वार्षिक प्रतिवेदन

Annual Report

2021-22

केंद्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान

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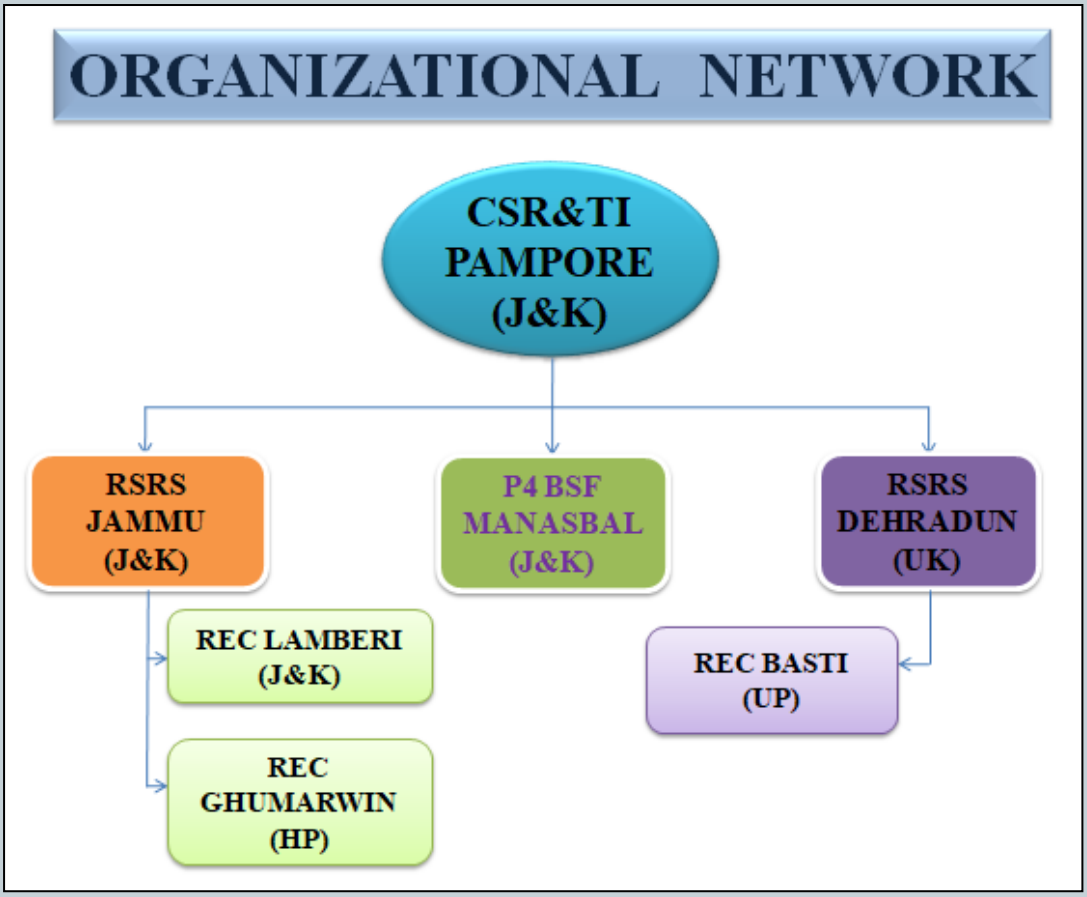








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वार्षिक अनुसंधान एवं प्रशासनिक प्रतिवेदन

ANNUAL RESEARCH & ADMINISTRATIVE REPORT

2021-2022

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान,
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Table-1: NEW RESEARCH PROJECTS INITIATED AS PI DURING 2021-22 (CSB CODED)

#	Project Code	Project Title	PERIOD	SCIENTISTS INVOLVED
1.	PIE03009SI	Evaluation of mulberry genotypes for improvement in productivity and quality under sub-tropical conditions of Jammu.	October, 2021-Nov.2024	PI: Santosh kumar Magadum CI: Vinod Singh CI: Rita Singh
2.	MOE03010SI	Evaluation of improved mulberry silkworm hybrids and technologies for North & North West India.	March, 2022-Feb. 2024	PI:Sardar Singh
3.	MOT03011MI	Popularization of Mulberry Sericulture in Kargil (Ladakh UT) *"In collaboration with College of temperate Sericulture (COTS), Mirgund"*	March, 2022 – Feb., 202	PI:Muttanna CI: Satish Y CI : Z.I.Buhroo
4.	PIE03012SI	Evaluation of Mulberry Somatic Hybrids.	March, 2022-Feb., 2025	PI: Gulab Khan Rohela CI: Pawan Saini CI :Ashok Kumar Kasakurti

Table-2: RESEARCH PROJECTS CONTINUEDAS PI DURING 2021-22 (CSB CODED)

#	Project Code	Project Title	PERIOD	SCIENTISTS INVOLVED
1.	PIB3629	Development of mulberry genotypes suitable for rainfed hill farming in North West India. (In collaboration With CSGRC, Hosur)	Jan. 2018 - Dec. 2021 (extended to June, 2022)	PI:Chhattarpal CI:Murali S
2.	AIB03002SI	Development of sustainable bivoltine silkworm double hybrids suitable to North West India.	March, 2020 - Feb., 2023	PI: Bharath Kumar Neelaboina CI: Shivkumar CI:Kiran R
3.	AIB03004SI	Evaluation and identification of high yielding bivoltine Silkworm *Bombyx mori* L. hybrids for temperate region of Jammu & Kashmir.	March, 2020 - Feb., 2023	PI: Kiran R CI:Bharath Kumar Neelaboina CI:Shivkumar
4.	AIB03006CI	Indo-Uzbekistan Collaborative Research Project on Improvement of Mulberry and Silkworm Breeding in Temperate Regions of India and Uzbekistan.	Aug., 2020 - July, 2026	PI: Sardar Singh CI:Pawan Saini CI:Bharath Kumar Neelaboina CI:Santosh Kumar Magadum
5.	AIB03007SI	Development of autumn specific bivoltine silkworm *Bombyx mori* L. suitable for temperate region of Jammu & Kashmir.	March 2021 - Feb., 2024	PI: Shivkumar CI: Bharath Kumar Neelaboina CI: Kiran R
6.	AIB03008SI	Development of nutrigenetic hybrids of bivoltine silkworm, *Bombyx mori* L. under sub-tropical conditions of North West India.	March 2021 - Feb., 2024	PI: Murali. S CI: Sardar Singh CI: Chhattarpal

Table-3: RESEARCH PROJECTS CONCLUDED AS PI DURING 2021-22 (CSB CODED):

#	Project Code	Project Title	PERIOD	SCIENTISTS INVOLVED
1.	PIB3586	Development of superior mulberry varieties through controlled hybridization for North-West Indian states *(In collaboration with CSGRC, Hosur)*	Sept. 2016 - Aug. 2021	PI : Rajesh Kumar CI: Pawan Saini CI : G. Thanavendan CI : K. Vijayan
2.	AIB3626	Identification of Bivoltine Silkworm Hybrids for Temperate Region of North West India.	March, 2018 - Feb. 2022	PI: Bharath Kumar Neelaboina CI: Shivkumar
3.	APR03003SI	Rescheduling of brushing date for second commercial crop rearing during autumn in Kashmir and Doon Valley.	March, 2020 - Feb., 2022	PI: Gulzar Ahmad Khan CI: Gulab Khan Rohela CI : K K Rai
4.	ARE03005SI	Development of trap through biorational tactics for the management of mulberry leaf webber *Glyphodes pyloalis* (Lepidoptera: Crambidae)	March, 2020 - Feb., 2022	PI: Rajesh Kumar CI: Satish Y.

Table 04: NEW RESEARCH PROJECTS INITIATED AS C.I DURING 2021-22

#	Project Code	Project Title	PERIOD	SCIENTISTS INVOLVED
1.	MOE02015MI	Evaluation of high yielding and low temperature stress tolerance mulberry varieties C-01 & C-11		CI: Santosh kumar Magadum CI: Chattar Pal
2.	MTL01025MI	Life cycle assessment of Mulberry Silk: A National assessment		CI : Kiran R

Table 05: RESEARCH PROJECTS CONTINUED AS C.I DURING 2021-22 (CSB CODED)

#	Project Code	Project Title	PERIOD	SCIENTISTS INVOLVED
1.	PIE01003MI	All India coordinated experimental trial for mulberry (AICEM-Phase IV)	2019-2025	Sardar Singh (Zonal – Coord.) Pawan Saini (Co-PI) Chattarpal (CI) Gulzar Ahmad Khan (CI) R.P Singh (CI)
2.	AIB01009MI	Evaluation of new bivoltine silkworm double hybrid TT21×TT56 at farmer's level for authorisation for commercial exploitation.	Arpil 2020-March-2023	CI: K.K Rai CI: Rita Singh

Table 06: RESEARCH PROJECTS CONCLUDEDAS C.I DURING 2021-22 (CSB CODED):

#	Project Code	Project Title	PERIOD	SCIENTISTS INVOLVED
1.	AIE-06002MI	Evaluation of bivoltine silkworm genetic resources for tolerance to abiotic stress in selected hot spots. *(In collaboration with *CSGRC Hosour, **SBRL, Bengaluru, ***REC, Chitradurga, #CSR&TI,Berhampore, ##RSRS,Jammu)*	April 2019 - March 2022	Sardar Singh & Murali S

Table 07: CONTINEOUS PROGRAMMES

#	Programme Code	Progamme Title	PERIOD	SCIENTISTS INVOLVED
1.	SS Pam-01	Nutrient analysis of soils & mulberry under temperate conditions	Continous	Gulab Khan Rohela
2.	PIB-Pam 1	Acquisition, Conservation, Characterization and Utilization of mulberry germplasm under temperate conditions	Continous	Pawan Saini Rajesh Kumar (upto July 2021)
3.	AIE -3056	Maintenance of Silkworm germplasm	Continous	Shivkumar Bharath Kumar Neelaboina
4.	AIE -3202	Maintenance of Silkworm Breeders' stock.	Continous	Bharath Kumar Neelaboina Shivkumar
5.	PIB -3212	Maintenance and characterization of mulberry genepool	Continuous	Surendar Kumar
6.	AIB -2016	Maintenance and evaluation of silkworm germplasm with manintainence of Parental Lines & Breeder's Stock	Continuous	K K Rai
7.	OFT Pam-17	Evaluation & Characterization of silkworm germplasm under sub-tropical conditions of Jammu & Kashmir.	Continuous	Murali S

ONGOING RESEARCH PROJECTS

AT MAIN INSTITUTE:

1. Project Code & Title: AIB03002SI-Development of sustainable Bivoltine Silkworm Double Hybrids suitable to North West India

Project Duration: March, 2020–February, 2023

Investigator (s): Bharath Kumar Neelaboina, Shivkumar & Kiran R

Objective(s):

- To develop and evaluate the performance of double hybrids suitable for North West India.
- To identify high yielding bivoltine silkworm double hybrids suitable for North West India.

Progress:

Three each oval and constricted foundation crosses were identified and shortlisted under the research project AIB-3609 was utilized for the preparation of 09 double hybrids. These 09 bivoltine silkworm double hybrids were reared during spring (May-June) summer (July-August) and autumn (August-September) 2021, respectively along with control FC2xFC1. The data of economically important traits such as Fecundity (no.), Hatching percentage (%), Yield by no., Yield by weight (kg), Single cocoon weight (g), Single shell weight (g), Shell ratio (%), pupation rate and Filament length (m) were evaluated for multi- traits evaluation index values (EI) and the results obtained is presented in Table 01 to 06. During spring season Doublehybrid-8 (DH-8) performed well with E.I value of 60.32 over the control 59.83, similar trend was observed during summer in which DH-8 was recorded E.I value of 60.37 over control 59.59.Further, during autumn season, DH-9 out performed compared to all the other double hybrids and recorded E.I value of 61.93 over control 59.50.

Table 01: Rearing Performance of the double hybrids during spring, 2021

Hybrid	Fec. (No)	Hat.%	Coccoon yield By No.	Coc.yield By wt.(kg)	SCW (g)	SSW (g)	SR (%)	Pupation rate (%)	Filament length (m)
DH-1	518	94.46	9173	13.48	1.64	0.33	19.88	90.33	806
DH-2	481	89.24	9040	12.28	1.53	0.29	19.13	89.00	757
DH-3	543	93.46	9560	14.81	1.72	0.35	20.41	94.00	821
DH-4	502	90.42	9267	12.82	1.56	0.28	17.78	91.33	741
DH-5	529	94.41	9373	14.13	1.68	0.34	20.13	92.33	814
DH-6	492	88.10	8520	11.91	1.59	0.30	18.69	83.67	756
DH-7	472	90.66	8947	11.98	1.52	0.29	19.32	88.33	772
DH-8	526	94.42	9560	15.13	1.75	0.36	20.77	94.33	816
DH-9	549	93.31	9267	13.88	1.67	0.34	20.16	91.33	785
FC2xFC1	528	94.24	9493	14.86	1.73	0.35	20.41	93.67	856
Mean	514	92.27	9220	13.53	1.64	0.32	19.67	90.83	792
STDEV	26.01	2.43	321.98	1.23	0.08	0.03	0.93	3.24	36.39

Table 02: Evaluation index values (EI) of the double hybrids during spring, 2021

Hybrid	Fec.(No)	Hat. %	Cocoon yield By No.	Coc.yield By wt.(kg)	SCW (g)	SSW (g)	SR (%)	Pupation rate (%)	Fil.length (m)	Avg. E.I
DH-1	51.41	59.02	48.55	49.63	50.55	51.32	52.30	48.46	53.82	51.67
DH-2	37.44	37.50	44.41	39.81	37.56	40.32	44.20	44.34	40.17	40.64
DH-3	61.02	54.89	60.56	60.43	59.21	59.02	58.00	59.78	57.94	58.98
DH-4	45.52	42.35	51.45	44.25	40.31	34.82	29.66	51.54	35.78	41.74
DH-5	55.77	58.81	54.76	54.88	54.49	54.62	54.98	54.63	56.02	55.44
DH-6	41.67	32.81	28.26	36.84	43.86	41.42	39.46	27.86	39.99	36.91
DH-7	33.73	43.36	41.51	37.34	35.98	40.32	46.22	42.28	44.29	40.56
DH-8	54.61	58.85	60.56	63.07	63.15	63.42	61.88	60.81	56.48	60.32
DH-9	63.45	54.29	51.45	52.87	53.70	54.62	55.28	51.54	47.96	53.91
FC2xFC1 (Control)	55.38	58.12	58.49	60.86	61.18	60.12	58.02	58.75	67.56	59.83

Table 03: Rearing Performance of the double hybrids during summer, 2021

Hybrid	Fec. (No)	Hat.%	Coc.yield By No.	Coc.yield By wt.(kg)	SCW (g)	SSW (g)	SR (%)	Pupation rate (%)	Filament length (m)
DH-1	517	90.33	9173	13.30	1.62	0.32	19.74	90.33	796
DH-2	486	88.33	8600	11.55	1.53	0.29	18.74	84.67	871
DH-3	523	93.00	9400	14.13	1.67	0.34	20.33	92.67	849
DH-4	476	90.00	9000	12.71	1.59	0.30	18.87	88.67	752

DH-5	518	91.00	9227	13.66	1.65	0.33	20.16	91.00	831
DH-6	495	92.00	8613	11.79	1.55	0.29	18.88	85.00	873
DH-7	502	93.00	8680	11.36	1.49	0.29	19.65	85.67	821
DH-8	533	93.33	9520	14.46	1.69	0.35	20.56	93.67	842
DH-9	534	94.00	9293	13.49	1.62	0.33	20.14	91.67	794
FC2 xFC1 (Control)	536	93.67	9467	14.24	1.67	0.34	20.34	93.00	856
Mean	512	91.87	9097	13.07	1.61	0.32	19.74	90	828
STDEV	21.05	1.87	354.78	1.15	0.07	0.02	0.69	3.43	38.44

Table 04: Evaluation index values (EI) of the double hybrids during summer, 2021

Hybrid	Fec.(No)	Hat. %	Coc.yield By No.	Coc.yield By wt.(kg)	SCW (g)	SSW (g)	SR (%)	Pupation rate (%)	Fil.length (m)	Avg. E.I
DH-1	52.26	41.82	52.14	52.03	52.01	50.88	50.03	52.04	41.56	49.42
DH-2	37.85	31.14	35.98	36.85	37.96	36.18	35.42	35.53	61.07	38.67
DH-3	55.27	56.05	58.53	59.18	59.53	59.70	58.59	58.83	55.26	57.88
DH-4	33.10	40.04	47.26	46.91	46.99	42.06	37.26	47.18	30.11	41.21
DH-5	52.90	45.37	53.65	55.11	56.52	56.76	56.15	53.98	50.67	53.46
DH-6	41.81	50.71	36.36	38.91	41.47	39.12	37.41	36.51	61.51	42.65
DH-7	45.14	56.05	38.24	35.20	32.45	39.12	48.63	38.45	48.07	42.37
DH-8	60.02	57.83	61.91	62.03	61.54	62.64	61.97	61.75	53.62	60.37
DH-9	60.34	61.39	55.52	53.61	52.01	53.82	55.88	55.92	40.95	54.38
FC2 x FC1 (Control)	61.29	59.61	60.41	60.16	59.53	59.70	58.67	59.81	57.17	59.59

Table 05: Rearing Performance of the double hybrids during autumn, 2021

Hybrid	Fec. (No)	Hat.%	Coc.yield By No.	Coc.yield By wt.(kg)	SCW (g)	SSW (g)	SR (%)	Pupation rate (%)	Filament length (m)
DH-1	503	92.94	8947	11.67	1.48	0.28	18.88	88.33	738
DH-2	495	88.78	8800	11.90	1.53	0.29	19.12	86.67	750
DH-3	515	93.60	9320	13.40	1.61	0.32	19.88	91.67	812
DH-4	534	92.66	8680	11.62	1.52	0.29	19.27	85.67	762
DH-5	522	93.05	9280	12.91	1.56	0.31	20.05	91.33	806
DH-6	520	90.98	8547	10.90	1.46	0.27	18.69	84.33	725
DH-7	488	89.27	8760	11.63	1.51	0.28	18.78	86.33	769
DH-8	519	92.67	9360	13.53	1.62	0.33	20.21	92.33	822
DH-9	533	93.58	9413	13.84	1.64	0.34	20.53	92.67	835
FC2 x FC1 (Control)	527	93.27	9400	13.63	1.62	0.33	20.16	92.67	832
Mean	516	92.08	9051	12.50	1.56	0.30	19.56	89	785
STDEV	15.70	1.78	337.30	1.07	0.06	0.02	0.68	3.27	40.83

Table 06: Evaluation index values of the double hybrids during autumn, 2021

Hybrid	Fec. (No)	Hat.%	Coc.yield By No.	Coc.yield By wt.(kg)	SCW (g)	SSW (g)	SR (%)	Pupation rate (%)	Fil.length (m)	Avg. E.I
DH-1	41.97	54.82	46.92	42.21	38.35	39.09	40.01	47.35	38.41	43.24
DH-2	36.67	31.40	42.57	44.30	46.33	44.99	43.63	42.25	41.51	41.52
DH-3	49.83	58.56	57.99	58.44	58.56	56.78	54.80	57.55	56.53	56.56
DH-4	61.72	53.26	39.01	41.76	44.74	44.99	45.76	39.18	44.37	46.09
DH-5	54.08	55.48	56.80	53.80	51.12	53.83	57.19	56.53	55.06	54.88
DH-6	53.01	43.79	35.06	35.01	35.16	36.15	37.32	35.10	35.30	38.43
DH-7	32.21	34.18	41.38	41.78	42.61	40.57	38.55	41.22	46.08	39.84
DH-8	52.38	53.34	59.17	59.65	59.62	59.73	59.54	59.59	59.14	58.02
DH-9	61.08	58.46	60.75	62.51	63.35	64.15	64.32	60.61	62.16	61.93
FC2 x FC1 (Control)	57.05	56.72	60.36	60.54	60.16	59.73	58.88	60.61	61.43	59.50

2. Project Code &Title: AIB03004SI -Evaluation and identification of high yielding Bivoltine silkworm (*Bombyx mori* L.) hybrids for temperate region of Jammu & Kashmir

Project Duration: March, 2020–February, 2023

Investigator (s): Kiran R, Bharath Kumar Neelaboina & Shivkumar

Objective(s):

- To evaluate the performance of hybrids for the temperate region of Jammu & Kashmir
- To identify high yielding bivoltine silkworm hybrids for the temperate region of Jammu & Kashmir

Progress:

A total of 8 parents and 16 hybrids were reared during Spring, Summer, and Autumn, 2021 season respectively, which comprised of 16 straight crosses in Spring 2021 and 8 shortlisted hybrid combinations during Spring and Autumn, 2021 along with its reciprocals. The data from six rearing was statistically analysed with appropriate statistical methods such as, Evaluation Index, Heterosis (MPV), Heterobeltiosis (BPV), Hybrid vigor (CPV), Classical multivariate clustering and Analysis of Variance. The results revealed that the hybrid combinations *viz*., BP- 2 x Line- 13 and BP- 2 x SO- 17 were found to performed well and which were shortlisted for further On Station Trial (OST) at CSR&TI, Pampore, RSRS Jammu and Sahaspur, respectively. The average EI values of the shortlisted hybrids from six seasons showed more than 50 and majority of the MPV, BPV and CPV values were found to be in positive side for the major economic traits and presented in Table-1-3, respectively.

Table 01: Comparative rearing performances of the silkworm hybrids during the spring season.

Hybrid	Fec. (No.)	Hat. (%)	Yield By No.	Yield By wt. (kg)	SCW (g)	SSW (g)	SR (%)	Pup. Rate (%)	AFL (m).	Avg EI
KR1	488	94.58	9560	14.12	1.65	0.28	17.02	89.70	583	48
KR2	467	95.58	9560	13.74	1.61	0.27	16.82	93.16	525	47
KR3	493	93.73	9620	13.21	1.54	0.31	19.81	93.96	676	56
KR4	498	93.83	9740	12.72	1.47	0.28	19.05	89.73	702	53
KR5	450	92.68	9640	10.02	1.21	0.24	19.50	90.60	701	41
KR6	509	94.20	9560	12.16	1.44	0.25	17.01	94.14	641	48
KR7	503	93.05	9520	12.59	1.49	0.30	19.80	93.00	606	52
KR8	511	92.86	9580	12.66	1.49	0.29	19.46	94.23	698	55
KR9	469	93.14	9560	11.58	1.38	0.26	18.48	89.12	684	43
KR10	511	94.10	9560	14.46	1.68	0.34	20.09	93.62	702	58
KR11	509	93.53	9580	13.39	1.57	0.31	20.00	93.23	746	58
KR12	501	93.28	9520	13.54	1.59	0.33	20.85	93.64	702	58
KR13	464	92.88	9500	12.08	1.44	0.26	17.71	90.15	548	41
KR14	492	92.81	9480	11.86	1.42	0.28	19.86	92.90	811	51
KR15	459	93.11	9560	11.55	1.38	0.26	18.55	90.64	492	41
KR16	468	93.24	9420	11.01	1.34	0.26	19.10	91.66	679	42
SH6x NB4D2	507	93.21	9580	11.96	1.42	0.27	19.08	92.06	733	51
FC2	505	94.03	9720	13.03	1.51	0.31	20.27	92.49	619	56

Table 02: Comparative rearing performances of the silkworm hybrids during the summer season.

Hybrid	Fec. (No.)	Hat. (%)	Yield By No.	Yield By wt. (kg)	SCW (g)	SSW (g)	SR (%)	Pup. Rate (%)	AFL (m).	Avg EI
KR3	537	96.25	9620	14.18	1.64	0.30	18.29	90.78	794	52
KR4	470	95.32	9600	13.26	1.55	0.29	18.41	92.07	754	39
KR7	507	95.52	9560	12.70	1.50	0.29	19.39	92.37	786	46
KR8	494	95.80	9740	12.02	1.40	0.28	19.67	92.86	790	42
KR10	501	96.08	9560	12.98	1.53	0.32	20.66	93.11	852	55
KR11	499	96.06	9600	13.48	1.57	0.31	19.94	94.25	649	51
KR12	519	95.87	9640	13.43	1.56	0.32	20.51	93.96	850	56
KR14	500	95.72	9640	13.06	1.52	0.30	20.00	93.27	887	49
KR3R	527	96.12	9500	13.51	1.59	0.30	18.81	94.02	748	53
KR4R	507	95.88	9560	13.12	1.54	0.29	19.10	92.89	657	46
KR7R	493	96.11	9560	13.49	1.58	0.31	19.67	93.16	665	50
KR8R	506	95.87	9480	13.01	1.54	0.30	19.15	92.43	779	48
KR10R	510	95.75	9540	13.67	1.60	0.32	20.13	94.84	798	57
KR11R	523	96.43	9620	13.55	1.58	0.32	20.05	92.79	808	55
KR12R	505	96.00	9560	13.44	1.57	0.32	20.31	92.78	743	53
KR14R	514	96.13	9580	14.06	1.64	0.33	19.92	91.84	901	58
SH6xNB4D2	527	95.06	9540	12.80	1.51	0.29	19.24	90.37	758	39
FC2	518	96.05	9580	13.38	1.56	0.32	20.46	93.39	688	52

R- Indicates reciprocal of straight cross

Table 03: Comparative rearing performances of the silkworm hybrids during the autumn season.

Hybrid	Fec. (No.)	Hat. (%)	Yield By No.	Yield By wt. (kg)	SCW (g)	SSW (g)	SR (%)	Pup. Rate (%)	AFL (m).	Avg EI
KR3	495	94.53	9260	13.03	1.58	0.28	17.72	90.24	659	41
KR4	506	94.25	9240	13.83	1.67	0.30	17.97	91.12	558	45
KR7	507	94.14	9140	14.35	1.75	0.31	17.77	90.59	790	49
KR8	508	93.93	9400	14.29	1.69	0.31	18.04	87.74	720	48
KR10	504	94.16	9660	13.71	1.59	0.31	19.25	91.39	823	52
KR11	544	88.20	9570	14.10	1.64	0.33	20.12	88.14	561	52
KR12	523	93.96	9660	14.24	1.64	0.33	19.81	93.78	798	58
KR14	508	93.30	9420	13.66	1.62	0.34	20.68	89.95	907	55
KR3R	543	93.16	9500	14.69	1.72	0.29	16.93	89.84	759	51
KR4R	524	92.81	9660	13.47	1.56	0.28	17.94	86.02	792	45
KR7R	554	94.49	9600	12.51	1.47	0.29	19.40	87.89	691	45
KR8R	526	92.52	9540	14.14	1.65	0.29	17.57	89.25	568	46
KR10R	537	93.05	9600	15.35	1.77	0.34	19.28	91.76	727	60
KR11R	539	93.94	9580	14.45	1.68	0.31	18.21	91.55	707	53
KR12R	538	95.42	9650	13.89	1.61	0.32	19.63	91.66	705	54
KR14R	573	94.03	9540	12.99	1.53	0.29	18.95	88.45	814	49
SH6xNB4D 2	552	93.07	9620	13.89	1.61	0.31	18.94	92.15	762	45
FC2	467	92.96	9660	13.08	1.52	0.29	19.08	89.30	719	51.62

R- Indicates reciprocal of straight cross

3. Project Code &Title: AIB03006CI - Indo-Uzbekistan collaborative research project for improvement of mulberry and silkworm breeding in temperate regions of India and Uzbekistan

Project Duration: August, 2020 – July, 2026 (Revised upto March 2030)

Investigator (s): Sardar Singh, Pawan Saini, Bharath Kumar Neelaboina & Santosh Kumar Magdum

Objective(s):

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

Progress:

- **Short-listing of genetic resources to be shared between CSR&TI, Pampore, India and SRIS, Tashkent, Uzbekistan**

  Based upon the passport information, four genotypes each of mulberry (Goshoerami, KNG, Ichinose and Chinese white) and silkworm (SO-17, BP-2, PAM-114 and PAM-117) have been short-listed for sharing with SRIS, Tashkent, Uzbekistan.

  Similarly, based upon the passport information provided by SRIS, Tashkent, four genotypes of mulberry (Balkhi-tut, Marvarid-tut, Nar-tut, Katlama-tut) and five breeds of silkworm (Sovetskaya – 14, Ipakchi 2, Mechenaya 1, Mechenaya 2, YP – 120) were short-listed for procurement from SRIS, Tashkent, Uzbekistan.
- **Online web-meeting for finalization of genetic resources, signing of MTA and exchange of material and date of scientific personals visit**

  An online web-meeting was conducted on 23rd November, 2021 through Zoom platform with SRIS, Tashkent, Uzbekistan and discussion was made regarding the short-listed mulberry and silkworm genotypes from CSR&TI, Pampore, India and SRIS, Tashkent, Uzbekistan, signing of MTA documents & tentative dates of visit of scientific personals from CSR&TI, Pampore, India and SRIS, Tashkent, Uzbekistan was also discussed during the meeting.
- **Signing of Material Transfer Agreement (MTA) for sharing of genetic resources between CSR&TI, Pampore, India and SRIS, Tashkent, Uzbekistan**

  The approved MTA documents and minutes of online web meeting were communicated to SRIS, Tashkent, Uzbekistan and the MTA has been agreed on 25th March, 2022. Initiated the work on clearance from the regulatory bodies viz., National Biodiversity Authority of India, Chennai, Import permit from NBPGR, New Delhi & NBAIR, Bengaluru for sharing of genetic resources between the two countries.

4. Project Code & Title: AIB03007SI -Development of autumn specific bivoltine silkworm (bombyx *mori*l.) hybrids suitable for temperate region of Jammu & Kashmir

Project Duration: March, 2021 – February, 2024

Investigator (s): Shivkumar, Bharath Kumar Neelaboina & Kiran R

Objective(s):

- To develop stable autumn specific bivoltine hybrids to suit the temperate region of Jammu & Kashmir
- To increase autumn season cocoon yields in the temperate region of Jammu & Kashmir

Progress:

A total of sixteen autumn specific hybrids (ASH) have been reared during autumn, 2021 and data was recorded for nine important economic parameters *viz*., Fecundity (No,), Hatching %, Larval weight (g), Yield /10,000 larvae by no. and by weight (kg), Single cocoon weight (g), Single shell weight (g), Shell ratio (%), Pupation rate (%), Filament length (m). The comparative rearing performance of 16 autumn specific hybrids along with controls is presented in Table-1&2. Further, the data was subjected to the multi- traits evaluation index to adjudicate the superiority of the autumn specific hybrids and presented in Table-2.The preliminary data analyzed revealed that, out of 16 hybrid combinations, the nine autumn specific hybrids viz., ASH-1, ASH-2, ASH-3, ASH-5 ASH-6, ASH-7, ASH-10, ASH-13 & ASH-14 were exhibited more than 50 index value (>50) during autumn season, 2021, which are considered as economically viable autumn specific hybrids for further utilization under the study.

Table 01: Comparative rearing performances of the 16 autumn specific hybrids in autumn season, 2021.

Traits / Hybrids	Fec. (No.)	Hat. (%)	Yield/ 10,000 larvae brushed		SCW (g)	SSW (g)	SR (%)	Pup. rate	FL (m)
			By No.	By wt.(kg)					
ASH-1	546	95.07	9740	13.98	1.62	0.31	19.14	94.00	792
ASH-2	532	94.89	9900	13.69	1.57	0.31	19.49	94.50	811
ASH-3	536	94.54	9960	14.14	1.60	0.31	19.38	95.00	788
ASH-4	405	94.77	9460	12.91	1.56	0.27	17.04	92.50	704
ASH-5	543	95.05	9900	14.44	1.64	0.33	20.12	94.50	739
ASH-6	568	95.18	9620	13.56	1.60	0.33	20.36	92.50	737
ASH-7	562	95.60	9860	14.42	1.65	0.34	20.67	94.50	721
ASH-8	402	94.32	9940	13.21	1.51	0.29	19.21	94.00	745
ASH-9	421	94.28	9480	12.28	1.49	0.28	18.52	91.50	792
ASH-10	532	95.52	9880	14.45	1.65	0.34	20.36	94.50	779
ASH-11	409	95.23	9380	12.74	1.55	0.28	18.06	91.50	819
ASH-12	406	95.50	9060	12.52	1.58	0.29	18.35	88.00	730
ASH-13	536	95.60	9280	13.97	1.70	0.35	20.59	90.50	748
ASH-14	550	95.48	9880	14.30	1.63	0.33	20.25	94.50	851
ASH-15	425	94.78	9060	12.51	1.58	0.29	18.36	89.00	710
ASH-16	410	94.38	9940	13.51	1.54	0.28	18.18	93.50	703
SH6×NB4D2	467	92.96	9740	13.20	1.52	0.29	19.08	95.00	762
FC1 × FC2	568	94.30	9740	12.71	1.49	0.30	20.20	94.50	805
G11 × G19	515	93.85	9820	13.87	1.58	0.31	19.37	91.50	768
Range	402-568	94.28-95.60	9060-9960	12.51-14.45	1.49-1.70	0.27-0.35	17.04-20.67	88.00-95.00	703-851
Average	478	94.80	9666	13.55	1.58	0.31	19.29	92.87	763
SD	102.9	0.69	294.70	0.70	0.05	0.02	1.01	2.05	42.22

Table 02:Multi- traits evaluation index of the 16 autumn specific hybrids during the autumn season, 2021

Traits / Hybrids	Fec.(No.)	Hat. (%)	Yield/ 10,000 larvae brushed		SCW (g)	SSW (g)	SR (%)	Pup. rate	FL (m)	Average EI
			By No.	By wt.(kg)						
ASH-1	56.56	53.84	52.50	56.09	58.00	50.00	48.47	55.51	56.87	54.20
ASH-2	55.28	51.23	57.93	52.05	47.00	47.50	51.97	57.95	61.37	53.59
ASH-3	55.65	46.23	59.97	58.37	54.00	50.00	50.84	60.39	55.92	54.60
ASH-4	42.91	49.49	43.00	40.90	45.00	27.50	27.74	48.20	36.03	40.08
ASH-5	56.33	53.55	57.93	62.66	62.00	60.00	58.24	57.95	44.32	57.00
ASH-6	58.69	55.43	48.43	50.11	53.30	57.50	60.56	48.20	43.84	52.90

ASH-7	58.17	61.59	56.57	62.42	63.00	65.00	63.65	57.95	40.05	58.71
ASH-8	17.29	43.04	59.29	45.14	36.00	40.00	49.16	55.51	45.74	43.46
ASH-9	44.42	42.39	43.68	31.82	31.00	32.50	42.36	43.32	56.87	40.93
ASH-10	55.28	60.36	57.25	62.91	63.00	62.50	60.64	57.95	53.79	59.30
ASH-11	43.27	56.16	40.28	38.41	44.00	35.00	37.87	43.32	63.26	44.62
ASH-12	43.04	60.14	29.43	35.24	50.00	40.00	40.74	26.24	42.18	40.78
ASH-13	55.63	61.59	36.89	56.04	74.00	70.00	62.85	38.44	46.45	55.77
ASH-14	57.03	59.78	57.25	60.77	60.00	60.00	59.46	57.95	70.84	60.34
ASH-15	44.85	49.71	29.43	35.17	49.90	40.00	40.79	31.12	37.45	39.82
ASH-16	43.41	43.84	59.29	49.40	42.00	35.00	39.03	53.07	35.79	44.54
SH6×NB4D2	48.95	23.26	52.50	45.07	38.00	40.00	47.91	60.39	49.76	45.09
FC1 × FC2	58.77	42.68	53.18	53.17	49.00	52.50	57.03	53.07	59.95	53.26
G11 × G19	53.58	36.16	55.21	54.52	49.00	47.50	50.74	43.32	51.18	49.02

AT REGIONAL SERICULTURAL RESEARCH STATION JAMMU:

5. Project Code &Title: AIB03008SI -Development of nutrigenetic hybrids of bivoltine silkworm (*Bombyx mori* L.) under sub-tropical conditions of North-West India

Project Duration: March, 2021 – February, 2024

Investigator (s): Murali S, Sardar Singh & Chattarpal

Progress:

Fifteen hybrid combinations along with two controls were evaluated during late spring (2021). The result revealed that, the consumption index was very less in hybrids viz., CSR50×BHR3 (0.26), RSJ14×B.CON4 (0.26), CSR50×B.CON1 (0.27), CSR50×B.CON4 (0.27), RSJ14×B.con 1 (0.29) compared to other hybrids (Table 1&2). The efficiency conversion for ingesta to cocoon was highest in the hybrids viz., FC1×FC2 (30.05), RSJ14×B.CON4 (29.53), CSR50×BHR3 (29.04), CSR50×B.CON4 (28.94), CSR50×B.CON1 (28.29), RSJ14×B.CON1 (26.62) and efficiency conversion for ingesta to shell was highest in the Hybrids viz., FC1×FC2 (21.13), RSJ14×B.CON4 (19.30), CSR50×BHR3 (19.20), CSR50×B.CON4 (18.90), CSR50×B.CON1 (18.71), RSJ14×B.CON1 (17.60). The ingesta per gram of the cocoon was very less compared to other hybrids viz., FC1×FC2 (3.33), RSJ14×B.CON4 (3.39), CSR50×BHR3 (3.44), CSR50×B.CON4 (3.46), CSR50×B.CON1 (3.54), RSJ14×B.CON1 (3.76) and the ingesta per gram of the shell was very less compared to other hybrids viz., FC1×FC2 (4.73), RSJ14×B.CON4 (5.18), CSR50×BHR3 (5.21), CSR50×B.CON4 (5.29), CSR50×B.CON1 (5.35), RSJ14×B.CON1 (5.68) (Table 3) and all the parameters taken for the study showed stastically significantly different from each other.

During autumn (2021), the data revealed that, the consumption index was very less in hybrids viz., FC1×FC2 (0.42), RSJ14×BHR3 (0.43), RSJ14×B.CON1 (0.43), CSR50×BHR3 (0.44), RSJ14×B.CON4 (0.45), RSJ14×BHR2 (0.45) compared to other hybrids. The efficiency conversion for ingesta to cocoon was highest in the hybrids viz., FC1×FC2 (10.72), RSJ14×B.CON1 (10.21), RSJ14×BHR2 (9.60), CSR50×B.CON4 (8.98), RSJ14×BHR3 (8.86), CSR50×BHR3 (8.82), CSR50×BHR2 (8.80) and efficiency conversion for ingesta to shell was highest in the Hybrids viz., FC1×FC2 (4.92), RSJ14×B.CON1 (4.75), CSR50×B.CON4 (4.55), CSR50×BHR2 (4.46), RSJ14×B.CON4 (4.31), CSR50×BHR3 (3.94), RSJ14×BHR3 (3.86). The ingesta per gram of the cocoon was very less compared to other hybrids viz., FC1×FC2 (9.33), RSJ14×B.CON1 (9.79), RSJ14×BHR2 (10.42), CSR50×B.CON4 (11.14), RSJ14×BHR3 (11.28), CSR50×BHR3 (11.34), CSR50×BHR2 (11.36), RSJ14×B.CON4 (11.76) and the ingesta per gram of the shell was very less compared to other hybrids viz., FC1×FC2 (20.33), RSJ14×B.CON1 (21.05), CSR50×B.CON4 (22.00), CSR50×BHR2 (22.42), RSJ14×B.CON4 (23.21), CSR50×BHR3 (25.35), RSJ14×BHR3 (25.88) and all the parameters taken for the study showed statistically significantly different from each other (Table 3 & 4).

Table 1: Nutrigenetic traits recorded for different hybrid combinations (Late Spring, 2021)

Hybrids	I/larva (g.)	D/larva (g.)	E/larva (g.)	AD (%)	RR	CI	RGR	R (g.)	MR
RSJ14×BHR2	5.64	1.97	3.67	34.86 (36.17)	1.54	0.30	0.03	0.78	0.04
RSJ14×BHR3	5.61	2.09	3.52	37.18 (37.55)	1.59	0.37	0.04	0.95	0.06
RSJ14×BCON1	4.55	1.22	3.32	26.86 (31.20)	1.37	0.29	0.04	0.23	0.01
RSJ14×BCON4	4.30	1.28	3.02	29.79 (33.06)	1.42	0.26	0.04	0.05	0.00
RSJ14×NB4D2	4.63	1.41	3.22	30.37 (33.43)	1.44	0.30	0.04	0.44	0.03
ATR16×BHR3	5.52	2.25	3.27	40.69 (39.62)	1.69	0.38	0.04	1.34	0.09
ATR16×BHR2	4.29	0.99	3.30	23.10 (28.71)	1.30	0.35	0.04	0.28	0.02

ATR16×BCON1	4.67	1.24	3.42	26.60 (31.03)	1.36	0.33	0.04	0.41	0.03
ATR16×BCON 4	4.52	1.45	3.07	32.08 (34.48)	1.47	0.33	0.04	0.55	0.04
ATR16×NB4D2	5.42	2.10	3.32	38.67 (38.43)	1.63	0.40	0.04	1.31	0.10
CSR50×BHR2	5.15	2.53	2.62	49.05 (44.44)	1.96	0.34	0.04	1.19	0.08
CSR50×BHR3	4.27	1.47	2.80	34.45 (35.92)	1.53	0.26	0.04	0.18	0.01
CSR50×BCON1	4.49	1.69	2.80	37.66 (37.83)	1.60	0.27	0.04	0.43	0.03
CSR50×BCON4	4.29	1.41	2.87	32.93 (35.00)	1.49	0.27	0.04	0.26	0.02
CSR50×NB4D2	4.96	2.36	2.60	47.60 (43.60)	1.91	0.32	0.04	1.21	0.08
FC1×FC2 (Control)	4.26	1.63	2.63	38.31 (38.22)	1.62	0.32	0.05	0.13	0.01
CSR2×CSR4(Control)	5.27	1.89	3.37	35.92 (36.81)	1.56	0.35	0.03	1.21	0.08
CD@1(%)	0.01	0.01	0.01	0.009	0.01	0.01	0.004	0.01	0.007
Sem±	0.00	0.005	0.005	0.003	0.005	0.005	0.001	0.005	0.002
CV (%)	0.14	0.41	0.22	0.01	0.45	2.20	4.31	1.10	7.88

Note: I –Ingesta, D – Digesta, E – Excreta, AD – Approximate Digestibility, RR- Reference ratio, CI – Consumption Index, RGR- Relative Growth Rate, R- Respiration, MR – Metabolic rate; SD-Standard Deviation

Table 2: Nutritional efficiency conversion parameters recorded for different hybrid combinations (Late Spring, 2021)

Hybrids	**Larva (%)**		**Cocoon (%)**		**Shell (%)**		**Cocoon (g.)**		**Shell (g.)**	
	ECI	**ECD**	**ECI**	**ECD**	**ECI**	**ECD**	**I/g**	**D/g**	**I/g**	**D/g**
RSJ14×BHR2	21.10 (27.33)	60.53 (51.06)	23.23 (28.80)	66.63 (54.68)	15.78 (23.39)	45.27 (42.27)	4.31	1.50	6.34	2.21
RSJ14×BHR3	20.32 (26.77)	54.65 (47.64)	19.61 (26.27)	52.73 (46.54)	13.37 (21.44)	35.95 (36.82)	5.10	1.90	7.48	2.78
RSJ14×BCON1	21.78 (27.80)	81.08 (64.18)	26.62 (31.04)	99.10 (84.53)	17.60 (24.79)	65.52 (54.01)	3.76	1.01	5.68	1.53
RSJ14×BCON4	28.60 (32.31)	96.02 (78.46)	29.53 (32.90)	99.14 (84.62)	19.30 (26.04)	64.79 (53.57)	3.39	1.01	5.18	1.54
RSJ14×NB4D2	20.95 (27.22)	68.99 (56.13)	25.05 (30.01)	82.50 (65.24)	17.71 (24.87)	58.32 (49.76)	3.99	1.21	5.65	1.71
ATR16×BHR3	16.49 (23.95)	40.52 (39.52)	20.11 (26.63)	49.42 (44.64)	13.59 (21.62)	33.39 (35.28)	4.97	2.02	7.36	2.99
ATR16×BHR2	16.55 (23.99)	71.64 (57.79)	22.14 (28.05)	95.86 (78.22)	15.15 (22.89)	65.59 (54.05)	4.52	1.04	6.60	1.52
ATR16×BCON1	17.79 (24.93)	66.88 (54.84)	21.86 (27.86)	82.19 (65.00)	15.01 (22.78)	56.41 (48.66)	4.57	1.22	6.66	1.77
ATR16×BCON 4	19.91 (26.48)	62.07 (51.96)	22.06 (28.00)	68.76 (55.99)	15.27 (22.99)	47.59 (43.60)	4.53	1.45	6.55	2.10
ATR16×NB4D2	14.58 (22.44)	37.69 (37.85)	21.22 (27.42)	54.87 (47.77)	14.39 (22.28)	37.21 (37.57)	4.71	1.82	6.95	2.69
CSR50×BHR2	26.02 (30.66)	53.05 (46.73)	22.72 (28.45)	46.32 (42.87)	16.31 (23.80)	33.25 (35.19)	4.40	2.16	6.13	3.01
CSR50×BHR3	30.21 (33.32)	87.70 (69.44)	29.04 (32.59)	84.30 (66.63)	19.20 (25.97)	55.74 (48.27)	3.44	1.19	5.21	1.79
CSR50×BCON1	28.06 (31.97)	74.51 (59.65)	28.29 (32.12)	75.10 (60.03)	18.71 (25.62)	49.67 (44.79)	3.54	1.33	5.35	2.01
CSR50×BCON4	26.84 (31.19)	81.50 (64.49)	28.94 (32.53)	87.88 (69.59)	18.90 (25.75)	57.41 (49.24)	3.46	1.14	5.29	1.74
CSR50×NB4D2	23.19 (28.77)	48.71 (44.24)	25.00 (29.98)	52.52 (46.42)	15.73 (23.36)	33.04 (35.07)	4.00	1.90	6.36	3.03
FC1×FC2 (Control)	35.21 (36.38)	91.91 (73.44)	30.05 (33.23)	78.43 (62.29)	21.13 (27.35)	55.15 (47.94)	3.33	1.28	4.73	1.81
CSR2×CSR4 (Control)	12.92 (21.06)	35.96 (36.83)	21.84 (27.84)	60.81 (51.21)	13.68 (21.70)	38.08 (38.09)	4.58	1.64	7.31	2.63
CD@5(%)	0.01	0.01	0.01	0.01	0.01	0.009	0.01	0.01	0.01	0.01
Sem±	0.004	0.004	0.003	0.006	0.004	0.003	0.005	0.005	0.005	0.005
CV(%)	0.01	0.01	0.01	0.01	0.02	0.009	0.16	0.48	0.11	0.32

Note: ECI - Efficiency conversion for Ingesta, ECD - Efficiency conversion for Digesta; SD-Standard Deviation

Table 3. Nutrigenetic traits recorded for different hybrid combinations (Autumn, 2021)

Hybrids	I/larva (g.)	D/larva (g.)	E/larva (g.)	AD (%)	RR	CI	RGR	R (g.)	MR
ATR16×BCON1	8.85	7.00	1.85	79.10 (62.77)	4.78	0.51	0.03	6.34	0.37
ATR16×BCON 4	8.82	7.27	1.55	82.43 (65.19)	5.69	0.51	0.03	6.62	0.38
ATR16×BHR2	9.00	7.03	1.97	78.11 (62.07)	4.57	0.52	0.03	6.34	0.36
ATR16×BHR3	8.42	6.55	1.87	77.79 (61.85)	4.50	0.49	0.03	5.90	0.34
ATR16×NB4D2	8.22	6.27	1.95	76.28 (60.83)	4.22	0.48	0.03	5.62	0.33
RSJ14×BCON1	8.42	6.30	2.12	74.82 (59.85)	3.97	0.43	0.03	5.53	0.28
RSJ14×BCON4	8.82	6.52	2.30	73.92 (59.26)	3.83	0.45	0.03	5.79	0.30
RSJ14×BHR2	8.65	6.40	2.25	73.99 (59.31)	3.84	0.45	0.03	5.63	0.29
RSJ14×BHR3	8.80	6.55	2.25	74.43 (59.59)	3.91	0.43	0.03	5.77	0.28
RSJ14×NB4D2	8.67	6.47	2.20	74.63 (59.73)	3.94	0.49	0.03	5.80	0.33
CSR50×BCON1	9.00	6.73	2.27	74.78 (59.83)	3.96	0.51	0.04	6.05	0.34
CSR50×BCON4	8.80	6.70	2.10	76.14 (60.73)	4.19	0.47	0.03	5.97	0.32
CSR50×BHR2	8.52	6.55	1.97	76.88 (61.23)	4.32	0.46	0.03	5.82	0.31
CSR50×BHR3	8.62	6.22	2.40	72.16 (58.13)	3.59	0.44	0.03	5.47	0.28
CSR50×NB4D2	8.82	6.67	2.15	75.62 (60.38)	4.10	0.47	0.03	5.96	0.32
CSR2×CSR4	9.20	7.03	2.17	76.41 (60.91)	4.24	0.50	0.03	6.33	0.34
FC1×FC2	7.93	5.64	2.29	71.12 (57.46)	3.46	0.42	0.03	4.91	0.26
CD@5(%)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Sem±	0.005	0.005	0.005	0.003	0.005	0.005	0.002	0.005	0.005
CV(%)	0.07	0.10	0.33	0.008	0.16	1.49	0.04	0.12	2.21

Note: I –Ingesta, D – Digesta, E – Excreta, AD – Approximate Digestibility, RR- Reference ratio, CI – Consumption Index, RGR- Relative Growth Rate, R- Respiration, MR – Metabolic rate; SD-Standard Deviation

Table 4. Nutritional efficiency conversion parameters recorded for different hybrid combinations (Autumn, 2021)

Hybrids	Larva (%)		Cocoon (%)		Shell (%)		Cocoon (g.)		Shell (g.)	
	ECI	ECD	ECI	ECD	ECI	ECD	I/g	D/g	I/g	D/g
ATR16×BCON1	7.46 (15.85)	9.43 (17.88)	7.57 (15.95)	9.57 (18.00)	3.62 (10.97)	4.57 (12.33)	13.21	10.45	27.66	21.88
ATR16×BCON 4	7.37 (15.75)	8.94 (17.38)	7.03 (15.37)	8.53 (16.98)	3.74 (11.13)	4.54 (12.30)	14.23	11.73	26.73	22.03
ATR16×BHR2	7.67 (16.07)	9.82 (18.26)	7.89 (16.31)	10.10 (18.52)	3.67 (11.04)	4.69 (12.49)	12.68	9.90	27.27	21.30
ATR16×BHR3	7.72 (16.13)	9.92 (18.34)	8.08 (16.51)	10.38 (18.78)	3.80 (11.22)	4.89 (12.77)	12.38	9.63	26.31	20.47
ATR16×NB4D2	7.91 (16.33)	10.37 (18.78)	7.66 (16.05)	10.05 (18.48)	3.53 (10.83)	4.63 (12.42)	13.05	9.95	28.34	21.62
RSJ14×BCON1	9.14 (17.58)	12.22 (20.44)	10.21 (18.62)	13.65 (21.66)	4.75 (12.57)	6.35 (14.59)	9.79	7.33	21.05	15.75
RSJ14×BCON4	8.28 (16.72)	11.20 (19.54)	8.50 (16.93)	11.50 (19.81)	4.31 (11.98)	5.83 (13.97)	11.76	8.69	23.21	17.16
RSJ14×BHR2	8.90 (17.34)	12.03 (20.28)	9.60 (18.04)	12.97 (21.10)	4.16 (11.75)	5.63 (13.72)	10.42	7.71	24.03	17.78
RSJ14×BHR3	8.86 (17.30)	11.91 (20.18)	8.86 (17.30)	11.91 (20.18)	3.86 (11.31)	5.19 (13.15)	11.28	8.40	25.88	19.26
RSJ14×NB4D2	7.73 (16.14)	10.36 (18.77)	7.27 (15.64)	9.74 (18.18)	3.58 (10.91)	4.79 (12.63)	13.76	10.27	27.97	20.87
CSR50×BCON1	7.56 (15.95)	10.10 (18.51)	7.33 (15.69)	9.81 (18.25)	3.56 (10.87)	4.75 (12.57)	13.64	10.20	28.13	21.03
CSR50×BCON4	8.30 (16.74)	10.90 (19.27)	8.98 (17.43)	11.79 (20.07)	4.55 (12.31)	5.97 (14.13)	11.14	8.48	22.00	16.75
CSR50×BHR2	8.57 (17.02)	11.15 (19.50)	8.80 (17.24)	11.45 (19.76)	4.46 (12.18)	5.80 (13.92)	11.36	8.73	22.42	17.24
CSR50×BHR3	8.70 (17.14)	12.06 (20.31)	8.82 (17.27)	12.22 (20.45)	3.94 (11.43)	5.47 (13.52)	11.34	8.18	25.35	18.29
CSR50×NB4D2	8.05 (16.48)	10.64 (19.02)	8.28 (16.72)	10.94 (19.30)	4.08 (11.64)	5.40 (13.43)	12.08	9.14	24.50	18.53
CSR2×CSR4	7.61 (16.01)	9.96 (18.39)	7.07 (15.42)	9.25 (17.70)	3.59 (10.91)	4.69 (12.49)	14.15	10.82	27.88	21.30
FC1×FC2	9.21 (17.66)	12.94 (21.07)	10.72 (19.10)	15.07 (22.82)	4.92 (12.81)	6.91 (15.23)	9.33	6.64	20.33	14.46
CD@5(%)	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01

Sem±	0.005	0.005	0.005	0.005	0.007	0.006	0.005	0.005	0.006	0.005
CV(%)	0.04	0.03	0.04	0.03	0.08	0.06	0.05	0.07	0.03	0.03

Note: ECI - Efficiency conversion for Ingesta, ECD - Efficiency conversion for Digesta; SD-Standard Deviation

6. Project Code &Title: PIB-3629 - Development of mulberry genotype suitable for rainfed hill farming in North-West India *(in collaboration with CSGRC, HOSUR)*

Project Duration: January, 2018 – December, 2021 (Extended upto June, 2022)

Investigator (s): Chattarpal, Murali S, Sardar Singh & G. Thanavanden*

Objective(s):

- Development of drought tolerant mulberry variety for rainfed hill farming system.

Progress

The Project has 4 steps:

- Step-01: Strategic trait based crossing and raising of progenies
- Step-02: Selection of hybrid progenies for traits related to yield and drought resistance under PRT (Progeny Row Trial):
- Step-03: Studies on Physio-biochemical parameters in different mulberry genotypes under PRT experiment.
- Step-04: Studies on disease and pest incidence in different mulberry genotypes under PRT experiment

Table 1: List of recipient and donor parents:

Recipient Mulberry Genotypes	Donor Mulberry Genotypes
Chakmajra, Kawnpui -1, Bikaner-1, Jalalgarh,-3, ERRC-101, Hosur-C-25 RSRS-Sahaspur, Sumarpur-1, C-1. Maranhalli-1, BR-2	S-13, Samguri-2, Khamrang, Hosur-C-11, UP-27, Hosur-C-16,Thailand lobed

Table 2: Cross combinations made utilizing receipient and donor parents by controlled hybridization:

S.No.	CROSS	S.No.	CROSS	S.No	CROSS
1	MI-0877 × MI-0836	5	MI-0853 × MI-0836	9	MI-0439 × MI-0012
2	ME-0256 × MI-0836	6	MI-0458 × ME-0125	10	MI-0675 × MI-0440
3	MI-0827 × MI-0836	7	MI-0324× MI-0313	11	MI-0853 ×ME-0125
4	ME-0256× MI-0440	8	MI-0310 × MI-0012	12	MI-0486 × MI-0012

Table 3: Days to 50%, 75% and 100% sprouting after winter pruning during Spring 2021

Cross combination	Days to 50 % Sprouting	Days to 75% Sprouting	Days to 100 % Sprouting
MI-0877 × MI-0836	20	27	34
ME-0256 × MI-0836	40	48	52
MI-0827 × MI-0836	30	34	41
ME-0256× MI-0440	21	27	41
MI-0853 × MI-0836	34	39	42
MI-0458 × ME-0125	38	41	48
MI-0324× MI-0313	27	34	41
MI-0310 × MI-0012	20	27	41
MI-0439 × MI-0012	27	34	41
MI-0675 × MI-0440	20	27	32
MI-0853 ×ME-0125	20	27	41
MI-0486 × MI-0012	25	34	41

Table 4: Average performance of different cross-combinations of mulberry progenies under PRT during Spring 2021

Cross	No. of Shoot/ Plant	Primary Shoot Length (cm)	Total Shoot Length (cm)	Leaf Yield(Kg.)/Plant	Inter-nodal distance (cm)	Leaf fall (%)	Specific leaf area (cm2/gm)	Leaf Moisture (%)	Growth during Stress (cm)
1	4.49	139.73	500.87	0.130	4.53	37.88	59.10	69.85	29.14
2	5.50	182.50	890.00	0.315	5.15	32.10	46.95	68.26	37.00
3	6.58	169.58	1001.25	0.320	6.29	41.32	50.87	69.88	29.00
4	5.19	156.59	667.77	0.190	3.98	37.30	63.60	65.87	26.25
5	4.67	195.00	747.78	0.288	4.56	42.75	63.92	59.16	27.22
6	6.64	166.64	974.09	0.317	4.36	32.18	49.48	69.56	29.82
7	6.27	195.65	1022.73	0.242	5.44	42.98	48.03	76.33	23.56
8	5.13	160.31	691.25	0.271	3.57	25.23	47.01	74.73	31.31
9	4.94	193.64	749.24	0.223	4.50	28.03	50.90	66.58	27.36

10	5.24	164.41	660.00	0.135	3.41	23.93	68.74	69.20	26.94
11	5.91	173.18	866.14	0.231	3.77	37.55	52.07	71.55	24.09
12	5.87	217.67	1039.33	0.310	3.71	34.45	44.07	73.66	23.27

Table 5: Average performance of different cross-combinations of mulberry progenies under PRT during Autumn 2021

Cross No.	No. of Shoot	Longest Shoot Length (cm)	Total Shoot Length (cm)	Leaf Yield /Plant (gm)	Inter-Nodal Distance (cm)	Moisture %	Leaf Fall %	Specific leaf area (cm sq./gm)	Stomatal Density /micro. field
1	3.41	142.18	398.48	161.84	3.71	75.19	20.08	58.17	64.45
2	8.25	161.25	1016.25	443.25	3.44	72.74	32.14	58.36	61.92
3	6.69	139.23	696.31	440.85	7.44	72.45	18.38	48.00	65.03
4	5.48	136.33	600.48	277.82	5.99	71.45	27.43	69.23	64.64
5	6.44	151.67	677.78	422.67	4.41	74.55	30.32	42.12	64.93
6	5.82	152.73	755.91	348.36	3.18	71.93	14.77	95.40	61.36
7	6.36	176.36	992.73	399.73	3.93	75.95	20.54	49.49	66.75
8	5.56	157.50	621.11	313.39	3.81	73.43	7.25	47.57	62.88
9	4.96	148.67	585.63	252.17	4.02	72.85	12.77	47.27	63.20
10	4.08	123.75	445.08	125.67	3.31	69.35	7.23	48.05	61.52
11	4.73	130.18	521.64	191.91	3.76	72.36	15.50	51.40	75.03
12	7.47	163.67	875.00	359.80	3.72	72.45	15.55	49.38	64.45

Table 6: Propagation Efficiency and Root Proliferation of mulberry progenies

Cross	Primary Root Length (cm)	Fresh Wt. of Root (g)	Root Volume (cc)	Shoot Weight(g)	Dry Weight of Root (g)	Root Shoot Ratio
1	12.65	1.15	1.09	3.83	0.19	0.25
2	13.83	2.03	2.09	5.87	0.35	0.07
3	10.06	1.12	1.11	3.91	0.16	0.19
4	15.63	1.20	1.14	6.42	0.33	0.14
5	17.03	1.48	1.70	6.39	0.36	0.22
6	18.83	2.31	2.44	7.29	0.51	0.29
7	16.31	1.70	1.88	5.90	0.29	0.27
8	10.24	1.07	0.73	2.65	0.13	0.31
9	10.90	1.28	0.75	6.55	0.13	0.14
10	13.39	0.46	0.64	2.13	0.14	0.15
11	15.64	0.92	1.01	3.92	0.24	0.20
12	14.66	0.57	0.81	4.69	0.24	0.12
S-1635	14.00	1.13	1.50	6.39	0.36	0.17
S-13	8.00	0.34	0.98	3.58	0.21	0.09
S-146	9.50	0.20	0.60	3.48	0.15	0.07

Table 7: Incidence of Diseases and Pests under Progeny Row Trial in 12 different cross-combinations of mulberry

#	Cross combination	Leaf Spot (PDI)	Powdery Mildew (PDI)	Tukra (PDI)	Leaf Webber (% damage index)
1	MI-0877 × MI-0836	24.63	12.13	16.75	4.63
2	ME-0256 × MI-0836	26.77	1.54	19.62	0.00
3	MI-0827 × MI-0836	24.90	5.24	14.76	2.86
4	ME-0256 × MI-0440	19.83	0.33	6.83	7.17
5	MI-0853 × MI-0836	16.00	0.00	12.20	5.60
6	MI-0458 × ME-0125	23.13	6.09	11.35	3.48
7	MI-0324 × MI-0313	14.71	0.00	9.71	7.65
8	MI-0310 × MI-0012	16.00	14.33	8.67	5.33
9	MI-0439 × MI-0012	20.71	1.43	5.57	5.08
10	MI-0675 × MI-0440	19.32	0.34	7.44	9.86
11	MI-0853 × ME-0125	18.67	12.44	17.33	7.56
12	MI-0486 × MI-0012	20.00	4.00	18.67	6.67



Fig.1: Screening of mulberry progenies for drought stress under rain-out shelter

Table 8: Mulberry progenies selected from 12 different cross combination

Cross Combination	Selected Progeny/Plant number	Number of Selected Plants
MI-0877 × MI-0836	P-286, P-295	02
ME-0256 × MI-0836	P-7	01
MI-0827 × MI-0836	P-9, P-19	02
ME-0256× MI-0440	P-40, P-94, P-104	03
MI-0853 × MI-0836	P-15, P-17	02
MI-0458 × ME-0125	P-8, P-12	02
MI-0324× MI-0313	P-15, P-21	02
MI-0310 × MI-0012	P-11, P-21	02
MI-0439 × MI-0012	P-40, P-101	02
MI-0675 × MI-0440	P-49, P-53	02
MI-0853 ×ME-0125	P-3	01
MI-0486 × MI-0012	P-15, P-17	02
Total selected plants		**23**

RESEARCH PROJECTS CONCLUDED

AT MAIN INSTITUTE:

1. Project code &Title: PIB-3586 - Development of superior mulberry varieties through controlled hybridization for North West Indian States (*in collaboration with CSGRC, Hosur*)

Project Duration: September, 2016–August, 2021

Investigator (s): Rajesh Kumar (*w.e.f.* January 2019), S. S. Chauhan (*upto* December 2018), Pawan Saini, Aftab Ahmad Shabnam (upto June 2018), G. Thanavendum (*w.e.f.* July 2018), Jhansi Laxmi K. (*upto* June 2018) & Kunjupillai Vijayan (*upto* May 2021)

Objective(s):

- Identification of desired parents from germplasm CSR&TI, Pampore and CSGRC, Hosur.
- Hybridization among selected parents with specific targeted traits.
- Evaluation of different F1s cross combinations for Development of HYVs suited to various agro-edaphic conditions and amenable to different agronomic practices, spacing's/ pruning systems under bush and tree mode of plantation in tropical/subtropical pockets of north-west states with emphasis on early sprouting nature, canopy configuration and rooting ability in cold/temperate/little-snowing areas.

Outcome:

- **Selection of potential parents from Temperate Mulberry Germplasm Accessions at CSGRC, Hosur**
  Based upon the passport information of 270 temperate accessions maintained at CSGRC, Hosur, 21 accessions were identified with early sprouting and good growth. Further, ME-0253, ME-113, MI-0240 and MI-0308 were selected for utilization in controlled hybridization.
- **Controlled hybridization between selected mulberry accessions**
  Crossing was facilitated amongst the selected parents of temperate origin at CSGRC, Hosur during September 2017 as ME-0253 x ME-113, ME-0253 x MI-0240 and ME-0253 x MI-0308.
- **Collection of hybrid seeds and sowing at CSR&TI, Pampore and CSGRC, Hosur**
  A total of 1850 hybrid seeds of three crosses were collected. Half of the seeds of two crosses (ME-0253 x ME-113 and ME-0253 x MI-0240) were sown at CSR&TI, Pampore during May 2018 and remaining seeds of two crosses and all the seeds of third cross were sown in pots at CSGRC, Hosur.
- **Seed germination and survival percentage of F_1 seedlings**
  After 60 days, the germination of seeds sown in nursery at CSR&TI, Pampore and in pots at CSRGC, Hosur was observed. The survival percentage of F1 seedlings were recorded after 90 days. Of the 750 and 150 hybrids seeds of ME-0253 x ME-113 and ME-0253 x MI-0240, a total of 176 and 12 seedlings were germinated. The survival percentages of seedlings were recorded after 90 days as 23.46 % and 8.0% for ME-0253 x ME-113 and ME-0253 x MI-0240 respectively. Similarly, at CSGRC, Hosur site also out of 750, 150 and 50 hybrid seeds for the three crosses, a total of 175, 34 and 6 hybrid mulberry seedlings were germinated respectively. The survival percentage for these three crosses at Hosur site was 23.33%, 22.66% and 12%, respectively.
- **Establishment of Progeny Row Trial (PRT) at CSR&TI, Pampore**
  The F_1 seedlings (215 hybrid progenies) of three crosses were collected from CSGRC, Hosur during February 2019 and brought to CSR&TI, Pampore. The 215 hybrid progenies were transplanted in 60 x 60 cm spacing under Progeny Row Trial (PRT) at CSR&TI, Pampore. The F_1 hybrid progenies (66 numbers of two crosses) raised in nursery at CSR&TI, Pampore were transplanted in PRT plot during November 2019.
- **Evaluation of mulberry F_1 progenies for Morphological traits at PRT Level**
  Based upon the visual selection, 40 F_1 mulberry progenies were selected from the total 281 progenies. Thirty (30) progenies from Cross 1 (ME-0253 x ME-0113) followed by eight (08) and two (02) progenies were selected from Cross 2 (ME-0253 x MI-0240) and Cross 3 (ME-0253 x MI-0308).
  The selected F_1 progenies were evaluated for quantitative (sprouting, frost damage, moisture content, moisture retention capacity, plant height, intermodal distance, number of shoots, branch thickness, leaf area), qualitative traits (growth nature, branching nature, young shoot colour, matured shoot colour, phyllotaxy, lenticels shape, leaf apcex, leaf base, leaf margin, leaf surface, leaf texture, leaf nature and leaf nature), diseases (leaf spot, powdery mildew) and rooting parameters.

- **Selection of elite mulberry progenies**

  Based upon the performance of mulberry progenies in PRT, ten (10) elite progenies were selected (Table 1) for further evaluation for yield attributing traits through varietal selection trials *i.e.* PYT, FYT, AICEM for identification of qualitatively and quantitatively superior mulberry varieties for regional, zonal and national use.

Table 1: Ten Mulberry Progenies selected based upon the morphological traits

Plant trait	Recipient ME-0253	Doner			1(19	2(32)	2(33)	2(34)	2(35)	2(36)	2(37)	2(38)	3(39)	3(40)
		Cross-1 ME-0113	Cross-2 MI-038	Cross-3 MI-0240										
Growth Nature	Straight	Slghtly curved	Slghtly curved	Slghtly curved	Straight	Straight	Straight	Straight	Straight	Straight	Straight	Straight	Straight	Straight
Branching Nature	Erect	Semi erect	Semi erect	Erect	Erect	Erect	Erect	Erect	Erect	Erect	Erect	Erect	Erect	Erect
Young Shoot Colour	Brown	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Matured shoot colour	Brown	Grey brown	Brown	Brown	Light Brown	Brown	Light Brown	Dark Brown	Brown	Brown	Light Brown	Brown	Dark Brown	Light Brown
Phyllotaxy	2/5	2/5	1/2	1/2	1/6	1/9	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6
Internodal distance (cm)	4.55	2.89	4.51	4.94	4.1	5.5	5	6	4.9	5.3		6.5	5.8	4.5
Lenticels/sq cm	5.63	5	5.67	3.97	10	11	6	8	7	10	8	9	10	11
Leaf Apex	Acuminate	Acuminate	Acuminate	Acuminate	Acute	Acute	Attenuate	Acuminate	Acuminate	Attenuate	Attenuate	Attenuate	Acuminate	Acuminate
Leaf shape	Ovate	Wide ovate	Narrow ovate	Ovate	Ovate	Ovate	Ovate	Narrow ovate	Narrow ovate	Ovate	Narrow ovate	Ovate	Ovate	Wide Ovate
Leaf Margin	Crenate	Serrate	Crenate	Crenate	Serrate	Serrate	Crenate	Crenate	Crenate	Crenate	Crenate	Crenate	Crenate	Crenate
Leaf base	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate	Cordate
Leaf surface	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth
Leaf texture	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse
Leaf nature	Homophyllous	Heterophyllous	Homophyllous	Homophyllious	Homophyllous	Heterophyllous	Homophyllous	Homophyllous	Homophyllous	Heterophyllous	Homophyllous	Homophyllous	Homophyllous	Homophyllous
Leaf colour	Deep green	Green	Deep green	Deep green	Green	Green	Green	Green	Green	Green	Deep green	Green	Deep green	Deep green
Leaf area (cm)	22.5 x 18.3	13 x12	22 x 14	23 x 18	17 x 12	17 x 12	15.5 x 13	16 x 12	16 x 9	15 x 12	18 x 11	17 x 12	14 x 10	18 x 14
Moisture content	74.58	70.26	70.88	72.64	91.93	95.03	75.37	75.6	70.24	56.73	92.98	83.89	94.54	55.46
MRC %	73.27	76.11	6.49	76.04	69.6	62.42	61.67	64.27	47.8	23.81	74.38	68.26	5.58	32.83
Surv %	76.66	10	8458	66.67	20	40	100	100	100	100	100	100	100	100

2. Project Code & Title: AIB-3626 -Identification of bivoltine silkworm hybrids for temperate region of North-West India

Project Duration: March, 2018–February, 2022

Investigator (s): Mir Nisar Ahmad (upto March, 2021), Bharath Kumar Neelaboina & Shivkumar

Objective(s):

- Identification of season specific silkworm hybrids suitable for temperate region of North India
- Popularization of Identified hybrids through multi-location trial in temperate region of North West India for enhanced cocoon production

Outcome: A total of 30 season specific hybrids developed from elite silkworm breeds procured from different research institutes were evaluated during Spring (May-June), Summer (July-August) and Autumn (August-September) 2019 and 2020 respectively. Two silkworm hybrids *viz*., CSR27xPAM117 for Spring &Summer season and Line-7xN5 for Autumn season were identified for North West India.

Salient features of CSR27xPAM117 and Line-7xN5

Traits	CSR27xPAM117	Line-7xN5
Fec.(No.)	516-534	513-521
Hat.(%)	93.66-94.25%	90.65 -94.15
Yield/10,000 (kg)	13.57-15.38	13.39-15.50
SCW(g)	1.57-1.63	1.56-1.59
SSW(g)	0.33-0.34	0.32-0.33
SR%	20.57- 20.70	20.43 - 20.58
Pup. rate(%)	92.00 - 94.00%	93-94
Fil. length (m)	875 -920m	824-839

3. Project Code &Title: ARE03005SI-Development of trap through biorational tactics for the management of mulberry leaf webber *Glyphodes pyloalis* (Lepidoptera: Crambidae)

Project Duration: March, 2020–February, 2022

Investigator (s): Rajesh Kumar & Satish Y

Objective(s):

- To develop a trap for controlling the monophagous pests, *Glyphodes pyloalis* of mulberry
- Field trial of developed trap for minimising the mulberry leaf damage.
- Multiply the identified biocontrol agent, *Chelonus carbonator* (Braconidae) and release in the field.

Findings:

- Developed solar LED trap with 440 nm wavelength and tangle foot transparent glue. Augmentation is tried to multiply the *C. carbonator* on *Corcyra cephalonica.*
- In future, the Solar LED trap will be tried in the field condition, which will help in minimizing the damage of monophagous pest, *Glyphodes pyloalis* in mulberry plantations. It will help in mulberry leaf production qualitatively and quantitatively.

Table: Observations for 50 adult attractions towards different wavelengths

#	LEDs	Wavelength (3.0-3.4 volt)	Adults attracted	
			25.09.2021	01.10.2021
1	Deep Red	660 nm	2	1
2	Infrared	940nm	0	0
3	Cyan	490nm	5	7
4	Broad Spectrum	380-840nm	5	6
5	Blue	440nm	25	27
6	Ambar	595-600nm	1	2
			38	43

The prototype of trap is depicted below:



The field evaluation of trap is proposed to be conducted in the mulberry fields to study the efficacy of developed trap.



4. Project Code & Title: APR03003SI - Rescheduling of brushing date for second commercial crop rearing in autumn in Kashmir & Doon Valley

Project Duration: March, 2020 – February, 2022

Investigator (s): Gulzar Ahmad Khan, Gulab Khan & Haroon Rashid (Site A: CSR&TI, Pampore)
K.K. Rai (Site B: RSRS, Sahaspur)

Objective(s):

Site A: CSR&TI, Pampore

- To stabilize second commercial crop by rescheduling of brushing date
- To develop package of practices for early autumn rearing

Site B: RSRS, Sahaspur

- To stabilize autumn crop through rescheduling of pruning period.
- To improve the cocoon production during autumn season through rescheduling of brushing date

Findings:

A. **Pampore Site:**New brushing schedule (5th Aug to 10th against the control 20th Aug) has been worked out for autumn crop based on rearing actvitities during 2020 & 2021 in Kashmir valley.

B. **Sahaspur Site:**No reschedule of pruning and first week of July is recommended as per existing practice.

The output of the project will be part of OST followed by OFT for validation and commercial exploitation of the technology and knowledge generated



Fig.Glimpses of project activities at CSR&TI, Pampore

NEW RESEARCH PROJECTS INITIATED

AT MAIN INSTITUTE:

1. Project Code & Title: MOE03010SI- Evaluation of Improved Mulberry Silkworm Hybrids & Technologies for North &North West India (ToT Project)

Project Duration: March, 2022–February, 2024

Investigator (s): Sardar Singh, Shivkumar, Santosh Kumar Magadum, Bharath Kumar Neelaboina, Satish Y, Vinod Singh, Rita Singh

Components:

I. Large scale farmer level trial of summer crop and its impact on autumn crop in selected areas of North West India (outcome of MOE-03001SI)
II. Cocoon production improvement during Autumn rearing through fortification of mulberry leaf (outcome of PIN-3608)
III. Revalidation of induction of water stress tolerance in mulberry under rainfed condition by application of triazole compound (Paclobutrazol). Outcome of PIP-3543
IV. Evaluation of identified Bivoltine Silkworm Hybrids for Temperate Region of North West India.(outcome of AIB-3626)
V. Soil health based fertilizer recommendation for DoS farms in North India.(Outcome of PPA-3603)
VI. Popularization of CRC concepts & its strengthening at selected DoS, CRC locations in North India
VII. On Farm Trial of BmNPV tolerant Silkworm Hybrids in North & North West India. (Outcome of AIB-3569)

Progress:

Component-I: The large scale field trial was conducted with 2500 dfls each during summer and autumn season, of which 575 dfls in J&K and 1900 dfls in HP were distributed. The average yield was recorded about 36.40 Kg at Jammu division whereas at Himachal Pradesh 23.33 Kg and control rearing at RSRS, Jammu was reported about 53.88 Kg during summer season (2021) with overall average yield about 26.640 Kg whereas during autumn season (2021), the average yield was recorded about 27.06 Kg at Jammu division, 43.80 Kg at Himachal Pradesh and control rearing was recorded about 41.50 Kg at RSRS, Jammu with overall average yield about 39.92 Kg respectively.

Component-II: A total of 500 DFLs for treatment with 0.5% Glutamic acid during autumn season 2021 through fortification of mulberry leaf & 500 DFLs as control were kept & utilized per test site under present validation of technology programme at three locations *viz*., Kashmir, Jammu & Dehradun @ 50 DFLs per farmer. The amino acid treatment carried out & cocoons obtained from three trial locations were given in Table 1-5 *viz*., Dehradun (Figs.1& 2), Jammu (Fig.3&4) & Kashmir (Figs.5&6).The result obtained was clearly revealed, an increase of 5.18 Kg/100 DFLs in cocoon yield (SH6×NB4D2) was observed in silkworm larvae fed with 0.5% Glutamic acid treated mulberry leaf over the control. The SCW (1.70g) & SR (19.41%) recorded in the treatment with amino acids with an increase of 0.08g & 1.03% respectively over the control at trial location of Dehradun (Table-1 & 2).An increase of 6.52 Kg/100 DFLs average in cocoon yield (FC1×FC2) was observed in silkworm larvae fed with 0.5% Glutamic acid treated mulberry leaf over the control at trial district of Udhampur of Jammu region (Table-3).Further, an increase of 4.58 Kg/100 DFLs in cocoon yield (FC1×FC2) was observed in silkworm larvae fed with 0.5% Glutamic acid treated mulberry leaf over the control at trial location of Kashmir. The higher SCW of 1.98g reflected as Figure-7 & SSW of 0.40g as Figure-8 & SR of 21.61% recorded in the treated cocoons with amino acids with an increase of 0.21g, 0.065g & 1.54% respectively over the control at trial location of Kashmir.

Table-1: On Field Trial (OFT) data treated with 0.5% Glutamic acid during autumn season 2021 at Deharadun

#	Name & parentage	Resident	No. of DFLs reared	Cocoons harvested (green kg)	Yield/100 DFLs (kg)	SCW (g)	SSW (g)	SR (%)
1	Smt. Pinki w/o Sh. Ramesh	Singhaniwala	50	20.500	41.000	1.56	0.28	17.95
2	Smt. Pola w/o ShSandhu Ram	Singhaniwala	50	19.000	38.000	1.65	0.32	19.39
3	Smt. Poonam w/o Narendra	Singhaniwala	50	21.600	43.200	1.60	0.31	19.38
4	Sh. Sanju s/o Prem Singh	Singhaniwala	50	22.000	44.000	1.70	0.33	19.41
5	Sh. Ravi s/o Kareshan	Singhaniwala	50	20.500	41.000	1.65	0.31	18.79
6	Smt. Bhoto Devi w/o Kartar	Sabhawala	50	22.000	44.000	1.59	0.30	18.87
7	Sh. Manish s/o Mahender	Sabhawala	50	19.500	39.000	1.59	0.29	18.24

8	Sh. Sushil s/o Kareshan	Sabhawala	50	21.500	43.000	1.70	0.33	19.41
9	Sh. Raju s/o Shyamlal	Sabhawala	50	20.500	41.000	1.65	0.31	18.79
10	Sh. Narendra s/o Munni Lal	Sabhawala	50	22.500	45.000	1.66	0.31	18.67
Total/Mean			500	209.600	41.92	1.64	0.31	18.89

Table-2: On Field Trial (OFT) data of control (without treatment) during autumn season 2021 at Dehradun

#	Name & parentage	Resident	No. of DFLs reared	Cocoons harvested (green kg)	Yield/100 DFLs (kg)	SCW (g)	SSW (g)	SR (%)
1	Sh. Sonu s/o Raghuvir	Singhaniwala	50	17.500	35.000	1.59	0.29	18.24
2	Sh. Inder s/o Balbir	Singhaniwala	50	18.200	36.400	1.50	0.27	18.00
3	Sh. Guddi s/o Saroop	Singhaniwala	50	16.500	33.200	1.60	0.30	18.75
4	Smt. Sangeeta w/o Bhopal	Singhaniwala	50	19.000	38.000	1.58	0.28	17.72
5	Sh. Sonu s/o Munna	Singhaniwala	50	18.500	37.000	1.60	0.27	16.88
6	Sh. Kamlesh s/o Ghanshyam	Sabhawala	50	19.000	38.000	1.56	0.27	17.31
7	Smt. Chando Devi w/o Somesh	Sabhawala	50	18.000	36.000	1.56	0.28	17.95
8	Sh. Jeet Singh s/o Prijhvi	Sabhawala	50	19.500	39.000	1.60	0.29	18.13
9	Sh. Palli s/o Vishambhar	Sabhawala	50	18.500	37.000	1.53	0.28	18.30
10	Sh. Rajpal s/o Vishambhar	Sabhawala	50	19.000	38.000	1.50	0.26	17.33
Total/Mean			500	183.700	36.740	1.56	0.28	17.86

Table-3: On Field Trial (OFT) data of treatment & control during autumn season 2021 at Jammu

Traits / Tested sites	No. DFLs		No. of Rearers		Actual yield (kg)		Average yield/100 dfls (dry cocoons in kg)	
	Treated	Control	Treated	Control	Treated	Control	Treated	Control
District (Kathua)	250	250	5	5	22.0	-	8.8	0.0
District (Udhampur)	250	250	5	5	36.5	20.2	14.6	8.08
Total/Mean	**500**	**500**	**10**	**10**	**58.5**	**20.2**	**11.7**	**4.04**

Table-4: On Field Trial (OFT) data treated with 0.5% Glutamic acid during autumn season 2021 at Kashmir.

#	Name & parentage	Resident	No. of DFLs reared	SCW (g)	SSW (g)	SR (%)	Pupation rate	Cocoon yield/100DFLs (green)
1	Abdul Gani Wani s/o MohdWani	Beighpora	50	1.56	0.28	17.95	91.20	53.20
2	Shakeel AhmWani s/o Ab Hamid Wani	Beighpora	50	1.62	0.35	21.61	93.00	60.92
3	Zoona Begum w/o Abdul Hamid Wani	Beighpora	50	1.98	0.39	19.70	89.00	54.66
4	Rayees Ahmad Wani	Beighpora	50	1.96	0.40	20.41	90.22	49.00
5	Aijaz Ahmad Naikoo s/o GH. Nabi Naikoo	Beighpora	50	1.74	0.36	20.69	91.00	56.01
6	Nazir Ahmad Naikoo s/o Abdul Khaliq	Beighpora	50	1.75	0.34	19.43	90.42	60.05
Total/mean			500	1.77	0.353	19.97	90.81	55.64
STDEV			-	0.17	0.04	1.25	1.324	4.438

Table-5: On Field Trial (OFT) data of control (without treatment) during autumn season 2021 at Kashmir.

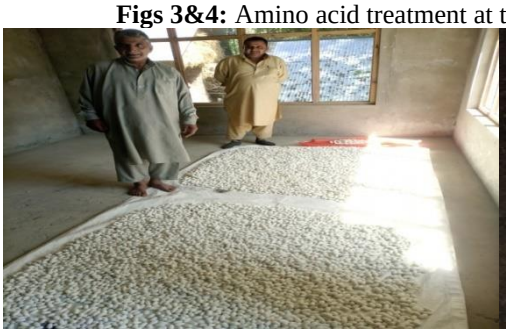
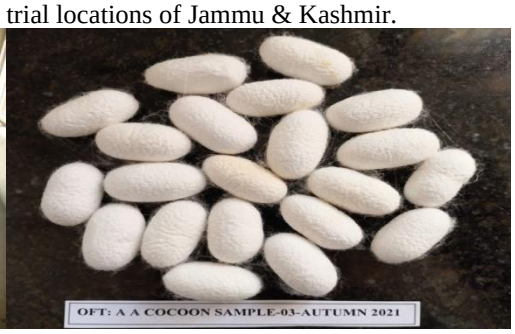
#	Name & parentage	Resident	No. of DFLs reared	SCW (g)	SSW (g)	SR (%)	Pupation rate	Cocoon yield/100DFLs (green)
1	Abdul Gani Wani s/o MohdWani	Beighpora	50	1.54	0.29	18.83	88.90	49.10
2	Rayees Ahmad Wani	Beighpora	50	1.60	0.31	19.38	90.11	55.22
3	Shakeel AhmWani s/o A Hamid Wani	Beighpora	50	1.57	0.28	17.83	92.00	51.00
4	Zoona Begum w/o Hamid Wani	Beighpora	50	1.46	0.24	16.44	88.56	45.20
5	Nazir Ahmad Naikoo s/o Abdul Khaliq	Beighpora	50	1.51	0.28	18.54	90.22	53.41
6	Aijaz Ahmad Naikoo s/o GH. Nabi Naikoo	Beighpora	50	1.69	0.33	19.53	93.55	55.56
Total/mean			500	1.56	0.288	18.43	90.56	51.58
STDEV			-	0.079	0.031	1.149	1.902	3.991




Figs 1&2: Amino acid treated leaf & cocoons at trial location of Dehradun.




Figs 3&4: Amino acid treatment at trial locations of Jammu & Kashmir.

Figs 5&6: Amino acid treated cocoons at trial location of Kashmir.

Component-III: The OST was conducted at three test sites viz., RSRS, Jammu, DoS, Nowshera and DoS, Sunderbani.
Mulberry plantation: The existing mulberry trees of S-146 variety (>10 years old) were selected.
Treatments: 5 (different concentrations of paclobutrazol)

T1 = Soil drenching of 10 mg/litre of paclobutrazol
T2 = Soil drenching of 15 mg/litre of paclobutrazol
T3 = Soil drenching of 20 mg/litre of paclobutrazol
T4 = Soil drenching of 25 mg/litre of paclobutrazol
T5 = Soil drenching with only water (Control)

Method of application: Paclobutrazol powder was dissolved in water to prepare the desired concentration of solution. The treatment solution was applied as a soil drench (3 litre/tree) at four intervals after 15 days each. Treatment solution required for one tree was 3 litre.

Table 1: Details of different doses of paclobutrazol applied at all test sites

Test sites		RSRS, Jammu	DoS, Nowshera	DoS, Sunderbani
Paclobutrazol dose applied on	First dose	7th July, 2021	9th July, 2021	9th July, 2021
	Second dose	22nd July, 2021	24th July, 2021	24th July, 2021
	Third dose	6th August, 2021	9th August, 2021	9th August, 2021
	Fourth dose	21st August, 2021	24st August, 2021	24st August, 2021

	RSRS, Jammu	DoS, Nowshera	DoS, Sunderbani
First dose			
Second Dose			
Third dose			
Fourth dose			

Parameters studied*:*
Data on growth, yield and leaf quality parameters were recorded after 90 days of the first application of the treatment at all the locations.

Table 2. Performance of different treatments for leaf yield per plant over the control at all test sites.

Concentration of paclobutrazol	RSRS, Jammu		DoS, Nowshera		DoS, Sunderbani		Overall	
	Leaf yield/ plant (Kg)	% increase over Control	Leaf yield/ plant (Kg)	% increase over Control	Leaf yield/ plant (Kg)	% Increase over Control	Average leaf yield/ plant (kg)	Avg increase over Control (%)
10 mg/lt (T_1)	5.78	24.30 %	4.14	7.53 %	4.98	15.55	4.97	16.39
15 mg/lt (T_2)	6.43	38.28 %	4.52	17.40 %	5.58	29.47	5.51	29.04
20 mg/lt (T_3)	7.84	68.60 %	5.71	48.31 %	6.92	60.56	6.82	59.72
25 mg/lt (T_4)	6.85	47.31 %	5.04	30.91 %	5.96	38.31	5.95	39.34
Control (T_5)	4.65	-	3.85	-	4.31	-	4.27	-

Conclusion:
Leaf yield per plant was recorded maximum in treatment 20 mg/litre (T_3) with 59.72% of average per cent increase over control followed by 25 mg/litre (T_4) with 39.34% and 15 mg/litre (T_2) with 29.04 %. The treatment 20 mg/litre (T_3) performed better among all the treatments at all the test sites. Therefore, based on the results of on station trial, it will be concluded that 20 mg/litre paclobutrazol treatment found effective and significantly improved leaf biomass of mulberry plantations at all test sites. Further, the effective dose of 20 mg/litre paclobutrazol will be validated at farmers' field condition through On Farm Trial (OFT).

Component-IV: OST of shortlisted hybrids under the project AIB-3626 completed at 3 test sites - Pampore, Jammu &Sahaspur &unit wise perfomrance of hybrids is furnished below:

CSR&TI, Pampore:

- In spring season CSR 27 × Pam 117 yielded 67.6 kg/100DFLs over control SH6×NB4D2 64.2 kg/100DFLs
- In summer CSR 27 × Pam 117 yielded 56.80 kg/100DFLs over control SH6×NB4D2 48.10 kg/100DFLs
- In autumn Line7xN5 yielded 43.1 kg/100DFLs over control SH6×NB4D2 42.30 kg/100DFLs

RSRS Jammu:

- In spring season CSR 27 × Pam 117 yielded 64.9 kg/100DFLs over control FC2xFC1 74.2 kg/100DFLs
- In autumn Line7xN5 yielded 25.60 kg/100DFLs over control SH6×NB4D2 41.50 kg/100DFLs

RSRS Sahaspur:

- In spring season CSR 27 × Pam 117 yielded 65.00 kg/100DFLs over control CSR2xCSR4 62.00 kg/100DFLs

In autumn Line7xN5 yielded 32.00 kg/100DFLs over control CSR2xCSR4 39.00 kg/100DFLs.

Component-V: Soil health based fertilizer in DOS farms
The mulberry farms of the targeted states has been shortlisted, collection of soil samples is in progress.

Component-VI: popularization of CRC
The details of the CRCs has been obtained from the DoSs of North India and based on the CRC data, shortlisting of CRC for assessment will be made using PPS method

Component-VII: Nine *Bm*NPV disease resistant silkworm breeds were evolved under the project AIB-3475 and from these breeds, 20 disease resistant hybrids were evolved tested at three locations viz., CSR&TI, Pampore, RSRS, Jammu & RSRS, Sahaspur under the project AIB-3569 and shortlisted the following region specific BmNPV tolerant silkworm hybrids based on highest EI from the pooled data.

Region	Silkworm hybrids
Kashmir	Pam DR4 x Pam DR6
Jammu & UP	Pam DR7 x Pam DR8
Uttarakhand	Pam DR1 x Pam DR6

The above shortlisted hybrids are being tested at farmer's level in the form of OFT in North & North West India during the year 2022-23.

2. Project Code & Title: MOT03011MI- Popularization of Mulberry Sericulture in Kargil (Ladakh UT)
Project Duration: March, 2022–February, 2024
Investigator (s): Muttanna, Satish Y & Z.I. Buhroo
Objectives:
1. To understand the context and interest of local people of Kargil towards mulberry sericulture with respect to their existing livelihood.
2. To organize large scale demonstration for awareness creation and building of capacities of the stakeholders of sericulture in Kargil

Progress:
A new project has been initiated for popularization of mulberry sericulture in Kargil district of Ladakh (UT). Primary data on the cropping pattern in Kargil and availability of Mulberry wealth is being assessed in collaboration with SKUAST-K.

3. Project Code & Title: PIE03012SI - Evaluation of mulberry somatic hybrids
Project Duration: March, 2022–February, 2025
Investigator (s): Gulab Khan Rohela (PI), Pawan Saini (CI) & Ashok Kumar Kasukurthi (CI)
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:
The three somatic hybrids combinations *viz*., (SH1-PPR1-Ichinose, SH2-PPR1-Chinese white &SH3-PPR1-PPR1) were shortlisted and evaluated for important yield and growth related traits, for which, initially the stem cuttings (100 each) of three combinations of somatic hybrids along with the cuttings (PPR-1 & Chinese white) and grafts (Goshoerami and Ichinose) of control mulberry varieties were planted during March 2022 for raising saplings. The raised saplings will be utilized for establishment of experimenta plots as RBD with three replications during 2023 for evaluation of yield and yield associated traits. The nurserry of somatic hybrids and control mulberry varieties were maintained by carrying out the intercultural operations i.e. weeding, application of FYM, Fertilizers and irrigation.

AT REGIONAL SERICULTURAL RESEARCH STATION, JAMMU

4. Project Code & Title: PIE03009SI & Evaluation of mulberry genotypes for improvement in productivity and quality under sub-tropical conditions of Jammu
Project Duration: December, 2021–November, 2025
Investigator (s): Santoshkumar Magadum (PI), Rita Singh (CI) &Vinod Singh (CI)
Objectives:
1. To evaluate newly developed genotypes for leaf yield and associated agronomic characters.
2. To assess leaf quality traits through physio-biochemical parameters and silkworm rearing for prospective commercial utilization.

Progress:
The research project were approved durig 2nd week of December, 2021 for the procurement of planting material i.e., stem cuttings of shortlisted mulberry hybrids. CSR&TI, Pampore and CSR&TI, Berhampore were requested to provide the stem cuttings of test mulberry genotypes.

RESEARCH PROJECT COLLABORATED WITH OTHER CSB INSTITUTES

ONGOING RESEARCH PROJECTS

AT MAIN INSTITUTE

1.Project Code & Title: PIE03001MI-All India Coordinated Experimental Trial For Mulberry (AICEM) Phase IV
Project Duration: 2019–2024
Zonal Coordinator: Sardar Singh
Investigator (s): Pawan Saini (*w.e.f.* August 2021), Rajesh Kumar (upto July 2021), Gulab Khan Rohela (*w.e.f.* April – June 2021), Gulzar Ahmad Khan, Chhattar Pal, R. P. Singh (upto April 2021), Kamlesh Kumar Rai and Santosh Kumar Magadum
Test Centers: CSRTI, Pampore, P4-BSF Manasbal, RSRS Jammu & RSRS Sahaspur
Objective(s): Identification of suitable mulberry variety for regional, zonal and national use based on their performance
Progress:

- **Maintenance of plantation of mulberry genotypes under AICEM testing:** 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. Goshoerami was used as local check variety at CSR&TI, Pampore; P4 BSF, Manasbal and SDD, Mirgund 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 1**).
- **Recording of yield and yield attributing traits:**
  Data on economic traits *i.e.* total shoot length (cm), no. of leaves, total shoot yield (including leaf) (kg), fresh leaf weight (kg), leaf/shoot ratio, moisture content (%), moisture retention capacity (%), leaf yield/plot (kg) and leaf yield/ha (kg) were recorded during spring and autumn 2021-22 and statistically analysed using SAS software. The F-statistic and critical difference (CD) were worked out for comparison of test entries with control varieties, location-wise comparison of test entries and interaction *viz.*, variety x location, variety x season, location x season and variety x location x season. The critical difference (CD) at 5% significant level showed no significant variation was observed in test entries for yield and yields attributing parameters in spring and autumn at all the four test sites. The combined ANOVA was worked out and showed significant variation among mulberry varieties, location and variety x location interaction. The other interactions viz., variety x season, location x season and variety x location x season were non-significant as revealed from combined ANOVA (**Table 2-10**).
- **Disease and Insect-Pest Incidence:**
  During autumn 2021, disease and insect-pests incidence was recorded at CSR&TI, Pampore and RSRS, Miransahib, Jammu test sites. While no disease and insect-pests were observed at P4 BSF, Manasbal and RSRS, Sahaspur, Dehradun test sites. Leaf spot, powdery mildew and leaf webber incidence were observed at CSR&TI, Pampore and RSRS, Miransahib, Jammu test sites. 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. At CSR&TI, Pampore test site, the three test entries C-1360, AGB-8 and PPR-1 have susceptible response towards leaf spot. While the local; check variety showed moderately resistance reaction against leaf spot. Resistance reaction was observed for powdery mildew in C-1360 and AGB-8 while PPR-1 and Goshoerami (local check) showed highly susceptible reaction. For leaf webber, all the test entries along with local check were moderately resistance. At RSRS, Miransahib, Jammu test site; moderately resistance reaction was observed for leaf spot and powdery mildew in test entries along with local check (S-146) whereas for leaf webber, resistance was observed in test entries and moderately resistance in local check (**Table 11**).
- **Leaf Sprouting Behaviour during spring 2022**
  The leaf sprouting has been assessed in test entries and check varieties after winter dormancy during January 2022 at RSRS, Miransahib and RSRS, Sahaspur while in March 2022 at CSR&TI, Pampore and P4 BSF, Manasbal test sites. Amongst the test entries, C-1360 sprouted first at all the four test sites of North-West zone. In temperate region PPR-1

sprouted almost a week after of C-1360. Under sub-tropical test sites, PPR-1 and AGB-8 was sprouted late than C-1360 as well as check varieties (**Table 12**).

- **Analysis of soil health status of AICEM field:** The soil samples were collected from two sites of Kashmir division *viz.*, CSR&TI, Pampore and P4 BSF, Manasbal. 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 13**). The soil testing results revealed that optimum and higher values of all the nutrient parameters. The soil samples of RSRS, Miransahib, Jammu and RSRS, Sahaspur, Dehradun were analysed at Soil Testing Laboratory of State Agriculture Department of Jammu and Dehradun respectively.
- **Meteorological data of AICEM test sites:** The meteorological data on temperature, relative humidity, rainfall and number of rainy days are recorded at all the test sites on day to day basis (**Table 14**).
- **Survival and Propagation Efficiency Study:**
  After winter dormancy, the stem cuttings of test entries from the border plants were utilized for initiation of rooting ability study at all the four test sites during main plantation season (January 2022 – sub-tropical region and March 2022 – temperate region) in randomized block design (RBD).

Table 1: Survival Percentage of Test Entries (as on 31-03-2022)

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 2: Yield and yield attributing parameters of Mulberry Varieties at CSR&TI, Pampore during Spring 2021

Varieties	TSL (cm)	NLPM	LW (kg)	SW (kg)	TSY (kg)	LSR	MC (%)	MRC (%)	NPY	TLY
C-1360	906.00	18.57	0.39	0.50	0.89	0.77	62.82	43.92	19.18	4678.11
AGB-8	446.30	18.53	0.38	0.39	0.77	0.98	35.33	21.98	18.76	4574.93
PPR-1	830.50	19.43	0.47	0.60	1.07	0.78	92.73	77.42	23.27	5613.60
Goshoerami (Control)	779.07	21.70	0.56	0.50	1.07	1.12	96.52	82.35	26.78	6532.90
CD 5%	206.59	0.52	0.10	0.12	0.22	0.04	13.09	14.00	5.41	1357.35
F-statistic	8.76	73.39	5.87	4.70	3.87	167.38	43.43	37.32	4.45	4.14

Table 3: Yield and yield attributing parameters of Mulberry Varieties at CSR&TI, Pampore during Autumn 2021

Varieties	TSL (cm)	NLPM	LW (kg)	SW (kg)	TSY (kg)	LSR	MC (%)	MRC (%)	NPY	TLY
C-1360	1220.63*	20.30	0.79	0.80*	1.60*	1.01	62.26	81.69	24.38	5945.94
AGB-8	760.10	23.93*	0.50	0.32	0.83	1.61	60.93	80.18	11.56	2819.27
PPR-1	1134.77*	19.70	0.70	0.63*	1.33	1.13	65.70	78.05	22.22	5419.27
Goshoerami (Control)	711.37	20.33	0.75	0.41	1.16	1.88	66.60	80.58	23.43	5713.82
CD 5%	174.93	1.48	0.14	0.13	0.27	0.12	4.01	10.15	6.64	1620.59
F-statistic	19.81	15.52	7.93	24.69	13.20	98.11	4.16	0.20	7.30	7.30

Table 4: Yield and yield attributing parameters of Mulberry Varieties at P4 BSF, Manasbal during Spring 2021

Varieties	TSL (cm)	NLPM	LW (kg)	SW (kg)	TSY (kg)	LSR	MC (%)	MRC (%)	NPY	TLY
C-1360	1905.47	17.90	0.75	1.19	1.94	0.60	72.60	92.65	30.54	7447.96
AGB-8	1810.90	18.23	0.71	37.57	1.82	0.64	72.88	92.17	30.19	7361.42
PPR-1	2014.93	16.67	0.84	1.26	2.10	0.68*	72.86	92.02	32.69	7973.98

Goshoerami (Control)	1910.43	17.60	0.77	13.34	1.95	0.64	72.40	92.80	32.08	7825.60
CD 5%	323.89	0.92	0.14	51.77	0.34	0.04	1.85	1.88	1.33	322.48
F-statistic	0.60	4.84	1.43	0.99	1.07	6.27	0.14	0.36	7.46	7.76

Table 5: Yield and yield attributing parameters of Mulberry Varieties at P4 BSF, Manasbal during Autumn 2021

Varieties	**TSL (cm)**	**NLPM**	**LW (kg)**	**SW (kg)**	**TSY (kg)**	**LSR**	**MC (%)**	**MRC (%)**	**NPY**	**TLY**
C-1360	1278.43	18.43	0.74	0.64	1.38	0.53	68.99	88.48	31.41	7660.73
AGB-8	1279.63	18.90	0.78	0.66	1.43	0.54	70.38	89.74	31.00	7560.97
PPR-1	1364.77	17.23	0.96	0.81	1.77*	0.53	70.13	90.36	34.53*	8448.37*
Goshoerami (Control)	1175.70	19.80	0.97	0.72	1.69	0.59	69.83	92.84	32.75	7974.39
CD 5%	196.90	1.08	0.09	0.10	0.13	0.04	1.95	2.51	1.65	401.38
F-statistic	1.40	8.85	16.24	6.22	18.55	4.38	0.87	4.85	8.47	8.98

Table 6: Yield and yield attributing parameters of Mulberry Varieties at RSRS, Miransahib, Jammu during Spring 2021

Varieties	**TSL (cm)**	**NLPM**	**LW (kg)**	**SW (kg)**	**TSY (kg)**	**LSR**	**MC (%)**	**MRC (%)**	**NPY**	**TLY**
C-1360	1284.43	20.67	0.69	0.41	1.09	0.64	78.60	74.43	33.60	8194.15
AGB-8	908.83	21.77	0.59	0.32	0.91	0.65	78.53	75.01	28.70	7000.23
PPR-1	1435.17	16.97	0.72	0.44	1.16	0.62	76.10	71.99	35.14	8570.62
S-146 (Control)	1999.80	20.67	0.75	0.49	1.24	0.60	78.13	73.18	36.88	8995.28
CD 5%	403.76	1.31	0.24	0.18	0.41	0.03	2.42	3.11	11.73	2862.18
F-statistic	11.43	23.36	0.82	1.41	1.07	3.50	2.16	1.70	0.82	0.82

Table 7: Yield and yield attributing parameters of Mulberry Varieties at RSRS, Miransahib, Jammu during Autumn 2021

Varieties	**TSL (cm)**	**NLPM**	**LW (kg)**	**SW (kg)**	**TSY (kg)**	**LSR**	**MC (%)**	**MRC (%)**	**NPY**	**TLY**
C-1360	1277.67	22.07	0.81	0.76	1.58	0.52	76.11	65.62	39.92	9735.46
AGB-8	1084.00	25.77*	0.90	0.68	1.58	0.57	74.53	62.23	43.93	10715.06
PPR-1	1127.33	19.20	0.81	0.70	1.51	0.54	72.73	64.17	39.67	9674.91
S-146 (Control)	1215.67	23.93	0.84	0.76	1.59	0.54	74.25	63.70	41.02	10003.97
CD 5%	248.24	1.38	0.19	0.19	0.36	0.04	2.26	5.70	9.39	2291.26
F-statistic	1.12	37.27	0.39	0.39	0.10	2.11	3.40	0.54	0.39	0.39

Table 8: Yield and yield attributing parameters of Mulberry Varieties at RSRS, Sahaspur, Dehradun during Spring 2022

Varieties	**TSL (cm)**	**NLPM**	**LW (kg)**	**SW (kg)**	**TSY (kg)**	**LSR**	**MC (%)**	**MRC (%)**	**NPY**	**TLY**
C-1360	531.87	21.03	0.24	0.35	0.60	0.69	73.51	87.42	8.42	2054.07
AGB-8	552.70	22.23	0.26	0.34	0.61	0.76	73.22	91.56	8.54	2082.52
PPR-1	436.93	21.17	0.18	0.25	0.43	0.80	83.60	93.49	7.28	1776.02
S-146 (Local Control)	535.30	21.53	0.26	0.31	0.58	0.88	74.17	85.59	8.84	2155.69
C-2038 (Zonal Control)	553.13	21.07	0.29	0.37	0.66	0.82	74.50	88.90	10.87	2650.41
Vishala (National Control)	497.93	20.40	0.24	0.33	0.57	0.77	73.10	85.11	8.84	2156.10
CD 5%	140.70	0.73	0.08	0.10	0.18	0.14	3.72	3.74	3.55	866.14
F-statistic	0.85	5.86	1.78	1.54	1.64	1.86	10.19	6.72	0.91	0.91

Table 9: Yield and yield attributing parameters of Mulberry Varieties at RSRS, Sahaspur, Dehradun during Autumn 2021

Varieties	**TSL (cm)**	**NLPM**	**LW (kg)**	**SW (kg)**	**TSY (kg)**	**LSR**	**MC (%)**	**MRC (%)**	**NPY**	**TLY**
C-1360	1045.27	18.83	0.61	0.51	1.12	1.24	72.50	84.79	26.63	6495.49

AGB-8	706.53	23.23	0.51	0.35	0.87	1.61	73.08	83.87	27.36	6673.82
PPR-1	722.13	19.13	0.55	0.48	1.03	1.27	73.66	82.96	26.57	6479.55
S-146 (Local Control)	1212.13	23.13	0.75	0.60	1.34	1.27	69.83	82.38	36.59	8923.58
C-2038 (Zonal Control)	996.87	19.70	0.50	0.39	0.997	1.37	71.54	84.77	22.86	5575.89
Vishala (National Control)	837.63	20.40	0.55	0.46	1.00	1.28	71.85	83.97	26.85	6549.27
CD 5%	223.54	1.84	0.20	0.18	170.97	0.17	1.50	0.45	8.22	2005.62
F-statistic	6.74	9.75	1.74	2.07	1.45	5.53	6.84	38.51	2.65	2.65

Table 10: Combined ANOVA of Mulberry Varieties for yield and yield attributing traits

Source of Variation	df	TSL (cm)	NLPM	LW (kg)	SW (kg)	TSY (kg)	LSR	MC (%)	MRC (%)	NPY	TLY
Treatments	40	1912238.21	17.016	0.265	615.95	1.473	0.103	793.73	1786.53	616.48	36659854
Error	215	58545.07	0.78	0.016	460.93	0.065	0.005	26.78	29.79	30.76	1848708
F_{cal}		32.66	21.76	16.39	1.34	22.46	20.50	29.64	59.98	20.04	19.83

Note: TSL: Total Shoot length; NLPM: Number of Leaves per Meter length; LW: Fresh Leaf Weight; SW: Fresh Shoot Weight; TSY: Total Shoot Yield (including leaf); LSR: Leaf/Shoot Ratio; MC: Moisture Content; MRC: Moisture Retention Capacity; NPY: Net Plot Yield and TLY: Total Leaf Yield

Table 11: Percent Disease Index (PDI) and Insect Pest Infestation in Test Entries at CSR&TI, Pampore and RSRS, Miransahib, Jammu Test Sites during autumn 2021

Test Sites	Test Entry	Percent Damage Index (PDI)					
		Leaf Spot	Grading	Powdery Mildew	Grading	Leaf Webber	Grading
CSR&TI, Pampore, Kashmir	C-1360	24.00	S	0.00	R	8.87	MR
	AGB-8	39.33	S	3.33	R	8.01	MR
	PPR-1	34.00	S	100.00	HS	10.03	MR
	Goshoerami	7.33	MR	100.00	HS	20.12	MR
RSRS, Miransahib, Jammu	C-1360	16.6	MR	13.3	MR	4 .00	R
	AGB-8	9.33	MR	8.00	MR	4.66	R
	PPR-1	6.00	MR	8.67	MR	3.33	R
	S-146	20.00	MR	20.00	MR	6.00	MR

PDI Scale: Resistant (0.1-5.0%); Moderately Resistant (5.1-20.0%); Susceptible (20.1-50.1%) and Highly Susceptible (50.0-100.0%) (Source: CSGRC, Hosur Catalogue on Mulberry Germplasm Volume 3 & 4, 2006)

Table 12: Leaf Sprouting (Days to 75% & 100%) Behaviour of Test Entries at Four Test Sites (Spring 2022)

Test Entries	CSR&TI, Pampore		P4 BSF, Manasbal		RSRS, Jammu		RSRS, DDN	
	D75	D100	D75	D100	D75	D100	D75	D100
C-1360	12	16	14	16	20	25	20	27
AGB-8	22	27	13	16	35	40	54	58
PPR-1	18	24	17	21	45	50	59	62
Goshoerami (Local check)	21	27	24	26	------	------	------	------
S-146 (Local check)	------	------	------	------	25	30	18	26
Vishala (National check)	------	------	------	------	------	------	25	29
C-2038 (Zonal check)	------	------	------	------	------	------	25	29

***D75: Days to 75% sprouting **D100: Days to 100% sprouting**

Table 13: Soil health status of four test sites (Autumn 2021)

Test Sites	pH	EC (dS/m)	OC (%)	N (Kg/ha)	P_2O_5 (Kg/ha)	K_2O (Kg/ha)
CSR&TI, Pampore, Kashmir	6.88	0.56	1.45	433.00	65.00	194.83
P4 BSF, Manasbal, Kashmir	7.22	0.40	1.35	420.33	43.67	180.00

RSRS, Miransahib, Jammu	6.77	0.47	0.52	288.43	13.32	126.43
RSRS, Sahaspur, Dehradun	6.95	0.11	0.65	--------	11.20	212.55

Test Sites	S (mg/kg)	Zn (mg/kg)	B (mg/kg)	Fe (mg/kg)	Mn (mg/kg)	Cu (mg/kg)
CSR&TI, Pampore, Kashmir	40.67	0.46	12.46	18.22	2.85	6.03
P4 BSF, Manasbal, Kashmir	14.83	0.19	9.11	37.22	9.08	8.58
RSRS, Miransahib, Jammu	17.45	0.67	-------	14.53	8.50	0.54
RSRS, Sahaspur, Dehradun	11.57	2.28	0.95	33.4	17.35	1.35

Table 14: Meterological data of four test sites (April 2021 – March 2022)

Month/Year	Temperature (°C)			Relative Humidity (%)			Rainfall (mm)	No. of Rainy Days
	Min.	Max.	Mean	Min.	Max.	Mean		
Test Site: Central Sericultural Research & Training Institute (CSR&TI), Pampore, Kashmir								
April – 2021	4.3	27.2	15.75	13	97	55	94.24	15
May	10.1	31.3	20.7	25	93	59	103.55	18
June	13.5	34.2	23.9	24	94	59	35.75	11
July	19.5	30	24.75	49	76	62.5	51.4	13
August	17.4	30.1	23.75	6	80	43.0	22.8	03
September	16.0	29.4	22.70	48	77	62.5	44.1	05
October	8.5	21.4	14.95	62	85	73.5	112.0	08
November	0.7	14.7	7.7	71	91	81.0	3.2	01
December	-1.7	10.4	6.05	66	90	78.0	20.9	04
January - 2022	0.0	7.3	3.65	71	88	79.5	99.5	12
February	0.3	11.1	5.7	71	88	79.5	100.7	05
March	6.7	20.7	13.7	42	73	57.5	21.3	04
Test Site: P4 Basic Seed Farm (BSF), Manasbal, Kashmir								
April – 2021	6.16	13.83	9.99	43	89	66	07	06
May	9.38	20.35	14.86	54	88	71	00	00
June	13.70	25.33	19.51	26	78	52	00	00
July	19.06	28.87	20.46	50.93	66.06	23.89	00	00
August	18.38	28.61	19.91	51.32	66.48	23.93	00	00
September	17.10	16.60	19.28	50.90	64.96	23.50	00	00
October	10.29	19.45	15.87	50.40	69.35	22.52	02	02
November	3.56	13.46	7.93	40.06	64.86	29.38	00	00
December	0.90	6.21	4.49	52.64	68.83	23.70	00	00
January - 2022	0.70	4.44	4.88	67.96	81.35	25.89	01	01
February	1.48	7.82	5.29	57.21	71.82	22.30	02	02
March	13.19	18.29	22.35	46.96	60.64	24.00	01	01
Test Site: Regional Sericultural Research Station (RSRS), Miransahib, Jammu								
April – 2021	14.3	32.4	23.35	27	60	43.5	22.2	2
May	19.9	36.1	28.00	29	55	42.0	52.0	4
June	25.0	38.0	31.50	34	59	46.5	61.2	5
July	25.6	42.9	35.25	22	100	61.0	587.6	20
August	22.7	36.4	29.55	54	95	74.5	243.9	12
September	22.2	35.0	28.60	55	96	75.5	194.2	13
October	12.5	35.0	23.75	46	96	71.0	108.4	06
November	9.0	28.4	18.7	44	88	66.0	00	00
December	2.3	26.0	14.15	54	100	77.0	0.6	02
January - 2022	4.7	20.6	12.65	59	97	78.0	201.8	11
February	5.3	24.0	14.65	44	97	70.5	45.8	07
March	10.5	37.3	23.90	19	89	54.0	2.1	02
Test Site: Regional Sericultural Research Station (RSRS), Sahaspur, Dehradun								
April – 2021	11.50	35.00	23.25	19.10	75.40	47.25	35.90	02

Month/Year	Temperature (°C)			Relative Humidity (%)			Rainfall (mm)	No. of Rainy Days
	Min.	Max.	Mean	Min.	Max.	Mean		
May	17.90	34.50	26.20	38.00	79.40	58.70	145.50	09
June	22.40	34.20	28.30	53.20	88.30	70.75	107.60	10
July	24.10	33.50	28.80	77.60	93.30	85.45	505.30	20
August	24.10	31.70	27.90	77.30	96.50	86.90	416.80	18
September	22.90	32.00	27.45	74.10	96.90	85.50	293.00	12
October	16.60	30.90	23.75	57.20	94.80	76.00	31.80	03
November	7.80	26.90	17.35	47.20	93.90	70.55	0.00	00
December	4.00	21.30	12.65	51.70	95.30	73.50	12.00	01
January - 2022	7.50	18.70	13.10	64.70	94.90	79.80	152.70	07
February	6.10	21.50	13.80	46.40	94.30	70.35	44.50	03
March	11.80	31.50	21.65	37.10	93.00	65.05	0.00	00

AT REGIONAL SERICULTURAL RESAERCH STATION, JAMMU

2. Project Code & Title: AIB01009MI: Evaluation of new bivoltine double hybrid TT21 ×TT56 at farmers level for authorization for commercial exploitation *(In collaboration with NSSO, CSTRI, CSRTI, Mysuru, Berhampore & Pampore)*

Project Duration: April, 2020 – March, 2023

Investigator (s): Surendra Singh Chouhan (CI) & Rita Singh (CI)

Objective(s):

To evaluate the performance of bivoltine hybrid, TT21 ×TT56in field for productivity and silk quality

Progress:

3000 DFLs of TT21xTT56 hybrids received from CSRTI, Mysuru were distributed to 4 districts (Kathua, Reasi, Udhampur and Rajouri) of Jammu division by SDD, Jammu. The data on rearing performance of the silkworm double hybrid has been submitted to CSRTI, Mysuru.

COLLABORATIVE PROJECTS CONCLUDED

1.Project Code & Title: AIE03002MI: Evaluation of bivoltine silkworm genetic resources for tolerance to abiotic stress in selected hot spots *(In collaboration with CSGRC, Hosur)*
Project Duration: April, 2020 – March, 2023
Investigator (s): Sardar Singh & Murali S
Objective(s):
To evaluate and identify the bivoltine silkworm germplasm resources tolerant to abiotic stress in hot spot areas
Findings (At Jammu): Under RSRS, Jammu 12 silkworm breeds has been tested under abiotic stress condition, the result revealed that the genotypes APS-4 has recorded average filament length of 737.50, with reelability of70.75%, raw silk of 24.38% followed by DD2 with average filament length of 730.00 m, reelability74.03 % and raw silk 25.99% (Table-01), respectively.
Table-01 Reeling performance of bivoltine accessions reared at RSRS, Jammu

Acc. no	Acc. name	Avg. filament length (m)	NBFL (m)	Fil. size (d)	Renditta (kg) (Dry)	Reelability (%)	Raw Silk (%)
BB1-86	KPG-A	650.00	492.50	2.42	5.81	60.55	17.54
BB1-184	SMGS-2	642.00	409.00	2.61	4.75	63.88	21.45
BB1-301	YS-7	621.50	412.50	2.45	4.87	70.81	21.32
BB1-339	DD2	730.00	537.50	2.64	4.27	74.03	25.99
BB1-44	NB4D2	670.50	614.00	2.44	4.17	34.96	24.18
BB1-334	APS-4	737.50	552.50	2.49	4.23	70.75	24.38
BB1-336	APS-8	727.50	565.00	2.53	4.07	70.87	26.00
BB1-338	DD1	630.50	403.50	2.48	4.03	67.68	25.19
BB1-343	NK3	525.50	330.00	2.33	5.59	63.35	18.92
BB1-358	CS26	676.50	470.00	2.53	4.06	74.05	25.32
BBI-290	CSR2	720.00	543.50	2.51	3.64	68.51	27.77
BBI-291	CSR4	635.00	486.50	2.39	5.26	62.61	19.25
Mean		663.57	484.71	2.49	4.56	65.17	23.11
SD		60.87	82.99	0.09	0.69	10.51	3.30
CV (%)		9.17	17.12	3.54	15.08	16.13	14.28

NEW COLLABORATIVE PROJECTS

1.Project Code & Title: MTL01025MI: Life Cycle Assessment Of Mulberry Silk*(In collaboration with CSRTI, Mysuru, Berhampore & Pampore, CSTRI, Bangalore)*
Project Duration: March, 2022 – February, 2025
Investigator (s): Kiran R
Objective(s):

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: Project has been coded in the month of March, 2022 and work has been initiated.

2. Project Code & Title: MOE02015MI: Evaluation Of Promising Mulberry Varieties, Bed Disinfectant And Low Cost Drip Fertigation System For Eastern &North Eastern India*(In collaboration with CSRTI, Berhampore)*
[Component II: Evaluation of high yielding and low temperature stress tolerant mulberry varieties C-01 & C-11]
Project Duration: February 2022 – January, 2025
Investigator (s): Santosh Kumar Magadum (CI) &Chattarpal (CI)
Objective(s):

1. To evaluate promising high yielding & low temperature stress tolerant genotypes C-01 & C-11in subtropical condition

Progress: Saplings of two test genotypes (C-01 and C-11) was received from CSR&TI, Berhampore along with two check varieties (C-2038 and S-146) and transplanted in main field with a spacing of 90 cm x 90 cmin Randomized Block Design with 3 replications. Establishment of experimental plantation in main field was maintained by adopting recommended package of practices.

PROGRAMMES OF CONTINOUS NATURE

AT Main Institute

1. Programme Title: Nutrient analysis of soil and mulberry under temperate conditions
Project code: SS-PAM-01
Project Duration: Continuous
Investigator (s): Gulab Khan Rohela
Objective(s):

- Evaluation of soil health status at CSR&TI Pampore and nested units
- Biochemical analysis of mulberry varieties

Workdone:

The nutrient analysis of soil and biochemical content (carbohydrate, protein and chlorophyll) of mulberry leaves from selected superior mulberry varieties under temperate conditions was carried during spring and autumn seasons 2021. The soil samples were collected from CSR&TI, Pampore and P4 Basic Seed Farm Manasbal during the last week of March, 2021. The soil samples were examined for 12 parameters viz., pH, EC, Organic carbon (OC), Macro nutrients (N, P and K) and Micro nutrients (S, Fe, Mn, Zn, Cu and B) status at the Agronomy & Soil Science Section Laboratory of CSR&TI, Pampore by using Mridaparikshak kit and Mridaparikshak instrument. The soil analysis of CSR&TI, Pampore and P4, BSF, Manasbal revealed that the soil nutrient contents are in normal range except Zinc (Table 1).

Table 1: Analysis of soil samples from CSR&TI, Pampore and P4, Basc Seed Farm, Manasbal (Spring- 2021)

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	7.36	0.44	1.44	484	74	213	34	0.52	12.4	11.46	2.8	5.7
Soil Health Report	Medium	Medium	High	Medium	High	Medium	High	Low	High	High	Medium	High
P4-Manasbal	7.48	0.36	1.22	388	44	182	14	0.21	8.21	32.2	9.0	5.4
Soil Health Report	Medium	Medium	High	Medium	High	Medium	Medium	Low	High	High	High	High

Biochemical Analysis of Leaf Samples:

The biochemical analysis (total soluble protein content, total soluble carbohydrate content and total chlorophyll content) of mulberry leaves from superior mulberry varieties were carried during spring and autumn season, 2021. Leaf samples were collected from the eight mulberry varieties*viz*. Goshoerami, PPR1, Chinese white, Rokokuyasu, KNG, TR-10, Ichinose and Karioroso during spring and autumn rearing seasons from mulberry farm of CSR&TI, Pampore for estimating its biochemical parameters. Bradford's methods, anthrone method and acetone method were used for estimation of total soluble protein content, total soluble carbohydrate, total chlorophyll content, respectively. The estimations were carried calorimetrically by using spectrophotometer. During 2021, the spring season mulberry leaf was found to possessed higher chlorophyll, protein and carbohydrates content in comparison with autumn season mulberry leaf (Table 2). During spring season, high moisture content was recorded in KNG (89.25%) and Ichinose (87.36), high chlorophyll content in Chinese white (6.73 mg/g leaf) and Tr-10 (6.67 mg/g leaf), high carbohydrate content in TR-10 (302 mg/g dwt of leaf) and Goshoerami (290 mg/g dwt of leaf) and high protein content in KNG (53.22 mg/g dwt of leaf) and Ichinose (52.18 mg/g dwt of leaf) (Table 2). In comparison to spring season, all the biochemical parameters recorded lesser value during autumn season for the tested varieties (Table 2).

Table 2: Biochemical analysis of mulberry leaves during spring and autumn 2020 (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	78.46	76.05	5.88	4.30	290	254	47.36	44.45
KNG	89.25	79.23	5.62	5.76	246	234	53.22	45.74
Ichinose	87.36	80.12	5.66	6.44	288	202	52.18	48.32

Chinese White	75.12	70.10	6.73	5.92	274	243	43.47	38.17
PPR1	85.76	76.44	5.84	5.00	282	288	50.12	44.62
Tr-10	78.22	65.64	6.67	5.86	302	302	46.35	31.13
Rokokuyaso	69.38	62.32	5.50	5.09	235	201	42.53	33.89
Karioroso	70.23	67.28	5.62	4.88	265	228	45.46	40.34

2. ProgrammeTitle: Acquisition, Conservation, Characterization and Utilization of Mulberry Germplasm under Temperate Conditions.

Project Code: PIB-PAM-01

Duration: Continuous

Investigator(s): Pawan Saini and Rajesh Kumar (upto July 2021)

Objective(s):

- Collection of diverse genetic stocks; Conservation and evaluation; Consequent documentation; Utilization in varied breeding programmes.

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 2022, the leaf sprouting behaviour of mulberry accessions maintained in NGPB and WGPB were assessed with respect to the bud growth stages. During March 2022, 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 March 2022 in NGPB

Date	Mulberry Accessions	Number
15th-22nd March 2022	T-4, $BC_2$59, TR-10, Almora Local, Kanva-2, S-1301, BR-2, C-4, S-146, ME-27, English Black, T-10, S-54, Mysore Local, Punjab Local, S-41, S-1708, S-1733, ME-58, AR-14, PPR-1, Chinese White, Mandalay (S1), S-799, C-763, S-36, ME-53, HP Local, S-1635, S-1531, C-776, Obowase, C-2038, Vishala, Shivalik, Okinowa	36
23rd-31st March 2022	Ichinose, Enshatakasuke, Goshoerami, Botatul, Tomeiso, Kakuso-27, Brentul Kashmir, Lajward, K2 x Kosen, Kasuga, Rokokiyaso, French, Victory-1, Zagtul, Senmatsu, Chattatul, PPR-1/PPR-1, PPR-1/CW, PPR-1/Ichinose	19

Table 2: Leaf sprouting nature of mulberry germplasm accessions during March 2022 in WGPB

Date	Mulberry Accessions	Number
15th-22nd March 2022	Chinese White, Multicaulis, Shrim-5, Muruiaso, Kosen, HP Local, Vishala, Okinowa, English Black, MS-2, Chine-08, ME-53, FGDTR, TR-10, TR-8, T-4, T-10, K-2, C-4, C-763, C-776, C-1733, Punjab Local, Mysore Local, $BC_2$59, Female Local, ME-129, S-1, S-36, S-41, S-54, S-799, S-1301, S-1531, S- 1635, S-1708, AR-12, AR-14, BR-2, Almora Local	40
23rd-31st March 2022	Goshoerami, Rokokiyaso, Ichinose, Togowase, Italian Sarnal, Kasuga, Kakuso-20, Kakuso-21, Kakuso-27, Kairyoroso, KNG, Shimanouchi, Obowase, Sanish-5, Senmatsu, Tomeiso, Tsukasguwa, Limencina, Enshatakasuke, Ichehei, Serpentina, French, Chattatul, ChattatulZangir, Brentul Kashmir, Zagtul, Botatul, Zangbad, Chinarpati, China-30, China-31, Nadigam, Lajward, K-2 x Kosen, Narola, Saspol, Gurez, Victory-1	38

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.

3. Programme Title: Maintenance of Silkworm Germplasm
Project code: AIE 3056
Project Duration: Continuous
Investigator (s): Shivkumar, Bharat Kumar Neelaboina and Kiran R
Objective(s):

- Evaluation, characterization and maintenance of Germplasm of bivoltine races of different origin

Progress: One hundred and eleven bivoltine silkworm races of different origins were maintained at Silkworm Improvement Section, CSR&TI, Pampore during the year 2021. The races were brushed in cellular mode during spring, 2021. After 3rd stage, 250 larvae were retained in each replication. The seed prepared in all the races for next spring rearing, 2022. The Origin-wise breakups of exotic and indigenous races are given in Table 01 and rearing performance of the 111 races maintained under Germplasm is presented in Table: 02.

Table-1: Origin-wise breakups of exotic and indigenous races maintained under silkworm germplasm

Exotic races		**Indigenous races**	
Origin	Number	Origin	Number
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 02: Comparative Rearing Performances of Germplasm races during spring, 2021

Race	Fecundity (No)	Hatching (%)	Larval Duration(Days)	Yield/ 10,000 larvae brushed		Single Cocoon Weight (g)	Single Shell Weight (g)	Shell Ratio (%)	Pupation Rate (%)
				By No.	By wt. (kg)				
EUROPEAN RACES:									
Alps Jaune	497	92.69	25.19	9620	13.94	1.62	0.31	19.20	92.56
Alps Yellow	518	93.34	26.00	9840	14.54	1.64	0.32	19.21	94.30
Cevenese Yellow	514	92.48	26.00	9540	13.33	1.57	0.30	18.85	91.38
Ascoli Yellow	516	93.46	26.00	9540	14.19	1.66	0.32	19.34	91.87
JAPANESE RACES:									
KN2	510	94.38	26.00	9720	14.20	1.63	0.31	19.08	92.74
Meigetsu	535	94.09	25.19	9660	13.51	1.59	0.29	18.30	94.45
B-36	550	94.01	25.19	9760	13.91	1.61	0.30	18.32	94.10
B-37	486	93.3	26.03	9520	13.29	1.59	0.30	18.61	91.11
B-39	503	93.1	26.03	9720	13.27	1.55	0.30	19.35	93.12
B-40	544	93.41	26.03	9820	13.86	1.60	0.31	19.12	92.06
GunkoManrie	505	92.98	26.03	9700	13.38	1.57	0.28	17.89	92.61
SS 4A	499	93.47	26.03	9740	14.03	1.63	0.33	20.00	92.71
SS 15A	516	92.67	26.03	9680	13.59	1.66	0.32	19.28	91.50
SS 17	531	93.02	26.03	9820	13.71	1.58	0.29	18.29	94.06
SS	472	94.08	26.03	9680	14.32	1.67	0.34	20.12	91.73
KY I	467	92.83	26.03	9780	13.90	1.61	0.33	20.56	93.79
KY II	545	93.38	26.03	9880	14.41	1.62	0.31	18.83	94.74
THAICHOAN X HOKOSHINGYAKO	528	98.50	25.61	9700	14.45	1.66	0.32	19.03	93.39
N124XC124	475	98.12	25.18	9860	13.83	1.57	0.30	19.17	94.13
N112xC110XN124XC124	498	98.37	25.18	9780	14.59	1.66	0.32	19.34	93.87
SHOKO GINREI	504	93.75	26.00	9840	14.64	1.65	0.31	18.48	94.18
FUJI SAKURA	556	94.46	26.00	9660	14.39	1.66	0.31	18.43	92.29
TAICHOAN	491	92.91	25.12	9840	14.54	1.64	0.31	18.60	92.82
SHOGETSU HOSHO	434	92.88	26.00	9740	13.64	1.59	0.31	19.24	93.23
KYORIE	504	93.06	26.00	9760	14.40	1.66	0.32	18.98	93.25

SHIMPAKU (P)									
KYORIE SHIMPAKU (M)	542	93.78	25.22	9680	14.22	1.66	0.32	19.03	92.63
SHINKI REYAKU	468	91.97	26.04	9660	13.18	1.55	0.32	20.32	92.72
SHUNREI SHOGETSU	513	93.44	25.22	9680	13.78	1.61	0.31	18.94	92.68
SM 2	548	91.95	25.22	9560	13.16	1.57	0.31	19.49	92.17
Zebra	429	92.56	25.22	9600	17.29	1.65	0.32	19.15	91.41
CHINESE RACES:									
YAKWEI	422	92.68	25.62	9640	13.21	1.67	0.33	19.52	93.01
CHAUNG NAUNG	539	94.12	26.00	9740	13.59	1.58	0.35	21.84	93.78
C 110	535	93.64	25.56	9840	14.58	1.67	0.34	20.12	94.28
CHUKWEI	544	93.66	25.22	9860	14.32	1.64	0.33	20.18	95.26
CHINESE FARMER	438	92.89	26.04	9740	13.64	1.57	0.30	19.17	93.43
CHINESE GOLDEN 70	405	92.34	25.22	9560	14.22	1.66	0.32	19.03	92.82
CHINESE GOLDEN 80	518	92.95	26.00	9820	14.90	1.68	0.33	19.35	93.79
CHINESE GOLDEN 90	511	93.09	26.04	9700	13.57	1.59	0.31	19.24	92.97
HAULAK	514	93.57	26.02	9740	14.17	1.64	0.34	20.43	93.33
KING HAUNG	545	95.70	25.23	9600	14.43	1.69	0.34	19.82	92.25
HAUCHI	514	93.46	25.62	9700	13.24	1.55	0.29	18.39	93.20
NAN NAUNG 6A	539	93.63	25.14	9740	13.88	1.61	0.31	18.94	93.24
CHINESE YELLOW	544	93.70	25.22	9680	14.28	1.64	0.32	19.51	92.45
MIRGUND RACES									
M III	505	94.01	25.22	9620	14.32	1.66	0.33	19.94	92.35
M 10	533	93.85	25.14	9600	14.14	1.64	0.32	19.21	92.90
M 42	547	93.41	25.15	9720	13.85	1.61	0.32	19.57	91.95
M 43	534	93.06	26.13	9760	13.91	1.61	0.32	19.57	92.23
M 45	508	93.67	25.63	9700	13.39	1.57	0.30	18.85	92.94
M 46	549	93.43	25.56	9640	13.15	1.55	0.28	18.06	92.33
MJ 20	494	93.23	25.22	9860	14.08	1.61	0.32	19.57	94.40
MJ 23	526	93.79	26.00	9680	14.08	1.62	0.32	19.75	92.73
MJ 103	513	93.16	26.04	9700	14.45	1.66	0.32	19.34	92.28
MJ 107	528	93.55	26.02	9760	14.26	1.63	0.32	19.38	92.78
RUSSIAN RACES									
AZAD	510	93.49	25.14	9620	13.55	1.58	0.29	18.41	91.28
AZERBAIIJAN	561	93.79	26.00	9700	14.02	1.61	0.30	18.32	93.31
SANISH E1 (P)	551	94.74	26.00	9540	13.13	1.57	0.30	18.85	90.45
SANISH E1 (M)	555	94.13	25.61	9820	13.77	1.59	0.30	18.61	93.21
SANISH E2 (M)	555	94	26.04	9580	13.36	1.65	0.32	19.15	91.61
SANISH 8	442	92.65	26.02	9820	14.26	1.64	0.32	19.27	93.18
SANISH 17	476	93.36	26.04	9800	14.33	1.63	0.31	18.77	93.39
SANISH 18 (P)	476	93.36	26.04	9680	13.55	1.57	0.30	19.17	93.43
SANISH 18 (M)	521	93.88	26.00	9580	14.25	1.66	0.32	19.34	91.45
SANISH 21 (P)	507	92.76	25.61	9700	14.31	1.64	0.33	19.82	93.18
SANISH 30	511	93.38	25.65	9700	13.38	1.57	0.28	17.89	92.85
SHEIKI I	493	92.21	26.04	9780	13.90	1.61	0.31	19.31	92.79
SHEIKI II	540	96.67	25.89	9600	13.90	1.62	0.32	19.81	90.91
TASHKASHI 112	533	94.09	26.00	9700	14.02	1.61	0.30	18.32	92.92
GYANDZA	543	94.30	26.00	9620	13.26	1.57	0.32	20.13	92.35
BELKOKONA-II	540	93.57	25.22	9680	13.54	1.59	0.31	19.56	93.22
MERIFA 7	517	93.52	26.00	9720	13.41	1.57	0.29	18.21	93.00
DEHRADUN RACE									
SH6	484	92.52	26.03	9860	14.07	1.61	0.31	19.25	92.35
MYSORE RACE									

NB4D2	520	93.56	26.03	9880	14.31	1.63	0.31	19.02	94.78
CSR2	453	91.62	26.03	9680	14.02	1.64	0.33	19.88	91.57
CSR4	483	93.52	26.03	9760	14.11	1.63	0.32	19.33	91.50
PAMPORE RACES									
PLF	540	93.25	26.00	9540	13.61	1.62	0.30	18.58	92.37
BL-1	544	93.02	26.00	9760	13.67	1.59	0.30	18.61	93.00
SF 17	487	93.19	26.00	9700	12.83	1.53	0.29	18.95	91.84
AT 4	525	94.20	26.00	9760	13.62	1.58	0.29	18.04	93.50
AT 9	534	94.6	25.22	9860	13.58	1.56	0.29	18.59	94.55
IB 2	549	93.17	26.00	9840	14.44	1.65	0.33	20.00	94.29
IB 3	536	94.17	26.00	9740	13.55	1.56	0.30	19.29	93.28
IB 9	538	94.43	25.07	9600	13.61	1.61	0.31	19.31	90.94
IB 11	543	93.93	26.00	9760	14.02	1.60	0.30	18.44	92.82
TA 3	508	93.33	26.03	9720	13.75	1.60	0.31	19.06	93.41
J PLAIN	564	94.84	26.00	9740	13.88	1.61	0.32	19.57	93.29
J MARKED	540	94.04	26.00	9720	13.51	1.58	0.30	18.73	93.39
HS 6 (SL)	506	93.69	26.03	9700	13.24	1.55	0.29	18.71	93.84
C. NICHI (SL)	544	94.39	25.61	9620	13.30	1.57	0.29	18.47	92.83
RP I	528	93.48	26.02	9680	13.98	1.61	0.29	18.01	92.38
RP II	538	93.84	26.03	9700	14.65	1.68	0.33	19.40	90.72
PAM 101	483	92.97	26.52	9760	13.67	1.57	0.30	19.17	93.33
PAM 102	533	94.48	26.03	9700	14.55	1.67	0.32	19.22	93.34
PAM 103	531	93.85	26.03	9800	14.47	1.64	0.31	18.90	93.45
PAM 104	535	93.83	26.03	9840	13.60	1.57	0.31	19.81	94.45
PAM 105	507	94.24	26.00	9800	13.73	1.59	0.31	19.56	93.61
PAM 106	471	93.08	26.00	9780	14.24	1.64	0.31	18.90	93.24
PAM 107	507	93.17	26.00	9800	13.69	1.58	0.31	19.30	93.39
PAM 108	544	93.07	25.14	9880	14.55	1.64	0.32	19.57	95.05
PAM 109	541	94.28	26.00	9840	13.80	1.57	0.31	19.49	95.74
PAM 110	539	92.95	25.20	9680	14.42	1.66	0.32	19.34	93.27
PAM 111	483	94.24	26.00	9820	14.50	1.64	0.31	18.90	94.57
PAM 112	502	93.42	26.00	9640	13.29	1.57	0.29	18.21	92.76
PAM 113	530	93.22	26.00	9740	13.64	1.59	0.31	19.24	93.40
PAM 114	522	93.17	26.02	9740	13.88	1.61	0.31	19.25	93.73
PAM 115	489	92.88	26.02	9680	13.35	1.57	0.31	19.81	92.64
PAM 116	469	92.43	26.03	9820	13.72	1.58	0.31	19.62	93.66
PAM 117	515	93.09	26.02	9900	14.63	1.66	0.33	19.88	95.00
CS 6	511	93.17	26.04	9860	14.37	1.64	0.32	19.51	94.23
ASSAM RACES									
BARAPOLU	264	90.94	26.00	8600	11.02	1.49	0.25	16.44	85.45
BARAPATH	228	88.89	27.00	8640	10.58	1.41	0.23	16.31	85.61
BERHAMPORE RACES									
S 36	538	93.32	26.00	9600	13.62	1.59	0.30	18.93	93.79

4. Title: Maintenance of Breeders' stock
Project code: AIE 3202
Project Duration: Continuous
Investigator (s): Shivkumar & Bharat Kumar Neelaboina
Objective(s):

- Maintenance of silkworm breeders' stock races to their original characteristics and to make supply of P3 layings for further utilization.

Progress: Thirteen bivoltine silkworm races *viz*. CSR-2, CSR-4, CSR-6, CSR-26, CSR-27, SH-6, NB4D2, CS-6, Pam-101, Pam-111, Pam-114, Pam-115 and Pam-117 were being maintained under this programme. The races were brushed in cellular mode during spring, 2021. After 3rd stage, 250 larvae were retained in each replication. The seed prepared in all

the races for next spring, 2022 for utilization in various breeding programmes. The performance of the races is given in Table 01.

Table 01: Performance of Silkworm Races maintained under breeder's stockduring spring 2021

Race	Fecundity (No)	Hatching (%)	Larval Duration (Days)	Yield/ 10,000 larvaebrushed		SCW (g)	SSW (g)	Shell Ratio (%)	Pup. Rate (%)
				By No.	By wt. (kg)				
CSR 2	453	91.62	26.03	9680	14.02	1.64	0.33	19.88	91.57
CSR 4	483	93.52	26.03	9760	14.11	1.63	0.32	19.33	91.50
CSR 6	512	93.16	26.01	9480	13.84	1.65	0.32	19.09	92.57
CSR 26	483	92.39	26.02	9620	13.40	1.58	0.30	18.99	93.95
CSR 27	533	93.64	26.01	9860	14.72	1.66	0.32	19.34	95.32
SH-6	484	92.52	26.03	9860	14.07	1.61	0.31	19.25	92.35
NB4D2	520	93.56	26.03	9880	14.31	1.63	0.31	19.02	94.78
CS 6	511	93.17	26.04	9860	14.37	1.64	0.32	19.51	94.84
Pam-101	483	92.97	26.52	9760	13.67	1.57	0.30	19.17	93.33
Pam-111	483	94.24	26.00	9820	14.50	1.64	0.31	18.90	94.57
Pam-114	522	93.17	26.02	9740	13.88	1.61	0.31	19.25	93.73
Pam-115	489	92.88	26.02	9680	13.35	1.57	0.31	19.81	92.64
Pam-117	515	93.09	26.02	9900	14.63	1.66	0.33	19.88	95.00
Mean	497.77	93.07	26.06	9762	14.07	1.62	0.31	19.34	93.55
SD	22.62	0.65	0.14	122.06	0.44	0.03	0.01	0.34	1.32

AT RSRS, JAMMU

5. Title: Evaluation and characterization of silkworm germplasm under sub-tropical conditions of J&K
Project code: OFT-PAM-17
Project Duration: Continuous
Investigator (s): Murali, S &Sardar Singh
Objective(s):

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

Workdone: 55 breeds comprising 21 Jam breeds, 11 RSJ breeds, 05 CSR breeds, 09 Pampore breeds, 02 ruling breeds (SH6 & NB4D2) and 07 other breeding lines are being maintained at RSRS Jammu as per the mandate.

RSRS, SAHASPUR

6. Title: Maintenance and evaluation of silkworm germplasm bank with maintenance of parental lines and breeders' stock.
Project code: AIB-2016
Project Duration: Continuous
Investigator (s): K.K. Rai
Objective(s):

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

Progress: Maintenance of Silkworm Germplasm Bank (GPB): Spring rearing, 2021 of GPB stock was initiated with 456 DFLs in respect of 48 races (all @ 10 DFLs each except mentioned in parenthesis/brackets against the race) viz. SM Series (2) : SM 1, SM 3 (01 DFLs); JP Series (3) : JP1A (P), JP1A(M), JP1B (M); PY Series (2) : PY 1(08 DFLs), PY 5; AF Series (2) : AF 2, AF 6; C Series (2) : C 108, C 122; CP Series (2) CP1B (P) (06 DFLs), 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 (02 DFLs); Lines (4): Line 1, Line 4, Line 13 & Line 14(09 DFLs). Brushing is done on 06-03-2021. Rearing and grainage are completed.

On assessment of GPB races on different parameters, following observations have been made in Spring-2021 rearing- Fecundity was maximum in JP1A(M) (536) and minimum in Dun-21 (425); Hatching percentage was maximum

in JP1B (96.21) and minimum in Dun-19 (91.44); Yield/10000 larvae by weight (kg) was maximum in Dun-21(14.384) and minimum in SF-19(12.716); Yield/10000 larvae by number was maximum in C-122(9934) and minimum in SF-19(9450); Single cocoon weight (gm) was maximum in J-112(1.727) and minimum in JJ-5(1.296); Single shell weight (gm) was maximum in Line-14 (0.313) and minimum in JJ-5(0.239); Shell Ratio % was maximum in CP1B(M) (19.13) and minimum in PY-1 (16.93) ; Pupation rate (%) was maximum in SM1 (91.67) and minimum in ATR-16 (90.66).

Table – 01: Rearing performance of Silkworm Germplasm in spring, 2021

Race	Fec.	Hat. (%)	Larval period (D:H)	Yield/ 10,000 Larvae Retained		Pupation %	SCW (g)	SSW (g)	SR (%)
				By No.	Bywt.(Kg)				
SM series (2)									
SM 1	487	95.69	27:04	9883	14.150	91.67	1.349	0.245	18.16
SM 3	496	94.86	28:06	9734	13.316	91.50	1.505	0.265	17.61
JP series (2)									
JP1A(P)	462	93.27	27:00	9767	13.600	91.50	1.388	0.259	18.66
JP1A(M)	536	94.51	27:00	9800	13.584	91.65	1.564	0.280	17.90
JP1B	526	96.21	24:02	9684	13.866	91.67	1.681	0.309	18.38
PY series (2)									
PY 1	519	93.26	28:00	9716	13.434	91.50	1.636	0.277	16.93
PY 5	518	94.02	28:03	9617	13.350	90.83	1.516	0.277	18.27
AF series (2)									
AF 2	503	95.03	28:02	9816	13.583	91.16	1.546	0.287	18.56
AF 6	513	94.34	29:00	9866	13.534	91.67	1.559	0.284	18.22
C series (2)									
C 108	495	94.34	28:00	9666	13.484	91.34	1.450	0.260	17.93
C 122	497	95.47	27:02	9934	13.900	91.50	1.477	0.269	18.21
CP1B (P)	495	94.33	28:00	9783	13.550	91.50	1.504	0.282	18.75
CP1B (M)	488	94.05	29:00	9800	13.867	91.50	1.516	0.290	19.13
J series (2)									
J 112	485	94.13	29:04	9850	14.117	91.00	1.583	0.299	18.89
J 122	502	94.32	29:00	9733	14.150	91.67	1.727	0.304	17.60
SH series (2)									
SH 2	491	93.79	28:03	9783	13.550	91.50	1.443	0.261	18.08
YS series (2)									
YS 3	492	94.30	29:04	9734	13.600	91.66	1.576	0.278	17.64
YS 5	491	94.80	29:02	9800	13.684	91.50	1.567	0.273	17.42
YS 7	495	95.36	29:00	9650	13.700	91.67	1.570	0.273	17.39
SF series (2)									
SF 2	459	94.56	29:00	9650	13.450	91.34	1.563	0.283	18.11
SF 4	504	94.25	29:00	9733	13.467	91.34	1.526	0.261	17.10
SF 19	499	93.59	29:02	9450	12.716	91.50	1.648	0.291	17.66
SF 21	493	95.23	28:00	9866	13.509	91.50	1.549	0.287	18.53
SL series (2)									
SL 3	458	94.33	29:00	9817	13.350	91.34	1.468	0.278	18.94
SL 6	491	94.18	29:02	9584	13.366	91.17	1.534	0.278	18.12
SL 7	481	93.86	29:00	9634	13.484	91.34	1.476	0.265	17.95
SL 9	468	93.70	28:06	9566	13.334	91.00	1.447	0.256	17.69
SL10	473	94.70	29:02	9816	13.816	91.67	1.437	0.265	18.44
SL 11	442	92.30	29:00	9650	13.583	91.50	1.412	0.266	18.84
Dun series (3)									
Dun 12	450	92.66	24:02	9516	14.084	91.50	1.682	0.308	18.31
Dun 19	426	91.44	25:02	9450	13.800	91.17	1.583	0.290	18.32
Dun 21	425	93.76	25:02	9667	14.383	91.00	1.608	0.302	18.78
ATR Series									
ATR16(P)	491	94.10	28:00	9700	13.566	90.66	1.496	0.273	18.25
ATR29(M)	504	94.44	29:04	9684	13.416	91.17	1.519	0.263	17.31

Others (19)									
RB 8	526	95.63	25:02	9900	14.350	91.50	1.616	0.300	18.56
Line-1	510	94.23	28:00	9800	13.466	91.34	1.587	0.273	17.20
Line-4	501	94.81	29:02	9950	13.616	91.50	1.458	0.267	18.93
Line-13	523	94.75	28:02	9600	13.350	91.17	1.573	0.281	17.86
Line-14	523	95.03	29:02	9866	13.600	91.50	1.692	0.319	18.85
AsHAHI	442	93.44	28:02	9650	13.184	91.50	1.414	0.263	18.60
JJ 5	511	94.61	28:00	9634	13.217	91.50	1.296	0.239	18.44
CP1B(P)	453	95.80	25:00	9484	13.034	91.83	1.507	0.259	17.19
CP1B(M)	454	95.92	26:02	9650	14.316	91.83	1.597	0.302	18.91
SY 6	481	93.98	27:06	9783	13.484	91.34	1.509	0.267	17.69
NS 6	496	95.26	28:00	9867	13.984	91.50	1.460	0.271	18.56
NN6D	508	93.50	27:05	9716	13.634	91.34	1.552	0.279	17.97
KA	493	94.26	27:05	9834	13.600	91.16	1.440	0.269	18.68
JD6	528	94.03	29:00	9734	13.450	91.50	1.510	0.276	18.28
ADG6	496	94.35	29:00	9600	13.383	91.50	1.516	0.267	17.61
Su	417	92.35	28:02	9566	13.266	91.34	1.409	0.264	18.74

Table–2:Rearing performance of silkworm races maintained in PBS during Spring- 2021

Race	**Fec.**	**Hat. %**	**LP (D:H)**	**Yield /10,000 Larvae retained**		**Pupation %**	**SCW (g)**	**SSW (g)**	**SR (%)**
				By No.	**By Wt. (Kg)**				
SH6	508	93.50	27:05	9716	13.634	91.34	1.552	0.279	17.97
NB4D2	493	94.26	27:05	9834	13.600	91.16	1.440	0.269	18.68
Dun 6	528	94.03	29:00	9734	13.450	91.50	1.510	0.276	18.28
Dun 17	496	94.35	29:00	9600	13.383	91.50	1.516	0.267	17.61
Dun 18	417	92.35	28:02	9566	13.266	91.34	1.409	0.264	18.74
Dun 22	508	93.50	27:05	9716	13.634	91.34	1.552	0.279	17.97
CSR 2	493	94.26	27:05	9834	13.600	91.16	1.440	0.269	18.68
CSR 4	508	93.50	27:05	9716	13.634	91.34	1.552	0.279	17.97
CSR 6	493	94.26	27:05	9834	13.600	91.16	1.440	0.269	18.68
CSR 26	528	94.03	29:00	9734	13.450	91.50	1.510	0.276	18.28
CSR 27	537	99.25	24:12	9717	19.266	91.00	1.931	0.355	18.38
SK6	526	99.42	23:09	9816	18.249	91.00	1.784	0.335	18.78
SK7	506	99.60	25:00	9799	17.033	90.00	1.689	0.316	18.71
APS5	470	99.15	24:00	9733	17.466	90.00	1.852	0.349	18.84
APS9	533	99.42	24:00	9650	18.266	91.00	1.787	0.339	18.97
BBE198	546	99.26	24:06	9616	17.299	90.00	1.624	0.309	19.02
APS4	557	99.82	24:09	9750	17.933	92.00	1.849	0.352	19.03
Pam DR-1	548	99.45	24:12	9666	17.566	90.00	1.765	0.343	19.43
Pam DR-4	541	99.26	24:09	9816	17.833	91.50	1.794	0.335	18.58
Pam DR-6	569	99.29	23:19	9650	17.966	90.00	1.801	0.330	18.35
Pam DR-7	545	99.08	23:09	9783	18.166	90.00	1.684	0.313	18.58
Pam DR-8	544	99.44	24:00	9850	17.433	90.00	1.786	0.324	18.16
Pam DR-9	517	99.03	24:00	9683	18.000	90.50	1.833	0.334	18.25
Pam DR-12	530	99.24	24:12	9850	17.949	90.00	1.697	0.314	18.50
Pam DR-16	519	99.22	23:12	9733	17.633	92.00	1.764	0.319	18.11
Pam DR-18	517	99.41	23:12	9883	18.046	92.50	1.792	0.337	18.47
MAS-N4	499	99.91	25:00	9500	17.733	91.00	1.640	0.309	18.84
MAS-N6	530	99.05	25:06	9333	15.633	90.00	1.610	0.312	19.38
MAS-N7	530	99.24	25:00	9866	18.033	91.50	1.684	0.328	19.47

Table–3: Rearing performance of silkworm races maintained in PBS during autumn-21

Race	Fec.	Hat. %	LP (D:H)	Yield /10,000 Larvae retained		Pupation %	SCW (g)	SSW (g)	SR (%)
				By No.	By Wt. (Kg)				
SH6	536	96.74	23:03	9916	13.650	91.16	1.690	0.348	20.62
NB4D2	557	98.29	22:00	9850	13.467	91.33	1.598	0.323	20.25
Dun 6	504	96.44	23:03	9950	13.684	91.33	1.537	0.315	20.46
Dun 17	504	97.23	23:00	9917	13.516	91.16	1.398	0.287	20.52
Dun 18	501	97.71	23:00	9616	13.184	91.17	1.583	0.286	18.11
Dun 22	509	95.77	23:00	9916	13.783	91.50	1.687	0.320	18.96
CSR 2	505	95.75	23:00	9600	13.466	91.00	1.634	0.358	21.99
CSR 4	479	96.87	23:05	9250	12.916	90.84	1.655	0.326	19.69
CSR 6	507	98.72	23:00	9800	13.834	91.16	1.491	0.276	18.51
CSR 26	496	97.87	24:00	9334	13.166	91.16	1.417	0.300	21.17
CSR 27	564	96.63	24:00	9184	12.916	90.84	1.616	0.325	20.11
SK6	487	95.47	23:00	9534	12.700	90.84	1.691	0.329	19.46
SK7	514	95.04	23:00	9216	12.916	91.34	1.597	0.326	20.41
APS5	479	94.78	22:03	9650	13.266	91.50	1.426	0.299	20.97
APS9	588	98.47	22:06	9666	13.500	91.34	1.514	0.326	21.53
BBE198	578	98.18	23:00	9750	13.366	90.84	1.571	0.311	19.79
APS4	556	98.02	23:00	9816	13.534	91.33	1.639	0.311	18.97
Pam DR-1	519	98.46	23:06	9883	13.883	90.84	1.422	0.268	18.85
Pam DR-4	540	98.66	23:06	9584	13.250	91.50	1.513	0.310	20.48
Pam DR-6	529	98.31	22:06	9934	13.584	91.50	1.617	0.321	19.85
Pam DR-7	543	98.24	22:00	9700	13.050	91.00	1.567	0.314	20.04
Pam DR-8	547	97.71	23:04	9634	13.150	90.34	1.524	0.310	20.34
Pam DR-9	569	97.18	23:00	9850	13.416	91.00	1.473	0.291	19.75
Pam DR-12	576	97.83	22:06	9734	13.366	91.16	1.458	0.283	19.41
Pam DR-16	540	97.59	23:00	9883	13.467	91.34	1.477	0.272	18.42
Pam DR-18	572	97.91	23:00	9900	13.417	91.50	1.488	0.288	19.35
MAS-N4	586	97.87	23:06	9884	13.600	91.50	1.519	0.286	18.83
MAS-N6	575	98.00	23:04	9784	13.450	91.50	1.464	0.293	20.01
MAS-N7	546	97.98	23:04	9984	13.550	91.16	1.505	0.268	1781

7. Title: Maintenance and characterization of mulberry gene pool
Project code: PIB-3212
Project Duration: Continuous
Investigator (s): Surendra Kumar (*w.e.f*08.02.2021) & Babulal (upto 13.01.2021)
Objective(s):

- 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 genotypes 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 (gm) have been recorded during 2021 (Spring & Autumn).

Out of 50 mulberry accessions received from CSGRC, CSB, Hosur (TN),35 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 comprising of *Morus indica, M. alba, M. laevigata, M. serrata and M. latifolia*species are being maintained as per the package of practices recommended by RSRS, Sahaspur.

Table 1: Morphological characters- spring 2021

Sl. No	Variety	No. of Branches	Shoot length (cm)	Avg. No. of Nodes	Wt. of 100 leaves (g)	Moisture %	Avg. leaf yield per plant (g)
1	China White	24.66	81.88	7.00	160.60	60.99	425.00
2	S-741	24.00	50.00	3.80	69.20	61.50	240.00
3	Rokokuyaso	12.00	33.66	4.00	95.48	66.48	75.00
4	MS-3	17.00	18.00	2.00	122.84	67.43	88.00
5	Local lobed	27.00	25.60	3.00	88.96	64.20	195.00
6	Kokuso-27	16.00	66.77	5.00	140.36	62.01	325.00
7	Majra-11	0.00	0.00	0.00	0.00	0.00	0.00
8	MS-2	23.30	69.20	4.88	121.84	71.56	371.66
9	LF-2	20.33	50.00	4.11	132.76	66.85	440.00
10	MS-8	6.50	22.00	3.33	98.00	71.42	68.00
11	MS-1	18.33	29.00	3.00	104.64	66.89	80.00
12	MS-5	26.60	47.33	3.33	103.96	66.67	281.60
13	S-642	22.00	49.00	3.66	107.62	67.80	300.00
14	MR-2	18.00	48.77	3.88	25.60	71.36	168.60
15	S-799	15.50	57.60	4.16	192.40	62.57	420.00
16	MS-9	20.50	30.83	3.16	112.00	71.42	167.50
17	S-1096	13.00	29.00	3.44	104.00	64.10	109.00
18	S-523	24.60	40.70	3.55	78.64	66.12	314.60
19	Sujanpur	23.00	63.30	4.22	114.64	67.44	364.00
20	MS-6	18.60	34.66	3.33	82.64	64.52	156.60
21	C-776	30.30	75.60	5.77	141.32	73.59	801.33
22	S-31	18.66	33.55	3.22	96.00	78.12	169.30
23	S-1301	19.30	39.22	3.77	82.64	68.50	200.00
24	MS-7	19.00	30.11	2.66	66.64	78.89	127.00
25	C-763	30.33	54.66	4.55	170.64	69.52	671.33
26	C-741	26.66	52.55	4.44	74.66	71.43	289.66
27	K-2(M)	14.00	42.44	3.66	85.33	65.63	168.00
28	Ichinose	22.66	78.11	5.77	170.64	78.12	518.33
29	LF-1	19.33	41.11	9.83	98.66	62.16	175.00
30	PGDTR-9	14.00	21.33	3.33	104.00	69.23	127.00
31	Kaiyorosao	0.00	0.00	0.00	0.00	0.00	0.00
32	C-1729	27.00	40.55	6.60	128.00	62.50	255.00
33	S-1635	25.00	40.00	5.33	160.00	75.00	475.00
34	C-1726	22.00	37.44	11.00	93.33	60.85	180.00
35	C1730	26.33	34.55	3.77	102.40	68.41	297.33
36	Mandaley	18.00	45.55	3.77	105.32	69.61	190.66
37	S-1685	14.00	37.77	11.33	102.64	66.25	167.33
38	C-1608	11.33	24.55	3.22	77.32	65.50	116.00
39	C-1737	6.00	28.33	2.66	101.60	68.50	122.00
40	C-1690	26.00	52.22	4.11	124.00	69.90	435.00
41	TR-4	22.00	73.55	7.33	186.64	68.58	223.33
42	S-1708	33.00	54.33	5.83	158.00	62.02	195.00
43	TR-5	38.00	71.77	5.77	226.40	67.03	731.66
44	TR-8	21.33	35.77	5.55	122.64	63.14	183.33
45	S-13	9.00	21.00	2.66	80.00	60.10	128.00
46	Philipines	22.66	63.33	7.22	133.20	59.96	154.00
47	Punjab Local	17.00	43.66	5.66	93.20	62.83	126.00
48	K2 (S)	15.00	40.22	3.66	104.00	66.69	157.66
49	S 799	24.33	36.33	4.55	80.00	66.70	130.33
50	L-4	20.00	68.33	5.22	136.00	60.88	275.00
51	S-146	20.00	29.55	3.55	112.00	62.14	254.00
52	L-6	23.33	50.11	4.77	118.00	66.10	155.00
53	China White (S)	21.66	61.11	6.66	160.00	63.35	233.30
54	S-41	20.33	38.88	3.77	105.33	62.03	383.33

55	S-1531	18.66	36.44	5.77	109.32	66.61	251.66
56	L-1	18.00	47.33	5.22	96.00	64.16	270.00
57	L-4	32.33	46.55	5.00	93.32	65.70	353.33
58	S-1	19.33	41.33	5.44	90.64	58.82	268.33
59	Tr-10	14.66	37.55	4.88	157.32	64.4	283.33
60	CM	22.33	37.00	3.88	133.33	62.01	316.66
61	S-54	16.00	37.77	4.77	133.32	69.99	313.33
62	Goshoerami	6.30	23.77	3.66	117.32	61.37	128.33
63	L-2	16.33	45.11	4.22	144.00	65.29	253.30
64	L-3	19.00	56.55	5.00	109.33	68.31	133.30
65	Kollegal L	54.00	37.70	7.33	114.66	69.78	545.00
66	Mysore L	26.00	48.22	4.77	138.64	65.37	268.00
67	S-30	17.33	45.55	4.11	149.32	67.85	201.66
68	RFS-135	21.00	47.00	6.11	178.64	70.89	260.00
69	RFS-175	20.00	45.50	4.66	197.32	60.81	408.33
70	V1	20.33	32.44	4.22	138.64	68.26	337.33
71	Vishala	39.33	45.66	4.22	172.00	61.25	508.33
72	Kajli	0.00	0.00	0.00	0.00	0.00	0.00
73	Motigara-L	19.66	62.66	5.33	157.33	62.72	242.66
74	H.P.-02/12	17.66	60.33	5.33	192.00	68.75	248.33
75	H.P.-02/13	0.00	0.00	0.00	0.00	0.00	0.00
76	H.P.-02/8	20.00	55.33	4.77	130.00	64.30	277.66
77	S-36	23.30	52.88	5.11	186.40	59.95	365.00
78	S-34	21.00	50.77	5.00	101.37	64.21	286.60
79	AR-12	26.33	55.00	4.33	170.40	64.01	326.00
80	AR-14	15.00	53.66	4.55	269.32	63.37	550.00
81	C-4	23.66	39.22	4.66	157.32	59.65	289.33
82	BR-2	18.00	33.66	3.22	94.66	63.65	143.00

Table 2: Morphological characters- Autumn, 2021

Sl. No	Variety	No. of Branches	Shoot length (cm)	Avg. No. of Nodes	Moisture %	Wt. of 100 leaves (g)	Avg. leaf yield per plant (g)
1	China white	29.0	166.6	5.2	67.20	200.0	1.400
2	S-741	18.0	143.0	3.8	77.00	140.0	673.3
3	Rokokuyasa	24.0	96.3	3.6	76.00	150.0	363.0
4	MS-3	8.0	139.0	2.69	74.00	110.0	610
5	Local lobed	23.0	82.6	3.47	40.00	65.0	350.0
6	Kokuso-27	29.6	160.7	4.13	60.90	220.0	1.211
7	Majra-11	0	0	0	0	0	0
8	MS-2	40.0	173.4	4.35	71.25	213.0	1.566
9	LF-2	47.0	128.0	3.81	67.74	310.0	1.380
10	MS-8	17,5	126.8	2.74	68.00	200.0	325.0
11	MS-1	24.8	110.53	2.87	71.00	166.0	720.0
12	MS-5	31.6	133.3	6.0	62.00	136.0	440.0
13	S-642	26.6	148.6	4.4	75.25	186.0	2.300
14	MR-2	19.32	127.0	3.6	70.96	165.0	368.0
15	S- 799	13.66	126.0	7.1	64.80	290.0	783.0
16	MS-9	20.66	78.9	5.2	70.00	173.0	463.33
17	S-1096	29.33	147.4	2.98	72.00	195.0	1.246
18	S-523	19.33	124.7	3.5	62.85	140.0	1.486
19	Sujanpur	17.66	141.4	4.04	69.00	200.0	396.66
20	MS-6	17.3	132.06	3.8	64.60	130.0	753.33
21	C-776	16.3	123,5	4.2	70.76	260.0	500.0
22	S-31	12	88.42	3.4	65.71	140.0	226.6
23	S-1301	15.6	169.1	3.7	72.50	160.0	250.0
24	MS-7	16.6	99.6	2,86	73.80	133.0	483.3
25	C-763	22.6	130.6	4,3	70.76	86.66	490.5

26	C-741	11.6	147.2	3.29	63.60	146.0	263.0
27	K2(m)	14.6	120.3	3.63	65.70	186.66	453.33
28	Ichinose	15.3	133.86	4.6	68.80	240.0	1.240
29	LF-1	16	117.3	3.5	71.00	266.0	620.0
30	PGDTR-29	8.0	42,16	2.4	72.00	140.0	80.0
31	Kaiyorosao	0	0	0	0	0	0
32	C-1729	27.3	84.8	2.6	72.00	266.0	680.0
33	S-1635	28	138.4	4.6	78.00	480.0	1.300.
34	C-1726	15	119.0	3.6	72.59	360.0	636.0
35	C-1730	15.6	102.0	3.7	64.28	186.0	680.0
36	Mandalay	16.6	96	4.0	61.73	153.0	476.0
37	S-1685	20.6	106.4	3.8	67.80	230.0	683.0
38	C-1608	12.0	79.2	2.4	61.33	150.0	310.0
39	C-1733	8	46.6	4.4	68.00	200.0	730.0
40	C-1690	21.3	120.0	3.0	72.38	280.0	746.0
41	Tr-4	20.3	143.2	3.9	69.28	93.0	460.0
42	C-1708	26.5	108.4	4.0	84.57	350.0	1.250
43	Tr-5	31.0	141.33	4.06	78.75	433.0	2.580
44	Tr-8	20.3	128.13	5.18	64.11	170.0	583.33
45	S-13	14.0	103.2	3.0	70.00	240.0	430.0
46	Philippines	8.3	214.4	4.9	71.66	80.0	460.0
47	Punjab Local	11.6	172.2	5.2	71.25	160.0	346.6
48	K2(s)	11.3	126.1	4.1	64.20	186.6	540.0
49	S-799	15	127.6	4.4	69.40	220.0	406.6
50	L-4	10.3	161.1	3.9	71.50	253.8	630.0
51	S-146	8.3	148.2	3.0	73.00	260.0	446.6
52	L-6	10.3	161.5	4.18	70.00	186.0	493..3
53	China white	9	165.8	5.2	74.20	373.0	616.6
54	S-41	10.6	139.0	3.82	75.80	290.0	693.3
55	S-1531	11.6	145.3	4.5	70.90	165.0	483.3
56	L-1	10.6	118.2	3.8	72.90	226.0	473.3
57	L-4	8	135.1	4.2	73.60	190..0	476.0
58	S-1	9	148.4	4.03	74.80	155.0	311.6
59	Tr-10	10	150.9	4.32	69.70	436.6	311.6
60	C M	12	142.6	3.04	69.70	205.0	463.0
61	S-54	9	115.0	2.16	72.20	215.0	436.0
62	Goshoerami	9	57.06	3.27	71.28	130.0	340.0
63	L-2	11	111.4	3.49	66.80	195.0	250.0
64	L-3	12	149.5	4.26	71.10	240.0	403.3
65	Kollegal	33	120.2	3.0	83.70	180.0	1.380
66	Mysore local	15	128.8	3.04	67.74	206.0	623.0
67	S-30	11	126.5	3.34	65.92	446.0	643.0
68	RFS-135	12	111.6	3.69	71.40	151.3	240.5
69	RFS-175	29	113.4	4.6	73.30	233.3	546.6
70	V 1	14	126.5	3.9	73.00	293.0	1.180
71	Vishala	15	130.4	4.0	70.19	340.0	1.040
72	Kajli	0	0	0	0	0	0
73	Motigara	10	136.8	3.96	65.16	200.0	436.0
74	HP02/12	10	130.0	4.0	66.90	260.0	710.0
75	HP02/13	0	0	0	0	0	0
76	HP02/08	11	127.2	4.7	73.40	275.0	346.66
77	S-36	8	1366.6	3.7	68.00	333.3	583.3
78	S-34	9	108.3	3.5	70.90	220.0	363.3
79	AR-12	10	111.2	3.4	68.90	217.0	462.61
80	AR-14	14	53-7	4.3	63.80	105.0	460.0
81	C-4	14	129.4	4.16	66.60	150.0	1.050

CAPACITY BUILDING & TRAININGS (CBT)

The Central Sericultural Research & Training Institute (CSR&TI), Central Silk Board (CSB), Pampore imparts need based training programmes in north India on various aspects of sericulture at main institute and Regional Sericulture Research Stations (RSRSs), Jammu and Sahaspur, Dehradun (Uttarakhand) and Research Extension Centers (REC's) under Capacity Building and Training (CBT) of CSR&TI, Pampore. The need based and demand driven training programmes in sericulture sector targets the sericulture farmers, Department of Sericulture (Dos) staff, technical staffs of CSB and other stakeholders of sericulture industry in north India for upgrading Knowledge, skill and attitude of the beneficiaries.

Capacity Building & Training (CBT): Training under Research and Development (R&D) sector, the structured training courses were imparted such as Intensive Bivoltine training programme (more than 30 days), Farmer Skill Training (FST) programme, Technical Orientation Programme (TOP) and Training under Post-Cocoon Sector to enhance skills of the stakeholders in sericulture Industry in north Indian states. In addition, the training under STEP were imparted i.e. Management development programme for 25 stakeholders at CSR&TI, Pampore. Along with above training programmes the Sericulture Resource Centers (SRC's) are established under CBT at farmer's location to be operated by lead farmers to inculcate first hand information about silkworm rearing and management practices at doorstep of sericulture farmers. In addition to above mentioned training programmes, CSR&TI, Pampore and its nested units imparts need based and location specific training programmes for stakeholders in North India.

The brief progress for Capacity Building & Training programmes carried out during 2021-22 is presented as under:

- A total of 1088 persons/stakeholders were imparted skill enhancement training on various aspects of sericulture in north India under Capacity building & training programmes during the year 2021-22 with total annual expenditure of Rs. 16.35 lakhs.
- Training programme under STEP, The Management Development Programme were conducted at CSR&TI, Pampore for upgrading computing skills. Under said programme a total of 25 stakeholders were benefitted.
- The training under R&D sector, The Farmer Skill Training (FST) programme were imparted to showcase recent technologies and to disseminate first hand information in sericulture sector of north Indian states, under FST Training programme, a total of 400 sericulture farmers were benefitted.
- In addition to FST, The Technical Orientation Programme (TOP) were conducted under the R&D sector, a total of 86 stakeholders were covered under said programme. The target groups of TOP programme includes Department of Sericulture (DOS) staff, CSB employees and other stakeholders in sericulture sector.
- Under structured training courses of R&D sector, The Post cocoon Technology Training were imparted to the weavers, rearers, students and other stakeholders in sericulture sector to strengthen post cocoon sector in north India. A total of 25 stakeholders/persons were benefitted under said programme.
- The sericulture resource centers (SRC) are established under CSR&TI Pampore and RSRS Sahaspur in collaboration with Sericulture Development Department (SDD) to inculcate first hand information about rearing and management practices under Capacity building and training (CBT) through lead farmer/progressive sericulture farmer. Under said programme a total of 291 sericulture farmers were benefitted in north India.

Details of Trainings conducted under CBT during the year 2021-22

Institute/ Unit	Farmers Skill Training		Technical Orientation Programme		Intensive Bivoltine training		MDP under STEP		Post-cocoon Technology (PCT)		Sericulture Resource centre (SRC)	
	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
CSR&TI Pampore	50	50	25	26	20	00	25	25	50	25	150	141
RSRS, Jammu	175	175	50	45	20	00	00	00	00	00	00	00
RSRS, Sahaspur	175	175	25	15	20	12	00	00	00	00	150	150

Capacity Building & Training programmes carried out during the year 2021-22

#	Title of the training programme	Target		Achievement	
		No. of programmes	No. of stakeholders	No. of programmes	No. of stakeholders
1	Intensive Sericulture Training	03	60	01	12
2	Farmers Skill Training	16	400	16	400
3	Technology Orientation Programme	04	100	04	86
4	Sericulture Resource Centers (SRCs)	2 (20)	300	2 (17)	291
5	Training on post cocoon technology	02	50	01	25
6	Management Development Programme under STEP	01	25	01	25
7	Other Need Based Training Programme (KVK & statistics programme)	-	-	02	31
8	Capsule training programme sponsored by Dos/Universities	-	-	09	141
9	Exposure visit by students	-	-	03	77
	Total	**28**	**935**	**39**	**1088**

Glimpse of Training Programmes Conducted during 2021-22
Farmers Skill Training (FST)





Technical Orientaion Programme (TOP)





Technical Orientiation Programe to DoS Officials



Sericulture Resource Centre (SRC)





Trainers Training Programme for KVK Scientists/Officials w.e.f. 13-09-2021 to 17-09-2021

Extension Communication Programmes

The Central Sericultural Research & Training Institute (CSR&TI), Central Silk Board (CSB), Pampore is conducting Extension Communication Programmes (ECPs) in North West India under main Institute, Regional Sericulture Research Stations (RSRSs), Jammu and Sahaspur, Dehradun (Uttarakhand) and Research Extension Centers (REC's). The ECP programmes in sericulture sector targets the sericulture farmers, for exposing /adoption of new technics / technologies in sericulture practices and also upgrading the Knowledge, skill and attitude of the beneficiaries. In addition of ECP programmers, Institute imparts other training Programmes for DOS officials and Non-profit organizations and need based institutes from private sector across North Indian states.

Extension Communication Programme (ECP): Extension Communication Programmes under Research and Development (R&D) sector, were conducted to aware and expose the new technologies in the field which helps in enhance skill of the stakeholders, the programmes which are conducted in the field under Extension Communication Programmes are as:-

1. Technical demonstration cum enlightenment programmes,
2. Awareness Programmes,
3. Farmers field days
4. Krishi Mela

The brief progress for Extension Communication Programmes (ECP) carried out during 2021-22 is presented as under:

- A total of 629 persons/stakeholders were participated in 26 Technical demonstration cum enlightenment programmes on various technologies developed by this institute & its nested RSRSs in North Indian during the year 2021-22.
- Under Awareness programmes a total of 1283 stakeholders were benefitted in 24 programmes. The awareness programmes always emphasis on successful silkworm rearing to farmers and also guiding about adoption and diligent follow the various technologies right from chawkie rearing to late age rearing. Special focus 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 no 1311 stakeholders were participated in 24 Famers field days (Programmes) in North India. The main theme of these programmes are to highlight the various technologies of the Institute & help the farmers to adopt the technologies and also to approach the Institute for technical guidance whenever necessary.
- 3 Reshem Krishi Mela were organized at P4, Basic seed Station Manasbal, RSRS- Jammu, and RSRS-Sahaspur, a total 651 farmer were participated in Krishi Melas.

Table: Consolidated details of programmes conducted during the year 2021-22

#	Name of the ECP	No. of programmes conducted	No. of stakeholders covered
1	Krishi Mela	03	651
2	Farmers field day	24	1311
3	Technical demonstration cum Enlightenment programme	26	629
4	Awareness Programme	24	1283
Total		**77**	**3874**

Table: Details of ECP's conducted through main Institute/P-4, B.S.F, Manasbal:

#	Name of the ECP	No. of programmes conducted	No. of stakeholders covered
1	Krishi Mela	01	205
2	Farmers field day	04	221
3	Technical demonstration cum Enlightenment programme	04	86
4	Awareness Programme	04	205
Total		**13**	**717**

Table: Details of ECP's conducted through RSRS, Sahaspur

#	Name of the ECP	No. of programmes conducted	No. of stakeholders covered
1	Krishi Mela	01	200
2	Farmers field day	10	565
3	Technical demonstration cum Enlightenment programme	11	299
4	Awareness Programme	10	535
Total		**32**	**1599**

Table: Details of ECP's conducted through RSRS, Jammu

#	Name of the ECP	No. of programmes conducted	No. of stakeholders covered
1	Krishi Mela	01	200
2	Farmers field day	10	525
3	Technical demonstration cum Enlightenment programme	11	244
4	Awareness Programme	10	543
Total		**32**	**1512**



Farmer's Field day at DH Pora, Kulgam on 05.03.2022



Technology Demonstrationat DH Pora, Kulgam on 05.03.2022



Awareness ProgrammeMalwan, Kulgam on 28.02.2022



Technology demonstration at Malwan, Kulgam on 28.02.2022



Awareness programme at Nagrota, Katua Dist of J&K (Left)
Technology demonstration at Govt. Seri. Center, Dist. Bilaspu, HP on 09.03.2022 (Right)



Resham Krishi Mela at RSRS Sahaspuron 21.03.2022

RESEARCH EXTENSION CENTRES

1. Research Extension Centre (REC), Lamberi:

It 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 420C during summer and 50C during winter. Silkworm rearing is practiced during spring (March- April) and autumn (August- September). 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 33.130 N and longitude 74.260 E & altitude varying from 700-800 MSL. The village covers an area of approximately 70 square kilometers and having populations of about 7500 souls.

REARING PROGRAMMES: First time in district Rajouri, three rearings were conducted during spring, summer and autumn seasons and the data is depicted as under:

#	Rearing Programme/ Season	No. of Farmers covered	Silkworm Seed supplied (DFLs)	Silkworm Hybrid	Actual Cocoon harvested (kg)	Average Yield /100 DFLs (kg)
1	Field Rearing under (Spring 2021)	272	46500	Double Hybrid	15601.000	33.550
2	Field Rearing under Private CRC (Spring 2021)	28	2000	Double Hybrid	803.000	40.150
3	Field Trial rearing under OFT (Summer 2021)	12	425	SH6 x NB4D2	149.000	35.060
4	Field Trial rearing under OFT (Autumn 2021)	12	425	SH6 x NB4D2	128.000	30.110

Technologies Advocated:

- Use of plastic collapsible mountage in summer and autumn rearings: On ripening 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, summer 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, summer and autumn seasons for better use of leaf during various seasons.

Raising of Nursery at REC Farm: 1000 Mulberry cuttings of S146 and 500 roots of Vishala varieties planted in the nursery at REC Lamberi under revenue generation scheme.

Maintenance of Mulberry Farm: Under REC Lamberi 2 acres of mulberry farm is being maintained by conducting various cultural operations.

2. Research Extension Centre (REC), Ghumarwin

Cluster Promotion Programme (CPP): 02 Mega clusters:

- Spring 2021: A total of 107300 DFLs were chawki reared at 08 CRCs in the cluster areas falling under different Govt. Sericulture Centres, Sericulture Division, DOI, Ghumarwin and distributed among 1401 farmers, covering 264 villages. A total production of 49,105 kgs of cocoon was harvested with an average yield of 45.79 kg/100 DFLs.
- Autumn 2021: A total of 35000 DFLs were chawki reared at 08 CRCs in the cluster areas falling under different Govt. Sericulture Centres, Sericulture Division, DOI, Ghumarwin and distributed among 702 farmers, covering 185 villages. A total production of 10840 kgs of cocoon was harvested with an average yield of 30.98 kg/100 DFLs.

Rearing techlogy demonstrations in a target area erstwhile IVLP

- Spring 2021: A total of 6500 DFLs were chawki reared under IVLP at GSC, Daslehra Sericulture Division, DOI, Ghumarwin and distributed among 100 farmers, covering 15 villages. A total production of 3050.03 kg cocoon was harvested with an average yield of 46.92 kg/100 DFLs. (Table-5).
- Autumn 2021: A total of 2000 DFLs were chawki reared under IVLP at GSC, Daslehra Sericulture Division, DOI, Ghumarwin and distributed among 40 farmers, covering 10 villages. A total production of 935.60 kg cocoon was harvested with an average yield of 31.19 kg/100 DFLs. (Table-6).

Demonstration of Technologies:

- Under TOT programme, a total of 2243 rearers covered under Mega Cluster Ghumarwin, Sangaswin & IVLP in 08 technologies for the year 2021-22.

Raising of Agro based mulberry tree plantation:

- Under this programme, 07 farmers have already been selected in Nurpur & Ghumarwin Division of HP State. A total of 1500 saplings were planted in the year 2020-21 in 5.0 acres of land to raise the Agro based mulberry plantation of these farmers in tree mode. Training of plants were undertaken on the advice of Scientist-D, RSRS, Jammu during July, 2021 and on spot demonstration was given to farmers through Video calling and the further progress is being monitored.



Farmer Field Day at Khann, Kandrour, Dist. Bilaspur, HP on 03.03.2022

3. Research Extension Centre (REC), Basti

REC, 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 6 clusters located at Basti, Gonda, Gorakhpur, Kushinagar, Bahraich and Shravasti 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. Different types of activity of the centre are given below:

Commercial silkworm rearing at cluster level: Total 6 commercial crops is in practice at farmers level throughout the year, however, only two crops namely spring and autumn were supervised in the adopted clusters of Basti, Gonda, Gorakhpur, Kushinagar, Bahraich and Shravasti district of Uttar Pradesh. The centre has supervised the chawki and late age rearing of 406460 DFLs at farmers' level among the above clusters. Out of which, chawki and late age rearing of 59660 DFLs in Gonda ,72800 DFLsin Basti, 50000 DFLs in Gorakhpur, 50000 DFLs in Kushinagar, 91000 DFLs in Bahraich and 83000 DFLs in Sravasti were supervised to achieve the higher cocoon yield. The centre has also undertaken a close monitoring at 3207 farmers level during late age rearing in 302 villages in above clusters.

Table 1: Cluster wise DFLs supplied and their cocoon yield

Crop Season	Name of the Cluster	Name of District	No. of Village Covered	No. of Farmer Covered	No. of DFLs Supplied	Total Cocoon Yield (kg)	Cocoon Yield/ 100 dfls (kg)
Spring , 2021	Paraspur,	Gonda	25	270	38800	22156	57.10
	Kaptanganj	Basti	30	320	38050	21695	57.10
	Gorakhpur	Gorakhpur	35	250	30000	16892	56.30
	Dudahi,	Kushinagar	28	210	30000	17360	57.80
	Mahadeva,	Bahraich	25	270	55000	31500	57.20
	Gauspur,	Sravasti	12	250	50000	28500	57.00
Autumn, 2021	Paraspur,	Gonda	30	290	20860	12250	58.70
	Kaptanganj	Basti	28	315	34750	20275	59.70
	Gorakhpur	Gorakhpur	14	150	20000	11875	59.30
	Dudahi,	Kushinagar	33	192	20000	11750	58.70
	Mahadeva,	Bahraich	24	360	36000	21690	60.20
	Gauspur,	Sravasti	18	330	33000	19867	60.20
	Total		**302**	**3207**	**406460**	**235810**	**58.00**

Survey of diseases and pests of mulberry and silkworm: The centre has conducted the routine and regular survey for the diseases and pest of mulberry plants in the operational area. In rainy season, minor attack of powdery mildew were observed in some of the operational area, however, there was no severe pest infestation in mulberry field was recorded during the period under report. Likewise, there was no severe attack of silkworm diseases were observed except attack of grasserie in some clusters. It was due to fluctuation in temperature and humidity. The farmers were educated to control of the silkworm diseases at their own level by following the standard guidelines. No Uzi incidence was recorded during the survey.

Soil Health Card of sericulture farmers field: Total 50 soil samples were collected from the progressive sericulture farmers field of Basti, Gonda and Gorakhpur following the standard procedures. The samples were processed and submitted to the RSRS, Sahaspur for further analysis and preparation of soil health card.

Collection of geo enabled sericulture data of Uttar Pradesh: Geo enable sericulture data alongwith photographs of 150 sericulture farmers were collected from the different part of Uttar Pradesh in consultation with DoS officials and uploaded to the Google sheet as created by the Central Office. Out of 150 farmers selected, 75 were involved in Mulberry sericulture, 50 in Eri and rest 25 were involved in Tasar sericulture.

Expansion of new mulberry varieties: The twigs of new mulberry varieties namely C-2038 and S-1635 were brought from Regional Sericultural Research Station, Sahaspur, Dehradun and their cuttings were planted at Govt. sericulture farm, Kajrikund, Basti for the expansion of new mulberry varieties by replacing the aged plantations of old varieties.




Farmer Skill Training Programme at Govt. Seri Fram, Gonda, Uttar Pradesh on 21.02.2022

P4-BSF (BASIC SEED FARM), MANASBAL

Achievements/highlights

1. Maintenance of Breeders' Stock (P3): Thirteen silkworm races *viz.*SH6, NB4D2, CSR2, CSR4, CSR6, CSR26, CSR27, CS6, Pam101, Pam114, Pam115, Pam116 and Pam117 in P3 were maintained.
2. One (01) Seri-cluster is running under the station covering 380 sericulture farmers. 19425 kg of cocoon production was achieved by disseminating the new evolved technologies such as disinfection, chawkie rearing, leaf preservation, late age rearing and shoot rearing to the farmers.
3. Maintenance of Temperate Mulberry Germplasm Bank (TMGB): Mulberry plantation of 83 genotypes / accessions is raised in 1.15 acre of land under this programme which was maintained as per norms.
4. Farm up gradation Programme: Area of 0.25 acres land was brought under up gradation programme.
5. Revenue Generation: An amount of ₹ 66490/- revenue was generated by selling, auction of excess leaf /grass krishi/pruned material & disposal of rejected cocoons.

Maintenance of Temperate Mulberry GermPlasm Bank (TMGB): The station is maintaining 83 genotypes / accessions in 1.15 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 under:

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

01	Almora Local	29	Ichihei	57	Punjab Local
02	AR-12	30	Ichinose	58	Rokokiyaso
03	AR-14	31	Italian Sernal	59	Senmetsu
04	ACC-48	32	Kasuga	60	Shimnouchi
05	ACC-67	33	Kanva-2	61	Sanish-5
06	ACC-77	34	Kokuso-13	62	Shrim-5
07	ACC-92	35	Kokuso-20	63	Shrim-8
08	ACC-99	36	Kokuso-21	64	Serpentaina
09	ACC-100	37	Kokuso-27	65	S-30
10	BR-2	38	Kairyoroso	66	S-36
11	BC-259	39	K2 x Kosin	67	S-41
12	Brantual Kashmir	40	Karionizamigashi (KNG)	68	S-54
13	Botatul	41	Kosin	69	S-146
14	C-4	42	Limoncina	70	S-799
15	Chinese White	43	Lajaward	71	S-1531
16	ChatatulZangir	44	Mysore Local	72	S-1635
17	Chatatul	45	Muraiso	73	S-1708
18	ChinarPati	46	*M.multicaulis*	74	T.sukasagwa
19	C-776	47	Mandalay	75	Tomeiso
20	C-1733	48	ME-27	76	TR-10
21	Exotica	49	ME-53	77	Togowase
22	English Black	50	ME-58	78	Victory
23	Enshatkasukwe	51	ME-129	79	Zagtul
24	FGDTR	52	MS-8	80	Zangbad
25	French	53	Vishalla	81	*Morus Nigra*
26	Female Local	54	Nadigam	82	PPR1 (S140)
27	Goshoerami	55	Obowase	83	Shivalik
28	Himachal Local	56	Okinowa		

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 1430 kg, 1100 kg & 1200 kg of good quality leaf was harvested for own utilization in the Spring, Summer & Autumn rearing respectively.

Up gradation programme: Under up gradation programme the station covered 0.25 acres of land by planting saplings of PPR-1 and maintained as per package of practices.

Establishment of a safety backup centre with 50 mulberry accessions of cold & temperate mulberry varieties: Under Research Programmes and Projects, plantation of two year old 50 genotypes were planted in 1st phase in an area of 0.50 acre at spacing of 9'x 9' supplied by CSR&TI Pampore and were maintained as per the package of practices under temperate climatic conditions.

Table: New GPB under Safety Backup of exotic mulberry accessions programme at P4 Manasbal:

01	Japan-II	21	MOULAI	41	ROSO
02	KAMISO-402	22	RUGGETTO	42	SEIZURO
03	CHINA-27	23	S-1	43	MIZUSAWA
04	BR-8	24	ATSUBAMIDORI	44	CATTANEO
05	BR-4	25	SOSUKE-II	45	BR-3
06	JAPANESA	26	ACC-165	46	XUAN-9
07	MORETIANA	27	CHINA-9	47	CHINA-2
08	XUAN-5	28	CHINA HYBRID-2	48	JAPAN
09	CREEPING MULBERRY HYBRID	29	M- MACROURA	49	VIETNAM-3
10	CANTON CHINA	30	ACC-152	50	KENMOCHI
11	FURCATA	31	SRDC-2	-	-
12	TILIAEFOLIA	32	BOGURAI-1	-	-
13	GEORGIA	33	THAIBEELAD	-	-
14	M.IHOU SERINGE	34	HUNGARIAN	-	-
15	PAPUA NEW GUINEA	35	ACC-148	-	-
16	KOKOSO	36	SOSUKI-1	-	-
17	BURMA-8	37	THAILAND LOBER	-	-
18	KANMASARI	38	LARGE BLACK	-	-
19	LAZURASO	39	BOGURAI-4	-	-
20	VENOSA	40	AUSTRALIA	-	-

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, 2020. 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 under:

Table: Performance of P3 silkworm rearing during spring, 2021

Race	Fecundity	Hatching %	Yield / 10, 000 larvae brushed		Single cocoon wt. (gms.)	Single shell wt. (gms.)	Shell ratio %	Pupation rate
			By No.	By Wt.				
SH6	584	97.48	9660	18.84	1.96	0.37	18.88	93.00
NB4D2	582	97.95	9844	19.66	1.94	0.37	19.07	92.00
CSR2	468	92.62	9864	18.71	1.90	0.39	20.52	94.00
CSR4	469	95.62	9792	17.60	1.84	0.40	21.73	91.00
CSR6	505	92.59	9816	19.00	1.96	0.44	22.44	93.00
CSR26	526	95.25	9828	18.41	1.89	0.41	21.69	93.00
CSR27	528	92.17	9832	18.36	1.88	0.40	21.28	92.00
CS6	568	96.98	9840	17.90	1.83	0.36	19.67	93.00
Pam101	558	97.60	9836	17.67	1.81	0.37	20.44	94.00
Pam114	562	96.63	9832	18.23	1.89	0.38	20.10	90.00
Pam115	566	96.92	9860	17.56	1.80	0.38	21.11	92.00
Pam116	565	97.11	9856	18.06	1.85	0.37	20.00	91.00
Pam117	580	96.71	9844	16.40	1.66	0.37	22.29	92.00

Silkworm Seed Supply Programme: The station supplied Ten (10) dfls each SH6 & NB4D2 of P3, level to P3 NSSO, CSB, Majra Dehradun.

POST COCOON TECHNOLOGY

Post Cocoon Technology Section of this Institute is continuously in touch with reeling unit holders, Silk exporters & Silk Mark Aus' of Kashmir valley to motivate the owners/ reelers /Exporters/ designated officers concerned to improve the Raw-Silk/Silk Carpet production and produce quality silk. A visible sign of improvement in raw silk quality at private/public reeling entrepreneur's level is appreciating. This office is promoting to enable the reeling units to work with perfection and achieve success in producing quality silk by continuously visiting their units by providing technical guidance.

This office is continuously forwarding the detailed test results along with gradation value of raw silk samples supplied with in a specific time for bringing improvement in various test characteristics for better quality production of raw silk. The samples along with Kilchas are returned to the beneficiaries after completing the testing work to avoid loss of silk in testing.

During the period mentioned above this office has under taken limited tests of 159 samples collected from functional reeling units of Jammu & Kashmir UT.

Table 1: Average performance of raw silk quality of tested samples:

Target Denier	Average Size (Denier)	Total No. of samples	Average Winding Breaks	Average Size deviation	Average. Maximum Deviation
20/22	21.12	29	-	2.04	3.12
28/32	30.17	130	-	2.72	3.69

Demonstration of Post Cocoon Technologies among the reeling: Use of three pan cooking as per CSTRI norms, use of black cloth in sun drying of cocoons and the procedure for drying of Cocoons under Hot air Drier during the visit.





Technical guidance at MRM units







Assessment of Cocoon Samples: A total of 1006 number of cocoon samples were assessed during the year 2021-22, out of which 876 samples were received from SBG Division & 130 Samples by P4 BSF Manasbal.

Table 02: Post Cocoon Analysis of Mono Cocoon Samples received from P4 BSF Manasbal (Spring- 2021)

Race/Batch	Avg. Filament Length (Mtrs.)	Total No. of Cocoons	Avg. Non-Filament Length (Mtrs.)	Wt. of 10 Cocoons (gms)	Total Wt. of Flt. In (gms)	Total wt of Silk waste (gms)	Avg. Filt. Denier	Estimated Renditta	Estimated Reelability (%)
Average 1-A	666	0.10	606	6.97	2.24	0.41	3.06	3.11	84
Average 2-A	811	0.20	675	7.83	2.54	0.49	2.85	3.11	83
Average 3-A	898	0.30	691	8.67	2.71	0.43	2.76	3.22	86
Average 4-A	715	0.20	596	7.33	2.34	0.38	1.95	3.13	86
Average 5-A	833	0.30	640	7.35	2.54	0.43	2.76	2.62	85
Average 6-A	801	0.10	728	7.13	2.53	0.42	2.84	2.82	86
Average 7-A	795	0.10	722	7.64	2.62	0.44	2.94	2.94	84
Average 8-A	693	...	...	6.77	2.13	0.35	2.77	3.21	87
Average 9-A	700	0.20	583	6.55	2.20	0.40	2.89	3.00	81
Average 10-A	719	0.10	653	7.04	2.35	0.41	2.97	3.02	85
Average 11-A	672	0.20	560	6.68	2.30	0.34	3.08	2.87	86
Average 12-A	700	---	---	6.33	2.09	0.38	2.75	3.05	84
Average 13-A	589	0.20	409	4.88	1.60	0.33	2.59	3.15	83

Field Programme / Awareness Programme: During the year 02 Awareness programmes and 22 field visits were conducted to different Reeling units & in Cocoon Markets. Rearers were advised to take various measures to ensure A grade silk. They have been practically shown drying of cocoons under black cloth to avoid the damage to the silk content by direct falling of ultra violet rays on cocoons, handling of green cocoons in willow baskets & proper storage of cocoons in these programmes. Similarly, reelers were advised to adopt mixed reeling principles during entire reeling operations to ensure good quality raw-silk.

Other activities:

a) **COCOON STIFLING:** 350 kgs App. (Green) cocoons of Spring & Late Spring 2021 received from SBG Division of this Institute are stifled during the period under report.

b) **MASS REELING ACTIVITES**: During the period mass reeling of the rejected cocoons has been done & it produced 4.80 Kgs of raw silk during the year 2021-22.

Demonstration of Technology: one programmes was organised at Govt. Silk Filature Srinagar where in all the reelers, cookers, re-winders etc participated, use of pressing plate was practically shown which is very important for uniform cocoon cooking in less span of time. Besides use of black cloth in drying of the green cloth was also practically shown to ensure the lustre of the cocoon protected from the harmful ultra violet rays of the sun, if dried under black cloth

Revenue generation:

1) Rs. 7950/- collected as raw-silk testing charges of 159 samples tendered by reeling units of Kashmir valley.
2) Raw-silk, reeling waste, defective, double and cut cocoons auctioned during the year an amount of Rs. 76,642/- realised out of the auction of these stocks.

SMOI WORK

The chapter has been entrusted the duty of popularising the Silk Mark scheme in Jammu and Kashmir. The main objective of the Silk Mark scheme is to ensure 100% purity in all silk products fixed with the Silk Mark tag. Annual targets are fixed for the chapter by the corporate office, SMOI, CSB Bangalore and maximum efforts are put in to achieve the set targets. During the year, as against a set target of five [5] Authorised user's, the chapter, enrolled two fresh Authorised Users and encouraged six [6] existing authorised users to renew their license, for a period of next five years. The chapter sold 7000 Silk Mark, sticker type labels/ Hang Tag and Sew-in labels and imparted training to 11 sales person during the year. The office collected Thirteen [13] fresh subscriptions for the Silk Mark magazine. During the year, the chapter conducted 07 programmes, to create awareness regarding the Silk Mark scheme.

Table 1: Details of the workdone during the year by the chapter are given below:

#	**Particular**	**Achievement**	**Revenue Generated (Rs)**	**Remarks**
1.	Member/AU enrolment	02/06	30,000	Fresh/renewals
2.	Labels Sold	7000	26,000	
3.	Weaver Member Enrolled	-	-	
4.	Gen/Prospective/Survillance visits	27	-	
5.	Aus' sale person trained	11	-	
6.	Awareness programmes	07	-	
7.	Magazine Subscription collected	13	4550	
	Total		**60,550**	

Inspection work: The inspection work is need based and demand dependent. Although, the pre-shipment inspection of the natural goods meant for exports, is not compulsory, whenever an exporter approaches the office for inspection of silk goods on voluntary basis, services are provided without any delay. The inspection wing provides prompt, timely and quick services of inspection to the exporters, both at exporter's premises and in the office complex. During the year, the office received four applications from Silk carpet exporters for inspection on voluntary basis with a total of 341 no of carpets, measuring 984.80 square mtrs and valued at Rs 5,78,55,965/- were certified for exports. The details are given below:

#	Particular	Achievement	Revenue Generated (Rs)	Remarks
1.	No. of applications	04	2,800	Based on demand
2.	No. of Carpet labels Sold	341	17,050	
3.	Square Mtrs certified	984.80	-	
4.	FOB Value of the certificate Goods (Rs)	5,78,55,965	-	
5.	No. of Tariff Certificates issued		350	
6.	No of blank forms sold		50	
7.	No.of handicraft /EEC certificate issued		350	
Total			**20,600**	

LIBRARY

- The library has 1374 books on different subjects covering agriculture and allied subjects such as sericulture, meteorology, entomology, agronomy, soil science, pathology, extension, economics, statistics, animal husbandry, plant breeding, genetics and biotechnology etc.
- The library has annual associate membership in International Sericulture Commission
- The library receives bimonthly magazine of Indian Silk published by Central Silk Board, Ministry of textiles, Govt. of India.
- It has also collection of Silk Mark Magazines published by Central Silk Board, Ministry of Textiles, Govt. of India.
- The library possesses copies of annual report, news letter, technological bulletins, technology descriptor, leaflets, folders, pamphlets and brochures are being well maintained for record and ready references.
- The institute library is referred by Central Silk Board (CSB) Scientists, research scholars and students of College of Temperate Sericulture (COTS), SKUAST-K, Mirgund and university of Kashmir..

केन्द्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर के हिन्दी अनुभाग द्वारा वर्ष 2021-22 के दौरान राजभाषा कार्यान्वयन में अर्जित उपलब्धियां

केंद्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान, पाम्पोर द्वारा वर्ष 2021-2022 के दौरान राजभाषा हिन्दी के प्रगामी प्रयोग एवं राजभाषा नीति के कार्यान्वयन से संबंधित वार्षिक रिपोर्ट-

1- **राजभाषा अधिनियम, 1963 की धारा के शत प्रतिशत अनुपालन :** राजभाषा अधिनियम, 1963 की धारा (3)3के शत प्रतिशत 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 22-2021 में निर्धारित लक्ष्य भी प्राप्त किया गया ।

2- **राजभाषा कार्यान्वयन समिति की बैठकों का आयोजन :** केंद्रीय रेशम उत्पादन अनुसंधान एवं प्रशिक्षण संस्थान , पाम्पोर द्वारा वर्ष 2022-2021 के दौरान द्वारा वर्ष 2021 22-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 ।

#	समिति की बैठक संख्या	तिमाही	अध्यक्ष	दिनांक
1.	86 वीं	प्रथम	डॉ. सरदार सिंह , वैज्ञानिक – डी (निदेशक प्रभारी)	.1906.2021
2.	87 वीं	दिवतीय	डॉ. सरदार सिंह , वैज्ञानिक – डी (निदेशक प्रभारी)	27.09.2021
3.	88 वीं	तृतीय	डॉ. सरदार सिंह , वैज्ञानिक – डी (निदेशक प्रभारी)	21.12.2021
4.	89 वीं	चतुर्थ	डॉ. सरदार सिंह , वैज्ञानिक – डी (निदेशक प्रभारी)	30.03.2022

3- **तिमाही प्रगति रिपोर्ट :** वर्ष के दौरान केंद्र द्वारा राजभाषा हिन्दी के प्रगामी प्रयोग संबंधी तिमाही प्रगति रिपोर्ट केन्द्रीय कार्यालय, बैगलुरु, राजभाषा विभाग, नई दिल्ली) राजभाषा विभाग को तिमाही प्रगति रिपोर्ट ऑनलाइन के माध्यम से भेजी गयी (एवं नराकास , श्रीनगर) कश्मीर (को निम्नानुसार भेजी गयी। सभी तिमाहियों में पत्राचार का प्रतिशत वार्षिक कार्यक्रम के लक्ष्यानुसार रहा ।

4-

	तिमाही प्रगति रिपोर्ट	तिमाही प्रगति रिपोर्ट भेजने की तिथि		
		केरेउअवप्रसं,पाम्पोर	क्षेरेउअके,जम्मू	क्षेरेउअके, सहसपुर
1.	अप्रैल – जून 2021	04.08.2021	07.07.2021	06.07.2021
2.	जुलाई – सितम्बर 2021	12.10.2021	10.10.2021	14.10.2021
3.	अक्टूबर – दिसम्बर 2021	25.01.2022	28.02.2022	03.01.2022
4.	जनवरी – मार्च 2022	25.04.2022	04.10.2021	07.04.2022

5- हिन्दी पखवाड़ा/दिवस का आयोजन : संस्थान में दिनांक 01.09.2021 से1 4 09.2021.तक हिन्दी पखवाड़े का आयोजन किया गया तथा पखवाड़े के दौरान हिन्दी प्रतियोगताएं आयोजित की गयी जिसमे केंद्र के अधिकारियों एवं कर्मचारियों ने भाग लिया तथा दिनांक 14.09.2021 को हिन्दी दिवस का आयोजन किया गया जिसमें गृह मंत्री, गृह सचिव भारत सरकार एवं श्री रजित रंजन ओखंडियार, सदस्य सचिव एवं मुख्य कार्यपालक अधिकारी, केन्द्रीय रेशम बोर्ड, बंगलुरू के संदेश को पढ़ा गया तथा दिनांक 15 सितम्बर202 1 हिन्दी पखवाड़े के समापन समारोह का

आयोजन किया गया जिसमे कार्यालय में आयोजित शब्दावली व सुलेख प्रतियोगिताओं में भाग लेने वाले विजेता प्रतिभागियों को प्रथम, द्वितीय, तृतीय तथा सांतवना नकद पुरस्कार से सम्मानित किया गया ।

6- **हिन्दी कार्यशालायों का आयोजन :** संस् थान एवं इसकी संबद्ध इकाईयों में नियमित रूप से प्रत्येक तिमाही में हिन्दी कार्यशालाओं का आयोजन किया गया। जिसमें राजभाषा हिन्दी के प्रयोग से संबंधित विषयों जैसे राजभाषा अधिनियम 1963की धारा (3)3 के 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 ।

	तिमाही	कार्यशाला के आयोजन की तिथि		
		केरेउअवप्रसं,पाम्पोर	क्षेरेउअके,जम्मू	क्षेरेउअके, सहसपुर
.1.	अप्रैल – जून,2021	29.06.2021	29.06.2021	29.06.2021
.2.	जुलाई – सितम्बर 2021	2909.2021.	28.06.2021	28.09.2021
.3.	अक्टूबर – दिसम्बर 2021	2812.2021.	28.12.2021	22.12.2021
.4.	जनवरी – मार्च 2022	03.03.2022	29.03.2022	30.03.2022

7- **नगर राजभाषा कार्यान्वन समिति)न.रा.का.स (एवं अन्य बैठकों में ऑनलाइन सहभागिता** वर्ष 2021-22 के दौरान नगर राजभाषा कार्यान्वयन समिति(नराकास))जिसमें संबधित इकाईयों द्वारा संबधित नगर राजभाषा कार्यान्वयन समिति में राभाकास के अघ्यक्ष एवं राजभाषा अनुभाग के अधिकारियों/ कर्मचारियों द्वारा भाग लिया गया ।

8- **हिंदी प्रकाशन** – वर्ष 2021-22 में क्षेत्रीय रेशम उत् पादन अनुसंधान केन् द्रसहसपुर में रेशम कृर्षि मेला के आयोजन यिका गया । मेले में डॉ सरदार सिंह, निदेशक प्रभारी '' शहतूती रेशम कीटपालन प्रौद्योगिकी'' पुस्तिका का विमोचनकिया गया ।

9- **राजभाषा प्रशिक्षण कार्यक्रम** - केन्द्रीय हिन्दी प्रशिक्षण संस्थान, राजभाषा विभाग, नई दिल्ली द्वारा संचालित हिन्दी पत्राचार पाठ्यक्रम में पंजीकृत संस्थान के 02 कर्मचारियों ने प्रज्ञा,प्रबोध परीक्षा उतीर्ण की गई।

विशिष्ठ उपलबधिया-

- फ़ाइलों के आंतरिक प्रष्ठों 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 कार्यक्रम रेशम कृषक मेला आदि के बैनर व पोस्टर को द्विभाषी रूप से जारी किए गए।
- क्षेत्रीय रेशम उत्पादन अनुसंधान केन्द्र, सहसपुर को वर्ष (देहरादून)2020-21 हेतु राजभाषा नीति के श्रेष्ठ कार्यान्वयन के लिए प्रोत्साहन पुरस्कार प्रशस्ति पत्र दिया गया ।

RESEARCH PUBLICATIONS

A. RESEARCH PAPERS

1. Aileni M, Rohela GK, Jogam P, Soujanya S, & Zhang B (2022). Biotechnological Perspectives to Combat the COVID-19 Pandemic: Precise Diagnostics and Inevitable Vaccine Paradigms. *Cells*, *11*(7), 1182. **https://doi.org/10.3390/cells11071182** (SCI indexed, Web of Science/Scopus Indexed & UGC Approved Journal). NAAS Rating: 12.60 and Impact Factor: 6.600.
2. Bharath, K, N., Shivkumar, Kiran R., Mir, N, A & S, Singh. Identification of mulberry silkworm (*Bombyx mori* L.) foundation crosses ideal for temperate climatic conditions of North West India.*Journal of Crop and Weed*.2021; 18(1): 01-08. (NAAS-5.46)
3. Gani, M., Senger, S., Loknath, S., Saini, P., Bali, K., Gupta, R., Sivaprasad, V., Jehle, J. A. and Wennmann, T. 2021.Patterns in Genotypes Composition of Indian Isolates of the Bombyx mori nucleopolyhedrosisvirus and Bombyx mori Bidensovirus. Viruses 13:901. DOI: https://10.3390/v13050901(NAAS: 11.05; IF: 5.048)
4. Gulab Khan Rohela, Pawan Saini, Pawan Shukla, Ashok Kumar Kasukurthi and Sardar Singh (2021). *In vitro* clonalpropagation of Chinese white (*Morus alba* L.); a temperate mulberry variety through nodal segments. *The Mysore Journal of Agricultural Sciences*. NAAS Rating: 4.64.
5. Gulab Khan Rohela, Prasad Bylla, Sreenu Pendli, Rajender Korra & Rajender Gandu Christopher T. (2021). High performance liquid chromatography based quantification of reserpine in *Rauwolfia tetraphylla* L. and enhanced production through precursor feeding. *Acta Chromatographica*. 34 (2022) 2, 120–129. https://doi:10.1556/1326.2021.00888. NAAS Rating: 7.64 and Impact Factor: 1.639.
6. Gulzar Ahmad Khan, Gulab Khan Rohela, GR Manjunatha, Muttanna, Satish Y[1], GR Halagundegowda, Colin Z Rentheleiand Sardar Singh (2021). Social Impact Assessment of Agricultural Technologies with Special Reference to Sericulture Sector-A Review. *Biological Forum* (UGC Approved Journal). NAAS Rating: 5.11.
7. Gulzar Ahmad Khan, 2022. Social impact assessment of Agricultural technologies with special reference to sericulture sector –A review etal. Published in Biological Forum an international Journal (2022)/14(1)189-196
8. Gulzar Ahmad Khan, 2022. Performance of global tradeof Indian silk in post liberalization era. Biological Forum an international Journal (2022)/13(4) 582-588
9. Gulzar Ahmad Khan and Haroon Rashid, 2021. Role model for youth in sericulture and allied sector, Indian Silk May & June 2021 Vol-12(old60) 12-13.
10. Kiran R., Bharath, K, N., Shivkumar, Mir, N, A and S, R., Chowdhary. Variation of embryonic diapause induction in bivoltine silkworm *Bombyx mori* L (Lepidoptera: Bombycidae) under controlled conditions. *Int. J. Indust. Entomol*. 2021; 43(2), 37-44.
11. Kumaresan, P, Sivaprasad,V. and Manjunatha,G.R (2021). Efficacy of Integrated Barrier System for Management of Pink Mealybug *Maconellicoccus hirsutus* (Green) in Mulberry. *Biological Forum-An International Journal.* 13(4):537-541.
12. Mood, K., Jogam, P., Sirikonda, A., Shekhawat MS, Rohela GK, Manokari M, Alliini, VR (2022). Micropropagation, morpho-anatomical characterization, and genetic stability studies in *Lippia javanica* (Burm.f.) Spreng: a multipurpose medicinal plant. *Plant Cell, Tissue & Organan Culture* (2022). **https://doi.org/10.1007/s11240-022-02294-5** (SCI indexed, Web of Science/Scopus Indexed & UGC Approved Journal). NAAS Rating: 8.71 and Impact Factor: 2.711.
13. Murali, S. and Sardar Singh (2021). Silkworm Germplasm Evaluation and Identification during Spring Season under Continuous Maintenance Programme at Jammu (Jammu & Kashmir). *Res. Jr. of Agril. Sci.*, 12(3): 727-732.
14. Rajesh Kumar and Sahadev Chouhan, 2021. Silk Moth Diversity and Commercialized Silks of India. On special occasion- Insect on Economics Importance. ZSI ENVIS-Newsletter, 27(2) - 1-11.
15. Santoshkumar Magadum and Sardar Singh. 2021. Genetic variability analysis for growth and yield contributing characters in mulberry germplasm under Jammu region. *The Pharma Innovation Journal*. 10(11): 2796-2799.
16. Santoshkumar Magadum and Sardar Singh. 2021. Variability studies in mulberry germplasm for leaf quality characters under Jammu region. *The Pharma Innovation Journal*.SP-10(12): 1986-1989.
17. Sardar Singh and Murali, S. (2021). Impact on autumn crop through Introduction of Summer crop under North West India. *The Pharma Innovation Journal*, SP-10(12): 1653-1658v
18. Shivkumar, Bharath Kumar Neelaboina, Kiran R and Sardar Singh Development of autumn specific silkworm stable breeds & hybrids for temperate climatic condition of Jammu & Kashmir, Journal of Crop and Weed (NAAS-5.46). (Accepted for publication)

19. Subhash Sirangi, Phanikanth Jogam, Gulab Khan Rohela, Ajmeera Ragan, Vatsavaya S. Raju (2021). Micropropagation of endemic *Corynandra chelidonii* var. *pallae* (Cleomaceae) through nodal explants and validation of their genetic integrity by ISSR markers.*Vegetos-Springer*. https://doi.org/10.1007/s42535-021-00302-1 (SCI indexed, Web of Science/Scopus Indexed & UGC Approved Journal). NAAS Rating: 7.15 and Impact Factor: 1.151.

B. Abstracts:

a. Gulab Khan Rohela, Pawan Saini, Pawan Shukla, Ashok Kumar Kasukurthi, Sardar Singh (2021). *In vitro* clonalpropagation of Chinese white (*Morus alba*L.);a temperate mulberry variety through nodal segments. *"National Conference on Sericulture Diversification for the Millenium".* Organized byDepartment of Sericulture, UAS, GKVK, Karnataka, India from 25th-27th November, 2021.
b. Kumar, P., Santoshkumar Magadum, Kumar, A. and Paliwal, A. 2021. Nutri-cereals: The wonder crops. *Vigyan Varta.*2(11): 32-35.
c. Singh, V., Santoshkumar Magadum and Singh, R. 2021. A model rearing house for successful mulberry silkworm rearing. *Vigyan Varta.* 2(5): 58-60.
d. Kumar, P., Santoshkumar Magadum and Pratap, O. 2021. Amaranthus: A wonderful food crop. *Vigyan Varta.*2 (12): 36-39.
e. Kumar, P. and Santoshkumar Magadum. 2021. Millets: God gifted nutrient rich food crops. *Biotica Research Today*. 3(12): 1113-1116.
f. Murali, S. and Singh, S. (2022). Mountages used in Sericulture for Quality Cocoon Production of Mulberry Silkworm, *Bombyx mori* L. *Biotica Research Today*, 4(2): 113-117.
g. Murali, S. and Singh, S. (2022). Mounting of Silkworms: It's Importance in Sericulture for Rearers under Subtropical Condition of North-West India. *Biotica Research Today*, 4(1): 038-042.
h. Pawan Shukla, Ramesha A. Reddy, Kangayam M.Ponnuvel, Gulab Khan Rohela, Shiv Prasad (2021). Comparative genomics Approach for Identification of Candidate Genes Associated with Low Temperature Stress Tolerance in Mulberry Varieties. Page No.83.*International Symposium on Plant Biotechnology Towards Improving Agri-Food Industry and Healthcare Products.* Organized byDepartment of Bioengineering and Biotechnology, Birla Institute of Technology, Mesra, Ranchi, India from 27th-30th October, 2021.
i. Saini, P., Bains, T. S., Sirari, A., Mandhal, K. S. and Yadav I. S. 2021.Mapping of yellow mosaic disease resistance in an interspecific cross of mungbean (Vigna radiata (L.) Wilczek) and urdbean (Vigna mungo (L.) Hepper). In: International Conference on Future Challenges and Prospects in Plant Breeding, 6th -7th October, 2021, organized by Tamil Nadu Agricultural University (TNAU), Coimbatore. 192p.
j. Santoshkumar Magadum, Managanvi, K. and Singh, V. 2021.Importance of pruning and training in mulberry cultivation.*Vigyan Varta.*2(11): 92-95.

Hindi Popular Article:

गुरजीत सिंह, रामेश्वर जांगु, अरुण कुमार और पवन सैनी 2022. कम पानी में धान की सीधी बुआईः टिकाऊ खेती. कृषि प्रवाहिकाः ई समाचार पत्रिका अंक 1, पृष्ट संख्या 20–21 (आर्टिकल आई डीः152)

C. Book / Booklet/ Brochure: 03

#	AUTHORS	CHAPTER TITLE	BOOK TITLE	YEAR	PUBLISHER
1	Sardar Singh, Rajesh Kumar and Muttanna	--	Training Module for Temperate & Subtropical Sericulture In India	2021	*CSRTI Pampore*
2	Mohammad Yaseen Mir, Saima Hamid, Gulab Khan Rohela, Javid A. Parray, and Azra N. Kamili	Composting and Bioremediation Potential of Thermophiles	Soil Bioremediation An Approach Towards Sustainable Technology ISBN: 978-1-119-54797-6	2021	*Wiley Blackwell*
3	Mohammad Yaseen Mir, Saima Hamid, Gulab Khan Rohela	Bioaugmentation: A Way Out for Remediation of Polluted Environments	Environmental Biotechnology: Sustainable Remediation of Contamination in Different Environs ISBN: 978-1-77463-830-9	2021	*Taylor & Francis* (Apple Academic Press & CRC, Press)
4	Ranjana Gautam,	Harnessing the	Omics Technologies for	2021	*Springer*

	Rajesh Kumar Meena, Gulab Khan Rohela, Naveen Kumar Singh, Pawan Shukla	Potential of Modern Omics Tools in Plant Tissue Culture	Sustainable Agriculture and Global Food Security Vol: 1 ISBN 978-981-16-0830-8 Editors: Kumar,A., Kumar, R., Shukla, P., Pandey,M.K. (Eds.)		
5	Sareen, S., Saini, P., Singh, C., Kumar, P. and Sheoran, S.	Genomics and molecular physiology for improvement of drought tolerance in wheat	Molecular Breeding in wheat, maize and sorghum: strategies for improving abiotic stress tolerance and yield.	2021	CAB International
6	Rohela, G. K., Shukla, P., Saini, P., Kumar, R., Vijayan, K. and Chowdhury, S. R	Improvement of mulberry (Morus spp.) by protoplast culture	Mulberry: Genetic improvement in context of climate change	2021	CRC press
7	Saini, P., Sonika, Bishnoi, S. K., Singh, C. and Saini, P.	Formation of indispensable staple: evolution and gene pools of wheat	Breeding Frontiers in wheat	2021	Agrobios Publisher
8	Singh, C., Saini, P., Kumar, P., Bishnoi, S. K., Gupta, V., Singh, S. K., Saini, P., Gupta, A., Tyagi, B. S. and Singh, G. P	Diversity and Genetic Architecture for Drought Tolerance in Wheat.	Breeding Frontiers in wheat	2021	Agrobios Publisher

D. WEBINARS / TRAININGS/ MEETINGS ATTENDED:

1. Detail of Scientists from CSR&TI, Pampore undergone training during the year 2021-22

#	Name of the scientist	Training Parogramme	Dates	Organised by	Offline/Online
1	Dr. Shivkumar & Sh. Kiran R	"Brainstorming session on silkworm improvement"	18/08/2021	CSR&TI, Mysuru	Online
2	All scientists of CSR&TI, Pampore	Hands on training programme on Application of Statistical tools in Sericulture Rseaerch	14/12/2021-15/12/2021	CSR&TI, Pampore	Offline
3	Sh. Kiran R	"Extension management approaches for promotion of sericulture industry"	15/06/2021-18/06/ 2021	National Institute of Agriculture Extension Management (MANAGE)	Online
4	Dr. Shivkumar and Sh. Bharath Kumar N	ANSH-2021: National Hindi Webinar	20/05/2021	CSB, Bangalore	Online
5	Sh. Kiran R	Online workshop entitled "Image analysis using freeware IMAGEJ"	19.01.2021-20.01.2021	Biologia Life Science LLP Maharashtra, India	Online
6	Dr. Pawan Saini Scientist-C	Introduction to Genomics and Bioinformatics	22nd-24th September 2021	Centre for Cellular and Molecular Platforms (C-CAMP) and Bengaluru Genomics Centre (BGC)	Online
7	Mr. Satish Y	Extension Management Approaches for Promotion of Sericulture Industry	15th to 18th June, 2021	MANAGE Hyderabad	Online
8	Mr. Satish Y	Statistics for Food Security and Promoting Sustainable Agriculture	29th June, 2021	N. M. College of Agriculture, NAU, Navsari	Online
9	Mr. Satish Y	A basic online, Hands-on Image Analysis Course	27 – 29th September, 2021	Centre for Cellular and Molecular Platforms (C-CAMP), Bangalore	Online

10	Dr. Muttanna Scientist-B	WTO & its Implications on Indian Agriculture	21 - 23rd June, 2021	MANAGE Hyderabad	Online
11	Dr. Muttanna Scientist-B	Innovations in Agricultural Extension Delivery Models	01st - 03rd Dec., 2021	MANAGE Hyderabad	Online
12	Dr. K. K Rai Scientist-D	Extension Management Approaches for Promotion of Sericulture Industry	15-18th June 2021	MANAGE Hyderabad	Online
13	Dr. Surendra Kumar Scientist-D	Conservation cultivation sustainable utilization of NTFP,s	14-15th Sept., 2021	Forest Research Institute, ICAR, Dehradun	Online
14	Dr. Gulzar Ahmad Khan, Scientist-C	Digital Content Development and Publication	27-29, Oct, 2021	MANAGE, Hyderabad	Online
15	Dr. Gulzar Ahmad Khan, Scientist-C	Socio Economic Assessment of Sericulture Technology	20 to 23rd Dec., 2021	CSB, Bangalore	Online
16	Dr. Gulzar Ahmad Khan, Scientist-C	Carbon Finance for Agriculture towards Climate Risks Mitigation	20th Jan., 2022	MANAGE, Hyderabad	Online
17	Dr. Gulab Khan Rohela, Scientist C	International Webinar Series on "Plants Tissue Culture: Current Trends and Future Perspectives"	17th-19th June, 2021	Department of Biotechnology, GSFC University, India.	Online
18	Dr. Gulab Khan Rohela, Scientist C	Recent Trends in Plant Biotechnology	08th September, 2021	Department of Biotechnology, Pingle Govt. College For Women, Warangal, Telangana, India	Online
19	Dr. Santoshkumar Magadum, Scientist-C	National webinar on Secondary agriculture for agricultural income enhancement	09th April, 2021	MPUAT, Udaipur	Online
20	Dr. Santoshkumar Magadum, Scientist-C	National webinar on Crop improvement in fruit crops: Hurdle and prospects	21st May, 2021	Mandsaur University, Mahya Pradesh	Online
21	Dr. Santoshkumar Magadum, Scientist-C	MaharanaPratap Memorial Lecture-2021 on Increasing Farmers' Income: Way Forward	18th June, 2021	MPUAT, Udaipur	Online
22	Dr. Santoshkumar Magadum, Scientist-C	National webinar on Research methodology and paper writing	12th July, 2021	MPUAT, Udaipur	Online
23	Dr. Santoshkumar Magadum, Scientist-C	International Webinar on Challenges in global research in agriculture and technology	13-14th July, 2021	RBS College, Agra	Online
24	Dr. Santoshkumar Magadum, Scientist-C	National webinar on publication ethics, strategies for writing good quality thesis, reference management &transdisciplinary research	21st July, 2021	GTN Arts College, Tamil Nadu	Online
25	Dr. Santoshkumar Magadum, Scientist-C	Webinar on Artificial Intelligence for Smart Agriculture	22nd July, 2021	ICAR-RCER, Bihar	Online
26	Dr. Santoshkumar Magadum, Scientist-C	National webinar on Nutritional security in India: Issues & way forward	04th September, 2021	ICAR-RCER, Bihar	Online
27	Dr. Santoshkumar Magadum, Scientist-C	International webinar on Alternate cropping systems for climate change and resource conservation	29th September to 01st October, 2021	ICAR-IIFSR, Meerut	Online
28	Dr. Santoshkumar Magadum, Scientist-C	Webinar on Role of Information technology management for enhancing agricultural productivity	30th September, 2021	ICAR-RCER, Bihar	Online
29	Dr. Santoshkumar Magadum, Scientist-C	National conference on Intergratedfarming systems: a tool for enhancing income & nutritional security	5-7th October, 2021	ICAR-RCER, Bihar	Online

30	Dr. Santoshkumar Magadum, Scientist-C	National webinar on Crop diversification: a way towards nutritional security	26th October, 2021	ICAR-RCER, Bihar	Online
31	Dr. Santoshkumar Magadum, Scientist-C	Webinar on Planning and decision making for efficient water management	01st November, 2021	ICAR-RCER, Bihar	Online
32	Dr. Santoshkumar Magadum, Scientist-C	International webinar on Global Research Initiatives for Sustainable Agriculture & Allied Sciences	13-15th December, 2021	Astha Foundation, Meerut	Online
33	Dr. Santoshkumar Magadum, Scientist-C	One week FDP on Research Paper Writing	28th June to 02nd July, 2021	RSRI, Tamil Nadu	Online
34	Dr. Santoshkumar Magadum, Scientist-C	FDP on Scaling up Agricultural Research with New Methodologies	6-10th Sept, 2021	Rama University, Kanpur	Online
35	Dr. Murali, S., Scientist-C	Application of Nanotechnology in Crop Protection: Current Status and Future Prospects	19th Jan, 2022	Sri Sri University, Cuttack, Odisha	Online
36	Dr. Santoshkumar Magadum, Scientist-C	Online MOOC course on Introduction to Statistical Analysis	01/05/2021 to 10.06.2021	Commonwealth Educational Media Centre for Asia (CEMCA) and Kalinga Institute of Social Sciences	Online
37	Dr. Pawan Saini, Scientist-C	National Intellectual Property Awareness Mission	04th February 2022	Intellectual Property (IP) Office, India	Online
38	Dr. Pawan Saini, Scientist-C	Management Development Training Under STEP	15th-17th February 2022	CSR&TI, Pampore	Online
39	Dr. Pawan Saini, Scientist-C	Genome-wide Association Studies (GWAS) and its Application in Agriculture	15th-24th March 2022	ICAR-IASRI, New Delhi	Online
40	Dr. Pawan Saini, Scientist-C	International Conference on Future Challenges and Prospects in Plant Breeding	06th-07th October 2021	Tamil Nadu Agricultural University (TNAU), Coimbatore	Online
41	Dr. Pawan Saini, Scientist-C	Introduction to Genomics and Bioinformatics	22nd-24th September 2021	C-CAMP and BGC, Bangalore	Online

2. Awards received by scientists of RSRS Jammu:

#	Name of Scientist	Description of award	Date	Given by
1.	Dr. Santoshkumar Magadum, Scientist-C	"Scientist of the Year Award"	13-15th Dec, 2021	Society for Scientific Development in Agriculture and Technology, Meerut, Uttar Pradesh
2.	Dr. Santoshkumar Magadum, Scientist-C	"Certificate of Reviewing"	31st May, 2021	Vigyan Varta, an International e-magazine for science enthusiasts.
3.	Dr. Santoshkumar Magadum, Scientist-C	"Certificate of Reviewing"	31st Nov, 2021	Vigyan Varta, an International e-magazine for science enthusiasts.
4	Dr. Santoshkumar Magadum, Scientist-C	"Best Article of the Month Award"	30th Nov, 2021	Vigyan Varta, an International e-magazine for science enthusiasts.

3. **Additional qualifications:** Dr. Santoshkumar Magadum, Scientist C successfully completed and gained the additional qualification of Post Graduate Diploma in Intellectual Property Rights (PGDIPR) from IGNOU, New Delhi through Open and Distance Learning mode.

4. Important meetings for sericulture development & coordination:

- Hon'ble Minister of State for Textiles and Railways, Govt. of India Smt. Darshana Vikram Jardosh, visited and reviewed the R&D activities of the institute on 03.10.2021. A presentation was made by Director (I/c). R&D output and efforts of scientists were appreciated by the Hon'ble Minister.
- Shri Sanjay Sharan, Joint Secretary (Silk) visited and reviewed the R&D & coordination activities of CSR&TI Pampore along with DOS, J&K, Department of Handloom and Handicraft, Govt of J&K from 02.07.2021 to 04.07.2021
- Shri Baldev Chouhan, Deputy Director (Seri.), Govt of HP visited to CSRTI, Pampore on 06.07.2021
- Organised 46th Research Council (RC) Meeting of CSR&TI, Pampore on 22.06.2021
- Organised 47th Research Council (RC) Meeting of CSR&TI, Pampore on 09.11.2021
- Organised 42nd Research Advisory Committee (RAC) Meeting of CSR&TI, Pampore on 27.08.2021
- Organised 43rd Research Advisory Committee (RAC) Meeting of CSR&TI, Pampore on 10-11, Jan., 2022
- An interactive meet for collaboration of R & D aspects between CSR&TI, Pampore and SKUAST-K & SKUAST-Jammu was held on 14.03.2022 under the chairmanship of Prof. Nazeer Ahmad, Former Vice chancellor & Chairman, RAC, CSRTI, Pampore.
- An interactive meeting was held on 03.03.2022 to discuss the issues of cocoon marketing in North India under the guidance of Dr R S Deshpande (RCC Member) and Dr Nazir Ahmad (RAC Chairperson)
- Dr. Sardar Singh, Diretcor Incharge attended ameeting on "Forest for Liveliohood" at Jammu organised by PCCF&HoFF, J&K on 28.02.2022





43rd RAC meeting held on 10th & 11th Jan., 2022 at Pampore (J&K) (Left)
Visit of HMoST to CSR&TI, Pampore on 03.10.2021 (Right)





Interactive meeting for collaboration in R&D aspects with SKUAST-K/SKUAST-J on 13.03.2022

Other Activites of CSR&TI, Pampore

- Celebrated Azadi Ka Amrit Mahotsav throught out the year 2021-22 at CSR&TI, Pampore & its nested units
- Celeberated Hindi Karyashala, Hindi Day & Hindi Pakhawada at CSR&TI, Pampore & its nested units
- Organised Covid-19 test camp in January, 2022.
- Celebrated Swatchta Pakhwada in March, 2022 at CSR&TI, Pampore & its nested units
- Celebrated Internation Yoga Day on 21.06.2021
- Organised "Hands on Training on Application of Statistcial Tools in Sericulture Research" at Pampore *w.e.f.* 14-15 December, 2021



Hands on Training on Application of Statistcial Tools in Sericulture Research at Pampore *w.e.f.* 14-15 Dec, 2021





Hindi Karyashala on 18.12.2021(Left) Hinid Fortnight w.e.f.1-14th Sep, 2021



Swatchata Pakhwada activities carried out by CSRTI, Pmapore & its nestedunits

RESEARCH ADVISORY COMMITTEE (FROM JULY 2020)

Prof. Nazir Ahmad Former Vice-Chancellor, Sher-E-Kashmir University of Agriculture Science & Technology, Shalimar, Srinagar (J&K)	**Chairman**
Dr. R.K Gupta Professor & Head, Sericulture Division of Entomology, Faculty of Agriculture SKUAST-Jammu, Main Campus, Chatha	**Member**
Dr. A K Roy Principal Scientist, Genetics Division, Indian Grassland & Fodder Research Institute, Jhansi- Uttar Pradesh,	**Member**
Dr. Bhagwati Charan Sharma, Professor & Head, Division of Agronomy, Faculty of Agriculture, SKUAST – Jammu	**Member**
Dr. M.A Khan Ex-Director, CSR&TI, Pampore, Central Silk Board,	**Member**
Director (Tech.) Central Silk Board, Bangalore – 560068	**Member**
Commissioner Industries (DOI), Himachal Pradesh	**Member**
Director, SDD, Jammu & Kashmir	**Member**
Director, DOS, Uttarakhand	**Member**
Director, DOS, Uttar Pradesh	**Member**
Director, DOH, Punjab	**Member**
Director, DOH, Haryana	**Member**
Director, CSR&TI, Pampore	**Member Convenor**

SCIENTIFIC & ASSOCIATED PERSONNEL

Dr. Sardar Singh, Director (I/C)

Main Institute, Pampore

Host Plant Division

Host Plant Improvement Section

Dr. Rajesh Kumar, Scientist-D (*up to11.08.2021)*
Dr. Pawan Saini, Scientist-C (*w.e.f* 12.08.2021)
Sh. Farooq Ahmad Dar, Senior Technical Assistant
Sh.Mohd.Altaf Koul, Senior Technical Assistant(*w.e.f* 12.08.2021)

Host Plant Protection Section

Dr. Rajesh Kumar, Scientist-D (*up to11.08.2021)*
Dr. Pawan Saini, Scientist-C (*w.e.f* 12.08.2021)
Sh. Farooq A. Dar, Senior Technical Assistant
Sh.Mohd.Altaf Koul, Senior Technical Assistant(*w.e.f* 12.08.2021)

Agronomy & Soil Section

Dr.Gulab Khan Rohela, Scientist-C(*up to11.08.2021)*
Mohd. Shafi Ganayee, Senior Technical Assistant(*up to11.08.2021)*
Mohd. Amin Bhat, Senior Technical Assistant(*up to11.08.2021)*
Smt.Zenab Jan, Senior Technical Assistant (*w.e.f* 12.08.2021)

Farm Management Section

Dr. Pawan Saini (*w.e.f* 01.02.2021)
Mohd. Shafi Ganayee, Senior Technical Assistant(*up to11.08.2021)*
Mohd. Amin Bhat, Senior Technical Assistant(*up to11.08.2021)*
Sh. Farooq A. Dar, Senior Technical Assistant(*w.e.f* 12.08.2021)
Sh.Mohd.Altaf Koul, Senior Technical Assistant(*w.e.f* 12.08.2021)

BiotechnologyDivision

Host Plant Biotechnology

Dr. Ashok Kumar Kasukurthi, Scientist-D
Dr. Gulab Khan Rohela, Scientist-C
Smt. Zenab Jan, Senior Technical Assistant

Silkworm Biotechnology

Dr. Ashok Kumar Kasukurthi, Scientist-D (*w.e.f* 27.01.2021)
Dr. Gulab Khan Rohela, Scientist-C(*up to11.08.2021)*
Smt. Zenab Jan, Senior Technical Assistant

Project Monitoring Coordination & Evaluation Division

Dr. Gulab Khan Rohela, Scientist-C (*w.e.f* 12.08.2021)
Sh. Satish Y., Scientist-B
Sh. Muneer Yousuf Rather, Senior Field Assistant
Smt. Nida Mushtaq, Field Assistant

Statistics Section:

Sh. Satish Y., Scientist-B

ICT, Section:

Sh. Satish Y., Scientist-B

Confidential Section:

Sh. Bhaskar Gupta, Stenographer-I(*up to13.08.2021*)
Sh. Subhash Chander Assistant Superintendent(*w.e.f* 14.08.2021)

Maintenance Section:

Sh. Saadat Hamid Khan, Assistant Director (Insp)
Mohd. Shafi Ganayee, Senior Technical Assistant
Sh. Ghulam Hassan Ahanger, Technician
Sh. Mohd. Yousuf Sheikh, Assistant Technician

Silkworm Division

Silkworm Improvement Section

Dr. Rajesh Kumar, Scientist-D (*w.e.f* 12.08.2021)
Dr. Shiv Kumar, Scientist-C (*up to11.08.2021)*
Sh. N. Bharath Kumar, Scientist-C
Sh.Kiran.R, Scientist-B
Sh.Mohd Sultan Bhat, Senior Technical Assistant(*up to* 31.05.2021)
Sh.Fayaz Ahmad Bhat , Senior Technical Assistant
Sh.M.Ashraf Hajam, Senior Technical Assistant(*up to11.08.2021)*
Smt.ImtiyazaAkhtar,Senior Technical Assistant

Post Cocoon Technology Section

Sh. Saadat Hamid Khan, Assistant Director (Insp)
Sh.Sheikh Altaf Hussain, STA (*up to11.08.2021)*
Sh.Mohd.Altaf Koul, Senior Technical Assistant

Silkworm Protection Section

Dr. Rajesh Kumar, Scientist-D (*w.e.f* 12.08.2021)
Mohd. Shafi Ganayee, Senior Technical Assistant
Mohd. Amin Bhat, Senior Technical Assistant
Sh. N. Bharath Kumar, Scientist-C(*up to11.08.2021)*
Sh.Kiran.R, Scientist-B(*up to11.08.2021)*

Silkworm Rearing Management & Seed Technology

Dr. Shiv Kumar, Scientist-C
Smt.Zenab Jan, Senior Technical Assistant (*up to11.08.2021)*
Smt.NisaraAkhter, Senior Technical Assistant(*up to11.08.2021)*
Mohd. Amin Bhat, Senior Technical Assistant(*w.e.f* 12.08.2021)
Sh. Inder Singh, Senior Technical Assistant(*w.e.f* 12.08.2021)

SEEM Division

Extension & Publicity Section

Dr Z R Collins, Scientist-D (w.e.f 13.09.2021)
Sh. Gulzar Ahmad Khan, Scientist-C
Dr Muttanna Scientist-B, (*w.e.f* 12.08.2021)
Smt. Nisara Akhter, Senior Technical Assistant(*w.e.f* 12.08.2021)

Trial of TechnoloySection

Sh. Gulzar Ahmad Khan, Scientist-C
Dr Muttanna Scientist-B, (*w.e.f* 12.08.2021)
Smt. Nisara Akhter, Senior Technical Assistant(*w.e.f* 12.08.2021)

Economics & Social Studies Section

Sh. Gulzar Ahmad Khan, Scientist-C(*up to11.08.2021)*
Sh. Inder Singh, Senior Technical Assistant(*up to11.08.2021)*
Dr. Muttanna, Scientist-B (*w.e.f* 12.08.2021)
Sh. Satish Y., Scientist-B (*w.e.f* 12.08.2021)

Hindi Section:

Dr. Rajesh Kumar, Scientist-D

Administration & Accounts Section

Sh. Fayaz Ahmad Malik, Assistant Director (A&A) (*up to* 31.05.2021)
Sh.Taslim Ansari, Assistant Director (A&A)
Smt. Tulsi Koul, Assistant Director (A&A) (*w.e.f* 17.01.2022)
Sh.Subhash Chander, Assistant Superintendent (Admn)

Training Division

Capacity Building & Training Section

Dr. Rajesh Kumar, Scientist-D(*up to11.08.2021)*
Dr. Muttanna, Scientist-B
Sh. Farooq A. Dar, Senior Technical Assistant(*up to11.08.2021)*
Sh.Sheikh Altaf Hussain, Senior Technical Assistant(*w.e.f* 12.08.2021)

Library Section

Dr. Muttanna, Scientist-B
Sh.Sheikh Altaf Hussain, Senior Technical Assistant

Multitasking Staff:

Sh. Ghulam Mohd. Sheikh
Sh. Abdul Rashid Mir
Sh. Mohd. Sidiq Wani *(upto 31.10.2021)*
Sh Guru Dayal *(w.e.f 15.11.2021)*
Sh Depty Nath *(w.e.f 15.11.2021)*
Sh. Manzoor Ahmad Mir
Sh. Mohd. Shafi Rather
Sh. Ghulam Mohd. Naikoo
Sh Tirath Lal *(w.e.f 15.11.2021)*
Sh. Abdul Rashid Hajam
Sh Balbir Raj *(w.e.f 15.11.2021)*
Sh. Mohd. Latief Khan
Sh. Bashir Ahmad Bhat
Sh.Dara Singh, Assistant Superintendent (Admn)
Sh. Dipak Kumar Murmu, Assistant Superintendent (Admn)
Sh.Rakesh Kumar Mishra, Upper Division Clerk
Sh.M.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
Sh. Anil Raina, Assistant Superintendent (*w.e.f* 14.03.2022)
Sh. Madhusudan Sharma, UDC (*w.e.f* 14.03.2022)
Sh. Jagmohan Singh, UDC (*w.e.f* 27.10.2021)
Sh. Ajay Malhotra, UDC (*w.e.f* 27.10.2021)
Sh Mahideep Uniyal, A.S (*w.e.f* 17.10.2021)
Sh. Kulwant Singh, UDC (*w.e.f* 27.10.2021)
Sh S. P.Tamta A.S (*w.e.f* 29.10.2021)
Sh. Neeraj Bhagat, UDC (*w.e.f* 27.10.2021)
Smt.Praveen UDC (*w.e.f* 28.10.2021)
Smt. Jameela Akhter Field Assistant

Vehicle Section:

Dr. Rajesh Kumar, Scientist-D (w.e.f 08.07.2020)
Sh. Mushtaq Ahmad Rather, Staff Car Driver, Grade-I
Sh Ranveer Singh(*w.e.f* 31.08.2021)

P-4, Basic Seed Farm, Manasbal

Scientific Staff:

Sh. Gulzar Ahmad Khan, Scientist-C(*W.e.f 01.04.2021to 29.03.2022)*
Dr. Rajesh Kumar, Scientist-D (*W.e.f 30.03.2022)*

Technical Staff:

Sh. Ichpal Singh, Senior Technical Assistant(upto 31.01.2022)
Sh. Zahoor Ahmad Bhat, Senior Technical Assistant
Sh. Zubaida Viqar, Senior Technical Assistant
Sh. Abdul Hamid Bhat,Senior Technical Assistant
Sh. Ishtiyaq Noor, Senior Field Assistant

Multitasking Staff:

Sh. Mushtaq Ahmad Shah
Sh. Bashir Ahmad Shaksaz

Regional Sericultural Research Station, Miransahib, Jammu

SCIENTIFIC STAFF:

Dr. Sardar Singh, Scientist-D& Incharge*(up to20.09.2021)*
Dr. Shakeel Ahmad, Scientist-C*(up to30.04.2021)*
Dr. Santoshkumar Magadam, Scientist-C
Dr. Murli S, Scientist-C
Sh. Chattarpal, Scientist-C
Dr. Vinod Singh, Scientist-C
Dr. Rita Singh, Scientist-B

TECHNICAL STAFF:

Sh. Ashok Kumar Bawoor, Senior Technical Assistant
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

ADMINISTRATIVE STAFF:

Smt. Tulsi Koul, Superintendent (Admn.) *(up to10.01.2022)*
Sh. Anil Raina, Assistant Superintendent*(up to31.01.2022)*
Sh. Madhusudan Sharma, UDC*(up to31.01.2022)*
Sh. Jagmohan Singh, UDC *(up to16.10.2021)*
Sh. Ajay Malhotra, UDC *(up to16.10.2021)*
Sh. Kulwant Singh, UDC *(up to16.10.2021)*
Sh. Neeraj Bhagat, UDC *(up to16.10.2021)*
Sh. Jeet Singh, SCD-I
Sh. Kourjit Singh, SCD-II
Sh. Lekh Raj, Assistant Technician
Sh. Shankar Singh, Multi Tasking Staff
Sh. Mahraj Krishan Raina, Multi Tasking Staff
Sh. Kamal Raj, Multi Tasking Staff
Sh. Shanti Saroop, Multi Tasking Staff
Sh. Guru Dayal, Multi Tasking Staff *(up to 01.11.2021)*
Sh. Depty Nath, Multi Tasking Staff*(up to 01.11.2021)*
Sh.Paras Ram, Multi Tasking Staff
Sh.Mela Ram, Multi Tasking Staff
Sh. Madan Lal, Multi Tasking Staff

Sh. Sarbjit Singh, Senior Technical Assistant Sh. Ajay Sharma, Senior Technical Assistant Sh. Sanjay Kumar, Senior Technical Assistant Smt. Malavati, Senior Technical Assistant Sh. Vikas Misri, Senior Field Assistant	Sh.Tirathlal, Multi Tasking Staff *(up to 01.11.2021)* Sh. Bhagat Bui Nath, Multi Tasking Staff Sh.Balbir Raj, Multi Tasking Staff *(up to 01.11.2021)* Sh Darshan lal, Multi Tasking Staff*(*w.e.f 21.08.2021*)*

Regional Sericultural Research Station, Sahaspur, Dehradun

SCIENTIFIC STAFF:	ADMINISTRATIVE STAFF:
Dr. K. K. Rai, Scientist-D & Incharge Dr. Surendra Kumar Scientist-D & Incharge (*w.e.f* 08-02-2021) Shri R. P. Singh, Scientist-D **TECHNICAL STAFF:** Shri Dharmendar Panday, STA (upto 30-04-2021) Smt Malkait kour, Senior Technical Assistant(*w.e.f* 29-04-2021) Shri S. K. Singh, Senior Technical Assistant 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. Meenakshi Chadha, Senior Technical Assistant Smt. Niveditta Khanduri, Senior Technical Assistant. Smt. Vandna Rathore, Senior Technical Assistant Shri Shyam Sunder Mohan, Senior Technical Assistant Shri Mohd Shafi Mir, Senior Technical Assistant Shri Piyush, Senior Field Assistant	Shri. Sunder Lal, Assistant Superintendant (upto 31-10-2021) Shri Mahideep Uniyal, A.S. (upto 30-09-2021) Shri R. K. Jain, Assistant Superintendant(upto 31-08-2021) Shri Manooj Kumar, UDC Shri Uday Loyal, UDC(upto 31-08-2021) Shri H. B. Sharma, SC Driver-I Shri Parmanand Sankha, SC Driver-I Shri Raj Kumar, MTS Shri Blaster Bhan, MTS Smt. Nandini Sanadhya, MTS Smt. Pushplata, MTS **At Fateh Nagar, Rajasthan** Smt. Rekha Joshi, Senior Technical Assistant Shri Bheru Lal Jat, MTS Shri Kishan Lala Kala, MTS Shri Ram Singh Jhala, MTS

Research Extension Centres (RECs)

REC, Lamberi (J&K)	REC- Basti
Smt.Neelam Kumari, Technical Assistant Sh. Parvaz Ahmad, Technical Assistant Sh.Parshotam Lal, Technical Assistant Sh.Ram Lal, Technical Assistant Sh.Puran Chand, MTS **REC, Ghumarwin** Sh. Fayaz Ahmad Begh, Senior Technical Assistant(*w.e.f* 08-02-2021) Sh. Yog Raj, Senior Technical Assistant Smt. Chander kala Ranaut, Senior Technical Assistant Sh. Praveen, Senior Technical Assistant Sh. Madan Singh Chouhan. Senior Technical Assistant Sh. B D Mandi, Senior Technical Assistant Sh. Habibullah Wani, Senior Technical Assistant(*w.e.f* 08-02-2021) Sh Rajesh Godyal	Shri Ram Nagina, Scientist-D (Retired 31.12.21) DR Ram Lakhan Ram Shri Jata Shankar Singh, Senior Tech. Assistant. Shri Pranab Kumar Das, Senior Technical Assistant(Retired 31.12.21) Shri Kailash Nath, Senior Technical Assistant Shri Ragubir Singh, Staff Car Driver Sh. Ashish Kumar Verma, Field Assistant. Sh. Guru Prasad, MTS(Expired 24.12.21)

ADMINISTRATIVE REPORT

EXPENDITURE 2021-22 – AT A GLANCE

Table-1: Expenditure booked under the following head of accounts at this Institute and its delegated units during year 2021-22

[Rs. In Lakhs]

S.No.	Head of Accounts	Paln Salaries	Plan SCSP	Plan STSP	Paln Recuring	Paln Capital	Total
1.	Salary & allowances	1,151.89	358.71	45.82	0	0	**1,556.42**
2.	Wage & EPF	489.85	81.88	0	30.58	0	**602.31**
3	7th CPC arrears of SFW / Farm Workers	0	0	0	0	0	**0**
4	Gratuity of SFW	0	0	0	0	0	**0**
5	Pension Gratuity	0	0	0	0	0	**0**
6	Gratuity & Retirement Benefits to Employees	310.32	136.12	0.48	0	0	**446.92**
7	Define Pension Cont.	38.94	4.84	1.05	0	0	**44.83**
8	Travelling Expenses	0	0	0	32.24	0	**32.24**
9	Contingencies	0	0	0	90.86	0	**90.86**
10	Assets	0	0	0	0	8.50	**8.50**
11	Recoverable advance	0	0	0	0	18.50	**18.50**
12	Advance deposited	0	0	0	0	0	**0.00**
13	Released under R&D scheme	0	0	0	0	0	**0.00**
		0	0	0	0	0	**0.00**
Total		**1,991.00**	**581.55**	**47.35**	**153.68**	**27.00**	**2,800.58**

Table-2: Revenue Generation during 2021-22

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.	-	0.10	0.0615
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	--	**0.30**	1.06428
4.2	Vanya host plant sapling/ seedling	--	--	-
4.3	Mulberry chawki worms	--	--	-
4.4	Mulberry Seed (DFLs)	--	--	-
4.5	Vanya seed (DFLs)	--	--	-
4.6	Cocoons	--	2.50	2.22468
4.7	Output from R&D Projects (Silk, fabric etc) Auction of scarab item, income from Hostel, Rent of tower, HRR & water charges	--	0.10	9.16882
4.8	Others (pl specify)	--		
	Total		**8.00**	**12.51928**