

**KANIKA TRIVEDY**  
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## Curriculum vitae

**Age** : 58 years  
**Date of birth** : 15<sup>th</sup> July 1958  
**Sex** : Female  
**Post held** : **DIRECTOR**  
**Educational qualifications** : M.Sc., Ph. D  
**Academic records**



**Ph.D Thesis title** :  
 Histological studies on the metamorphic changes in the neurosecretory cells of the brain during pupal period in a lepidopteron, *Prodenia litura* Fabr.

### Educational qualification:

Examination	Subject/ specialization	Board/University	Year of passing	%of marks	Class/ division
Higher Secondary	General subjects	Board of secondary Education, Bhopal, MP	1974	64%	I div
B.Sc.	Zoology, Botany and Chemistry	Jiwaji University Gwalior, MP	1977	65%	I div (IX Rank)
M.Sc.	Zoology with Entomology specialization	Jiwaji University Gwalior, MP	1979	67%	I div IV Rank Received two years National Scholarship on the basis of B.Sc. Result
Ph. D.	Insect endocrinology	Jiwaji University Gwalior, MP	1989	-	Received Individual CSIR, Junior Research Fellowship for three years (1980-1982)

### Experience :

Teaching : 35 years  
 Extension work : 4 years  
 Research : 35 years

Organization	Designation	Duration	Subject/ area
Jiwaji University, Gwalior, MP	CSIR, Junior Research Fellow (Indiv)	3 years (1980-1982)	Doing Ph. D and teaching Entomology to M.Sc.
CTRITI, Ranchi	Sr. Res. Asst.	5 Years (1982-1987)	Teaching to varying training Courses for Tasar culture
BSMTC, CTRI, Ranchi	Sr. Res. Asst.	2 Years (1987-1989)	Tasar silkworm rearing and seed production
CSRTI, Mysore	Sr. Res. Asst.	3 years (1990-1992)	Silkworm Physiology research & teaching

<b>Organization</b>	<b>Designation</b>	<b>Duration</b>	<b>Subject/area</b>
CSRTI, Mysore	Sr. Res. Officer	11 years (1993 –2004)	Silkworm Physiology research & teaching
CSRTI, Mysore	Deputy Director	4 years (2004-2008)	Silkworm Physiology, Product diversification research & teaching
CSRTI, Mysore	Scientist D & Head, SW Phy	5½ years 1 <sup>st</sup> Jan 2009 – to 3 <sup>rd</sup> June 2013	Silkworm Physiology, Product diversification research & teaching
CSRTI, Mysore	Scientist D, DC (SERI) & Head SW Phy	1½ months 20 <sup>th</sup> April -3 <sup>rd</sup> June 2013	Silkworm Physiology, Product diversification research & teaching, Sericulture Division
CSRTI, Mysore	Scientist D (SEEM)	11 months <i>w.e.f.</i> 3 <sup>rd</sup> June 2013 to 30 <sup>th</sup> April 2014	Sericulture Extension, Economics & Management (SEEM) & teaching
CSRTI, Mysore	Scientist D, DC (SERI)	2½ months <i>w.e.f.</i> 1 <sup>st</sup> May 2014 to 9 <sup>th</sup> July 2014	Research, extension & teaching, Sericulture Division
SBRL, Bangalore	Director I/C	8 months <i>w.e.f.</i> 10 <sup>th</sup> July 2014 to 27 <sup>th</sup> Feb 2015	Research & administration
SBRL, Bangalore	Director	8 months 28 <sup>th</sup> Feb 2015 to 31 <sup>st</sup> Oct 2015	Research & administration
CSGRC, Hosur (add charge)	Director	7 months 28 <sup>th</sup> Feb 2015 to 8 <sup>th</sup> Oct 2015	Research & administration
CSR & TI, Berhampore, WB	Director	<i>w.e.f.</i> 3 <sup>rd</sup> Nov 2015 to till date	Research & administration

**Training :** Trained approximately 600 candidates in non-mulberry and mulberry sericulture and 250 candidates from DOS of different states in mulberry sericulture.

### **Professional Training undergone:**

**Overseas** Trained in New Enzyme Immuno Assay Technique at Ecole Normale Superior, Paris, France for 45 days in 1992.

### **National**

- Trained in tissue culture techniques ( Trends in cell – tissue- organ culture and techniques in animal virology) in tissue culture workshop held at University of Poona from 22<sup>nd</sup> Nov – 12<sup>th</sup> Dec 1981
- 21 days Refresher course in Tasar culture at CTR & TI, Ranchi in 1986
- Trained in “Intensive bivoltine training” at CSRTI, Mysore from 5<sup>th</sup> March – 6<sup>th</sup> April 1990
- Trained in Gas chromatography (GC) and High-pressure liquid chromatography (HPLC) at CFTRI, Mysore *w.e.f.* 17<sup>th</sup> - 21<sup>st</sup> February 1997
- Completed course on computer fundamentals and MS office at the Academic council of Software Tecnology Group, International training Centre, (STG) Mysore *w.e.f.* 22<sup>nd</sup> - 27<sup>th</sup> May, 2000.
- Trained in workshop on intellectual Property Rights (IPR) *w.e.f.* 25-28<sup>th</sup> Aug. 2003
- Attended training programme on Biotechnology and bio-information in sericulture *w.e.f.* 29-30<sup>th</sup> Aug 2003
- Attended workshop on Hindi *w.e.f.* 26-27<sup>th</sup> Dec 2003
- Trained for one month in large-scale diet preparation and diet rearing technology from A. Yamaguchi, Japanese Expert in March 2007.
- Trained in workshop “Teaching to enabling assimilation” at RKM, Khar, Mumbai on 30<sup>th</sup> Aug 2008.
- Trained at Administrative Staff College of India ( ASCI), Hyderabad for “ General management programme for Senior women scientists” in *w.e.f.* 15<sup>th</sup> Sept 28<sup>th</sup> Sept 2008

- Trained in “Intellectual Property Rights” for senior level officers at Administrative Training Institute, Mysore for 3 days (1<sup>st</sup> –3<sup>rd</sup> July 2009).
- Trained in 2 days “Hindi Workshop” 3-4<sup>th</sup> March 2010 at CSRTI, Mysore.
- Knowledge gained in Seminar on food safety with MERCK microbiology at CFTRI, Mysore on 26.2.10
- Underwent training at NAARM, Hyderabad in “Developing Winning Research Proposals in Sericulture Research” *w. e. f.* 28<sup>th</sup> Oct – 3<sup>rd</sup> Nov 2010
- Certificate of appreciation received for training undergone on “BASIC OF NETWORK AND INTERNET USAGES” conducted from 2-3<sup>rd</sup> September 2011.
- Attended one day “Brainstorming session on Nanotechnology and its application in Sericulture” held on 10<sup>th</sup> Oct 2012 at CSRTI, Mysore.
- Trained in “Impact Assessment” for senior level officers at Administrative Training Institute, Mysore for 3 days *w.e.f.* 19<sup>th</sup> -21<sup>st</sup> August 2013.
- ISO Training on implementation of quality system as ISO 9001:2008 on 18.12.13

## Hindi:

1. Radio talk on ‘तसर उत्पादन में महिलाओं का सहयोग’ at All India radio on 25.2.84 at 4 pm
2. Participated in हिन्दी टिप्पण, □ लखन, प्रशासनिक शब्दावली प्रतियोगिता on 11<sup>th</sup> September 1991 during हिन्दी पखवाड़ा Sept 1991.
3. I prize in “हिन्दी □ शुभाषण प्रतियोगिता ख वर्ग” during हिन्दी पखवाड़ा Sept 1996.
4. II prize in सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 1997.
5. हिन्दी टिप्पण तथा मसौदा लखन का □ भ्यास in Hindi workshop in Dec 2003
6. III prize in सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2005.
7. III prize Hindi सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept. 2007.
8. II prize in Hindi श्रुत लखन during हिन्दी (राजभाषा) पखवाड़ा Sept. 2007.
9. Consolation prize in पाठ पठन during हिन्दी पखवाड़ा Sept 2008.
10. Consolation prize in निबन्ध during हिन्दी पखवाड़ा Sept 2008.
11. III prize in श्रुत लखन during हिन्दी पखवाड़ा Sept 2008.
12. II prize in सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2009.
13. हिन्दी टिप्पण तथा मसौदा लखन का □ भ्यास in Hindi workshop in March 2010
14. II prize Hindi सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2010
15. Consolation prize in Hindi श्रुत लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2010.
16. II prize in Hindi सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2012.
17. II prize in Hindi श्रुत लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2012.
18. II prize in Hindi स्मृति परीक्षण during हिन्दी (राजभाषा) पखवाड़ा Sept 2012.
19. I prize in Hindi सही लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2013.
20. I prize in Hindi श्रुत लखन during हिन्दी (राजभाषा) पखवाड़ा Sept 2013.
21. I prize in Hindi समूह चर्चा during हिन्दी (राजभाषा) पखवाड़ा Sept 2013.

## Awards:

- **International: WIPO Gold medal and certificate for “Best woman Inventor of the year 2004” by World Intellectual Property Organization, Geneva on 11<sup>th</sup> May 2005 at New Delhi.**
- **National : “Technology day award 2004” bears individual shield, certificates and Rs. 1 lakh jointly for meritorious invention of SAMPOORNA on 30<sup>th</sup> June 2004 at New Delhi**
- **Institute: Award on “Annual day celebration 2008” from Director, CSR&TI, Mysore, for the outstanding contribution in the field of sericulture research.**
- **Awarded 1<sup>st</sup> Prize Rs. 1500/- and Certificate for oral presentation for the paper “कृत्रिम आहार पर तसर चॉकी कीट पालन - एक सफल प्रयोग” in अखिल भारतीय राजभाषा तकनीकी सेमिनार, Ranchi held on 26-27<sup>th</sup> April 2011.**
- **Best poster Awarded to the poster Green” silk: Dye Chemistry to Dyeability by. On “National Science day (28<sup>th</sup> February 2012)” at NCL, Pune**

### **Honours:**

- Honoured by Honorable Karnataka State Sericulture Minister Shri Revanna for the contribution of the product SAMPOORNA during Krishimela Held on 4<sup>th</sup> January, 2003.
- Honoured by Dr. G.K. Veeresh, Former Vice Chancellor, UAS Bangalore in presence of Prof. V.L. Chopra, President National Academy of Agricultural Sciences and chairman, RCC, CSB on 20<sup>th</sup> May 2004 at Bangalore for the “Development of the SAMPOORNA”.
- Honoured by the Committee of Sri Ramakrishna Hegde, Rastriya Chintana Vedike on 13<sup>th</sup> January 2011 at Mysore for contribution in Science.

### **Technologies commercialized:**

1. **“Nutrid”** – a semi synthetic diet for young instar silkworm rearing. **(Know-How sold by CSB to M/S SERICARE, Bangalore for Rs. 10 lakh with recurring royalty- 3% on Sales, Exclusive for 10 years) (2004)**
2. **“Sampoorna”** – a hormone for early and uniform maturity in silkworms. **(Know-How sold by CSB to M/S SERICARE, Bangalore for Rs. 4 lakh with recurring royalty- 3% on Sales, Exclusive for 10 years). (2003)**
3. **“Colour silk”**- Natural Pink color silk **(Know-How sold by CSB to M/S RMKV, Chennai for Rs. 1 lakh for 1 colour with recurring royalty- 3% on Sales, Nonexclusive) (2014)**

### **Authorization of silkworm hybrids:**

Two silkworm hybrids *viz.*, bivoltine x bivoltine CSR2 (A) x CSR4 (A) and Multi x bivoltine BL67 (A) x CSR19 (A) **especially evolved to rear on semi-synthetic diet are first diet hybrids authorized in India.**

### **Full length cDNA sequences:**

Submitted two full length cDNA sequences of lipophorin receptors (LpR) of eri silkworm, *Samia ricini* to National Center for Biotechnology Information (NCBI, USA) **(Accession Numbers: KU936050 and KU936051)**

### **Patents granted:**

1. **Process of extraction of ecdysteroid used for uniform and advanced maturity of silkworm (sampoorna) (Patent no. 193857, dated 14.06.2001) granted on 6<sup>th</sup> Dec 2005 (Filed IPR no. 475/Mas/2001 dated 14.6.2001).**
2. **A silkworm feed and a process for preparation thereof (Patent no. 218430, dated 3.02.99) granted on 1<sup>st</sup> April 2008 (Filed IPR no. 133/Mas/99 dated 3.2.99)**
3. **A semi-synthetic diet for rearing young instar tropical tasar silkworm, *Antheraea mylitta* (Patent no. 240259, dated 12.06.2007) granted on 30<sup>th</sup> April 2010 (Filed no.IPR/ 4.13.19.1/06096/2008) 1214/CHE/2007, dt. 12.6.2007**
4. **Universal diet for young age silkworm- “SERINUTRID” Patent no. 247304 dated 10.9.2007 granted on 31.3.11 (filed vide patent no.IPR/ 4.3.21/ 06097/2007) 2020/CHE/2007, dt. 16.9.2007**

### **Patents filed:**

1. **Induction of colour to fibroin in silkworm**  
(no.IPR/4.19.9/06085/2007) 3848/CHE/2010, dt. 15.12.2010  
246/CHE/2007 dt 02/02/2007
2. **Artificial diet for young instar Eri**  
rearing(no.IPR/4.13.19/06095/2007) 2115/CHE/2007, dt. 20.9.2007
3. **Preparation of Silkworm powder for human health beneficial effects**  
(no.IPR/4.3.16/07076/2008) 365/CHE/2008, dt. 13.2.2008
4. **Preparation of nutritious silkworm pupae for human food**  
(no.IPR/4.3.16/08025/2008) 1814/CHE/2008, dt. 29.7.2008
5. **Preparation of nutritious, odorless pupae powder**  
(no.IPR/4.3.16.1/08026/2008) 1813/CHE/2008, dt. 29.7.2008.
6. **Preparation of transparent, odorless refined silkworm pupae oil**  
(no.IPR/4.3.16/08024/2008) 1764/CHE/2008, dt. 23.7.2008
7. **Process for extracting virgin sericin of *Bombyx mori* for potential industrial applications** (no.IPR/4.11.16/09001/2009)  
1831/CHE/2009, dt. 3.8.2009
8. **Process for the extraction of fibroin of *Bombyx mori* for potential application in different value added products** (no.IPR/4.11.16/09003/2009) 2449/CHE/2009, dt. 9.10.09.
9. **Artificial diet for young instar Muga rearing**  
(no.IPR/4.11.13/10055/2010) 2901/CHE/2010, dt. 30.9.2010
10. **Process for the utilization of spent silkworm moths for value added by-products** (No. IPR/FA/13018/2013) 3919/CHE/2014 dt.8.8.2014.
11. **A Process for culturing *Cordyceps* using silkworm** (No. IPR/13056/2014) 5697/CHE/2014 dt. 25.11.2014

### **Research supervision (Guidance):**

**Dessertation Guide : 16 M.Sc. students completed their dissertation work**

**Ph. D. Guide : 2 candidates got Ph. D degree in 2009**

**(Recognised guide of Mysore University for Ph.D. )**

### **Research works carried out as Principal Investigator at CSRTI, Mysore:**

1. Studies on the use of insect growth regulators in sericulture Juvenile hormone and Anti-juvenoid hormone.
2. Studies on feed conversion efficiency of improved bivoltine and multivoltine Breeds/hybrids
3. Extraction of PTH from silk moth brains and its use in sericulture along with synthetic PTH analogues.
4. Extraction of ecdysteroid from plants, its partial purification and quantification and its application on silkworm in hastening maturation events and synchronizing spinning activities.
5. Formulation of artificial diet for young age silkworm, Mulberry, Tasar, Eri and Muga.
6. Screened breeds/hybrids for the acceptance of diet, developed 21 productive, sex limited, robust and traditional bivoltine and 13 multivoltine breeds /hybrids for artificial diet through directional breeding.
7. Preparation of Silkworm powder, pupae for human food, pupae powder, transparent, odorless refined silkworm pupae oil, extraction of virgin sericin, fibroin and utilization of spent silkworm moths.
8. Production of natural Coloured Cocoons
9. *In vivo* & *in vitro* culture of *Cordyceps* culture

### **Breakthrough Research:**

1. **For the first time a common artificial diet for all Multi bivoltine hybrids developed and is being popularized for available commercial layings (Universal diet).**

2. In India first plant based phyto-ecdysteroid hormone made available to farmers for early and uniform maturation of silkworm.
3. For the first time natural coloured silk is produced. The colour can be induced in all stages of silkworm. Even after 100% degumming the colour is retained in Fibroin.
4. Diet for young instar vanya silkworm *i.e.* Tasar, Eri & Muga are ready for release.
5. Protocol has been standardized for extraction and purification of silk proteins (Sericin and Fibroin). The purified proteins have a large potential market in Bio medical use.
6. Protocols for silkworm powder, pupae oil refining, pupae powder and ready to use pupae have been standardized.
7. *In vivo* & *in vitro* *Cordyceps* culture using silkworm pupae is standardized.

**Technical and specialized skills** – Biochemical and Microbiological techniques, HPLC, ELISA, laboratory instrumentation, lab techniques, Knowledge of computer, Interested in current research for achieving future Academic goals

### Publications

I a	International Indexed Journal	<b>28</b>
Ib	International Proceeding	<b>06</b>
II a	National Indexed Journal	<b>46</b>
IIb	National Proceeding	<b>20</b>
III	Blog	<b>01</b>
IV	Book/Chapter/Theme paper/Compiled	<b>11</b>
V	Popular Article	<b>25</b>
VI	Abstract in International symposium/Seminar/Confrences	<b>06</b>
VII	Abstract in National symposium/Seminar/Confrences	<b>41</b>
	<b>Total</b>	<b>184</b>

### Imparted Special Training

- ✓ Imparted Training cum demonstration to 10 DOS of Chattisgarh state at Bangursia, Chhattisgarh (invited by Govt of Chattisgarh) *w.e.f.* 7<sup>th</sup> Oct 2009 -14<sup>th</sup> Oct 2009 in diet rearing of Tasar and Eri up to II instar.
- ✓ Imparted Training cum demonstration to 30 DOS officials at Office of Joint Director, Sericulture, Koni, Bilaspur (invited by Govt of Chattisgarh) and to take special classes on “Semisynthetic diet for young instar tasar and eri” *w.e.f.* 30<sup>th</sup> July – 11<sup>th</sup> Aug 2010.
- ✓ Imparted training to 16 CRC owners under Technology upgradation programme (TUP) to 10 CRC’s Entrepreneurs from Karnataka, Andhra Pradesh and Tamilnadu on “ Large scale chawki rearing with Nutrid (Artificial diet)” *w. e. f.* 11.7.11 – 15.7.11 (TUP 11-12/CRN -01 at M/S SERICARE, Dodballapur , Karnataka

- ✓ Imparted demonstration cum training to 10 master trainers on the technology on “Tasar chawki silkworm rearing on semi-synthetic diet” at District Sericulture Office, Malakhedi, Dist Hoshangabad, MP Silk Federation under Directorate of Sericulture, MP, *w.e.f.* 30<sup>th</sup> July -10<sup>th</sup> August 2012.
- ✓ Imparted demonstration cum training to 15 master trainers on the technology on “Tasar chawki silkworm rearing on semi-synthetic diet” at Bolpur Composite unit, Muluk, Dist. Birbhum under Directorate of Textiles (Sericulture), Govt. of West Bengal, Kolkata 700013 *w.e.f.* 12<sup>th</sup> Sept – 23<sup>rd</sup> Sept 2012.
- ✓ Imparted demonstration cum training to 16 master trainers on the technology on “Muga chawki silkworm rearing on semi-synthetic diet” at Coochbehar under Directorate of Textiles (Sericulture), Govt. of West Bengal, Kolkata 700013 *w.e.f.* 27<sup>th</sup> Feb to 11<sup>th</sup> March 2013.
- ✓ Imparted 4 practical demonstration cum training to 24 CRC owners of Karnataka under SEED ACT at CSRTI, Mysore on the technology of “Mulberry chawki silkworm rearing on semi-synthetic diet in two batches *w.e.f.* 22.4.13 to 20.7.13 & 26.8.13 to 23.11.13.
- ✓ Demonstrated Tasar diet Chawki rearing at REC Kapistha, W.B. *w.e.f.* 23<sup>rd</sup> September 2013 to 5<sup>th</sup> Oct 2013 and imparted training to 25 tasar farmers.
- ✓ Imparted demonstration cum training to 7 farmers & 5 DOS of Tamil Nadu at Nathakarai located in Attur Taluk in salem district on the technology on “Mulberry chawki silkworm rearing on semi-synthetic diet *w.e.f.* 20-28<sup>th</sup> Dec 2013.
- ✓ Imparted demonstration cum training to 54 farmers & 3 DOS of Tamil Nadu at Shrivilliputtur located in Viruthunagar district on the technology on “Mulberry chawki silkworm rearing on semi-synthetic diet *w.e.f.* 17 –25<sup>th</sup> January 2014
- ✓ Imparted 2 practical demonstration cum training to 13 CRC owners of Karnataka under SEED ACT at CSRTI, Mysore on the technology of “Mulberry chawki silkworm rearing on semi-synthetic diet in two batches *w.e.f.* 18.12.2013- 17.3.2014

# Publications

## I. International

### a) In indexed Journals

1. Pooja, M., Pradeep, A.R., Shambhavi, P.H., Ponnuvel, K.M. and **Trivedy, K.** (2017). The dipteran parasitoid *Exorista bombycis* induces pro- and anti-oxidative reactions in the silkworm *Bombyx mori*: Enzymatic and genetic analysis. *Arch. Insect. Biochem. Physiol*, 00:e21373. doi: 10.1002/arch.21373 [Wiley, UK]
2. Rahul, K., Roy, G., Hossain, Z & **Trivedy, K.** (2017). Impact of probiotics *Lactobacillus rhamnosus* ATCC 9595 and *Lactobacillus acidophilus* ATCC 4356 on the economic traits of silkworm *Bombyx mori* L. *Imperial Journal of Interdisciplinary Research.*, **3(3)**: 1115-1117
3. Kar, R., Gogoi, S. N., Dutta, S. K., **Trivedy K.**, (2016). Foliar diagnosis of cationic micronutrients for mulberry (*Morus sp.*) growing under North-Eastern states of India. *Nature and Science* (ISSN 1545-0740) – Accepted
4. Niharendu Bikash Kar, Mrinal Kanti Majumdar, **Kanika Trivedy** (2016) Effect of Pressurized Cooking & Low-Temperature Reeling of Cocoon on Qualitative & Quantitative Traits of Bivoltine Raw Silk, *American International Journal of Research in Formal, Applied & Natural Sciences*, ISSN (Print): 2328-3777, ISSN (Online): 2328-3785, ISSN (CD-ROM): 2328-3793
5. **Kanika Trivedy**, S. Sangappa, S. Nirmal Kumar and B. B. Bindroo (2016) Production of pink colored silk fabric dyed using a “green” dye-fed silkworm approach. AATCC (American Association of Textile Chemists and colorists), Association of Textile, Apparel & Materials Professionals USA, Review, 16 (1) : 48-57.
6. Gupta Tania, K Kadono-Okuda, K Ito, **K Trivedy**, K M Ponnuvel (2015) Densovirus infection in silkworm *Bombyx mori* and genes associated with disease resistance, *Invertebrate Survival Journal*, 12: 118-128, <http://www.isj.unimo.it/articoli/ISJ372.pdf>
7. Lekha, Govindaraj Tania Gupta, Arvind K. Awasthi, Geetha N. Murthy, **Kanika Trivedy**, Kangayam M. Ponnuvel (2015) Genome wide microarray based expression profiles associated with BmNPV resistance and susceptibility in Indian silkworm races of *Bombyx mori*. *Genomics* 106 : 393-403



8. Lekha G, T Gupta, **K Trivedy**, K M Ponnuvel (2015) Paralogous gene conversion, allelic divergence of attacin genes and its expression profile in response to BmNPV infection in silkworm *Bombyx mori* *Invertebrate Survival Journal* 12: 214 – 224 <http://www.isj.unimo.it/articoli/ISJ386.pdf>
9. Pradeep AR, Anitha J, Panda A, Pooja M, Awasthi AK, Geetha NM, Ponnuvel KM and **Trivedy K** (2015) Phylogeny of Host Response Proteins Activated in Silkworm *Bombyx mori* in Response to Infestation by Dipteran Endoparasitoid Revealed Functional Divergence and Temporal Molecular Adaptive Evolution *J Clin Cell Immunol* 2015, 6:5 <http://dx.doi.org/10.4172/2155-9899.1000370>
10. Anuya Nisal, **Kanika Trivedy**, Hasan Mohammad, Suyana Panneri, Sayam Sen Gupta, Ashish Lele, Ramesh Manchala, Nirmal S. Kumar, Mugdha Gadgil, Harish Khandelwal, Snehal More and R. Seeta Laxman (2014) Uptake of Azo Dyes into Silk Glands for Production of Colored Silk Cocoons Using a Green Feeding Approach, **ACS Sustainable Chemistry & Engineering (ACS Publications) American Chemical Society, ACS Sustainable Chem. Eng., 2014, 2 (2), pp 312–317**  
[pubs.acs.org/journal/ascecg](http://pubs.acs.org/journal/ascecg) , [dx.doi.org/10.1021/sc400355k](http://dx.doi.org/10.1021/sc400355k)
11. Aabid Khaliq Tantray and **Kanika Trivedy** (2014) Quantification of Vitamin C in mulberry leaves. *Sericologia (India)* **54(3):198-201**
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13. Aabid Khaliq Tantray, **Kanika Trivedy** and S. Nirmal Kumar (2011) Studies on hypervitaminosis and early maturation in the silkworm, *Bombyx mori* L induced by vitamin C treatment. *Sericologia (France)* **51(4):75-82**
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34. Sashindran Nair K.,**Kanika Trivedy**, P.K.Chinya and M.M. Ahsan (1998) Evaluation of feed conversion efficiency of improved Multi x Bivoltine hybrids of Silkworm, *Bombyx mori* L vis-a vis the existing popular ones. Current Technology Seminar, CSRTI, Berhampore. July 22-23, 1998.
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37. Sashindran Nair K., T. Leelapriya, P.K.Chinya and **Kanika Trivedy** (1998). Introduction of PMF technology for sustainable sericulture. International conference on pest and pesticide management for sustainable Agriculture, C.S.Azad University of Agriculture and Technology, Kanpur. December, 11-13, 1998. p.323.
38. **Kanika Trivedy**, K.Sashindran Nair, S.B.Magadum, M.M.Ahsan and R.K.Datta (1995). A Juvenile hormone modulated alterations in the economic traits of silkworm *Bombyx mori*. Current Technology Seminar. CSRTI, Berhampore. 25 - 26 Oct. 1995.
39. **Kanika Trivedy**, O.K.Remadevi, S.B.Magadum and R.K.Datta (1992). Effect of a juvenile hormone analogue, labomin on the growth and economic characters of silkworm, *Bombyx mori* L.National Conference on Mulberry Sericulture Research, CSRTI, Mysore.. Dec. 10-11, 1992. p.78
40. **Kanika Chakraborty**& K. C. Gupta (1981). Effect of Sodium fluosilicate on the activity of neurosecretory A cells of the brain of cut worm *Agrotis segetum* (D & S) "First all India Symposium of insect Endocrinology" (28-30 March 1981) held at Aurangabad.
41. Bahadur J and **Kanika Chakraborty**, (1981). Histomorphology of cephalic neurosecretory cells in *Agrotis segetum* during metamorphosis. National Academy of Sciences, India, 51st Annual session held at Cochin (5-7 Oct.1981)

## **X. Ph. D. Guideship – Two candidates** registered under Mysore University.

### **Ph. D. awarded in March 2009**

1. "Studies on extraction, purification and qualitative variation of fibroin in breeds/hybrids of silkworm *Bombyx mori* L for value added product"- **Dr. Mousumi Mondal**
2. "Comparative study of synthetic and plant based vitamin C on the economic parameters of the silkworm, *Bombyx mori* L" - **Dr. Aabid Khaliq Tantry**

## **XI. Guide for M.Sc. Dissertations (Awarded)**

1. "Quantification of Deoxynojirimycin in mulberry plants and silkworm powder by Jayanna (2013) Department of studies & Research in Biochemistry, Kuvempu University. Shimogha.
2. "Comparative analysis of oil extracted from larvae, pupae and adult silkworm *Bombyx mori*(2013) by Ms T. Rajeswari, Department of Biotecnology, Alagappa University, Karaikudi 630003, Tamilnadu
3. "Studies on comparative biochemical profile of different moths of silkworm *Bombyx mori*" by Dhananjaya Kumar (2012) Department of Biochemistry, Kuvempu University. Shimogha.
4. "Use of probiotics to improve economic characters of silk worm *Bombyx mori*" by Rashmi M.C. (2012) Department of Microbiology, Maharani's science College for women, Mysore.
5. "*In vitro* testing of disinfectants used in sericulture to control the growth of fungi in rearing houses" by N. Vinutha. (2010), Department of microbiology, Maharani's Science college for women, Mysore.
6. "*In vitro* testing of disinfectants used in sericulture to control the growth of bacteria in rearing houses" by S. Kusuma (2010), Department of microbiology, Maharani's Science college for women, Mysore.
7. "Standardization of procedure for culturing some useful fungi on *Bombyx mori* spent pupae" by M. Mahalakshmi (2009), Department of Microbiology, University of Mysore, Mysore
8. "Studies on comparative feed conversion efficiency of newly evolved multi x bi hybrid" by Tanushri Adhikari (2009), CSRTI, Mysore
9. "Biochemical analysis of silkworm larval powder of, *Bombyx mori*" dissertation work carried out by Muhammad. Althaf(2008), Periyar University, Salem, Tamilnadu.



10. "Biochemical analysis of pupa oil of silkworm, *Bombyx mori*" dissertation work carried out by C H. Veeranjanyulu (2008), Periyar University, Salem, Tamilnadu.
11. "Protein banding pattern in the de-oiled pupal powder of silkworm *Bombyx mori* in differentsexes" dissertation work carried out by Anil Kumar Bhat. C (2007), Periyar University Salem, Tamilnadu.
12. "To standardize the procedure for isolation and purification of vitamin C from botanicals" dissertation work carried out by Ramesh D.S (2007), Periyar University, Salem, Tamilnadu.
13. "Effect of ascorbic acid on the economic characters of silkworm, *Bombyx mori L*" dissertation work carried out by Mr. Animesh Chakraborty (2006), Mysore University, Karnataka.
14. "Studies on comparative performance of silkworm reared on semi-synthetic diet and mulberry leaves" dissertation work carried out by Miss Mousumi Mondal (2003) Mysore University, Karnataka
15. "Study on the effect of Phytoecdysteriod on the seed crop performance of silkworm *Bombyx mori L.*" dissertation work carried out by Miss Anindita Dhar (2002) Mysore University, Karnataka
16. "Effect of Juvenile hormone analogue (JHA) on the growth and economic characters of silkworm *Bombyx mori L.*" dissertation work carried out by Mr. B.Hemantha Kumar (1996), Mysore University, Karnataka.

## **XII. C.D.**

1. Five decades of Research and Development at CSRTI, Mysore – 2011
2. Growthindices of silkworm *Bombyx mori.L.* – 2010
3. Tasardiet rearing technology by "Silk Research Development and Training, Bilaspur, Chattisgarh". "कोसा रेशम का विकास नयी तकनीक के साथ" ( **bilingual Hindi & English**)

## **XIII. Pamphlets**

1. Nutrid – Semi-synthetic diet for rearing young age silkworm (I & II instar), (Hindi, English and Kanada)

2. “Samruddhi” - (Jha Technology) For Enhanced Cocoon/Silk Production(Hindi, English and Kanada)
3. Sampurna - A hormone for uniform maturity of Silkworm(Hindi, English and Kanada)

**RELEASED by CSR&TI Berhampore WB in 2016-**

4. Resham Krishi Barta, Vol. 1(1), January, 2016. (Magazine)
5. Guidelines for chawki rearing, Booklet No. 06, Feb.,2016
6. Appropriate technique for silkworm rearing, Pamphlet No. 26, Feb.,2016
7. Control measures for mulberry diseases, Pamphlet No. 27, Feb.,2016
8. Control measures and forewarning for major diseases and pests of mulberry, Pamphlet No. 28, Feb.,2016 (HINDI)
9. Appropriate technology for silkworm layings brushing, Leaflet No. 29 (Pamphlet No. 29), Feb.,2016,
10. Control of thrips in mulberry cultivation, Pamphlet No. 30, Feb.,2016
11. Control of Whitefly in mulberry cultivation, Pamphlet No. 31, Feb.,2016
12. Appropriate technique for better silk yarn production, Pamphlet No. 33, Feb.,2016
13. SK6 x SK7 – New silkworm hybrid, mulberry cultivation, Pamphlet No. 34, Feb.,2016
14. Ghar Shodhon – An excellent formulation for disinfection of rearing house and rearing appliances, Leaflet No. 03, Feb.,2016

**RELEASED by CSRTI, Berhampore 2016-2017**

15. Essential guidelines for spraying pesticides/ fungicides (2017). Pandit, D., Bandyopadhyay, U. K., Manjunatha, G. R. and **Trivey, K.** Trilingual (Bengali/ Hindi/ English)
16. Kechua Khad Toiari kanre ki Asan Bidhi (2017). Afroz, S., Chanda, S., Sahoo, A. and **Trivedy, K.**(Hindi)
17. Polupalaner Khutinati (2017). Dutta Biswas, T., **Trivedy, K.** and Chanda, S. (Bengali)

18. Vermicompost Sahaj Upaye Tairir padhyati (2017). Afroz, S., Chanda, S., Sahoo, A. and **Trivedy, K.** (Bengali)
19. "Vermicompost".....A Made Easy (2017). Afroz, S., Chanda, S., Sahoo, A. and **Trivedy, K.** (English)
20. Congenic bivoltine breeds B.Con.1 and B.Con.4 and their hybrid a new approach in hybrid breeding (2017). Verma, A.K., Chattopadhyay, G.K., Chandrakant, N., Lakhsmanan, V. and **Trivedy, K.** (English)
21. Diseases of mulberry and their control (2017). Singh, G. B., **Trivedy, K.** and Gangopadhyay, S. (English)
22. Hygiene and Disinfection methods for Silkworm rearing (2017). Singh, G. B., **Trivedy, K.** and Gangopadhyay, S. (English)
23. Method of incubation and black boxing and their usefulness (2017). Singh, G. B., **Trivedy, K.** and Gangopadhyay, S. (English)
24. Mulberry varieties suitable for different agro-climatic zones of West Bengal (2017). Suresh, K., Banerjee, R., Chakravarty, D., Ghosh, P. K. and **Trivedy, K.** (English)
25. Pest of Mulberry and their control (2017). Singh, G. B., **Trivedy, K.** and Gangopadhyay, S. (English)
26. Rearing method of late age silkworm (2017). Singh, G. B., **Trivedy, K.** and Gangopadhyay, S. (English)
27. Sapling preparation and its maintenance (2017). Singh, G. B., **Trivedy, K.** and Gangopadhyay, S. (English)
28. Silkworm disease and pests management (2016). Gogoi, S. N. and **Trivedy, K.** (English)
29. Darjeeling ani Sikkim pahari khetrama unnat jatka kimbu kheti (2016). Kar, R. and **Trivedy, K.** (Nepali)
30. Darjeeling pahari ila kama dui phasaliye resham krira palanka nimti (2016). Kar, R. and **Trivedy, K.** (Nepali)
31. Pahari khetrama kimbuma lagne kehi rogharu, hanikarak krira ani tyasko niyantran (2016). Kar, R. and **Trivedy, K.** (Nepali)
32. Resham Krirako rogharubat bachau ebang niyantranma rakhne upayharu (2016). Kar, R. and **Trivedy, K.** (Nepali)
33. Unnat maner resham suta utpadaner sathik padhwati (2016). Kar, N. B., Majumder, M. K. and **Trivedy, K.** (Nepali)

## XIV Media

- Three documentary films (15 min) were made on “**Kisan Nursery**”, “**Nari Shakti in Sericulture**” and “**Bivoltine Sericulture**” for telecasting. 16 number of “Resham Katha” on sericulture improvement through Akashvani uploaded in the institute website [www.csrtiber.res.in](http://www.csrtiber.res.in).
- All the on-going and concluded research projects (45 Nos.) uploaded in the institute website ([www.csrtiber.res.in](http://www.csrtiber.res.in)) for *e-monitoring* of R&D activities.
- All brochures/ pamphlets published recently in different vernaculars had been uploaded in the institute website [www.csrtiber.res.in](http://www.csrtiber.res.in)
- Two News & Views, a half-yearly Institute’s R&D news bulletin were published.
- Four Resham Krishi Barta, a quarterly sericulture bulletin in Bengali, were published.

## Symposia/Seminars/Conference/workshop attended

1. Attended the 23<sup>rd</sup> International Congress on Sericulture & Silk Industry held on 24-27<sup>th</sup> Nov 2014 at Bangalore, India
2. Attended workshop on “Women Empowerment” at Delhi on 17<sup>th</sup> Sept 2014
3. Attended Conference on “Applying NGS (New genomics science) on Basic Research , Agriculture and Health care” at Hotel Capitol, Bangalore on 11<sup>th</sup> Sep 2014 organized by Genotypic, Bangalore.
4. Attended "अंतराष्ट्रीय संयुक्त राजभाषा वैज्ञानिक / तकनीकी संगोष्ठी - विश्व की प्रगति में विज्ञान तथा प्रौद्योगिकी का योगदान in 5-7<sup>th</sup> December 2013 at New Delhi.
5. Attended “National Seminar on recent trends in research & development in Muga culture ideas to action” held on 3<sup>rd</sup> -4<sup>th</sup> May 2012 at Guwahati, Assam
6. Attended “National Conference of Recent Trends in Zoology” held at Jiwaji university, Gwalior, MP *w.e. f.* March 12-14, 2012.

7. Attended अखिल भारतीय राजभाषा तकनीकी सम्मिनार, Ranchi, Jharkhand held on 26-27<sup>th</sup> April 2011.
8. Attended National Conference on Sericulture Innovations Before and Beyond held on 28-29<sup>th</sup> January 2011 at CSRTI, Mysore, Karnataka, India
9. Participated in “Interactive session of silkworm breeding” organized by CSRTI, Mysore held at “Satellite silkworm Breeding Station, Coonoor” w. e. f. 2<sup>nd</sup>-3<sup>rd</sup> Dec 2010
10. Attended Sericulture Workshop and Exhibition at Belgaum on 5.3.11.
11. Attended seminar on food safety with Merck microbiology at CFTRI, Mysore on 26. 2.10
12. Water Technology Seminars- solution for current analytical challenges held on 19<sup>th</sup> Feb 2009 at Hotel Regalis Mysore
13. Shimadzu Road show and Seminar held on 6<sup>th</sup> August 2008 at Hotel Regalis Mysore
14. Attended Analytica Anacon Symposium at Bangalore on HPLC, GC and GCMS *w.e.f* 16.11.06- 18.11.06
15. International Workshop on bioactive peptides and their role in nutrition and health foods held at CFTRI, Mysore (16-17<sup>th</sup> February 2006) .
16. National Seminar on Sericulture extension management, CSRTI, Mysore ( 24-25<sup>th</sup> Feb 2006)
17. The 20<sup>th</sup> Congress of the International Sericultural Commission (ISCC 2005) held during 15-18<sup>th</sup> Dec. 2005 at Bangalore, India.
18. National Seminar on “ Role of Women in Science and Technology and its impact on society” held in Hindu College, Guntur 11-12<sup>th</sup> Sept 2004
19. “National Conference on Tropical Sericulture for Global Competitiveness organized by National Academy of Sericultural Sciences, India” at Central Sericultural Research & Training Institute, Mysore – 5-7<sup>th</sup> November, 2003.
20. National Seminar on Mulberry Sericulture Research in India at Karnataka State Sericulture Research & Development Institute, Bangalore. November, 26-28, 2001.
21. Seminar on Sericulture Technology: CSRTI, Mysore An Appraisal. June 6-7, 2000.

22. National Conference on Strategies for Sericultural Research and Development. CSRTI, Mysore, November 16-18, 2000.
23. National Symposium on Fifty Years of Zoology. University of Calcutta. Calcutta. February 13-14, 1999..
24. Current Technology Seminar, CSRTI, Berhampore. July 22-23, 1998.
25. Current Technology Seminar. CSRTI, Berhampore. 25 - 26 Oct. 1995.
26. National Conference on Mulberry Sericulture Research, CSRTI, Mysore.. Dec. 10-11, 1992.

## Achievement -

- Studies on the use of insect growth regulators in sericulture

Through preliminary screening with broad spectrum concentrations of 25 juvenile hormone analogous, (JHAs) received from different sources like (R394, W328, R77-Czech Republic), (B, C, BME, BK-BARC, Bombay), Pune (NLOE 12, 13, 15, 19, 21, 24, 4, 1, 8, 22, 2, 6, 10 - National chemical laboratory), (BPE - Indian Institute of Technology, New Delhi) have been screened. It was observed that some of the IGRs like R394, BK, BME, NLOE 24, 13 have shown growth promoting activity and improved the shell weight in silkworm, *Bombyx mori*. The improvement in cocoon and cocoon shell weight ranged from 7 – 20 percent.

- Studies on anti-juvenoid KK-42 has been carried out.
- Ecdysteroid titre was measured in different breeds of silkworm larvae and after the treatment of juvenile hormone R394.
- Studies on feed conversion efficiency of improved bivoltine and multivoltine  
Breeds/hybrids

Extraction of PTTH forms silk moth brains and its use in sericulture along with synthetic PTTH analogues. 42 synthetic PTTH analogues were screened for their bioactivity in silkworm using five different concentrations. Based on the results, the analogues, DB5, TP, and DB2 were selected for mass bioassay. About 23 percent improvement was resulted in shell weight. Further, PTTH was extracted from silk moth brain (40000 nos.) and administered to V instar silkworm in a separate experiment. Around 13 percent improvement in shell weight was noticed.

- Studies on feed conversion efficiency of improved bivoltine and multivoltine  
Breeds/hybrids  
30 silkworm breeds/hybrids were studied for their feed conversion efficiency  
15 mulberry genotypes were studied for their nutritional quality through feed conversion efficiency.
- Extraction of ecdysteroid from plants, its partial purification and quantification and its application on silkworm in hastening maturation events and synchronizing spinning activities.

From the above two successful industrially viable technology was evolved as stated below-

### **1. Formulation of artificial diet and screening and development of the breeds and hybrids for rearing on artificial diet.**

Presently a technology on semi synthetic diet rearing for young age silkworm has been developed. It helps in –

1. Supplying balanced nutrition to young age silkworm.
2. Robust chawki rearing through out the year irrespective of seasons.
3. Reducing labour as no bed cleaning is needed until II molt.
4. Reducing number of feeds *viz.* only one feeding in each instar.
5. Reducing disease incidence.
  - a. Methodology has been standardized for semi-synthetic diet preparation and preservation.
  - b. As the existing popular silkworm hybrids were not accepting diet well, it was decided to evolve silkworm breeds from which suitable hybrids also were made.
  - c. A total of 127 breeds/hybrids were screened. 55 bivoltine germplasm breeds, 20 productive bivoltine, 20 multivoltine breeds, 23 bivoltine hybrids and 9 multi x bivoltine hybrids were screened for their feed response percentage for semi synthetic diet.
  - d. Bivoltine pure breeds such as CSR2A, CSR4A, CSR5A, CSR18A, CSR19A, NB4D2A and two hybrids i.e. CSR2A x CSR4A, CSR18A x CSR19A and their reciprocals, Multivoltine pure breeds such as BL24A, BL67A, 96CA, Pure MysoreA, C.NichiA and Multi x Bi hybrids i.e. BL67A x CSR101A, PMA x NB4D2A, 96CA x CSR18A, PMA x CSR2A were evolved for rearing on semi-synthetic diet up to II instar and then on with mulberry leaf till spinning.
  - e. Two Hybrids *viz.*, CSR2A x CSR4A and BL 67Ax CSR101A were tested onder “All India race authorization test”.
  - f. Large scale rearing methodology has been standardized and 6014 Dfls of BL67A x CSR101A were Chawki reared on diet and distributed to farmers and average of 60kg/100Dfls were obtained at farmers’ level.
  - g. Technology was patented and sold through NRDC to M/S SERICARE, Bangalore for Rs 10 lakh.

**2. Extraction of ecdysteroid from plants, its partial purification and quantification and its application on silkworm for hastening maturation events and synchronizing spinning activities.**



Extracted ecdysteroid from identified plant, the same was quantified through HPLC. The ecdysteroid was then administered to silkworm on the commencement of spinning at a particular dose at the laboratory of main research institute and regional research stations and also at the farmers' field. The result was highly encouraging with regard to the synchronization of spinning in silkworm. The average result with the phytoecdysteroid show that in the phytoecdysteroid treated batches, 95 % of the worms matured at 18-24 h after the treatment whereas in control, it took more than 42 h. The cocoon characters were recorded on par in both the batches.

- 45 plant samples were collected and screened for the presence of phytoecdysteroid. Few plants containing higher amount of phytoecdysteroid was identified.
- Extraction procedure, quantification, dosage, application procedure was standardized.
- Identified plants were collected in bulk quantity and bulk - extraction process was standardized and quantification of the active ingredient in the extract was done. Hormone was named as "Sampoorna".
- So far Sampoorna for treating 1.30 lakhs has been extracted and quantified. Out of which 80,500 Dfls worth phytoecdysteroid was tested in the field through RSRSs and direct supply for testing at farmers' level. Farmers' result shows 12-24 hours early maturation without affecting the crop performance at onset of maturation treatment.
- Hormone (Sampoorna) was released during Krishi Mela on 6-7th Jan 2003. 53000 Dfls worth hormone was sold to 161 sericulturists @ Rs 10/- per bottle for 100 Dfls treatment.
- "Sampoorna - a hormone for uniform maturation" was patented and sold through NRDC to M/S SERICARE, Bangalore for Rs. 4 lakh.
- The product has been commercially launched by M/S SERICARE and being sold in market @ Rs 40.00 / 100 Dfls.