

CURRICULUM VITAE

Dr. V. GIRISH NAIK

Scientist – C

Host Plant Improvement

(Molecular Biology Laboratory)

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Date of Birth: 26 January 1960

Education Qualification

Sl. No.	Institution / Affiliation	Degree / Award	Year	Class / Grade / Rank
1.	St. Aloysius College, Mangalore (Affiliated to the University of Mysore, Mysore)	B.Sc. (Chemistry, Botany, Zoology)	1982	First Class
2.	Department of Botany, Karnatak University, Dharwad.	M.Sc. in Botany with specialization in Cytogenetics and Plant Breeding.	1985	First Class and FIRST RANK
3.	University Grants Commission, New Delhi.	UGC-NET qualified in Life Science	1985	Award of Junior / Senior Research Fellowship
4.	CSRTI, Mysore (Affiliated to the University of Mysore, Mysore)	Ph.D. in Biotechnology	2008	–

Title of the Ph.D. Thesis: “Characterization of mulberry (*Morus* spp.) varieties using DNA markers”

Training Undergone

1. Participated in a Contact Program under **Young Scientist Scheme** in Molecular Biology at **Centre for Cellular and Molecular Biology, Hyderabad** from 16 – 23 February, 1985 sponsored by **DST, New Delhi**.
2. Worked as a **Research Fellow** in Plant Biochemistry Laboratory, Dept. of Botany, Karnatak University, Dharwad from 1985-86 in a research project entitled “**Pesticide interaction with plant membrane proteins**”.

3. Worked as Junior/Senior Research Fellow (UGC-NET) at Indian Institute of Spice Research, ICAR, Kozhikode from 1986-89 on a research topic entitled **“Cytogenetical studies in *Piper* species of South India”**.
4. Underwent training from 1 June to 6 July, 1994 in **“Mulberry Breeding and Genetics”** at CSRTI, Mysore under the guidance of **Dr. K. Hasegawa, Mulberry Expert, Japan International Cooperation Agency**.
5. Underwent an **overseas training** in **“Mulberry breeding and physiology”** at **Sericultural Research Institute, Chinese Academy of Agricultural Sciences, Zhenjiang, China** from 23 July 1994 to 22 September 1994.
6. Participated in a workshop on **“Mathematical and Computational Biology”** at **Centre for Cellular and Molecular Biology, Hyderabad** from 8 – 13 January, 2001.
7. Underwent **Hands-on Training course** on **“DNA Markers: Development and Applications”** from February 25 – March 12, 2004 organized by the **Association for the Promotion of DNA Fingerprinting and other DNA Technologies (ADNAT)**, Hyderabad, India and **Centre for Cellular and Molecular Biology, Hyderabad, India**.
8. Successfully completed an advance training course sponsored by **Center of Excellence in Genomics** on **“Molecular Marker Technology for crop Improvement”** held at **International Crops research Institute for Semi-Arid Tropics, Patancheru, Hyderabad, India** from 18 – 29 May 2009.
9. Participated in a Central Silk Board, Bangalore sponsored training program on **“Writing Winning Research Proposals”** held at **National Academy of Agricultural Research Management (NAARM)**, Hyderabad during September 2 to 8, 2011.
10. **Twenty four years of research experience** in the field of **Molecular Genetics and Mulberry Breeding** as a Scientist in Central Silk Board. **Nineteen years specifically in the field of molecular characterization of mulberry genome** at CSGRC, Hosur and Molecular Biology Laboratory – 1, CSRTI, Mysore.

Details of Research Experience / Service

Place of Posting	From	To	Work Done
CSRTI, Mysore	07/08/1989	31/07/1990	Cytogenetical studies in mulberry.
NSP, Project Office, Palghat	01/08/1990	28/02/1994	P2 Farm activity (Basic Seed Multiplication) and Technical Reporting on National Sericulture Project implementation.
CSGRC, Hosur	01/03/1994	06/08/1999	Morphological, biochemical and molecular characterization of mulberry germplasm.

CSGRC, Hosur	07/08/1999	07/04/2001	Biochemical and molecular characterization of mulberry germplasm.
CSRTI, Mysore	08/04/2001	Till Date	DNA fingerprinting of mulberry for cultivar identification, estimation of genetic redundancy in gene bank, assessment of genetic diversity of germplasm and construction of core collection using DNA markers, genome analysis of mulberry, construction of molecular linkage map of mulberry, identification of QTLs/DNA markers associated with yield attributing traits, moisture stress tolerance, diseases and pest resistance in mulberry. Development of Mulberry Genome Database (MulGenomeDb) - http://www.btismysore.in/MulGenomeDb/

Membership of Professional / Scientific Institutions and Societies

1. Association for the promotion of DNA fingerprinting and other DNA technologies, Hyderabad – **Life member**.
2. Indian Society of Genetics and Plant Breeding, New Delhi – **Ordinary member**.
3. National Academy of Sericultural Sciences, Bangalore – **Life Member**.

List of Research Publications

Research papers published in journals:

1. **Naik VG**, and Mukherjee P (1997) An exploration to Andaman and Nicobar Islands for wild mulberry germplasm. Journal of Environmental Resources 5(1-4): 17-19.
2. Ravindran S, Rao AA, **Naik VG**, Tikader A, Mukherjee P, Thangavelu K (1997) Distribution and variation in mulberry germplasm collected through exploration. Indian Journal of Plant Genetic Resources 10(2): 233-242.
3. Tikader A, Rao AA, Ravindran S, **Naik VG**, Mukherjee P, Thangavelu K (1999) Divergence analysis in different mulberry species. Indian Journal of Genetics and Plant Breeding, 59(1): 87-93.
4. Goel AK, Ravindran S, Rao AA, **Naik VG**, Tikader A, Mukherjee P, Sekar S (1998) Variability in rooting parameters at juvenile stage in mulberry (*Morus* spp.) germplasm. Indian Journal of Sericulture 37(2): 109-112.
5. Ravindran S, Tikader A, **Naik VG**, Rao AA, Mukherjee P (1999) Distribution of mulberry species in India and its utilization. Indian Journal of Plant Genetic Resources 12(2): 163-168.
6. Tikader A, Ravindran S, **Naik VG**, Rao AA, Mukherjee P, Dandin SB, Ramesh SR (1999) Geographical distribution and variation in Indian mulberry genetic resources. In the proceedings of "Advances in Indian Sericulture Research" organized by Central Silk Board at Central Sericultural Research and Training Institute, Mysore from 16-18 November, 2000. pp. 30-35.

7. **Naik VG**, Sarkar A, Sathyanarayana N (2002) DNA fingerprinting of Mysore Local and V-1 cultivars of mulberry (*Morus* spp.) with RAPD markers. Indian Journal of Genetics and Plant Breeding, 62(3): 193-196.
8. Dandin SB, **Naik VG** (2004) Biotechnology in mulberry (*Morus* spp.) crop improvement: Research directions and priorities. In: Srivastava PS, Narula A, Srivastava S (Eds.) Plant Biotechnology and Molecular Markers, Anamaya Publishers, New Delhi, India. pp.206-216.
9. Awasthi AK, Nagaraja GM, **Naik GV**, Kanginakudru S, Thangavelu K, Nagaraju J (2004) Genetic diversity and relationships in Mulberry (genus *Morus*) as revealed by RAPD and ISSR marker assays. BMC Genetics, 5:1-9.
10. Chatterjee SN, Nagaraja GM, Srivastava PP, **Naik VG** (2004) Morphological and molecular variation of *Morus laevigata* in India. Genetica, 121(2) 133-143.
11. **Naik VG**, Dandin SB (2005) Molecular characterization of some improved and promising mulberry varieties (*Morus* spp.) of India by RAPD and ISSR markers. Indian Journal of Sericulture, 44(1) 59-68.
12. **Naik VG**, Dandin SB (2006) Identification of duplicate collections in the mulberry (*Morus* spp.) germplasm using RAPD analysis. Indian Journal of Genetics and Plant Breeding, 66(4): 287-292.
13. **Naik VG**, Mathithumilan B, Bhaskar Roy, Sukumar M, Mishra S, Dandin SB (2006) Assessment of genetic diversity and interrelationship among few wild mulberry (*Morus laevigata* and *M. Serrata*) collections of India through DNA marker analysis. Indian Journal of Sericulture, 44(2):169-175.
14. Dandin SB, **Naik VG**, Mathithumilan B, Sukumar M, Mishra S (2006) Biotechnology: a modern tool for effective utilization of germplasm for mulberry improvement. In the proceedings of the International Conference – “Problems in maintenance and utilization of mulberry and silkworm genetic resources” held at Sericultural Experiment Station, Vratza, Bulgaria from September, 25-29, 2006.
15. Guruprasad, **Naik VG**, Tikader A, Mishra S, Prasad KS, Dandin SB (2009). Identification of genetic redundancy in mulberry germplasm assembled for screening disease and pest resistance by DNA marker aided analysis. Indian Journal of Sericulture, 48(2):168-177.
16. **Naik, VG**, Tikader A, Mathithumilan B, Dandin SB, Kamble CK (2009) Genetic divergence and interrelationships as revealed by DNA marker analysis among wild mulberry species of the Indian sub-continent. In the proceeding of the National workshop on Seri-biodiversity conservation held during 7-8 March, 2009 at CSGRC, Hosur.
17. Mishra S, **Naik VG**, Ghosh U, Qadri SMH (2010) Standardization of annealing temperature for ISSR markers and assessment of genetic diversity along with SSR markers in mulberry (*Morus* spp.). Green Farming, 1(3): 298-302.
18. **Naik VG**, Subbulakshmi N, Pinto MV, Mishra S, Guruprasad and Qadri, SMH. (2013) Assessment of genetic diversity among mulberry collections from South India using phenotypic and RAPD markers. Indian Journal of Sericulture, 52(1): 34-43.
19. Pinto MV, **Naik VG** and Qadri SMH. Genetic variability studies in mulberry using microsatellite markers. Accepted for publication in Journal of Sericulture and Technology.

Research papers presented in seminars / conferences / symposia / workshops:

1. **Naik VG**, Nair MK, Ravindran PN (1989) Cytogenetic studies in *Piper colubrinum* Link, Jahrb. In: National Symposium on Recent Advances in Plant Cell Research 7-9 June, 1989 at Department of Botany, University of Kerala. Trivandrum, pp 21.
2. Rao AA, Tikader A, Ravindran S, **Naik VG**, Mukherjee P, Thangavelu K. (1997) Histological aspects of stress tolerance in mulberry (*Morus* spp.). In: National Conference on Moriculture – Physiological, Biochemical and Molecular Aspects of Stress Tolerance in Mulberry. Bharathidasan University, Trichy. February 22-23, 1997, pp 40.
3. Mukherjee P, Tikader A, Ravindran S, Rao AA, **Naik VG**, Thangavelu K (1997) Biodiversity in *Morus laevigata* wall. in India and prospects of utilization. In: International Symposium on Sustainable Utilization of Biodiversity held on 8-10 March, 1997 at Indira Gandhi National Forest Academy, Dehradun.
4. **Naik VG**, Ravindran S, Mukherjee P, Thangavelu K (1997). Peroxidase Isozyme study in *Morus* species. In: Current Technology Seminar on Mulberry and Silkworm Breeding and Genetics, Molecular Biology and Agronomy held on 18-19 September, 1997 at CSRTI, Mysore, pp 12-13.
5. **Naik VG**, Ravindran S, Mukherjee P (1998) Peroxidase isozyme polymorphism in *M. laevigata* Wall. germplasm collections. In: Seminar on Mulberry and Silkworm Germplasm held on 9 January, 1998 at SMGS, Hosur, pp 10-11.
6. Ravindran S, Rao AA, **Naik VG**, Tikader A, Mukherjee P, Thangavelu K (1998) Exploration for mulberry genetic resources in India and its utilization. In: Seminar on Mulberry and Silkworm Germplasm held on 9 January, 1998 at SMGS, Hosur, pp 8.
7. Mukherjee P, Tikader A, Ravindran S, Goel AK, Rao AA, **Naik VG**, Thangavelu K (1998). An assessment of mulberry breeding achievement in India. In: Seminar on Mulberry and Silkworm Germplasm held on 9 January, 1998 at SMGS, Hosur, pp 14.
8. Thangavelu K, **Naik VG**, Mukherjee P (1998) *In situ* conservation of *Morus laevigata* Wall. In: Seminar on Mulberry and Silkworm Germplasm held on 9 January, 1998 at SMGS, Hosur, pp 9.
9. **Naik VG**, Ravindran S, Mukherjee P (1998) Genetic polymorphism of cultivated mulberry varieties using isozyme systems. In: Current Technology Seminar on Mulberry and Silkworm Breeding and Genetics, Molecular Biology and Agronomy held on 9-10 September, 1998 at CSRTI, Mysore, pp 4.
10. **Naik VG**, Mukherjee P (1998) *In situ* conservation – its relevance in protection of wild mulberry (*Morus* spp.) in India. In: National Dialogue – Issues in Management of Plant Genetic Resources held on 1-2 December 1998 at NBPGR, New Delhi, pp 99-100.
11. Ravindran S, Tikader A, **Naik VG**, Rao AA, Mukherjee P (1998) Distribution of mulberry species and utilisation. In: National Dialogue – Issues in Management of Plant Genetic Resources held on 1-2 December, 1998 at NBPGR, New Delhi, pp 53-54.
12. Nagaraja GM, **Naik VG**, Awasthi AK, Mukherjee P (1999) Genetic diversity and relationship among mulberry (genus *Morus*) species as revealed by RAPD and Inter SSR-PCR analysis. In: Seminar on Breeders Scientists Interaction – Issues Related to Germplasm Maintenance, Protection and Utilization held on 10 February, 1999 at SMGS, Hosur, pp 5.

13. **Naik VG**, Nagaraja GM, Awasthi AK, Mukherjee P, Chatterjee SN, Dandin SB. (2000). Molecular characterization of mulberry (*Morus* spp.) germplasm – scope and prospects. In: National Symposium on DNA Technology in management of Biodiversity held on 20-21 February, 2000 at M.S. Swaminathan Research Foundation, Chennai.
14. Ramesh SR, **Naik VG**, Ravindran S, Mukherjee P. (2000) Variability of chlorophylls, protein and carbohydrate contents in mulberry germplasm accessions. In: National workshop on management of Sericultural Germplasm for posterity held on 26-27 July, 2000 at CSGRC, Hosur, pp 13-14.
15. **Naik VG**, Mukherjee P, Dandin SB (2000) Molecular technologies for mulberry (*Morus* spp.) gene bank management: Opportunities and Challenges. In: National workshop on management of Sericultural Germplasm for posterity held on 26-27 July, 2000 at CSGRC, Hosur, pp 6-7.
16. Tikader A, Ravindran S, **Naik VG**, Rao AA, Mukherjee P, Dandin SB, Ramesh SR (1999) Geographical distribution and variation in Indian mulberry genetic resources. In the proceedings of “Advances in Indian Sericulture Research organized by Central Silk Board at Central Sericultural Research & Training Institute, Mysore from 16-18 November, 2000, pp 30-35.
17. **Naik VG**, Sarkar A, Dandin SB (2003) Identification of duplicate collection in mulberry germplasm bank by RAPD analysis. In: Workshop on Pre-breeding strategies for utilization of Sericultural Germplasm Resources on 19-20 February 2003 at Central Sericultural Germplasm Resources Centre, Hosur.
18. **Naik VG**, Ayesha Rehman, Sarkar A, Dandin SB (2003) Genetic diversity and interrelationship among indigenous and exotic mulberry (*Morus* spp.) germplasm by RAPD analysis. In: National Seminar on Genetics and Plant Breeding – Impact of DNA Revolution held on October 30-31, 2003 at University of Agricultural Sciences, Dharwad,
19. Mamtha R, **Naik VG**, Sarkar A, Dandin SB (2003) Genetic diversity and inheritance of RAPD markers in lobed and unlobed genotypes of mulberry (*Morus* spp.). In: The National Conference on Tropical Sericulture for Global Competitiveness, Central Sericultural Research & Training Institute, Mysore, 5-7 November 2003.
20. Tikader A, Ravindran S, **Naik VG**, Rao AA, Mukherjee P, Dandin SB, Ramesh SR (2004) Geographical distribution and variation in Indian mulberry genetic resources. In: Proceedings of the Conference on – Advances in Indian Sericultural Research held at Central Sericultural Research & Training Institute, Mysore.
21. **Naik VG** (2005) Seri-biotechnology and Bioinformatics. In: Proceedings of the National Workshop on Bioinformatics held on 20-24 January 2005 at Centre for Information Science and Technology (CIST), University of Mysore, Mysore, pp 168-172.
22. **Naik VG** (2005) Perspective of employing DNA markers for improvement of yield and quality in mulberry. In: National Workshop on Selection Indices in Breeding of Mulberry and Silkworm. Sericulture College, UAS, Chinthamani, 1 July 2005.
23. **Naik VG**, Mathithumilan, Roy B, Dandin SB (2006) Assessment of genetic diversity and interrelationship among wild mulberry (*Morus laevigata* and *M. serrata*) collections of India through molecular marker analysis. In: Second National Plant Breeding Congress 2006 – Plant breeding in post genomic era, Indian Society of Plant Breeders, Center for Plant Breeding and Genetics, TNAU, Coimbatore, March, 1-3, 2006, pp. 253.

24. Sukumar M, **Naik VG**, Ramaiah JK, Dandin SB, Sheshashayee MS and Udaya Kumar M (2006) Assessment of genetic polymorphism among parental lines identified for the development of mapping population for water use efficiency and rooting trait in mulberry using ISSR markers. In: Second National Plant Breeding Congress 2006 – Plant breeding in post genomic era, Indian Society of Plant Breeders, Centre for Plant Breeding and Genetics, TNAU, Coimbatore, March 1-3, 2006, pp 260.
25. Mathithumilan B, Mishra S, Mohan N, **Naik VG**, Dandin SB (2006) Genetic analysis of some mulberry (*Morus* spp.) genotypes differing in photosynthetic efficiency by RAPD markers. In: Second National Plant Breeding Congress 2006 – Plant breeding in post genomic era, Indian Society of Plant Breeders, Centre for Plant Breeding and Genetics, TNAU, Coimbatore, March 1-3, 2006. pp 261.
26. Dandin SB, **Naik VG**, Mathithumilan B, Sukumar M, Mishra S. (2006) Biotechnology: a modern tool for effective utilization of germplasm for mulberry improvement. In: Proceedings of the International Conference on – “Problems in maintenance and utilization of mulberry and silkworm genetic resources” held at Sericultural Experiment Station, Vratza, Bulgaria from September 25-29, 2006.
27. Guruprasad K, Raveendra Mattigatti, **Naik VG**, Dandin SB and Rajan RK. (2006) Mulberry Genome Database. In: International conference on Bioinformatics – 2006 held at New Delhi, India from December 18 – 20, 2006.
28. Prasad KS, Aruna S, **Naik VG**, Dandin SB, and Kamble CK (2008) Screening of mealy bug infestation in core mulberry germplasm towards identification of DNA markers associated with resistance. In: international Conference on trends in Seri-biotechnology at Department of Sericulture, Sri Krishnadevaraya University, Anantapur during 27-29, March 2008. pp 11.
29. Mishra S, **Naik VG**, Mathithumilan B, Dandin SB, and Kamble CK (2008) Genetic analysis of sex expression in mulberry (*Morus* spp.) by RAPD and ISSR marker assays. In: National Conference on New Horizons in Biotechnology, Department of Biotechnology, Swami Vivekanand Mahavidyalaya, Udgir, India from February 8-9, 2008.
30. Guruprasad, Mishra S, **Naik VG**, Mousami, Tikader A, Kamble CK (2008) Assessment of genetic redundancy by single primer amplification among a collection of mulberry germplasm from Kerala. In: International Conference on Trends in Seri-biotechnology. Department of Sericulture, Sri Krishna Devaraya University, Ananthapur, India from March 27-29, 2008.
31. Guruprasad, **Naik VG**, Urs MKP, Kamble CK (2008) Analysis of molecular marker diversity among breeders’ collection of mulberry (*Morus* spp.). In: Perspective and Present Scenario in Plant Science Research held on 20 and 21 November, 2008 at Dept. of Botany, Institute of Science, Mumbai.
32. Guruprasad, **Naik VG**, Tikader A, Qadri SMH, Kamble CK (2008) Genetic characterization of Chinese mulberry germplasm collection by single primer amplification technique. In: Perspective and Present Scenario in Plant Science Research held on 20 and 21 November, 2008 at Dept. of Botany, Institute of Science, Mumbai.
33. Vinoda KS, Devaraja Achar AM, Anand R, Divakara HB, Madhura JN, Sheshashayee MS, **Naik VG**, Udayakumar M, Prasad TG, Devaiah MC (2008) Phenotypic and genotypic characterization of trait specific mapping population of mulberry segregating for water use efficiency. In: International Conference on trends in Seri-biotechnology at Department of Sericulture, Sri Krishnadevaraya University, Anantapur during 27-29, March 2008. pp 7.

34. **Naik VG**, Tikader A, Mathi Thumilan, Dandin SB and Kamble CK (2009) Genetic divergence and interrelationships as revealed by DNA marker analysis among wild mulberry species of the Indian sub-continent. In: National workshop on Sericobiodiversity conservation held during 7-8 March, 2009 at CSGRC, Hosur.
35. Guruprasad, **Naik VG**, Tikader A, Mishra S, Prasad KS, Dandin SB (2009) Identification of genetic redundancy in mulberry germplasm assembled for screening diseases and pest resistance by DNA marker aided analysis. In: National Conference on “Plant Biodiversity and Bioprospecting” at Mysore from 16-17 March, 2009, pp 100.
36. **Naik VG**, Dandin SB, Qadri SMH (2009) DNA fingerprinting and genetic diversity analysis of mulberry germplasm resources for crop improvement. In: National Conference on “Plant Biodiversity and Bioprospecting” at Mysore from 16-17 March, 2009, pp 101-102.
37. Mishra S, **Naik VG**, Gosh U, Qadri SMH (2010). Optimization of PCR conditions and amplification of ISSR microsatellite markers for assessment of genetic variation among trait specific mulberry (*Morus* spp.) parental lines. In: Dr. Norman E. Borlaug Commemoration National Conference on Plant Diversity and Plant Health at University of Mysore, Mysore from 11-12 March, 2010, p 111.
38. Guruprasad, **Naik VG**, Dandin SB, Qadri SMH (2010). Assessment of genetic diversity and interrelationships among mulberry (*Morus* spp.) germplasm collections by single primer amplification method. In: Dr. Norman E. Borlaug Commemoration National Conference on Plant Diversity and Plant Health at University of Mysore, Mysore from 11-12 March, 2010, p 112.
39. **Naik VG**, Dandin SB, Kamble CK, Qadri SMH (2010). Genetic characterization of promising mulberry germplasm by morphological, RAPD, ISSR and microsatellite markers In: Dr. Norman E. Borlaug Commemoration National Conference on Plant Diversity and Plant Health at University of Mysore, Mysore from 11-12 March, 2010, pp 112-113.
40. **Naik VG** (2010). Recent advances in mulberry biotechnological research. In: Workshop on Recent Advances in Sericultural Research held at Bengaluru from 18-19, May 210. p. 38.
41. **Naik VG**, Mishra S, Dandin SB, Udayakumar M, Qadri SMH. (2011) Mapping quantitative trait loci for root characters and associated traits in mulberry (*Morus alba*) towards development of moisture stress tolerant lines. In: National conference on “Sericulture Innovations Before and Beyond” held at CSRTI, Mysore from 28-29 January, 2010. pp 144.
42. Guruprasad, **Naik VG**, Dandin SB, Kamble CK and Qadri SMH. (2011) Construction of core collection of mulberry germplasm using dominant marker systems – A preliminary attempt. In: National conference on “Sericulture Innovations Before and Beyond” held at CSRTI, Mysore from 28-29 January, 2010. pp 151.
43. **Naik VG**, Krishnan RR, Ramesh SR, Jhansi Lakshmi K, Rekha M, Qadri SMH, Kamble CK, Manjula A (2012). Comparative assessment of core collection of mulberry germplasm constructed by clustering and maximization strategy using phenotypic markers. In: UGC sponsored National Seminar on “Recent Trends for Sustainable Sericulture” held at Department of Sericulture, SPMVV, Tirupati from 5-6 March, 2012.
44. Pinto MV, **Naik VG** and Qadri SMH (2012). Discerning the genetic variability in *Morus* species using simple sequence repeats. In: UGC sponsored National

Seminar on “Recent Trends for Sustainable Sericulture” held at Department of Sericulture, SPMVV, Tirupati from 5-6 March, 2012.

Books / Catalogues:

1. Thangavelu K, Mukherjee P, Tikader A, Ravindran S, Goel AK, Rao AA, **Naik VG**, Sekar S (1997) Catalogue on Mulberry (*Morus* spp.) germplasm. Vol-I
2. Thangavelu K, Mukherjee P, Tikader A, Ramesh SR, Rao AA, **Naik VG**, Deole A, and Sekar S (2000) Catalogue on Mulberry (*Morus* spp.) germplasm, Vol-II

Research Projects completed / being perused

A) As Principal Investigator

1. **DBT funded** – Mulberry Genome Characterization: DNA profiling for ascertaining genetic diversity and construction of framework linkage map (At CSRTI, Mysore in collaboration with CCMB, Hyderabad). Period: 2004 to 2007.
2. **DBT funded** – DNA marker aided analysis of mulberry gene bank towards core assembly for sustainable conservation and enhanced utilization in crop improvement (At CSRTI, Mysore in collaboration with CSGRC, Hosur). Period: 2010 to 2013.
3. **DBT funded** – Sustaining mulberry yields: Identification of QTLs conferring resistance to root rot disease by Linkage Disequilibrium mapping and trait introgression. (Phase 1). Period: 2013 to 2015.
4. **Pilot Study** – Development of microsatellite markers from EST library. Period: 2010 to 2011.
5. **CSB funded** – Development of superior mulberry varieties by exploitation hybrid vigor based on the molecular marker diversity of promising parental lines (At CSRTI, Mysore). Period: 2006 to 2014.

B) As Co-Principal Investigator

6. **CSB funded** – Collection, characterization, evaluation, conservation and utilization of mulberry genetic resources (At CSGRC, Hosur) – Phase I, II & III. Period: 1994 to 2001.
7. **CSB funded** – Molecular characterization of mulberry and silkworm germplasm (At CSGRC, Hosur in collaboration with Seribiotech Laboratory, Bangalore). Period: 1997 to 2001.
8. **DBT funded** – Genome analysis in mulberry: DNA profiling of important germplasm using molecular markers and development of mapping population (At CSRTI, Mysore in collaboration with CCMB, Hyderabad). Period: 2000 to 2003.
9. **DBT funded** – Identification of QTLs for water use efficiency and root traits to improve moisture stress tolerance in mulberry (*Morus alba* L.) through marker assisted selection (At CSRTI, Mysore in collaboration with UAS, Bangalore). Period: 2004 to 2009.
10. **DBT funded** – Identification of DNA markers associated with the diseases and pest resistance in mulberry (*Morus* spp.). (At CSRTI, Mysore, under Network Program). Period: 2005 to 2008.

Important Research Contributions

- Conducted survey exploration for mulberry germplasm collections in South India including Andaman & Nicobar Islands. Responsible for collection unique wild germplasm (*Morus laevigata*) from Andaman Islands.
- Characterized mulberry germplasm collections using morphological, biochemical and molecular markers.
- Phylogenetic analysis of fifteen mulberry species was undertaken using DNA markers and established that *M. laevigata*, *M. serrata* and *M. tiliaefolia* were the most primitive and divergent from the rest.
- Analysis of molecular marker variation among *M. laevigata* population resulted in the new information on probable migration and distribution of the species in the Indian subcontinent.
- Molecular IDs of important mulberry cultivars and germplasm were developed for identification, protection of Plant Breeders' Right (PBR) and registration.
- A strategy for identification duplicate and redundant collection in the mulberry gene bank was suggested with the aid of molecular marker analysis for efficient utilization of germplasm in crop improvement.
- Genetic diversity of large number of mulberry germplasm collections (850 Nos.) was estimated for exploitation of heterosis in mulberry breeding program.
- A DNA marker (OPA-20₈₉₇) for rooting ability in mulberry was identified and converted into a codominant SCAR (sequence characterized amplified region) marker for use in marker assisted breeding.
- Mapping population for yield and yield contributing traits, water use efficiency and root trait (moisture stress tolerance) and alkalinity stress tolerance was developed and established in the field.
- Framework linkage map of Mysore Local (♀) and V-1 (♂) mulberry cultivars were developed for utilization in the map based cloning of genes. Quantitative trait loci (QTLs) controlling yield and yield contributing characters were identified.
- Genetic Linkage maps of Himachal Local, MS-3, Dudhia White and UP were constructed using molecular markers.
- QTL analysis using trait specific (WUE and root) mapping populations was undertaken. On Himachal Local (♀) map, QTLs were identified in the chromosomal regions controlling average shoot length (LG7, LOD 4.0), length of the longest shoot (LG7, LOD > 4.0). On MS-3 (male parent) map, QTLs for average leaf area and inter-nodal distance were located in LG3 with LOD value > 4.0.
- Analysis of root trait mapping population identified QTLs on LG9 of Dudhia White controlling leaf yield (LOD 3.4) and longest root length on LG5 (LOD 3.2).
- WUE and root trait were introgressed and two populations were developed. Five promising mulberry introgressed lines were identified based on $\Delta 13C$, total shoot biomass and morphological grading for evaluation under primary yield trial.
- A DNA and phenotypic marker-centric database – **MulGenomeDb** was developed to facilitate the systematic storage, visualization, analysis of data generated in the Laboratory and to access the same through World Wide

Web. The web system catalogues data and information on PCR based markers (RAPD, ISSR etc.) of the genomes of large number of mulberry germplasm collections and mapping populations in the form of DNA fingerprints/profiles, detailed primer-wise marker scores, similarity/dissimilarity matrices, molecular marker based genetic clusters and phylogenetic trees, marker segregation pattern of progenies, important phenotype etc. Visit mulberry genome database (MulGenomeDb) @ <http://www.btismysore.in/MulGenomeDb/>

- *In-silico* analysis of EST library resulted in identification of 150 Simple Sequence Repeat (SSR) motifs and designing of 101 pairs (F/R) of primers for microsatellite marker analysis in mulberry.
- Identified a set of unique mulberry germplasm (520 acc.) from the whole collection by clustering and P method/MSTRAT (based on phenotypic markers) for identification of a panel of diverse germplasm and construction of a core collection by microsatellite marker aided analysis. The unique mulberry germplasm was genotyped using 50 polymorphic microsatellite markers.

List of M.Phil., M.Sc. and B.Tech. Dissertations completed under the guidance of Dr. V. Girish Naik

2001-2002

1. Jyoti Prakash

M.Sc. (Seri. Tech.) dissertation on - "*RAPD marker analysis of Mysore Local, V-1 and its progenies*". Co-Guide Dr. A. Sarkar, submitted to the University of Mysore, Mysore.

2. Madhusudhan P.

M.Sc. (Biotechnology) dissertation on - "*Genetic analysis of some mulberry genotypes using RAPD markers*", submitted to University of Mysore, Mysore.

3. S. Shyamala

M.Sc. (Biotechnology) dissertation on – "*RAPD analysis of few diploid and tetraploid mulberry varieties*", submitted to University of Mysore, Mysore.

2002-2003

4. Ayesha Rehman

M.Sc. (Seri. Tech.) dissertation on – "*Studies on some indigenous and exotic mulberry genotypes using RAPD markers*". Co-Guide Dr. A. Sarkar, submitted to University of Mysore, Mysore.

2002-2004

5. Guruprasad K.

Bioinformatics Trainee. Project work on – "*Mulberry genome database*". Guides – V. Girish Naik and Ravindra Mattigatti, submitted to the Central Sericultural Research and Training Institute, Mysore.

6. Purnima P. and Guruprasad K.

Bioinformatics Trainees. Project work on – “*Plant DNA sequence database and primer designing*”. Guides – V. Girish Naik and Ravindra Mattigatti, submitted to the Central Sericultural Research and Training Institute, Mysore.

2003-2004

7. Indranil Bagchi

M.Sc. (Seri. Tech.) dissertation on – “*Genetic analysis of mulberry genotypes with respect to water stress response using DNA markers*”. Co-Guide Dr. A. Sarkar, submitted to University of Mysore, Mysore.

2004-2005

8. Bhaskar Roy

M.Sc. (Seri. Tech.) dissertation on – “*Genetic diversity analysis of wild mulberry species *Morus laevigata* and *M. serrata* of India using RAPD and ISSR assay*”, submitted to University of Mysore, Mysore.

9. Susmita Sarkar

M.Sc. (Seri. Tech.) dissertation on – “*DNA marker analysis in some varieties of *Morus alba* and *M. indica**”, submitted to University of Mysore, Mysore.

2005-2006

10. Neetha Mohan

M.Sc. (Bioinformatics) dissertation on – “*Genetic analysis of DNA markers in some mulberry (*Morus spp.*) genotypes having contrasting photosynthetic efficiency*”, submitted to the Mahatma Gandhi University, Kottayam.

11. Sheethal Vijayan

M.Sc. (Bioinformatics) dissertation on – “*Genetic diversity and interrelationship among mulberry germplasm accessions showing different response for leaf moisture retention capacity using RAPD markers*”, submitted to the Mahatma Gandhi University, Kottayam.

12. Ancy Mathews

M.Sc. (Bioinformatics) dissertation on – “*Assessment of ISSR markers polymorphism among parental genotypes identified for the development of mapping population for water use efficiency and root traits in mulberry (*Morus spp.*)*”, submitted to the Mahatma Gandhi University, Kottayam.

13. Manu Muralidharan T. and Tijo Varghese

B.Tech. (Industrial Biotechnology) dissertation on – “*DNA profiling of genotypes for the development of segregating population for QTL mapping of WUE and root traits in mulberry using RAPD and SSR markers*”, submitted to the Anna University, Chennai.

14. Monalisa Sinha

M.Sc. (Seri. Tech.) dissertation on – “*Genome characterization of some of the underutilized mulberry germplasm collection using SSR (micro-satellite) and ISSR markers*”, submitted to University of Mysore, Mysore.

15. Namita Mandal

M.Sc. (Seri. Tech.) dissertation on – “*Genetic analysis of sex expression in mulberry (Morus spp.) using molecular markers*”, submitted to University of Mysore, Mysore.

2006-2007

16. Kavya B. C.

M.Sc. (Biotechnology) dissertation on – “*DNA profiling of some distinct female and male mulberry (Morus spp.) genotypes by ISSR and RAPD markers*”, submitted to the Punjab Technical University, Jalandhar.

17. Debasish Basak

M.Sc. (Seri. Tech.) dissertation on – “*Cloning and sequencing PCR products amplified by RAPD and ISSR marker in mulberry*”, submitted to University of Mysore, Mysore.

18. Pijush Mallick

M.Sc. (Seri. Tech.) dissertation on – “*DNA typing towards identification of RAPD markers associated with female and male flowering of mulberry (Morus spp.)*”, submitted to University of Mysore, Mysore.

2007-08

19. Pankaja H. P.

M.Phil. (Botany) Thesis on – “*Identification of duplicates in germplasm assembled for screening of disease and pest resistance in mulberry (Morus spp.) by DNA marker analysis*” submitted to Periyar University, Salem.

20. Suniti Kumar Das

M.Sc. (Seri. Tech.) dissertation on – “*Genome analysis of few diploid mulberry cultivars and their colchi-tetraploid derivatives*”, submitted to University of Mysore, Mysore.

21. C. Jai Sarvanan

M.Sc. (Seri. Tech.) dissertation on – “*Genetic characterization of Chinese mulberry germplasm collections by PCR technique*”, submitted to University of Mysore, Mysore.

22. Mousami Rakshit

M.Sc. (Seri. Tech.) dissertation on – “*Assessment of genetic redundancy in ERRC series of mulberry germplasm collection by single primer based amplification*”, submitted to University of Mysore, Mysore.

2008-09

23. Harsha Raj M.

M.Sc. (Biotechnology) dissertation on – “*DNA profiling of some indigenous mulberry collections and assessment of interrelationship*”, submitted to University of Mysore, Mysore.

24. Mohammed Aiyaz

M.Sc. (Biotechnology) dissertation on – “*RAPD marker based diversity analysis in mulberry (Morus species germplasm accessions)*”, submitted to University of Mysore, Mysore.

25. Rahul Vasantrao Khandare

M.Sc. (Biotechnology) dissertation on – “*Molecular marker analysis in root trait specific segregating population in mulberry (Morus spp.)*”, submitted to University of Mysore, Mysore.

26. Nandini H. P.

M.Sc. (Biotechnology) dissertation on – “*DNA profiling of mulberry germplasm collection from Jammu and Kashmir*”, submitted to the Punjab Technical University, Jalandhar.

27. Anitha Valsan

M.Sc. (Biotechnology) dissertation on – “*Molecular marker segregation in mapping population for root trait*”, submitted to the Punjab Technical University, Jalandhar.

28. Sahida T. H.

M.Sc. (Biotechnology) dissertation on – “*RAPD profiling of female and male mulberry genotypes (Morus spp.)*”, submitted to the Punjab Technical University, Jalandhar.

29 . Nandini K.

M.Sc. (Biotechnology) dissertation on – “*Assessment of genetic similarity among mulberry accessions by RAPD marker analysis*”, submitted to the Punjab Technical University, Jalandhar.

30. Ramya H. P.

M.Sc. (Biotechnology) dissertation on – “*Genetic analysis of mulberry collection by RAPD fingerprinting*”, submitted to the Punjab Technical University, Jalandhar.

31. C. S. Nagadeepti.

M.Sc. (Biotechnology) dissertation on – “*Molecular characterization of exotic mulberry (Morus spp.) genotypes*”, submitted to the Punjab Technical University, Jalandhar.

32. Uttam Ghosh

M.Sc. (Seri. Tech.) dissertation on – “*Genetic characterization of parental lines of mapping population for moisture stress tolerance in mulberry (Morus spp.)*”, submitted to University of Mysore, Mysore.

33. Shalima Chandrashekar

M.Sc. (Seri. Tech.) dissertation on – “*Study on allelic polymorphism at microsatellite and ISSR loci among triploid and tetraploid mulberry (Morus spp.) germplasm collection*”, to be submitted to University of Mysore, Mysore.

2009-10

34. N. Subbulakshmi

M.Phil. (Biotechnology) thesis on – “*Genetic analysis of mulberry (Morus spp.) using PCR based markers*”. submitted to Ayya Nadar Janaki Ammal College (Autonomous), Sivakasi, Tamil Nadu.

35. Sarathi Kanan

M.Sc. (Biotechnology) dissertation on – “*Molecular characterization of mulberry genetic resources of North-West regions of India by DNA markers*”. submitted to N.G.M. College of Arts & Science (Autonomous), Pollachi, Tamil Nadu.

2010-11

36. Marian Vincent Pinto

M.Sc. (Biotechnology) dissertation on – “*Microsatellite (SSR) marker based DNA fingerprinting and genetic analysis in mulberry species (Morus spp.)*”, submitted to Pooja Bhagavat Memorial Mahajana Post Graduate Center, Mysore (affiliated to the University of Mysore, Mysore).

37. Nanda B. R.

M.Sc. (Biotechnology) dissertation on – “*SSR marker resolution of few suspected genetically redundant cultivated mulberry varieties of India*”, submitted to Pooja Bhagavat Memorial Mahajana Post Graduate Center, Mysore (affiliated to the University of Mysore, Mysore).

38. Bhanuja Acharya

M.Sc. (Biotechnology) dissertation on – “*Microsatellite markers of mulberry and in-silico development of genic-SSR markers from EST database*”, submitted to North Orissa University, Baripada.

39. Jyoti Panigrahi

M.Sc. (Biotechnology) dissertation on – “*Genetic analysis of a diverse set of mulberry germplasm collection using microsatellite markers designing*”, submitted to North Orissa University, Baripada.

2011-12

40. Rajila C.

M.Sc. (Biotechnology) dissertation on – “*SSR marker analysis of an exotic mulberry collection for assessment of genetic structure*”. submitted to N.G.M. College of Arts & Science (Autonomous), Pollachi, Tamil Nadu affiliated to Bharathiar University, Coimbatore.

41. T. Liji

M.Sc. (Biotechnology) dissertation on – “*Dissecting the genomes of exotic mulberry germplasm by microsatellite marker analysis*”. submitted to N.G.M. College of Arts & Science (Autonomous), Pollachi, Tamil Nadu, affiliated to Bharathiar University, Coimbatore.

42. P. Manikandan

MCA project work on – “*Mulberry Genome Network*” submitted to Bharathiar University, Coimbatore.

2012-13

43. S. Subhasini

M.Sc. (Biotechnology) dissertation on – “*Genetic diversity and structure analysis of Morus indica collections based on microsatellite marker polymorphism*” submitted to N.G.M. College of Arts & Science (Autonomous), Pollachi, Tamil Nadu, affiliated to Bharathiar University, Coimbatore.

44. A. Thimmalakshmi

M.Sc. (Biotechnology) dissertation on – “*Genome analysis of wild and exotic mulberry (Morus spp.) using Simple Sequence Repeats*” submitted to N.G.M. College of Arts & Science (Autonomous), Pollachi, Tamil Nadu, affiliated to Bharathiar University, Coimbatore.

45. Vemula Grace Swathi Priya

M.Sc. (Molecular Biology Integrated) dissertation on – “*Analysis of microsatellite allelic polymorphism in a mulberry (Morus spp.) germplasm collection*” submitted to the Department of Molecular Biology, Yuvaraja’s College (Autonomous under the University of Mysore), Mysore.

List of research students being guided for the award of Ph.D. degree in Biotechnology at Molecular Biology Laboratory – 1, CSRTI, Mysore under University of Mysore, Mysore:

1. Mr. Ramesh Krishnan R., Senior Research Fellow, DBT
2. Mr. Marian Vincent Pinto, Junior Research Fellow, CSIR-NET
3. Ms. Sowmya Pesaramilli, Junior Research Fellow, UGC-RGNF

List of persons trained under the supervision of Dr. V. Girish Naik in Molecular Biology and Mulberry Biotechnology

2005-06:

1. Mr. Abhilash, B.E. (Biotech), GM Institute of Technology, Davanagere

2007-08:

2. Mr. K. K. Ganapathi, M.Sc. (Biotech), St. Philominas College, Mysore
3. Ms. Ramyashree V. N., M.Sc. (Biotech), St. Philominas College, Mysore
4. Ms. Spoorthi B. R., M.Sc. (Biotech), St. Philominas College, Mysore
5. Ms. Deepa H. S., M.Sc. (Biotech), St. Philominas College, Mysore
6. Ms. Pankaja H. P., M.Sc. (Biotech), St. Philominas College, Mysore
7. Dr. G. Savithri, Asst. Professor, S. P. Mahila Vishwavidhyalaya, Tirupathi.
8. Dr. N. Vijayakumari, Asst. Professor, S. P. Mahila Vishwavidhyalaya, Tirupathi.
9. Dr. P. Vijaya, Teaching Faculty, S. P. Mahila Vishwavidhyalaya, Tirupathi.
10. Dr. R. Rajani, Teaching Faculty, S. P. Mahila Vishwavidhyalaya, Tirupathi.
11. Ms. K. Kiruthika Lakshmi, M.Sc. (Biotech), A J College, Sivakasi.
12. Ms. Veena T. P., M.Sc. (Biotech), University of Mysore, Mysore
13. Ms. Veena M., M.Sc. (Biotech), University of Mysore, Mysore
14. Ms. Suma H. K., M.Sc. (Biochemistry), PG Center, Shivagangotri, Davanagere.
15. Ms. Manasa L., M.Sc. (Biochemistry), PG Center, Shivagangotri, Davanagere.
16. Ms. Sowmyashree., M.Sc. (Biotech), Mahajana College, Mysore.
17. Mr. Sharath Chandra., M.Sc. (Biochemistry), Yuvaraja College, Mysore
18. Dr. P. K. Mishra, Scientist-C, Central Tasar Research & Training Institute, Ranchi.
19. Mr. Giridhara, M.Sc. (Biochemistry), PG Center, Shivagangotri, Davanagere.

2008-09:

20. Ms. Sushma S., M.Sc. (Biotech), J. S. S. College, Ooty Road, Mysore.
21. Ms. Prithvi Kumari K., M.Sc. (Biotech), J. S. S. College, Ooty Road, Mysore.
22. Ms. Kavya M., M.Sc. (Biotech), J. S. S. College, Ooty Road, Mysore.
23. Ms. Shruthi Nagaraj, M.Sc. (Biotech), J. S. S. College, Ooty Road, Mysore.
24. Ms. Achla Pandith, M.Sc. (Biotech), J. S. S. College, Ooty Road, Mysore.
25. Ms. Radhika M., M.Sc. (Biotech), J. S. S. College, Ooty Road, Mysore.
26. Mr. Sarang Sudhakar Talwelkar, M.Sc. (Biotech), Kirthi nagar, Akola
27. Mr. M. Purushotahm, M.Sc. (Sericulture), University of Mysore, Mysore
28. Mr. Vinodh Kumar H. S., M.Sc. (Biotech), Hassan.
29. Mr. Pruthvi Swaroop B. R., M.Sc. (Biotech), Hassan.

2009-10:

30. Ms. R. Nandini, B.E. (Biotech), SJCE, Mysore
31. Ms. M. Ashwini, M.Sc. (Biotech), Chikamagalur.

2010-11:

32. Students (28Nos.) of M.Sc. (Seri-Biotech), S. P. Mahila Vishwavidhyalaya, Tirupathi.

2011-12:

33. Mr. S. A. Sheshadri, B.E. (Biotech), SJCE, Mysore
34. Mr. Goutham T., B.E. (Biotech), SJCE, Mysore.

2012-13:

34. Students (14 Nos.) of M.Sc. (Seri-Biotech), S. P. Mahila Vishwavidhyalaya, Tirupathi.
35. Ms. S. Subhasini, M.Sc. (Biotech), NGM college, Pollachi.
36. Ms. A. Thimmalakshmi, M.Sc. (Biotech), NGM college, Pollachi.
37. Ms. N. Deepa, B.E. (Biotech), SJCE, Mysore
38. Ms. Subbalaxmi A. R., B.E. (Biotech), SJCE, Mysore
39. Ms. Pavithra Nayak, Research Scholar, University of Bangalore, Bangalore.