xPamDR8	10	500	235.00	47.00	1.542	0.313	20.28
2	SH6xNB4D2	1	50	22.00	44.00	1.490	0.297	19.93
3	FC1xFC2	1	50	21.00	42.00	1.502	0.299	19.91

OFT of AIB03002SI: Evaluation of sustainable bivoltine silkworm double hybrid (BK20xBK7) suitable to North West India
Duration: April, 2024 to March, 2025
Scientists involved: Santoshkumar Magadum (CI)

Objectives:

- To evaluate BK20 x BK7 at Jammu and Uttarakhand during spring season at farmer level.

Progress achieved:

(i) Spring 2024:

During Spring 2024, chawki rearing of 550 DFLs of test hybrid BK20xBK7 and 50 DFLs of FC1xFC2 (as control) was carried out through and at REC, Lamberi and distributed among 15 selected famers in Lamberi area of Distt. Rajouri for conducting On Farm Trial at farmers' field condition.Test hybrid BK20 x BK 7 recorded an average yield of 46.50 kg/100 DFLs whereas control FC1xFC2 recorded an average yield of 44.00 kg/100 DFLs.

Table 61.Field trial of test hybrid under OFT during Spring 2024

S. No.	Test hybrid	No. of farmers covered	Quantity of DFLs	Av. Yield/ 100 DFLs (kg)	Av. Single Cocoon wt. (g)	Av. Single shell wt.	SR%
1	BK20 x BK 7	14	550	46.50	1.529	0.308	20.16
2	FC1xFC2	1	50	44.00	1.509	0.301	19.95

(ii) Autumn 2024:

During Autumn 2024, chawki rearing of 550 DFLs of test hybrid BK20xBK7 and 50 DFLs of SH6xNB4D2 (as control) was carried out through and at REC, Lamberi and distributed among 8 selected famers in Lamberi area of Distt. Rajouri for conducting On Farm Trial at farmers' field condition.Test hybrid BK20 x BK 7 recorded an average yield of 34.40 kg/100 DFLs whereas control SH6xNB4D2 recorded an average yield of 34.00 kg/100 DFLs.

Table 62.Field trial of test hybrid under OFT during Autumn 2024

S. No.	Test hybrid	No. of farmers covered	Quantity of DFLs	Av. Yield/ 100 DFLs (kg)	Av. Single Cocoon wt. (g)	Av. Single shell wt.	SR%
1	BK20 x BK 7	7	350	34.40	1.424	0.268	18.82
2	SH6xNB4D2	1	50	34.00	1.402	0.264	18.83

OFT of AIB03004SI: Validation of high yielding bivoltine silkworm (*Bombyx mori* L.) hybrids for temperate region of Jammu & Kashmir
Duration: July 2024 to June 2025

Scientists involved: Santoshkumar Magadum (CI)

Objectives:

- Field trial of two hybrids Hybrid-10 (BP2xLine-13) and Hybrid-12 (BP2xSO17) along with control SH6xNB4D2 during spring season.

Progress achieved:

(i) Spring 2024:

During Spring 2024, chawki rearing of 200 DFLs of test hybrids(BP2xLine-13 and BP2xSO17) and 50 DFLs of SH6xNB4D2(as control) was carried out at RSRS, Jammu and distributed among 5 selected famers in Lamberi area of Distt. Rajouri for conducting On Farm Trial at farmers' field condition.Test hybrid BP2xLine-13recorded an average yield of 47.00 kg/100 DFLs and BP2xSO17 recorded 45.00 kg/100 DFLs, whereas control SH6xNB4D2 recorded an average yield of 42.00 kg/100 DFLs.

Table 63.Field trial of test hybrids under OFT during Spring 2024

S. No.	Test hybrid	No. of farmers covered	Qunty of DFLs	Av. Yield/ 100 DFLs (kg)	Av. Single Cocoon wt. (g)	Av. Single shell wt.	SR%
1	BP2xLine-13	2	100	47.00	1.593	0.333	20.90
2	BP2xSO17	2	100	45.00	1.530	0.312	20.39
3	SH6xNB4D2	1	50	42.00	1.489	0.296	19.88

(ii) Autumn 2024:

During Autumn 2024, chawki rearing of 200 DFLs of test hybrids (BP2xLine-13 and BP2xSO17) and 50 DFLs of SH6xNB4D2 (as control) was carried out at RSRS, Jammu and distributed among 5 selected famers in Lamberi area of Distt. Rajouri for conducting On Farm Trial at farmers' field condition.Test hybrid BP2xLine-13recorded an average yield of 35.00 kg/100 DFLs and BP2xSO17 recorded 35.80 kg/100 DFLs, whereas control SH6xNB4D2 recorded an average yield of 34.00 kg/100 DFLs.

Table 64.Field trial of test hybrids under OFT during Autumn 2024

S. No.	Test hybrid	No. of farmers covered	Qunty of DFLs	Av. Yield/ 100 DFLs (kg)	Av. Single Cocoon wt. (g)	Av. Single shell wt.	SR%
1	BP2xLine-13	2	100	35.00	1.482	0.280	18.89
2	BP2xSO17	2	100	35.80	1.486	0.282	18.97
3	SH6xNB4D2	1	50	34.00	1.402	0.264	18.83

RESEARCH EXTENSION CENTRE LAMBERI, DISTT. RAJOURI, J&K:

- Research Extension Centre, Central Silk Board, Lamberi was established in July 2018 in district Rajouri after closure and shifting of erstwhile REC Nowshera for the development of sericulture in the area. The topography of the area is semi-hilly, altitude varying from 700-800 meters MSL, perennial vegetation of Conifers, Sesum and Mulberry etc. Climate of the area is sub-tropical with temperature going up to 42^0C during summer and 5^0C during winter. Silkworm rearing is practiced during spring (March- April) and autumn (August- September).

- **Geographical situation:** - REC, Lamberi is situated at Jammu- Poonch National highway at a distance of 111 Km. from Jammu. The Nearest railway, station/airport is Jammu. The district headquarter Rajouri is at a distance of 70 km from Lamberi. Lamberi is situated at latitude 33.13^0 N and longitude 74.26^0 E & altitude varying from 700-800 MSL.

REARING PROGRAMMES

Two rearings were conducted under REC Lamberi during spring and autumn seasons and their data depicted as Annexure- I, Annexure-II and Annexure-III.

SPRING 2024. **Annexure-I**

Name of CDC	No. of villages covered	No. of farmers	Seed issued (Dfls)	Cocoon harvested (Kg)	Avg. Yield Kg/100dfls
LAMBERI	16	316	31000	12770.000	41.19
-	**16**	**316**	**31000**	**12770.000**	**41.19**

SPRING (OFT) 2024 **Annexure-II**

Name of CDC	No. of villages covered	No. of farmers	Seed issued (Dfls)	Cocoon harvested (Kg)	Avg. Yield Kg/100dfls
LAMBERI	06	32	1450	672.000	46.34
-	**06**	**32**	**1450**	**672.000**	**46.34**

AUTUMN 2024 **Annexure-III**

Name of CDC	Type of Rearing	No. of villages covered	No. of farmers	Seed issued (Dfls)	Cocoon harvested (Kg)	Avg. Yield Kg/ 100dfls
LAMBERI	Commercial	16	54	5400	810.000	15.00
LAMBERI	**OFT**	06	24	1200	424.000	35.33
LAMBERI		**06**	**78**	**6600**	**1234.000**	**18.70**

SUPPORT FOR USE OF QUALITY DISINFECTANTS

Quality disinfectant and hygiene ensure disease free environment during silkworm rearing which ultimately results in successful silkworm rearing and good quality cocoon harvest. Silkworm rearing especially bivoltine is prone to suffer from diseases during rearing. The

quality disinfection and hygiene are the most important component in establishment of autumn crop and quality cocoon production in spring rearing. Efforts are being made for supply of the recommended disinfectants in the desired quantity and also ensured complete disinfection of the rearing houses and rearing appliances before start of the silkworm rearing through DOS available resources.

TECHNOLOGIES ADOVOCATED

- **Use of plastic collapsible mountage in autumn rearings:** On ripen of worms in the rearing bed, initially plastic mountages were used on borders and then central of the bed which resulted in successful mounting of all the worms.
- **Use of local Mounting material:** Local mounting material available i.e. pine needle, googli (Semi dried) and dry mustard twigs were used during the rearing besides collapsible plastics mountages.
- **Use of bed disinfectants:** Application of bed disinfectants such as Vijetha and Slaked Lime were used right from chawki rearing upto the fifth stage at CRCs and farmers level for preventing occurrence of any diseases.
- **Disinfection and Hygiene**: Pre and post rearing disinfection of rearing houses, rearing implements, surroundings etc. was carried out during spring and autumn seasons with Serichlor and bleaching powder solution at farmers level and also advised the farmers to maintain hygienic conditions in and around the rearing houses.
- **Mulberry leaf harvesting:** mulberry leaf harvesting technology imparted to the farmers during spring and autumn seasons for better use of leaf during various seasons.

RAISING OF NURSERY AT REC FARM

1000 Mulberry CUTTINGS OF S146 varieties planted in the nursery at REC Lamberi for Revenue Generation Scheme. An amount of Rs. 6900/- received on account of sale of 690 mulberry saplings to the farmers and amount sent to the RSRS, Jammu under Revenue Generation Head .

MAINTENANCE OF MULBERRY FARM

Under REC Lamberi 2 acres of mulberry farm is being maintained by conducting properly various cultural operations.

RESEARCH EXTENSION CENTRE, GHUMARWIN, DISTT. BILASPUR, HP.

- Research Extension Center, Ghumarwin under Mulberry Sector was restructured during June 2018 and presently functioning from accommodation provided by DOI, HP. It is located 20 km towards North from district headquarters Bilaspur, 105 km from state capital Shimla towards East. The latitude of Ghumarwin is 31^0 26' N and the longitude is 76^0 42' E. The altitude of Ghumarwin town is about 1800 feet above mean sea level. The town has the sub tropical climate and characterized by hot summer and cold winter. The temperature varies between 10 to 42^0 C with June as hottest and January as cold month. Geographically the Ghumarwin town is located in seismic zone. The REC provides the technological support & time to time technical guidance to sericulture farmers of District Bilaspur (HP) under two Clusters, Ghumarwin & Sangaswin, besides IVLP Daslehra.

Rearing Performance:

Validation of high yielding bivoltine silkworm (*Bombyx mori L*) hybrids for temperate region of Jammu & Kashmir.

Under the programme, A total of 350 DFLs were chawkei reared in PPP mode at CRC, Ghumarwin under Sericulture Division, DOI, Ghumarwin& distributed among 07 farmers of Distt- Bilaspur covering05villages. A total production of 159.25 kg cocoon was harvested with an average yield of BP2xSO17- 46.23kg/100 DFLs;BP2xLine13- 45.63 kg/100 DFLs and SH6xNB4D2- 42.90kg/100 DFLs resp.

Spring 2024

Season	Name of Hybrid	Seed distributed (DFLs)	No of Rearers	Total green cocoon harvested (kg)	Avg. yield /100 DFLs	SCW (g)	SSW (g)	SR %
Spring 2024	BP2xSO17	**150**	03	69.35	46.23	1.56	0.289	18.52
	BP2xLine13	**150**	03	68.45	45.63	1.61	0.305	18.94
	SH6xNB4D2 (Control)	**50**	01	21.45	42.90	1.45	0.265	18.27
Total/Avg.		**350**	**07**	**159.25**	**45.50**	**1.54**	**0.286**	**18.57**

Autumn 2024

A total of 350 DFLs were chawkei reared in PPP mode at CRC, Ghumarwin under Sericulture Division, DOI, Ghumarwin& distributed among 07 farmers of Distt- Bilaspur covering 04 villages. A total production of 126.55 kg cocoon was harvested with an average yield of KR11x KR10- 37.50 kg/100 DFLs; KR12 x KR10- 35.27 kg/100 DFLs and SH6xNB4D2- 34.80kg/100 DFLs resp.

Season	Name of Hybrid	Seed distributed (DFLs)	No of rearers	Total green cocoon harvested (kg)	Avg. yield / 100 DFLs	SCW (g)	SSW (g)	SR %
Autumn 2024	KR11xKR10	**150**	03	56.25	37.50	1.52	0.27	17.76
	KR12xKR10	**150**	03	52.90	35.27	1.57	0.28	17.83
	SH6xNB4D2 (Control)	**50**	01	17.40	34.80	1.58	0.27	17.09
Total/Avg.		**350**	**07**	**126.55**	**36.16**	**1.55**	**0.27**	**17.42**

On Farm trial of nutrigenetic hybrids of bivoltine silkworm *Bombyx mori L.*, under subtropical conditions of Northwest India.

Autumn 2024

A total of 650 DFLs were chawkei reared in PPP mode at CRC, Ghumarwin under Sericulture Division, DOI, Ghumarwin (HP)& distributed among 26 farmers of Distt- Bilaspur covering 12 villages. A total production of 266.20 kg cocoon was harvested with an average yield of CSR50 x Bcon1 42.28 kg/100 DFLs; RSJ14 x Bcon1- 40.12 kg/100 DFLs and SH6xNB4D2- 38.00kg/100 DFLs.

Name of Hybrid	Seed distributed (DFLs)	No of Rearers	Total green cocoon harvested (kg)	Avg. yield /100 DFLs	SCW (g)	SSW (g)	SR %
CSR50xBCon1	**300**	10	126.85	42.28	1.62	0.30	18.52
RSJ14xBCon 1	**300**	14	120.35	40.12	1.60	0.292	18.25
SH6xNB4D2 (Control)	**50**	01	19.00	38.00	1.525	0.265	17.37
	650	**26**	**266.20**	**40.95**	**1.58**	**0.285**	**18.04**

RESEARCH EXTENSION CENTRE, BASTI, UP

- Research extension centre, Basti is entrusted with the responsibility to provide the new and improved technology to the mulberry sericulture farmers of Uttar Pradesh for their skill updation and betterment of sericulture industry. Besides, this centre is also committed to provide the technical guidance to the officials of Directorate of Sericulture, Uttar Pradesh for their technological advancement in sericulture and extension approaches. The centre is actively involved in various clusters located at Basti, Gonda, Gorakhpur, Kushinagar, Bahraich, Shravasti and Varanasi district of Uttar Pradesh to supervise the chawki rearing at Govt. sericulture farm level and late age rearing at farmers' level during the spring and autumn season.

ONGOING PROGRAMME:

Evaluation of Nutrigenetically Superior Silkworm Hybrids under Sub Tropical Conditions of North West India (Outcome of AIB03008SI)

An On Farm Trial (OFT) was conducted to evaluate the field performance and seasonal adaptability of nutrigenetically superior silkworm hybrids under real world conditions. The study involved the rearing of 300 Disease-Free Layings (DFLs) each of JNH-1 (CSR50 × Bcon1) and JNH-3 (RSJ14 × Bcon1) during the Autumn 2024 season, and JNH-1 (CSR50 × Bcon1) and JNH-2 (CSR50 × Bcon4) during the Spring 2025 season at the Government Sericulture Farm, Gajapatipur, Bahraich. Similarly, a parallel trial involving 300 DFLs each of JNH-1 (CSR50 × Bcon1) and JNH-3 (RSJ14 × Bcon1) was carried out during the Autumn 2024 season at the Government Sericulture Farm, Kajari Kund, Basti, Uttar Pradesh.
Each seasonal trial engaged 12 participating farmers at each location, aiming to assess the performance of nutrigenetically superior silkworm hybrids in farmers' field conditions. The primary objective was to evaluate the rearing performance and seasonal adaptability of these three test hybrids i.e. JNH-1, JNH-2, and JNH-3 in comparison to the established bivoltine hybrid SH6 × NB4D2, which served as the benchmark control.

Rearing performance of two nutrigenetically superior hybrids JNH-1 (CSR50x Bcon1) and JNH-3 (RSJ14 x Bcon1) in autumn, 2024 at the Government Sericulture Farm, Gajapatipur, Bahraich.

A critical analysis of the rearing data identified two nutrigenic hybrids JNH-1(CSR50xBcon1)and JNH-3 (RSJ14 x Bcon1) as top performers, each excelling in different traits. CSR 50 × B. Con1 recorded the highest average shell ratio 20.08% indicating superior silk quality. In contrast, RSJ-14 × B. Con1 showed better productivity, with a higher average cocoon weight 1.48 g and yield 44.34 kg/100 DFLs, making it more suitable for commercial cocoon production. The control hybrid, SH6 × NB4D2, though tested in a single trial, registered the highest yield 47.00 kg/100 DFLs across all hybrids, suggesting strong production potential. However, its shell ratio was 18.75% which was slightly lower than that of the nutrigenic hybrids.

In summary, RSJ-14 ×B. Con1 offered a balanced advantage in both cocoon weight and yield, CSR 50 × B.Con1 was not able for silk quality, and the control hybrid stood out for yield performance in a limited trial. Rearing outcomes for JNH-1 (CSR 50 × B. Con1) and JNH-2 (CSR 50 × B. Con4) during Autumn 2024 at the Government Sericulture Farm, Gajapatipur, Bahraich.

Rearing performance of two nutrigenetically superior hybrids JNH-1 (CSR50 x Bcon1) and JNH-3 (RSJ14 x Bcon1) in autumn, 2024 at the Government Sericulture Farm, Gajapatipur, Bahraich

Sl. No	Name	Name of Hybrid	No. of DFLs reared	SCW (g)	SSW (g)	SR %	Yield/100 DFLs
1.	Smt.Rangili	CSR50xB.Con1	50	1.46	0.26	17.81	44.60
2.	Smt.Rajwati	CSR50xB.Con1	50	1.40	0.28	20.00	47.00
3.	Smt.Vitana	CSR50xB.Con1	50	1.47	0.27	18.37	42.20
4.	Smt.Phoolmati	CSR50xB.Con1	50	1.41	0.31	21.99	40.40
5.	ShriVidhyaran	CSR50xB.Con1	50	1.39	0.28	20.14	45.00
6.	Smt.Sheela	CSR50xB.Con1	50	1.40	0.31	22.14	38.00
7.	Smt.Anita	RSJ-14XBCon1	50	1.45	0.29	20.00	49.00
8.	Smt.Ramrati	RSJ-14XBCon1	50	1.46	0.31	21.23	46.40
9.	ShriChaudhary	RSJ-14XBCon1	50	1.44	0.28	19.44	41.00
10.	Smt.Kalawati	RSJ-14XBCon1	50	1.51	0.27	17.88	43.40
11.	Smt.Malti	RSJ-14XBCon1	100	1.52	0.31	20.39	44.30
12.	Smt.Mangali	SH6XNB4D2 (Control)	50	1.44	0.27	18.75	47.00

Rearing performance of two nutrigenic hybrids JNH-1 (CSR50 x Bcon1) and JNH-3 (RSJ14 x Bcon1) reared at Kajarikund Basti also emerged as top performers, each excelling in different traits. Among all the breeds, SH6XNB4D2 (Control) showed the highest average yield at 31.40kg per 100 DFLs, making it the most productive in terms of total cocoon output. However, RSJ-14 X B. Con1 had the highest average shell ratio (19.78%) and shell weight (0.24g), indicating better cocoon quality and silk content. CSR 50 x B. Con1, though widely reared, had slightly lower yield and shell quality compared to the other two breeds. Still, individual farmers like Smt. Kewala using this breed achieved high yields, suggesting that with proper care, it can perform very well.

In terms of top performers, Shri Nirahu (RSJ-14 X B. Con1) achieved the highest yield of 33.00 kg/100 DFLs, followed by Smt. Kewala (CSR 50 x B. Con1) with 32.20 kg, and Smt. Maina (SH6 X NB4D2) with 31.40 kg. Overall, SH6 X NB4D2 is best for high yield, RSJ-14 X B. Con1 offers superior silk quality, and CSR 50 x B. Con1 is a balanced option that can perform well under good management. Rearing outcomes for JNH-1 (CSR 50 × B. Con1) and JNH-2 (CSR 50 × B. Con4) during Autumn 2024 at the Government Sericulture Farm, Kajarikund, Basti.

Rearing performance of two nutrigenetically superior hybrids JNH-1 (CSR50 x Bcon1) and JNH-3 (RSJ14 x Bcon1) in autumn, 2024 at the Government Sericulture Farm, Kajarikund, Basti

Sl. No	Name	Name of Hybrid	No. of DFLs reared	SCW (g)	SSW (g)	SR %	Yield/100 DFLs
1.	Smt.Durgawati	CSR50xB.Con1	50	1.24	0.21	16.94	25.00
2.	Smt.Dharma	CSR50xB.Con1	50	1.29	0.24	18.60	25.80
3.	Smt.Vidyotama	CSR50xB.Con1	50	1.32	0.23	17.42	22.40
4.	SmtAnara	CSR50xB.Con1	50	1.20	0.21	17.50	20.60
5.	Smt.Sharda	CSR50xB.Con1	50	1.24	0.24	19.35	26.40
6.	Smt.Kewala	CSR50xB.Con1	50	1.38	0.23	16.67	32.20
7.	ShriNirahu	RSJ-14XBCon1	50	1.37	0.26	18.98	33.00
8.	Ms.Chandani	RSJ-14XBCon1	50	1.32	0.27	20.45	27.60
9.	Smt.Sarpatta	RSJ-14XBCon1	50	1.32	0.28	21.21	25.00
10.	ShriDeepak	RSJ-14XBCon1	50	1.26	0.21	16.67	18.60
11.	Smt.Kailashpati	RSJ-14XBCon1	50	1.29	0.23	17.83	19.80
12.	Ms.Kiran	RSJ-14XBCon1	50	1.20	0.22	18.33	28.20
	Smt.Maina	SH6XNB4D2 (Control)	50	1.27	0.23	18.11	31.40

Rearing performance of two nutrigenetically superior hybrids JNH-1 (CSR50 x Bcon1) and JNH-2 (CSR 50x B. Con4) in Spring, 2025 at the Government Sericulture Farm, Gajapatipur, Bahraich.

In the spring season of 2025, the rearing performance of two nutrigenetically superior silkworm hybrids JNH-1 (CSR50 x B. Con1) and JNH-2 (CSR50 x B. Con4) was also evaluated at the Government Sericulture Farm, Gajapatipur, Bahraich to access their superiority in different crop season.

The nutrigenetic hybrid JNH-2 demonstrated a superior yield performance, producing an average of 54.1kg/100DFLs, which is approximately 10.4% higher than the control hybrid's yieldof49.0kg/100 DFLs. Compared to the control hybrid, JNH-2 not only achieved a higher average cocoon yield but also recorded the highest individual farmer yield of 64.4 kg/100 DFLs, indicating its strong productivity potential. In contrast, JNH-1 produced an average yield of 48.37 kg/100 DFLs, which was slightly lower than the control hybrid's 49.0 kg/100 DFLs, suggesting comparable but somewhat inferior performance. The control hybrid, while exhibiting a respectable yield of 49.0 kg/100 DFLs, was outperformed by JNH-2 in both average yield and key quality parameters, highlighting the advantage of the newer nutrigenetic hybrid. Overall, JNH-2's yield advantage over the control underscores its suitability for spring season rearing, offering farmers a more productive option for

maximizing silk output. Rearing performance of two nutrigenetically superior hybrids JNH-1 (CSR50 x Bcon1) and JNH-2 (CSR 50x B. Con4) in Spring, 2025 at the Government Sericulture Farm, Gajapatipur, Bahraich.

Rearing performance of two nutrigenetically superior hybrids JNH-1 (CSR50 x Bcon1) and JNH-2 (CSR 50x B. Con4) in Spring, 2025 at the Government Sericulture Farm, Gajapatipur, Bahraich.

Sl. No	Name	Name of Hybrid	No. of DFLs reared	SCW (g)	SSW (g)	SR %	Yield/100 DFLs
1.	Smt.Sunita-I	CSR50xB.Con4	50	1.45	0.29	20.0	45.2
2.	Smt.Malti	CSR50xB.Con4	50	1.52	0.31	20.4	64.4
3.	ShriChetram	CSR50xB.Con4	50	1.5	0.29	19.3	59.2
4.	Smt.Sunita-II	CSR50xB.Con4	50	1.5	0.30	20.0	56.2
5.	SmtSangeeta	CSR50xB.Con4	50	1.48	0.29	19.6	51.8
6.	Smt.RamPyari	CSR50xB.Con4	50	1.42	0.28	19.7	47.8
7.	Shri Ram	CSR50xB.Con1	50	1.45	0.27	18.6	45.6
8.	ShriAnita	CSR50xB.Con1	50	1.51	0.29	19.2	54.8
9.	Smt.Kabutara	CSR50xB.Con1	50	1.49	0.28	18.8	47.2
10.	ShriChaudhuri	CSR50xB.Con1	50	1.5	0.3	20.0	49.2
11.	ShriBalakRam	CSR50xB.Con1	50	1.49	0.26	17.4	47.6
12.	Shri.VidyaRam	CSR50xB.Con1	50	1.45	0.28	19.3	45.8
	SmtVitana	SH6XNB4D2 (Control)	100	1.51	0.28	18.5	49.0

P4-BSF (BASIC SEED FARM), MANASBAL

1. INTRODUCTION

Location: The P4, Basic Silkworm Seed Farm is situated at the North Bank of Manasbal Lake about 32 km North of Srinagar, Jammu and Kashmir, 34º 14'59'N, 74º 39'11'E; 1583m above sea level. It has predominantly rural surroundings with three villages, Kondabal, Jarokbal and Gratbal.

- **History & Broad Outline:** Originally Regional Research Laboratory (CSIR), Srinagar had a Drug Research Centre at this lake side land at Manasbal (J&K) which was later taken over by Sericulture Development Department, (Govt. of J&K) Srinagar.

- **In the year 1984,** to organize the production of silkworm seed on scientific lines, Central Silk Board, Govt. of India established **P1 Basic Silkworm Seed Farm**.

- **In the year 1989**, the station was upgraded as P4 Basic Seed Farm with the aim to produce and supply disease parental stock (P3) of bivoltine silkworm races to P3 Stations of Central Silk Board.

- **In the year 2000 onwards,** four (04) silkworm races viz., SH-6, NB4D2, CSR-2 and CSR-4 were maintained as parental stock of bivoltine silkworm races. Out of these four silkworm races three races were replaced by CSR-6, CSR-26 and CSR-27 in 2013 and seven more silkworm races *viz.*, Pam-114, Pam-115, Pam-116, Pam-117, CSR6, CSR-26 and CSR-27 were added for maintenance under breeder's stock.

2. MANDATE AND ACTIVITIES OF THE STATION

- To maintain standards in timely production and supply of parental seed and plant material.
- To produce and supply disease free high yielding parental stock of bivoltine silkworm races to Sericulture Development Department and other stations as a basic stock for the preparation of industrial hybrid seed.
- To maintain mulberry plantation and mulberry chawki garden to ensure quality leaf for silkworm rearing and production of quality silkworm seed.
- To act as a nuclear farm for multiplication of improved mulberry varieties by latest grafting techniques for supply to Sericulture Development Department, CDC's, other stations and extension centers under different projects / programmes.
- To maintain Temperate Mulberry Germplasm Bank (TMGB) for exchange of breeding material.
- In total P4 station maintain 141 mulberry genotypes
- To act as test centre of AICEM Phase IV experiment to evaluate the performance of four newly evolved mulberry varieties *viz.*,PPR-1, AGB-8, C-1360 and control (Goshoerami) under temperate climatic conditions.
- To conduct experimental programmes in collaboration with CSR&TI, Pampore J&K.

- To create Awareness of Sericulture / Silk among students/ local people/ youth / faculties / visiting dignitaries involved in the sericulture / allied sectors.
- Other programmes like Conference, awareness programme, Resham Krishi Mela (as per assigned by Dir-CSB-CSRTI, Pampore)
- Publications

3. PROJECT WORK

- AICEM-IV as Co-Investigator
- CRC-ToT (MOE01030SI) as Co-Investigator
- Seri-Tourism Project entitled "Seri Tourism at P-4, Basic Seed Farm, Manasbal to Gurez Valley (Gilgit Sector) – An Ancient Silk Route of India" as Principal Investigator (Budget 94 Lakhs) approved on 25th March, 2024.
- NHAI Project Work - Only Nursery work at CSB-P4, Manasbal as Member of Committee
- Trial of Breeds (as per recommendation of Dir-CSB-CSRTI, Pampore)

Maintenance of Temperate Mulberry Germ Plasm Bank (TMGB):
Scientists involved: Dr. Rajesh Kumar

The station is maintaining 141 genotypes / accessions in 1.65 acre under dwarf type of plantation for the multiplication of breeding material. The plantation was maintained as per applied package of practices. The list of genotypes / accessions maintained at this station is given in table 65.

Table-65: List of mulberry genotypes / accessions maintained at P4 Manasbal.

1	Almora local	49	ME-53	97	Georgia
2	AR-12	50	ME-58	98	M.ihouseringe
3	AR-14	51	ME-129	99	Papua new guinea
4	ACC-48	52	MS-8	100	Kokoso
5	ACC-67	53	Vishalla	101	Burma-8
6	ACC-77	54	Nadigam	102	Kanmasari
7	ACC-92	55	Obowase	103	Lazuraso
8	ACC-99	56	Okinowa	104	Venosa
9	ACC-100	57	Punjab local	105	Moulai
10	BR-2	58	Rokokiyaso	106	Ruggetto
11	BC-259	59	Senmetsu	107	S-1
12	Brantualkashmir	60	Shimnouchi	108	Atsubamidori
13	Botatul	61	Sanish-5	109	Sosuke-II
14	C-4	62	Shrim-5	110	ACC-165
15	Chinese white	63	Shrim-8	111	China-9
16	Chatatulzangir	64	Serpentaina	112	China hybrid-2
17	Chatatul	65	S-30	113	M-Macroura
18	Chinar pati	66	S-36	114	ACC-152
19	C-776	67	S-41	115	SRDC-2
20	C-1733	68	S-54	116	Bogurai-1
21	Exotica	69	S-146	117	Thaibeelad
22	English black	70	S-799	118	Hungarian

23	Enshatkasukwe	71	S-1531	119	Acc-148
24	FGDTR	72	S-1635	120	Sosuki-1
25	French	73	S-1708	121	Thailand lober
26	Female local	74	T.Sukasagwa	122	Large black
27	Goshoerami	75	Tomeiso	123	Bogurai-4
28	Himachal local	76	Tr-10	124	Australia
29	Ichihei	77	Togowase	123	Roso
30	Ichinose	78	Victory	124	Seizuro
31	Italian Sernal	79	Zagtul	125	Mizusawa
32	Kasuga	80	Zangbad	126	Cattaneo
33	Kanva-2	81	Morus nigra	127	BR-3
34	Kokuso-13	82	PPR1 (S140)	128	Xuan-9
35	Kokuso-20	83	Shivalik	129	China-2
36	Kokuso-21	84	C2038	130	Japan
37	Kokuso-27	85	Japan-II	131	Vietnam-3
38	Kairyoroso	86	Kamiso-402	132	Kenmochi
39	K2 x Kosin	87	China-27	133	FYT/99-G4
40	Karionizamigashi (KNG)	88	BR-8	134	Survana-2
41	Kosin	89	BR-4	135	S145
42	Limoncina	90	Japanesa	136	S106
43	Lajaward	91	Moretiana	137	C1360
44	Mysore local	92	Xuan-5	138	AGB-8
45	Muraiso	93	Creeping mulberry hybrid	139	TR-8
46	M.Multicaulis	94	Canton china	140	C-763
47	Mandalay	95	Furcata	141	S-130
48	ME-27	96	Tiliaefolia		

Maintenance of General Plantation & Chawkie Garden:

- **General Plantation:** Under general plantation, 12.90 acres was maintained and cultural operations were attended as per applied package of practices. A total of around 4240 kg, 1289 kg & 1250 kg of good quality leaf was harvested for departmental rearing utilization in the Spring, Summer & Autumn, respectively.

- **The chawkie garden**: The chawkie garden in an area of 0.50 acre comprising of 03 varieties *viz*. KNG, Ichinose and Goshoerami was maintained. A total of 170 kgs of chawkie leaf was harvested and utilized for chawkie rearing during spring, 2024.All cultural operations were carried out as per the applied package of practices through manual and mechanization. The dressing of the plantation was also carried out during the period.

Maintenance of other Plantation: The plantation has been maintained as per package of practices advocated for temperate region. The details of plantation are as under:

- **Paired Row Plantation:** Paired row plantation of Goshoerami variety in 0.25 acre was maintained as per recommended package of practices for demonstration purpose.
- **Maintenance of Breeders' Stock of Newly Evolved F1 Selections:** The separate plantation of F1 selections (*viz*., S-106, S-140 and S-145) is maintained in an area of 0.25

acres with 200 saplings in each selection (Total 600). It is being maintained at a spacing of 3 ft. x 6 ft. under dwarf pattern to raise breeding stock for further multiplication and was maintained as per the package of practices under temperate climatic conditions.

Raising of nursery by planting stem cuttings: Mulberry raised in polybags / nursery beds.

- The survival percentage of 7500 cuttings raised by cuttings was 13 % i.e. 1000 polybags survived.
- 5500 cutting were raised in open filed area and survival % was 27.27 % i.e. 1500 survived.

PLANTATIONS SUPPLIED AND PLANTED:

- During the financial year 2024-25 – Supplied 8200 mulberry plants
  - ✓ 8000 mulberry supplied to CSB-CSRTI, Pampore for NHAI
  - ✓ 200 mulberry plants supplied to Deputy Commissioner, Ganderbal
- 1800 mulberry plants planted on terrace of CSB-P4, BSF, Manasbal
- 248 mulberry plants gap filling was done in general plantations.

Maintenance of Silkworm Parental Breeds:

Maintenance of Breeder's Stock (P3): The station maintained thirteen silkworm races *viz*, SH6, NB4D2, CSR2, CSR4, CSR6, CSR26, CSR27, CS6, Pam101, Pam114, Pam115, Pam116 and Pam117 as per norms. The rearing of these parents was conducted in cellular mode in spring, 2024. After 3rd stage 250 larvae were retained. The seed prepared in all the races and shifted to cold storage for hibernation. The performance of the races is given in table 66.

Table 66. The rearing performance of P3 breeders stock during the spring rearing, 2024 at P4 Basic seed Farm Manasbal.

Parental Race	Race Log No.	Date of Brushing (M-D-Y)	No. Of DFLs/ (No.)	Eggs / Laying (No.)	Larval Brushed (No.)	Hatching %	Larval after III Moult / Retained	Larval Duration Days: Hrs	Weight of 10 Mature Larvae (gm)	Actual (Number) (average)	Yield (wt in gm)
SH6	1-A	04/05/24	5	549	516	93.99	250	24	50	246	451
NB4D2	2-A	04/05/24	5	581	560	96.39	250	24	48	247	435
CSR-2	3-A	04/05/24	5	479	453	94.57	250	24	43	247	417
CSR-4	4-A	04/05/24	5	480	457	95.21	250	24	45	247	431
CSR-6	5-A	04/05/24	5	506	475	93.87	250	25	45	247	416
CSR-26	6-A	04/05/24	5	518	496	95.75	250	25	45	247	418
CSR-27	7-A	04/05/24	5	529	506	95.65	250	24	44	247	432
CS-6	8-A	04/05/24	5	551	503	91.29	250	24	47	247	444
PAM-101	9-A	04/05/24	5	544	525	96.51	250	24	48	247	421
PAM-114	10-A	04/05/24	5	537	510	94.97	250	24	47	248	442
PAM-115	11-A	04/05/24	5	569	543	95.43	250	24	45	248	438
PAM-116	12-A	04/05/24	5	531	509	95.86	250	24	46	248	417
PAM-117	13-A	04/05/24	5	530	503	94.91	250	24	45	248	438

Continued

Parental Race	Yield 10,000 larvae		SCW (g)	SSW (g)	SR %	V Age Larval Duration (hrs)	Pupation Rate	Filament Length (m)	Renditta	Denier
	By No.)	By wt. (kg)								
SH6	9840	18.08	1.9	0.36	18.95	148	93	813	2.37	3.12
NB4D2	9888	17.4	1.82	0.35	19.23	148	93	766	2.46	3.41
CSR-2	9872	16.67	1.73	0.38	21.97	148	92	753	2.22	3.5
CSR-4	9872	17.23	1.78	0.39	21.91	148	94	779	2.2	3.11
CSR-6	9872	16.65	1.8	0.4	22.22	172	93	873	2.3	3.07
CSR-26	9888	16.71	1.68	0.39	23.21	172	92	694	2.48	3.14
CSR-27	9872	17.3	1.78	0.39	21.91	148	93	759	2.41	2.98
CS-6	9872	17.74	1.81	0.33	18.23	148	93	818	2.67	2.78
PAM-101	9896	16.84	1.72	0.32	18.60	148	93	740	2.48	3.21
PAM-114	9960	17.66	1.82	0.33	18.13	148	93	953	2.43	2.38
PAM-115	9928	17.54	1.67	0.31	18.56	148	94	791	2.69	2.66
PAM-116	9904	17.43	1.74	0.34	19.54	148	92	849	2.56	2.41
PAM-117	9936	17.52	1.78	0.33	18.54	148	93	822	2.64	2.48

DEVELOPMENTAL PROJECT:

Title of the Project	:	Seri Tourism at P-4, Basic Seed Farm, Manasbal on the way to Gurez Valley (Gilgit Sector) – An Ancient Silk Route of India
Total Budget	:	94.00 Lakhs
Location of the Project	:	CSB-P-4, Basic Seed Farm, Manasbal, Safapora, Dist: Ganderbal, Jammu and Kashmir (UT)
Google Link of the Location	:	P-4 BASIC SEED FARM, CENTRAL SILK BOARD, MINISTRY OF TEXTILES on Google Maps https://maps.app.goo.gl/NBqR4TFzs4zkvN6h8
Principal Investigator	:	Dr. Rajesh Kumar, Scientist D CSB-P-4, Basic Seed Farm, Manasbal, Safapora, Dist: Ganderbal, Jammu and Kashmir (UT)
Coordinator	:	Director CSB-CSRTI, Pampore, Jammu and Kashmir (UT)
Project Type	:	Continuous Nature
Availability of Electricity	:	24 Hrs Hotline Power at the Station installed on 19.03.2024 – Free of cost

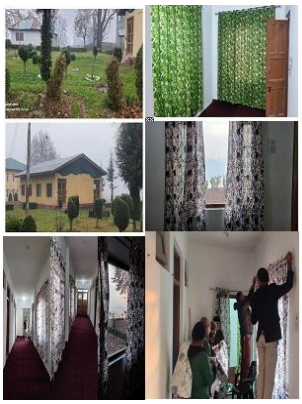
Objective:

Sericulture Awareness to General Public through Seri-Tourism.
To preserve the Indian traditional culture of Silk

GOOGLE MAPPING OF SITE

Conversion of Available Sources
Developed Lab cum Meeting Room

Converted of Available Sources
To be converted to Reception and Registration



Conversion of Available Sources To be converted to Normal GUEST Rooms

Beautification Work

JCB Work done for Land preparation of Silk Moth Park and Terrace

Items procured and work done under Seri-Tourism

- As per the project indent, items are being received from CSRTI, Pampore.
- 3Guest Rooms and one Dining Room has been established in old rearing building.
- Reception room established in old structure constructed in 1947-48.
- JCB work is initiated and Silk Moth Park land has been prepared (0.67 acre)
- Pathways work is under progress through JCB.
- 55 inch TV has been received
- 32 inch TV has been received
- One 80 Litre Water cooler has been received
- 40 chairs (Neelkamal) have been received
- Personally visited Executive Engineer office, R&B Office Ganderbal and AEE, R&B, Safapora and handed over a letter for Plinth estimate of Museum Hall, Toilets, View Points and Cafeteria.
- One 29.01.2024 has been collected the same and sent to Pampore for further necessary action.
- As per the project indent, items are being received from CSRTI, Pampore.
- 3 Guest Rooms and one Dining Room has been established in old rearing building.
- Reception room established in old structure constructed in 1947-48.
- JCB work is initiated and Silk Moth Park land has been prepared (0.67 acre)
- 4 number of Hot and Cold Acs revied
- 5 umbrella big size received
- Electric Lawn Mover of Makita Company received
- 16 CCTV camera installed

- JCB work completed and covered about 88000 square feet land for seri-tourism purpose. Bills was sent to Pampore for final payment.
- Personally visited Executive Engineer office, R&B Office Ganderbal and AEE, R&B, Safapora and handed over a letter for Rain Shelter estimate and received which was communicated to Dir-CSB-CSRTI, Pampore.
- As per the project indent, items are being received from CSRTI, Pampore.
- Pre-Fabricated Museum items have been received
- 4 Hot and Cold AC has been received
- 4 Plastic tables received
- New Park is being developed
- Terrace plantations for beautification have been initiated
- CCTV installed and working properly.
- 86 inch interactive panel board has been received
- Butterfly gate received and painted
- 4 Glass table received and kept in the Guest rooms
- Bolero Camper 4 x 4 has been dispatched from Mahindra and Mahindra Plant of Bolero Vehicles, Haridwar and lying with CSB-CSRTI, Pampore.

Budget Utilized: 52.77 Lakhs

Purchasing was done from GeM (99.0%)

CAPACITY BUILDING & TRAININGS (CBT)

The Capacity Building is one among the mandates of R&D Institutes of Central Silk Board, Bangaluru. Under the Capacity Building & Trainings (CBT), the Central Sericultural Research & Training Institute (CSR&TI) Pampore, during the year 2024-25 targeted 922 stakeholders within specific programmes, as fixed by the CSB, Bangaluru, across the Bivoltine sericulture practizing states of North India, alongwith its nested Regional Sericultural Research Station(s) [(Sahaspur, Dehradun & Miransahib, Jammu (J&K)] and Research Extension Centres (REC's) [(Lamberi; Ghumarwin & Basti)], with the aim to update them with the latest trends and developments in the field of sericulture, thereby, resulting in capacity building of stakeholders involved in Sericulture.

While organising the training programmes, care was taken for ideal orientation as well as practical demonstration of technologies for improvement of sericulture industry qualitatively and quantitatively at the respective levels.

Consolidated details of CBT programmes conducted by CSRTI, Pampore during the year 2024-25 is as under:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1.	Training under STEP (MDP)	03 day	01	01	25	25
2.	Intensive Sericulture Training (ISTP)	30 days	02	02	40	38
3.	Farmers Skill Training (FST)	03 days	18	18	450	451
4.	Technology Orientation Programme (TOP)	05 days	04	04	100	87
5.	Post Cocoon Technology (PCT)	05 days	03	03	75	75
6.	Training through Sericulture Resource Centre (SRC)	01 day	15	16	225	246
7.	Establishment of New SRC's	--	04	04	--	--
Total			**47**	**48**	**915**	**922**
8.	Exposure of Students/Farmers/Govt. officials (Institute/RSRS)	--	--		**1502**	

❖ **Unit Wise details of CBT programs conducted during the year 2024-25:**

A. Main Institute:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1.	Training under STEP (MDP)	03 day	01	01	25	25
2.	Intensive Sericulture Training (ISTP)	30 days	01	01	20	20
3.	Farmers Skill Training (FST)	03days	06	06	150	151
4.	Technology Orientation Programme (TOP)	05 days	01	01	25	25
5.	Post Cocoon Technology (PCT)	05 days	01	01	25	25
6.	Training under Existing Sericulture Resource Centre (SRC)	01 day	08	09	120	141
Total			**18**	**19**	**365**	**387**

FST & Intensive Sericulture Training programmes at Main Institute

B. Regional Sericultural Research Station, Jammu:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1	Intensive Sericulture Training (ISTP)	30 days	01	01	20	18
2	Farmers Skill Training (FST)	03 days	03	03	75	75
3	Technology Orientation Programme (TOP)	05 days	02	02	50	38
4	Post Cocoon Technology (PCT)	05 days	01	01	25	25
5.	Establishment of New Sericulture Resource Centre (SRC)	-	01	01	-	-
Total			**8**	**8**	**170**	**156**

Regional Sericultural Research Station, Sahaspur:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1	Farmers Skill Training (FST)	03 days	04	04	100	100
2	Post Cocoon Technology (PCT)	05 days	01	01	25	25
3	Training under Existing (SRC)	01 day	07	07	105	105
Total			**12**	**12**	**230**	**230**

Exposure visits under Non-CBT: One-day exposure visits were made by schools, colleges and universities to Regional Sericultural Research Station, Sahaspur and scientists from this station explained various activities of mulberry cultivation, mulberry saplings production, pest and disease management in mulberry, silkworm rearing and its management, diseases of silkworm and its management, by-products from sericulture industry. Totally 342 students were visited and an amount of Rs. 9,400/- generated as revenue from exposure visits.

Details of Exposure Visits by the Students from Universities, Colleges & Schools

Sl. No.	Name of the Institutes/School	Date of visit	No. of Students	Amount collected (Rs.)
1.	Dolphin (PG) Institute of Biomedical & Natural Sciences, Dehradun, Uttarakhand	30-03-2024	54	1,080.00
2.	Welham Girls School, Dehradun, UK	06-04-2024	66	1,320.00
3.	Meerut Institute of Technology (U.P.) & Roorkee Engineering College, Roorkee (Uttarakhand)	09-04-2024	41	1,000.00
4.	Graphic Era Hill University, Dehradun	30-04-2024	49	1,000.00
5.	Graphic Era Hill University, Dehradun	01-05-2024	48	1,000.00
6.	Garg P.G. College, Haridwar, (UK)	08-10-2024	30	1,000.00
7.	Garg P.G. College, Haridwar, (Uttarakhand)	24-10-2024	16	1,000.00
8.	JBIT College of Applied Sciences, Sahaspur, Dehradun, Uttarakhand	04-03-2025	27	1,000.00
9.	GRD- Institute of Management & Technology, Dehradun, Uttarakhand	18-03-2025	11	1,000.00
		Total	**342**	**9,400.00**

Exposure visit of various college students to RSRS, Sahaspur

Exposure visits made by farmers: A total of 120 farmers had visited to Regional Sericultural Research Station, Sahaspur in-order to learn the mulberry cultivation and silkworm rearing. The details of the exposure visits made by the sericulture practicing farmers are furnished below:

Details of One Day Exposure Visit by the Farmers from Northern Zone

Sl. No.	Name of Sponsoring Agency	Date of visit	No. of Farmers
1.	Directorate of Industries, Sericulture Wing, HP	04-02-2025	40
2.	Directorate of Industries, Sericulture Wing, HP	13-02-2025	40
3.	Directorate of Industries, Sericulture Wing, HP	20-02-2025	40
		Total	**120**

C. Research Extension Centre, Basti, Uttar Pradesh:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1	Farmers Skill Training (FST)	03 days	01	01	25	25
2	Technology Orientation Program (TOP)	05 days	01	01	25	25
3	Establishment of New SRC	--	01	01	--	--
Total			**03**	**03**	**50**	**50**

D. Research Extension Centre, Ghumarwin, Himachal Pradesh:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1	Farmers Skill Training (FST)	03 days	02	02	50	50
2	Establishment of New SRC	--	02	02	--	--
Total			**04**	**04**	**50**	**50**

E. Research Extension Centre, Lamberi, Jammu & Kashmir:

#	Training Programme	Program Duration	No. of programmes		No. of beneficiaries	
			Target	Achievement	Target	Achievement
1	Farmers Skill Training (FST)	03 days	02	02	50	50
Total			**02**	**02**	**50**	**50**

Extension Communication Programmes

The CSB-Central Sericultural Research & Training Institute (CSR&TI), Pampore, conducts Extension Communication Programmes (ECPs) across North-western India. These programs are organized through the main institute, Regional Sericulture Research Stations (RSRSs) in Jammu and Sahaspur, Dehradun (Uttarakhand), Research Extension Centers (RECs) and P4 Station.The primary goal of the ECPs in the sericulture sector is to enhance the practices and productivity of sericulture farmers by introducing them to innovative techniques and technologies. By focusing on improving the knowledge, skills, and attitudes of the beneficiaries, these programs facilitate the adoption of advanced sericulture methods. ECPs are integral to the Research and Development (R&D) efforts, aiming to increase awareness and expose stakeholders to the latest advancements in the field. The overarching objective is to ensure that farmers are well-equipped to implement new practices effectively, thereby enhancing their skill sets and improving overall productivity in the sericulture sector. Through these initiatives, CSR&TI plays a pivotal role in fostering sustainable growth and innovation in sericulture across the region. In addition to the ECP, the institute offers various training programs for officials from the Department of Sericulture (DoS), non-profit organizations, and private sector institutes across North Indian states. These programs cater to the specific needs of the participants, providing targeted training to improve their capabilities in sericulture management and development. Through these initiatives, the institute aims to foster a comprehensive and sustainable growth in the sericulture sector by building a knowledgeable and skilled workforce capable of driving innovation and improving productivity.

Extension Communication Programme (ECP):

1. Technical demonstration cum enlightenment programmes,
2. Awareness Programmes
3. Farmers Field Day
4. Krishi Mela
5. Workshop/Seminar.

The brief progress for Extension Communication Programmes (ECP) carried out during 2024-25 is presented as under:

- 03 Reshem Krishi Mela was organized by at , CSR&TI, Pampore, RSRS- Jammu, and RSRS-Sahaspur a total no. of **1041** farmer were participated in all the 03 Krishi Melas' under Extension Communication Programmes (ECP) .

- A Total no **1000** Stakeholders were participated in 20 Famers field days (Programmes) in north India under Extension Communication Programmes (ECP) during the year 2024-25. The theme of the programmes is to highlight the various technologies of the Institute, and urge the farmers to adopt the technologies and also calling farmers to approach the Institute for technical guidance whenever necessary and aware farmers to adopt and maintain the plantations technology being exclusively is very beneficial for quality leave harvest.

- Under Awareness programmes a total of **1033** stakeholders were benefitted in 20 programmes.

Conducted indifferent States/ areas viz. Jammu & Kashmir, Jammu, Uttarakhand, and Utter Pradesh (U.P).The awareness programmes always emphasis on successful silkworm rearings of farmers and guiding farmers about adoption and diligent follow the various technologies right from Chawkie rearing upto late age rearing. Special focus is always given towards importance of maintaining hygiene, as silkworms are very sensitive to diseases animals and also upgrading of skills, under these said programmes

- A total of **434** persons/stakeholders were participated in 20 Technical demonstrations cum enlightenment programmes' in north-western sericulture under Extension Communication Programmes (ECP) during the year 2024-25.

- A total No. **115** persons/stakeholders were participated in workshop on hybrid mode from north west India under sericulture Extension Communication Programmes (ECP) during the year 2024-25.

- Under Awareness programmes under Central Seed Act, a total of **100** stakeholders were benefitted in 01 programme.

- In addition of above Extension Communication Programmes (ECP) 387 persons/stakeholders where trained by CSR&TI, Pampore and its nested RSRSs during filed visits.

- A total no 3723Persons/stakehol 113 ere covered under 64 ECPs (Programmes) beside that 387 Persons/stakeholders were aware about the Sericulture technologies and its impact .

Programme details conducted at CSR&TI, Pampore and its nested RSRSs:

#	Programme	CSR&TI, Pampore & nested units			
		Total Porg (No)	**Target Beneficiaries (No)**	**Achievement Programmes**	**Achievement Beneficiaries**
1.	Krishi Mela	03	800	03	1041
2.	Farmers Field Day	20	1000	20	1000
3.	Awareness Programme	20	1000	20	1033
4.	Technology Demonstration	20	400	20	434
5.	Workshop/seminar	01	100	01	115
	Awareness programme under Seed Act	01	100	01	100
6.	* Other activities (Field visit)	0	0	40	387
	Total	**65**	**3400**	**65**	**3723**

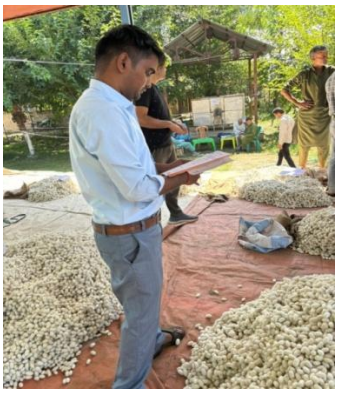
*Note: * Field visits not included in Total*

POST COCOON TECHNOLOGY SECTION

The Post Cocoon Technology (PCT) Section, CSB-CSR&TI, Pampore carried out the cocoon testing/ reeling of cocoon lots/samples, produced under the research projects/continuous programs of Silkworm Breeding Division, Host Plant Division, Biotechnology Section of main Institute & P4-Basic Seed Farm, Manasbal. Besides, as per demand, limited Yarn testing of samples is carried out by the section. The testing of cocoon samples received from sericulture farmers is also done.

The details of the activities carried out during the year 2024-25 are mentioned hereunder:

1. **Mono-Cocoon Reeling Test**: A total of 176 cocoon samples received from the Divisions of main Institute, P4-BSF, Manasbal and cocoon auction markets were tested through Mono-Cocoon testing method.




2. **Mass Reeling Test:** 08 samples of P4-BSF, Manasbal were tested through mass reeling method.

3. **Limited Yarn Test**: The limited yarn test for denier deviation conducted for 03 samples received from Jammu Kashmir Industries (JKI), Filature unit, Solina, Srinagar.

4. **Cocoon Stifling/Drying & Sorting**: A total quantity of 100 kg Green cocoon including samples were stifled and sorted.

5. **Raw Silk Production:** A total of 3.50 Kg of Raw Silk produced during the year.


6. **Silk Waste:** 1.2 kg of Silk waste generated through raw silk production and cocoon/yarn testing.

7. **Trainings:** 05 days training program under the Capacity Building & Trainings was conducted and coordinated by the section.


8. **Demonstration:** A total of 50 officers/officials of Central Govt., 500 plus students/teachers, 300 plus farmers were demonstrated the steps involved in raw silk testing/reeling.



9. Visitors: Horticulture Minister, Govt. Of Punjab, visited the PCT section along with officers & 05 farmers.

10. **Field Visits:** 13 Field visits were undertaken to the reeling & weaving clusters.

11. **Revenue Generation:**Revenue generated of amount of Rs. 1.65450 (One lakh Sixty five thousand four hundred fifty only) by auction of cocoon & raw silk available in the section.

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर के हिन्दी अनुभाग द्वारा वर्ष 2024-25 के दौरान राजभाषा कार्यान्वयन में अर्जित उपलब्धियां

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर द्वारा वर्ष 2024-25में राजभाषा हिन्दी के प्रगामी प्रयोग एवं राजभाषा नीति के कार्यान्वयन से संबंधित निम्नलिखित कार्य किये गये।

1) राजभाषा अधिनियम, 1963 एवं नियमावली, 1976 का अनुपालन: राजभाषा अधिनियम, 1963 की धारा 3(3), के शतप्रतिशत अनुपालन सुनिश्चित करने के अलावा, 1976 के नियम 05 के अधीन हिन्दी में प्राप्त पत्रों के उत्तर हिन्दी और द्विभाषी में ही दिये गए तथा मूल पत्राचार एवं वार्षिक कार्यक्रम 2024-25 में निर्धारित लक्ष्य भी प्राप्त किया गया।

2) राजभाषा कार्यान्वयन समिति की बैठकों का आयोजन: वर्ष के दौरान विभागीय राजभाषा कार्यान्वयन समिति की तिमाही बैठकों का आयोजन निम्नानुसार किया गया एवं बैठकों में राजभाषा के कार्यान्वयन से संबंधित लिए गये निर्णयों पर अनुवर्ती कार्रवाई भी की गई।

वर्ष के दौरान आयोजित राजभाषा कार्यान्वयन समिति की बैठकों का विवरण

#	समिति की बैठक संख्या	तिमाही	अध्यक्ष	दिनांक
1	98वीं	अप्रैल - जून, 2024	डॉ. एन. के. भाटिया	06.06.2024
2	99 वीं	जुलाई-सितम्बर,2024	डॉ. एम. महेश्वरी, निदेशक	24.09.2024
3	100 वीं	अक्टूबर- दिसम्बर,2024	डॉ. सरदार सिंह , निदेशक	24.12.2024
4	101 वीं	जनवरी- मार्च,2025	डॉ. सरदार सिंह , निदेशक	27.03.2025

तिमाही प्रगति रिपोर्ट: वर्ष के दौरान संस्थान द्वारा राजभाषा हिन्दी के प्रगामी प्रयोग संबंधी तिमाही प्रगति रिपोर्ट केन्द्रीय कार्यालय, बेंगलूरु, राजभाषा विभाग, नई दिल्ली एवं नराकास, श्रीनगर को निम्नानुसार भेजी गई। साथ ही राजभाषा विभाग को तिमाही प्रगति रिपोर्ट ऑन लाइन के माध्यम से भी भेजी गई एवं सभी तिमाहियों में पत्राचार का प्रतिशत वार्षिक कार्यक्रम के लक्ष्यानुसार रहा।

तालिका -125: **वर्ष के दौरान भेजी गयी तिमाही प्रगति रिपोर्टो का विवरण**

#	तिमाही	तिमाही प्रगति रिपोर्ट भेजने की दिनांक
1	अप्रैल - जून,2024	25.07.2024
2	जुलाई - सितम्बर,2024	12.10. 2024
3	अक्टूबर - दिसम्बर,2024	25.01. 2025
4	जनवरी - मार्च,2025	25.04. 2025

4) हिन्दीपखवाड़ा / हिन्दी दिवस का आयोजन: संस्थान में दिनांक 17.09. 20204 से 30.09.2024 तक हिन्दी पखवाड़े का आयोजन किया गया तथा पखवाड़े के दौरान हिन्दी प्रतियोगिताएं आयोजित की गयी जिसमें संस्थान के अधिकारियों एवं कर्मचारियों ने भाग लिया तथा दिनांक 14.09.2024 को हिन्दी दिवस का आयोजन किया गया जिसमें माननीय गृहमंत्री जी, संघ सरकार के संदेश का वाचन किया गया तथा प्रतियोगिताओं के विजेताओं को प्रथम, द्वितीय,तृतीय तथा सांत्वना पुरस्कार वितरित कर सम्मानित किया गया ।

5) हिन्दी कार्यशालाओं का आयोजन: संस्थान में नियमित रूप से प्रत्येक तिमाही में हिन्दी कार्यशालाओं का आयोजन किया गया। एवं राजभाषा हिन्दी के प्रयोग से संबंधित विषयों जैसे; टिप्पण लेखन, पत्र लेखन एवं सरल हिन्दी वाक्य रचना एवं

राजभाषा विभाग द्वारा विकसित सूचना प्रौद्योगिकियों जैसे, लीला मोबाइल ऐप, ई-महाशब्दकोश, यूनीकोड एवं गूगल हिन्दी वाक् टंकण आदि विषयों पर प्रशिक्षण दिया गया।

वर्ष के दौरान निम्नलिखित हिन्दी कार्यशालाएँ आयोजित की गयी

#	तिमाही	कार्यशाला के आयोजन की दिनांक	उपस्थित विशेषज्ञ
1	अप्रैल - जून, 2024	29.06.2024	डॉ.पवन सैनी, वैज्ञानिक-डी, केरेउअवप्रसं, पाम्पोर
2	जुलाई -सितम्बर,2024	28.09.2024	डां. मुदासिर, सहा. आचार्य, हि.वि., के. वि., श्रीनगर
3	अक्टूबर-दिसम्बर,2024	26.12.2024	डॉ.भारतेन्दु कुमार पाठक, आचार्य, हि.वि., के. वि., श्रीनगर
4	जनवरी- मार्च, 2025	28.03.2025	डॉ.सरदार सिंह , वैज्ञानिक-डी, निदेशक

6) नगर राजभाषा कार्यान्वयन समिति (नराकास) एवं अन्य बैठकों में सहभागिता –वर्ष 2024-25के दौरान नगर राजभाषा कार्यान्वयन समिति (नराकास) की बैठक दिनांक 17.12.2024को हिन्दी अनुभाग से श्री सत्येन्द्र प्रसाद टम्टा, सहायक अधीक्षक(प्रशा.) एवं सुश्री संचिता नायक, कनिष्ठ अनुवादक (हिन्दी) ने भाग लिया गया ।

7) राजभाषाप्रशिक्षण कार्यक्रम -केन्द्रीय हिन्दी प्रशिक्षण संस्थान, राजभाषा विभाग, नई दिल्ली द्वारा संचालित हिन्दी पत्राचार पाठ्यक्रम में पंजीकृत संस्थानके 03अधिकारियों/ कर्मचारी ने प्रज्ञा, प्रबोध परीक्षा उतीर्ण की गई ।

विशिष्ठ उपलबधिया:

- फ़ाइलों के आंतरिक पृष्टो पर प्रयोग किए जाने वाले द्विभाषी आदेशों व वाक्यांशों को छपवाया गया ।
- लिफ़ाफ़ों पर पते द्विभाषी मे लिखे गए व फ़ाइलों एवं पत्रशीर्षों को द्विभाषी रूप में छपवाया गया ।
- वेतन पर्चियों को द्विभाषी रूप से जारी किया गया ।
- संस्थान द्वारा आयोजित रेशम कृषक मेला आदिकार्यक्रमों के बैनर व पोस्टर को द्विभाषी रूप से जारी किए गए।
- संस्थान की वार्षिक हिंदी पत्रिका **'रेशम तरंग'** का सफलतापूर्वक विमोचन किया गया ।
- दिनांक 23.09.2025 को अंतराष्टीय सांकेतिक भाषा दिवस का आयोजन किया गया ।
- संस्थान के दो वैज्ञानिकों द्वारा रॉची में आयोजित राजभाषा तकनीकी सेमिनार में हिंदी में शोध पत्र का प्रस्तुतीकरण किया गया ।
- संस्थान में अधिकतर कार्य हिन्दी एवं द्विभाषी रूप में किया जा रहा है ।
- संस्थान से 'क' क्षेत्रों को हिन्दी में पत्र एवं उत्तर दिये जा रहे है ।
- संस्थान में दिनांक 08.03.2025 को महिला दिवस मनाया गया जिसमें डां. प्लावनी राय, वैज्ञानिक-बी द्वारा पूर्ण तरह से हिन्दी में व्याख्यान दिया ।

क्षेत्रीय रेशम उत्पादन अनुसंधान केंद्र, सहसपुर

क्षेत्रीय रेशम उत्पादन एवं अनुसंधान केन्द्र, सहसपुर द्वारा वर्ष 2024-25 के दौरान राजभाषाहिन्दी के प्रगामी प्रयोग एवं राजभाषा नीति के कार्यान्वयन से संबंधित वार्षिक रिपोर्ट।

1) **राजभाषा अधिनियम, 1963 की धारा के शत प्रतिशत अनुपालन:** राजभाषा अधिनियम, (3) 3 की धारा 1963 के शत प्रतिशत अनुपालन सुनिश्चित करने के अलावा,के अधीन हिन्दी में प्राप्त पत्रों के उत्तर 05 के नियम 1976 हिन्दी और द्विभाषी में ही दिये गए तथा मूल पत्राचार एवं वार्षिक कार्यक्रम 2024-25 में निर्धारित लक्ष्य भी प्राप्त किया गया ।
2) **राजभाषा कार्यान्वयन समिति की बैठकों का आयोजन:** क्षेत्रीय रेशम उत्पादन एवं अनुसंधान केन्द्र, सहसपुर, देहरादून द्वारा वर्ष 2024-25 के दौरान विभागीय राजभाषा कार्यान्वयन समिति की तिमाही बैठकों का आयोजन निम्नानुसार किया गया एवं बैठकों में लिए गए निर्णय पर अनुवर्ती कार्यवाई भी की गयी

क्रमांक	समिति की बैठक संख्या	तिमाही	अध्यक्ष	दिनांक
1	140	प्रथम	डॉ. सरदार सिंह, वैज्ञानिक डी	27.06.24
2	141	दिवतीय	डॉ. सरदार सिंह, वैज्ञानिक डी	27.09.24
3	142	तृतीय	छत्तरपाल, वैज्ञानिक-सी	26.12.24
4	143	चतुर्थ	छत्तरपाल, वैज्ञानिक-सी	28.02.25

3) **तिमाही प्रगति रिपोर्ट:** वर्ष के दौरान केंद्र सरकार द्वारा राजभाषा हिंदी के प्रगामी प्रयोग से संबंधित तिमाही प्रगति रिपोर्ट केंद्रीय कार्यालय, बैंगलुरु, राजभाषा विभाग, नई दिल्ली (राजभाषा विभाग को तिमाही प्रगति रिपोर्ट ऑनलाइन माध्यम से भेजी गई) तथा नराकास, देहरादून को निम्नानुसार प्रेषित की गई। सभी तिमाहियों में पत्राचार का प्रतिशत वार्षिक कार्यक्रम के लक्ष्यानुसार रहा।

क्रमांक	तिमाही प्रगति रिपोर्ट	तिमाही प्रगति रिपोर्ट भेजने की तिथि
1.	अप्रैल – जून 2024	06-07-2024
2.	जुलाई – सितम्बर 2024	04-10-2024
3.	अक्टूबर – दिसम्बर 2024	08-01-2025
4.	जनवरी – मार्च 2025	05-04-2025

4) **हिन्दी पखवाड़ा/दिवस का आयोजन:** केंद्र में दिनांक 17.09.2024 से 30.09.2024 तक हिन्दी पखवाड़े का आयोजन किया गया। पखवाड़े के दौरान विभिन्न हिन्दी प्रतियोगिताएँ आयोजित की गईं, जिनमें केंद्र के अधिकारियों एवं कर्मचारियों ने उत्साहपूर्वक भाग लिया। इस अवसर पर सदस्य सचिव एवं मुख्य कार्यपालक अधिकारी, केन्द्रीय रेशम बोर्ड, बंगलुरु के संदेश का वाचन किया गया। दिनांक 30 सितम्बर, 2024 को हिन्दी पखवाड़े के समापन समारोह का आयोजन किया गया, जिसमें कार्यालय में आयोजित शब्दावली एवं सुलेख प्रतियोगिताओं में भाग लेने वाले विजेता प्रतिभागियों को प्रथम, द्वितीय, तृतीय तथा सांत्वना श्रेणी के नकद पुरस्कार प्रदान कर सम्मानित किया गया।
5) **हिन्दी कार्यशालायों का आयोजन :** केंद्र में नियमित रूप से प्रत्येक तिमाही में हिन्दी कार्यशालाओं का आयोजन किया गया। जिसमें राजभाषा हिन्दी के प्रयोग से संबंधित विषयों जैसे राजभाषा अधिनियम की धारा 1963 (3) 3के अंतर्गत जारी कागजात के बारे में जानकारी, पत्र लेखन , हिन्दी अनुवाद, कार्यालय में प्रयोग किये जाने वाले हिन्दी शब्दों की जानकारी एवं गूगल हिन्दी आदि विषयों पर प्रशिक्षण दिया गया ।

क्रमांक	तिमाही	कार्यशाला के आयोजन की तिथि
1	अप्रैल – जून, 2024	29.06.24
2	जुलाई – सितम्बर 2024	30.09.24

3	अक्टूबर – दिसम्बर 2024	27.12.24
4	जनवरी – मार्च 2025	01.03.25

6) **नगर राजभाषा कार्यान्वयन समिति (नराकास) एवं अन्य बैठकों में ऑनलाइन सहभागिता:** वर्ष 2024–25 के दौरान इस संस्थान द्वारा निम्नलिखित बैठकों में सहभागिता की गई।

क्रमांक	**नगर राजभाषा कार्यान्वयन समिति (न.रा.का.स.) की बैठक के आयोजन की तिथि**	**बैठक में भाग लेने वाले अधिकारी/कर्मचारी का नाम**
1	12-06-2024	डॉ. साक्षी वैष्णव, वैज्ञानिक–बी श्रीमती रेखा जोशी, वरिष्ठ तकनीकी सहायक

क्षेत्रीय रेशम उत्पादन अनुसंधान केंद्र, जम्मू

वर्ष 2024–25 में क्षेत्रीय रेशमोत्पादन अनुसंधान केंद्र, मीरासाहिब, जम्मू द्वारा हिंदी से संबंधित किए गए कार्यों का सारांश विवरण:

- **हिंदी सप्ताह आयोजन :** रेशम उत्पादन अनुसंधान केंद्र, मीरासाहिब, जम्मू द्वारा डॉ. संतोष कुमार मगदुम, वैज्ञानिक-डी एवं प्रमुख की अध्यक्षता में हिन्दी सप्ताह का आयोजन दिनांक 06.09.2024 से 13.09.2024 तक किया गया, जिसमें केंद्र के सभी अधिकारियों एवं कर्मचारियों ने बढ़-चढ़कर भाग लिया। हिन्दी सप्ताह समारोह के अंतर्गत दो प्रतियोगिताओं - (क) हिन्दी से अंग्रेज़ी तथा अंग्रेज़ी से हिन्दी अनुवाद और (ख) हिन्दी निबंध लेखन का आयोजन किया गया। इन प्रतियोगिताओं के विजेताओं को पुरस्कार राशि केंद्रीय रेशमोत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पांपोर द्वारा प्रदान की गई।
- **हिंदी दिवस आयोजन :** रेशम उत्पादन अनुसंधान केंद्र, मीरासाहिब, जम्मूद्वारा 13 सितंबर, 2024 को हिंदी दिवस का आयोजन किया गया, जिसमें इस केंद्र के सभी अधिकारी एवं कर्मचारी सम्मिलित हुए। इस अवसर पर डा. संतोषकुमार मगदुम, वैज्ञानिक-डी एवं प्रमुख, रेशम उत्पादन अनुसंधान केंद्र, मीरासाहिब, जम्मू द्वारा सदस्य सचिव, केंद्रीय रेशम बोर्ड, बेंगलुरु का संदेश पढ़ा गया। सभी उपस्थित सदस्यों ने बारी-बारी से इस केंद्र में हिंदी को बढ़ावा देने के अपने-अपने विचार और सुझाव साझा किए। इसके उपरांत, सभी अधिकारियों और कर्मचारियों ने शपथ ली कि वे अपना अधिकतम कार्य हिंदी में ही करेंगे।
- **राजभाषा कार्यान्वयन समिति की तिमाही बैठकों का आयोजन:** उक्त अवधी में केंद्रीय कार्यालय द्वारा निर्धारित लक्ष्य के अनुसार प्रत्येक तिमाही में राजभाषा कार्यांवयन समिति की तिमाही बैठक का आयोजन किया गया जिसका विवरण निम्नावत है :

क्र.सं .	तिमाही की अवधी	तिमाही बैठक आयोजन की तिथि	अध्यक्ष का नाम व पद	सम्मलित अधिकारी / कर्मचारियों की संख्या
01	अप्रैल,2024 से जून,2024	28.06.2024	डॉ. संतोषकुमार मगदुम, वैज्ञानिक-डी एवं प्रभारी	10
02	जुलाई,2024 से सितम्बर, 2024	28.09.2024	डॉ. संतोषकुमार मगदुम, वैज्ञानिक-डी एवं प्रभारी	11
03	अक्तूबर,2024 से दिसम्बर, 2024	26.12.2024	डॉ. संतोषकुमार मगदुम, वैज्ञानिक-डी एवं प्रभारी	14
04	जनवरी,2025 से मार्च, 2025	27.03.2025	डॉ. संतोषकुमार मगदुम, वैज्ञानिक-डी एवं प्रभारी	15

- **एक दिवसीय हिंदी कार्यशाला:** केंद्रीय कार्यालय द्वारा निर्धारित लक्ष्य के अनुसार इस केंद्र द्वारा प्रत्येक तिमाही में एक दिवसीय हिंदी कार्यशाला का आयोजन किया गया जिसका विवरण इस प्रकार है :

क्र.सं .	तिमाही की अवधी	कार्याशाला आयोजन की तिथि	सम्मिलित अधिकारियों/कर्मचारियों की संख्या
01	अप्रैल,2024 से जून,2024	29.06.2024	13
02	जुलाई,2024 से सितम्बर,2024	30.09.2024	14
03	अक्तूबर,2024 से दिसम्बर,2024	30.12.2024	11
04	जनवरी,2025 से मार्च,2025	28.03.2025	14

- क्षेत्रीय रेशमोत्पादन अनुसंधान केंद्र, मीरा साहिब द्वारा प्रत्येक तिमाही मे हिंदी कार्यशाला आयोजन से केंद्र पर कार्यरत सभी अधिकारियोंकर्मचारियों को बहुत लाभ हुआ है जिससे केंद्र के हिंदी कार्यवयन में काफी सुधार हुआ / है।
- उपरोक्त सभी तिमाही बैठकों/कार्यशालाओं के कार्यवृत्त सादर जानकारी एवं अवलोकनार्थ केंद्रीय रेशमोत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पांपोर तथा सदस्य सचिव, नगर राजभाषा कार्यान्वयन समिति, भारतीय समवेत औषध संस्थान, कैनाल रोड, जम्मू को प्रेषित किए गए।

कार्यालय द्वारा किया गया पत्राचार: टिप्पणी लेखन/

क्र.सं .	तिमाही की अवधी	पत्र/टिप्पणी	हिंदी/द्विभाषी में लिखित	अंग्रेजी में लिखे गए	कुल योग	हिंदी का प्रतिशत
01	अप्रैल से जून,2024	पत्र	665	163	828	80.31
		टिप्पणी	63	15	78	80.77
02	जुलाई से सितम्बर,2024	पत्र	863	168	1031	83.71
		टिप्पणी	75	17	92	81.52
03	अक्तूबर से दिसम्बर,2024	पत्र	785	86	871	90.13
		टिप्पणी	71	15	86	63.37
04	जनवरी से मार्च,2025	पत्र	1327	146	1473	90.09
		टिप्पणी	57	8	65	87.70
कुल योग		**पत्र**	**3640**	**563**	**4203**	**86.60**
		टिप्पणी	**266**	**55**	**321**	**82.87**

- राजभाषा की चारों तिमाही प्रतिवेदन सदस्य सचिव, केंद्रीय रेशम वोर्ड, बेंगलुरु एवं इस की प्रति सूचनार्थ एवं आवश्यक कार्यवाई हेतु निदेशक, केंद्रीय रेशमोत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पांपोर व अध्यक्ष, नगर राजभाषा कार्यन्वयन समिति, भारतीय समवेत औशध संस्थान, कैनाल रोड, जम्मू को भेजी गई हैं।

नगर राजभाषा कार्यन्वयन समिति, भारतीय समवेत औशध संस्थान, कैनाल रोड, जम्मू द्वारा आयोजित कार्यक्रमों में भाग लेना :

- वर्ष 2024–25 के दौरान क्षेत्रीय रेशम उत्पादन अनुसंधान केंद्र, मीरासाहिब, जम्मू को नगर राजभाषा कार्यान्वयन समिति, जम्मू द्वारा भारत सरकार की राजभाषा नीति के उत्कृष्ट निष्पादन के लिए सम्मानित और प्रमाणित किया गया।

LIBRARY

The library of CSR&TI, Pampore has a diverse collection of **1,374** books encompassing various disciplines related to agriculture and its allied sectors. These include sericulture, meteorology, entomology, agronomy, soil science, plant pathology, extension education, agricultural economics, statistics, animal husbandry, plant breeding, genetics, and biotechnology, among others. This extensive repository is a vital resource for scientists, researchers, and students.

The library also maintains an annual associate membership with the International Sericulture Commission, granting access to international advancements and research in sericulture. It subscribes to *Indian Silk*, a bimonthly magazine published by the Central Silk Board (CSB), Ministry of Textiles, Government of India, which offers insights into the latest innovations and trends in the silk industry. Additionally, it archives *Silk Mark* magazines, also issued by the CSB, which advocate for authenticity in silk production and trade.

Apart from books and periodicals, the library holds a rich collection of institutional materials such as annual reports, newsletters, technical bulletins, technology descriptors, leaflets, folders, pamphlets, and brochures. These resources are carefully organized and preserved, providing valuable reference material for ongoing academic and research work.

Regularly utilized by scientists of the Central Silk Board, project staff, research scholars, and students from esteemed institutions like the College of Temperate Sericulture (COTS) under SKUAST-K, Mirgund, and the University of Kashmir, the library plays a pivotal role in fostering academic and scientific pursuits in sericulture and allied fields.

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5) Ram, R.L. (2024) Current Research in Soil Fertility (Vol.-XII), Paperback ISBN: 978-93-6135-393-2.

6) Ram, R.L. and Maheshwari, M. (2024) Exploring New Frontiers in Sericulture: The Deep Dive Efforts of REC, Basti, Resham Mitra (2024): 21-24, Resham Nideshalaya, Uttar Pradesh, Lucknow.

INTERNATIONAL:

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POPULAR ARTICLES:

1) Santoshkumar Magadum,Managanvi, K and Kumar, P. 2024. Silk: The Queen of Fibres. Vigyan Varta 5(11): 125-129.

2) Singh, M., Kumar, P. andSantoshkumar Magadum. 2024. Seed Certification and its Significance. Vigyan Varta 5(12): 9-13.

3) संतोष कुमार मगदुम. (2024). रेशम: रेशों की रानी. ज्ञान वार्ता, 12: 1–5. (नगर राज भाषा कार्यान्वयन समिति, जम्मू द्वारा प्रकाशित)।

4) सुनील और संतोष कुमार मगदुम. (2024). शहतूत कीट का एक संक्षिप्त अवलोकन. रेशम तरंग, अंक 2, 38.

5) गुलाब खान रोहेला, पवन सैनी, अशोक कुमार कसुकुर्थी और एन. के. भाटिया. (2024). शहतूत दैहिक संकरों का पत्ती के अनुकरण, जैवरासायनिक विश्लेषण एवं जैव परख मूल्यांकन. Resham Tarang, CSR & TI, Pampore.

6) Gulzar Ahmad Khan, Gulab Khan Rohela. Silk Samagra Scheme for Integrated Development of Silk Industry in India. 5(3): (B) 86 – 87. *Agri Cos e-Newsletter,* 2024

7) Plabani Roy, Syam S, Basanagouda Gonal, Pawan Saini, Gulab Khan Rohela. Mulberry (Morus SPP.): A Potential Carbon Sequester. News Letter of NASSI, Vol.2, Issue 1; Page No.3, 2024

8) Syam S, Plabani Roy, Basanagouda Gonal, Pawan Saini, Gulab Khan Rohela. Role of Beneficial Microorganisms in Sericulture Industry. News Letter of NASSI, Vol.1, Issue 2; Page No.6, 2024

9) हिमाचल प्रदेश में उनन्त शहतूत रेशम प्रौद्योगिकी की मार्गदर्शिका- Rakesh Prajapati, Rita Singh, Baldev Chauhan -DOI, Sericulture Division, Shimla (2024).

10) Rita Singh, Baldev Singh, Pawan saini, Sardar Singh. 2024-25. Silkworm diseases and their management (in Hindi)

11) Arasakumar, E., Sakshi Vaishnav, Chhattar Pal & Sardar Singh (2024). Occurance of predatory coccinellid beetles in mulberry eco-system under the sub-tropical conditions of North West India. Uttarakhand Agri Gate Magazine, 4(6):502-507.

12) Sakshi Vaishnav, Arasakumar, E., Chhattar Pal & Sardar Singh (2024). Sericulture in India – Recent Progress, Resham Tarang, Annual Magazine, CSR&TI, Pampore.

International - Ph.D. Thesis completed:
Title of thesis:"Bıology of the giant peacock moth (*Saturnıa pyrı* Denıs et Schıffermüller), development of a mass rearing method for use ın sericulture"

Student Name:	Shukurova Zarintaj Yusif
Guide Name:	Prof.Gulzarn Alihaydar Mustafayeva
International Consultant / Guide:	Dr. Rajesh Kumar, Scientist D
Broad Subject:	Biology
Specialization:	2401.01-Zoology
Submitted to:	Institute of Zoology of the Ministry of Science and Education of the Republic of Azerbaijan

Supervision of M.Sc (Seri) students for dissertation:Dr. Santoshkumar Magadum, Scientist D, RSRS, Jammuas Major Advisor supervisedSeven (07) M.Sc (Sericulture) students of Department of Sericulture, Poonch Campus, University of Jammu for their dissertation programme and successfully completed and submitted the Thesis under his guidance.

Working as Editor International E-magazines:Dr. Santoshkumar Magadum, Scientist-D is working as one of the Editors for Vigyan Varta: an International E-magazine for Science Enthusiasts (E-ISSN: 2582-9467) published from Bhubaneswar, Odisha.

i)**Dr. Santoshkumar Magadum, Scientist-D is working as one of the Editors** for Sabujeema: an International Multidisciplinary E-magazine published from Bhubaneswar, Odisha.

Seminars/Workshops/Trainings Attended

#	Seminars/Workshops/Training Programme	DATE	Organized by	Offline/ Online	Name of the Scientist
1	Workshop on Late age silkworm rearing organized by CSR&TI, Pampore	25-03-2025	CSR&TI, Pampore	Online/ Offline	Dr. Dr. Santoshkumar Magadum, Scientist-D Shri Chhattarpal, Scientist-C Dr. Arasakumar, Scientist-B Smt. Chandrakala, STA Smt. Gunjan Ameta, STA Smt. Meenakshi Chadha, STA Smt. Vandna Rathore, STA Mr. Mohd Shafi Mir, STA Smt. Sarojini Negi, STA Smt. Rekha Joshi, STA. Shri Piyush, SFA
2	पी-3, मूल बीज फार्म मजरा द्वारा आयोजित हिंदी कार्यशाला: “राजभाषा कार्यान्वयन नीति एवं टिप्पणी आलेखन संबंधी अनुवाद टूल कंठस्थ 2.0	18-04-2025	P3, BSF, Dehradun	Offline	Shri Mohd Shafi Mir, STA Smt. Rekha Joshi, STA
3	Implementation of Preventive Vigilance Measures Campaign and Observation of Vigilance Awareness	11-10-2024 to 14-10-2024	CSR&TI, Pampore	Online	Shri Chhattar Pal, Scientist-C Dr. Arasakumar, Scientist-B Dr. Sakshi V., Scientist-B Smt. Chandrakala, STA Smt. Gunjan Ameta, STA Smt. Meenakshi Chadha, STA Smt. Vandna Rathore, STA Mr. Mohd Shafi Mir, STA Smt. Sarojini Negi, STA Smt. Rekha Joshi, STA. Shri Piyush, SFA
4	"Nanopore-Based Transcriptome Sequencing & Data Analysis" at CSTRI, Ranchi	03-02-2025 to 07-03-2025	CSTRI, Ranchi	Offline	Dr. Sakshi Vaishnav, Scientist-B
	“Sericulture Extension Management” National Institute of Agricultural Extension Management (MANAGE), Hyderabad	23rd-25th October, 2024	National Institute of Agricultural Extension Management (MANAGE), Hyderabad	through virtu mode	Dr. Santoshkumar Magadum, Scientist-D
	“Extension for Climate Resilient Agriculture” by Extension Education Institute, Ministry of Agriculture and Farmers Welfare, Govt. of India, Hyderabad in collaboration with National Institute of Agricultural Extension Management (MANAGE), Hyderabad	18th-23rd November, 2024	Extension Education Institute, Ministry of Agriculture and Farmers Welfare, Govt. of India, Hyderabad	through virtu mode	Dr. Santoshkumar Magadum, Scientist-D
	एक दिवसीय राजभाषा सम्मेलन-2024: भारतीय तकनीकी शिक्षा में हिंदी की भूमिका एवं महत्व	12 जुलाई 2024	भारतीयप्रौद्योगिकीसंस्थान, जम्मू	Online	Dr. Santoshkumar Magadum, Scientist-D
	International Conference on	10-11th	Society for	Online	Dr. Santoshkumar Magadum,

	Emerging Technologies in Agriculture and Allied Sciences	August, 2024	Agri., Allied Sciences and Technology, Bhubaneswar		Scientist-D
	6th International Conference on "Cutting-Edge Solutions in Science- Agriculture, Technology, Engineering and Humanities"	24-26th August, 2024	AETDS, U.S.Nagar, Uttarakhand	Online	Dr. Santoshkumar Magadum, Scientist-D
	IXth International Conference on "Global Research Initiatives for Sustainable Agriculture & Allied Sciences"	10-12th December 2024	Astha Foundation, Meerut, U.P.	Online	Dr. Santoshkumar Magadum, Scientist-D
	International Conference on "Emerging Technologies in Silk Sector - SILKTECH 2025"	17th February 2025	Central Silk Board, Bengaluru	Online	Dr. Santoshkumar Magadum, Scientist-D

Awards

#	Name of the Scientist	Award	Date	Awarded by
1	Dr. Gulab Khan Rohela	"CSB Best Research Scientist Award"for his extraordinary contribution towards research.	21st September, 2024	Central Silk Board during Platinum Jubilee Celebration of CSB
2	Dr. Santoshkumar Magadum,	CSB Best Extension Scientist Award"for his extraordinary contribution towards research and extension work.	21st September, 2024	Central Silk Board during Platinum Jubilee Celebration of CSB
3	Dr. Santoshkumar Magadum,	"Best Oral Presentation Award"	10-12 December 2024	GRISAAS-2024
4	क्षेत्रीय रेशम उत्पादन अनुसंधान केन्द्र, मीरांसाहिब, जम्मू	राजभाषा नीति का बेहतरीन निष्पादन	27 नवंबर 2024	नगर राजभाषा कार्यन्वयन समिति, जम्मू

SCIENTIFIC & ASSOCIATED PERSONNEL

Dr. N. K. Bhatia, Director (upto 08-07-2024)
Dr. Maheshwari, Director (15-07-2024 to 19-10-2024)
Dr. Sardar Singh, Director (*w.e.f.* 21-10-2024)

Main Institute, Pampore

Host Plant Division

Host Plant Improvement Section
Dr. Pawan Saini, Scientist-D
Dr. Basangouda Gonal, Scientist-B
Sh. Mohd. Amin Bhat, Sr. Technical Assistant
Sh. Rajinder Kumar, Sr. Technical Assistant

Host Plant Protection Section
Dr. Pawan Saini, Scientist-D
Sh. Mohd. Amin Bhat, Sr. Technical Assistant
Sh. Rajinder Kumar, Sr. Technical Assistant

Agronomy & Soil Section
Dr.Gulab Khan Rohela, Scientist-D
Dr. Plabani Roy, Scientist-B
Sh. Sardar Inder Singh, Sr. Technical Assistant

Farm Management Section
Dr. Pawan Saini, Scientist-D
Sh. Mohd. Amin Bhat, Senior Technical Assistant
Sh. Rajinder Kumar, Senior Technical Assistant

Biotechnology Division

Host Plant Biotechnology
Dr. Gulab Khan Rohela, Scientist-D
Sh. S Syam, Scientist-B
Sh. Sardar Inder Singh, Sr. Technical Assistant

Project Monitoring Coordination & Evaluation Division
Dr. Irfan Illahi, Scientist-D
Smt. Jameela Akhter, Field Assistant
Smt. Nida Mushtaq, Field Assistant

ICT, Section:
Sh. Ashok Kumar Saini, Asstt. Director(Computer)

Maintenance Section:
Sh. Saadat Hamid Khan, Assistant Director (Insp)
Sh. Mohd. Altaf Koul, Senior Technical Assistant
Sh. Ghulam Hassan Ahanger, Technician
Sh. Mohd. Yousuf Sheikh, Assistant Technician

Training Division

Capacity Building & Training Section
Dr. Shivam Bhardwaj, Scientist-B
Sh.Sheikh Altaf Hussain, Sr. Technical Assistant

Library Section
Dr. Gulab Khan Rohela, Scientist-D
Sh.Sheikh Altaf Hussain, Senior Technical Assistant

Multitasking Staff:
Sh. Ghulam Mohd. Sheikh
Sh Guru Dayal
Sh Depty Nath
Sh. Mohd. Shafi Rather
Sh Tirath Lal
Sh. Bashir Ahmad Shakhsaz
Sh Balbir Raj
Sh. Mohd. Latief Khan
Sh. Bashir Ahmad Bhat

Silkworm Division

Silkworm Improvement Section
Sh. P Kumaresan, Scientist-D
Sh. N. Bharath Kumar, Scientist-D
Dr. Kiran R, Scientist-C
Dr. Shivam Bhardwaj, Scientist-B
Sh. Farooq Ahmad dar, Sr. Technical Assistant
Smt. Nisara Akhtar, Sr. Technical Assistant
Sh Fayaz Ahmad Bhat, Sr. Technical Assistant
Sh.Mohd.Ashraf Hajam, Sr. Technical Assistant
Smt.ImtiyazaAkhtar,Senior Technical Assistant

Post Cocoon Technology Section
Sh. Saadat Hamid Khan, Deputy Director (Insp) (upto 29-02-25)
Sh. Jagdish Verma, Scientist-B
Sh.Mohd.Altaf Koul, Senior Technical Assistant

SEEM Division

Extension & Publicity Section
Sh Sardar Inder Singh, Sr. Technical Assistant
Sh. Sheikh Altaf Hussain, Sr. Technical Assistant

Hindi Section:
Sh. Satyandra Prasad Tamta, Asstt. Supdt.(Admn)
Ms. Sanchita Nayak, Jr. Translator(Hindi)

Administration & Accounts Section
Sh. Saadat Hamid Khan, Asstt. Director(Insp) (upto 29-02-25)
C. A. Harshida P. Amirtkar, Ad (A&A)
Sh. Anil Raina, Superintendent (Admn)
Sh. Dipak Kumar Murmu, Assistant Superintendent (Admn)
Sh. Madhusudan Sharma, Asstt. Supdt.(Admn)
Sh. Jagmohan Singh, Asstt. Supdt.(Admn)
Sh Satyandra PrasadTamta, Asstt. Supdt.(Admn)
Sh. Ajay Malhotra, Asstt. Supdt.(Admn)
Sh. Kulwant Singh, Asstt. Supdt.(Admn)
Sh. Tanuj Kumar Gairola, Asstt. Supdt(Admn)
Sh.Rakesh Kumar Mishra, Upper Division Clerk
Sh. Syed Mohd Iqbal Indrabi, Upper Division Clerk
Smt.Praveen UDC
Sh.Mohd. Ayub Khan, Upper Division Clerk
Sh.Nazir Ahmad Malik, Upper Division Clerk
Smt.Mehmooda Akhter, Upper Division Clerk
Sh.Fayaz Ahmad Wani, Upper Division Clerk

Vehicle Section:
Sh. Kulwant Singh, Asstt. Supdt.(Admn)
Sh. Mushtaq Ahmad Rather, Staff Car Driver Grade-I
Sh Ranvir Singh, Staff Car Driver Grade - I

Computer Section :
Sh. Ashok Kumar Saini, Asstt. Director(Computer)

P-4, Basic Seed Farm, Manasbal

Scientific Staff: Dr. Rajesh Kumar, Scientist-D **Technical Staff:** Sh. Zahoor Ahmad Bhat, Senior Technical Assistant Sh. Zubida Viqar, Senior Technical Assistant Sh. Abdul Hamid Bhat,Senior Technical Assistant Sh. Ishtiyaq Noor, Senior Field Assistant	**Multitasking Staff:** Sh. Mushtaq Ahmad Shah

Regional Sericultural Research Station, Miransahib, Jammu

SCIENTIFIC STAFF: Dr. Santoshkumar Magadam, Scientist-D Dr. Sunil, Scientist-B **TECHNICAL STAFF:** Sh. Hira Lal Raina, Senior Technical Assistant Sh. Bachitar Lal, Senior Technical Assistant Sh. Sanjiv Kumar Sharma, Senior Technical Assistant Sh. Yashpal Bhagat, Senior Technical Assistant Sh. Tarsem Lal, Senior Technical Assistant Sh. Kam Raj, Senior Technical Assistant Sh. Chuni Lal, Senior Technical Assistant Sh. Madan Lal, Senior Technical Assistant Smt. Dalip Kour, Senior Technical Assistant Sh. Madan Lal, Senior Technical Assistant Sh. Sarbjit Singh, Senior Technical Assistant Sh. Ajay Sharma, Senior Technical Assistant Sh. Jagdish Singh Raja, Sr. Technical Asstt. Smt. Malavati, Senior Technical Assistant	**ADMINISTRATIVE STAFF:** Sh. Kourjit Singh, SCD-II Sh. Lekh Raj, Assistant Technician Sh. Mahraj Krishan Raina, Multi Tasking Staff Sh.Mela Ram, Multi Tasking Staff Sh. Madan Lal, Multi Tasking Staff Sh. Bhagat Bui Nath, Multi Tasking Staff Sh Darshan Lal, Multi Tasking Staff

Regional Sericultural Research Station, Sahaspur, Dehradun

SCIENTIFIC STAFF: Dr. Sardar Singh, Scientist-D (upto 19-10-2024) Sh. Chhattar Pal, Scientist-C Dr. E. Araskumar, Scientist-B Dr. Sakshi Vaishnav, Scientist-B **TECHNICAL STAFF:** Smt Malkait kour, Senior Technical Assistant Shri Madan Singh Chouhan, Sr. Tech. Asstt. Shri R. P. Godiyal, Senior Technical Assistant Smt. Chandrakala, Senior Technical Assistant Smt. Jyoti Krishali, Senior Technical Assistant Smt. Gunjan Ameta, Senior Technical Assistant Smt. Rekha Joshi, Senior Technical Assistant Smt. Meenakshi Chadha, Senior Technical Assistant Smt. Vandna Rathore, Senior Technical Assistant Shri Mohd Shafi Mir, Senior Technical Assistant Shri Piyush, Senior Field Assistant	**ADMINISTRATIVE STAFF:** Shri Manoj Kumar, Asstt. Supdt. (Admn) Shri Raj Kumar, MTS Shri Blaster Bhan, MTS Shri Kishan Lal Kalal, MTS Shri Ram Singh Jhala, MTS

Research Extension Centres (RECs)

REC, Lamberi (J&K) Smt. Neelam Kumari, Technical Assistant Sh. Parvaz Ahmad, Technical Assistant Sh. Parshotam Lal, Technical Assistant Sh. Ram Lal, Technical Assistant **REC, Ghumarwin** Dr. Rita Singh, Scientist-B Smt. Chander kala Ranaut, Senior Technical Assistant Sh. Praveen, Senior Technical Assistant Sh. Habibullah Wani, Senior Technical Assistant Sh Rajesh Godyal, Multi Tasking Staff	**REC- Basti** Dr. Ram Lakhan Ram, Scientist-D Shri Kailash Nath, Senior Technical Assistant Sh. Ashish Kumar Verma, Field Assistant.

ADMINISTRATIVE REPORT

EXPENDITURE 2024-2025 – AT A GLANCE

Table-1: Expenditure booked under the following head of accounts at this Institute and its delegated units during year 2024-25

[Rs. In Lakhs]

S.No.	Head of Accounts	Paln Salaries	Plan SCSP	Plan STSP	Paln Recuring	Paln Capital	Total
1.	Salary & allowances	2.52	-	-	-	-	**2.52**
2.	Wage & EPF				1.71	-	**1.71**
3	7th CPC arrears of SFW / Farm Workers						
4	Gratuity of SFW						
5	Pension Gratuity						
6	Gratuity & Retirement Benefits to Employees						
7	Define Pension Cont.						
8	Travelling Expenses				45.72		45.72
9	Contingencies				166.92		166.92
10	Assets					32.10	
11	Recoverable advance						
12	Advance deposited						
13	Released under R&D scheme						
Total		**2.52**			**214.35**	**32.10**	**248.97**

Table-2: Revenue Generation during 2024-25

Sl. No.	Source of Revenue Generation	Physical (No.)	Revenue generated (Rs. in Lakhs)	
			Target	Achievement
1	**Patent (Technology)**			
1.1	License Fee collected	--		
1.2	Royalty collected	--		
2	**Testing & Analytical charges (Sample)**			
2.1	Testing of Soil/water/FYM/ Leaf etc	Need based		
2.2	Quality analysis/ testing of products	Need based		
2.3	Testing of cocoons/silk yarn/fabric etc.	-		
3	**Consultancy (Services)**	--		
4	**Supply/ sale proceeds of cutting / Sapling/ seedling/ chawki worms/ cocoons/ Silk etc.**			
4.1	Mulberry cutting/ Mulberry leaf/ sale of green grass mulberry twigs	--		0.45
4.2	Vanya host plant sapling/ seedling	--		0
4.3	Mulberry chawki worms	--		0
4.4	Mulberry Seed (DFLs)	--		0
4.5	Vanya seed (DFLs)	--		0
4.6	Cocoons	--		3.31
4.7	Output from R&D Projects (Silk, fabric etc) Auction of scarab item, income from Hostel, Rent of tower, HRR & water charges	--		3.71
4.8	Others (pl specify)	--		0
	Total			**7.47**