Curriculum Vitae

Dr. Rahul G. Shelke, Ph.D
Senior Project Associate
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Personal Information

Date of Birth	16th July 1987
Gender	Male
Citizenship	India
Religion	Hindu
Languages Known	English, Hindi and Marathi,
Hobbies	Reading and Gardening
Postal/Permanent Address	Venkatesh Nagar, Near Finley Mills, Paratwada, Tal- Achalpur, Dist-Amravati 444805, Maharashtra, India

Academic Qualification

Academic Qualification	Subject Specialization	Institute/ University	Year of passing
PhD	Biosciences and Bioengineering	Indian Institute of Technology Guwahati, Assam, India	2019
Post Graduation	Agricultural Biotechnology	OUAT, Bhubaneswar, Orrisa, India	2011
Graduation	Agricultural Biotechnology	PDKV, Akola, Maharashtra, India	2009
12th	Senior Cert in Science	Maharashtra State Board, India	2005
10th	Junior Cert	Maharashtra State Board, India	2003

Areas of Interest

- Biodiversity and evolutionary genetics studies
- Stress biology, Repetitive elements
- Comparative and functional genomics
- Organellar genome assembly, Molecular markers and DNA barcoding

Dissertation

- **Ph.D. Thesis Title: "MINING OF REPEAT ELEMENTS FROM *PONGAMIA* FOR MARKER DEVELOPMENT"**

  A brief outcome of Ph.D. research: *Pongamia* is a non-edible oil yielding legume tree grows throughout the Indian subcontinent on marginal land. However, despite promising features very little is known about the genetic makeup of this plant. Moreover, the lack of comprehensive genetic information hindering the development of different genetic tools. Thus in my thesis, I started with the work on repetitive elements like LTR and non-LTR transposable element (LINEs) mining from *Pongamia* genome. After dot blot analysis, I found that the genome was highly occupied by heterogenous retrotransposons. During my study, I also assembled the *Pongamia* transcriptome using trinity assembler and analysed different *Pongamia* genes for Transposable Elements (TEs) insertions. I found more than 300 unigenes

harbouring small fragment of TEs in coding sequences. Furthermore, transcriptionally active TEs were mined computationally from *Pongamia*. In my last chapter of doctoral study, I had isolated and characterised the different EST-SSR from the assembled transcriptome. Moreover, I designed EST-SSR markers for fatty acid genes and successfully validated in *Pongamia* accessions and in different dicot and monocot species. The objective of my study was to isolate and characterise the different repetitive elements and their role in protein-coding genes of *Pongamia*, followed by designing of gene-specific EST-SSR markers.

- **M.Sc. Thesis Title: "MOLECULAR DIVERSITY OF RAPD AND IRAP MARKER IN SOME SELECTED INDIAN BANANA"**
  A brief outcome of Master's research: Morphological similarities among the banana clones make identification difficult under field conditions. Random amplified polymorphic DNA (RAPD) and inter-retrotransposon amplified polymorphism (IRAP) marker was used to characterize genetic variations among 21 banana germplasm. IRAP primers were designed to determine 'AA' and 'BB' specific markers on the basis of repetitive and genome-wide dispersed long terminal repeat (LTR) retrotransposons. RAPD markers successfully detected genetic variation between genotypes. IRAP markers amplified either by a single primer or a combination of primers, based on LTR orientation, successfully amplified different retrotransposons dispersed in the Musa genome. The average level of polymorphism exhibited by IRAP markers was more compared to RAPD markers. The study showed the existence of substantial genetic variations among the tested varieties. All the 12 table-top varieties were clustered together while four cooking varieties i.e. Bantala-I, Bantala-II, Dakhkhnisagar and Athiakol with 'BB' formed a distinct group. These results suggested that IRAP markers were found more robust than RAPD markers to study the intra-group genetic diversity between the tabletop and cooking banana.

Work Experience

- Project (Senoir Project Associate position, March 2021 to present): "Targetted metabolite genetics in two underutilized narcotic crops (*Cannabis* and Opium Poppy) for cannabionoids and oripavine improvement" (CSIR-NBRI, Lucknow, UP, India).
- Project (SRF Position, till October 2018): "Genome and transcriptome sequencing of aromatic rices from North Eastern region" (IIT Guwahati, Assam, India).
- Project (JRF Position, 2017): "Genome and transcriptome sequencing of aromatic rices from North Eastern region" (IIT Guwahati, Assam, India).
- Teaching Assistantship: July 2014 to December 2014, assisted to professor for conducting B. tech (Bioprocess Engineering) practical/lab classes at BSBE Department, IIT Guwahati, Assam, India.

Training Attended

- 2010 - At Bioenergy Laboratory, Center for Energy, Indian Institute of Technology, Guwahati-781 039, Assam, India.
- 2008 - r-DNA Technology workshop at Ventura Institute of BioSciences, Malakpet, Hyderabad, India- 500036.

Publications

- **Shelke RG**, Banerjje R, Joshi B, Singh B, Singh PP, Tiwari GJ, Adhikari D, Jena SN, Barik SK (2022). Chloroplast genome of *Lithocarpus dealbatus*: identification of hotspots for sequence variability and phylogeney analysis in Quercoideae, a subfamily of Fagaceae. ***BMC Genomics***, (under review), preprint https://doi.org/10.21203/rs.3.rs-1361496/v1

- **Shelke RG** and Rangan L (2022). The whole chloroplast genome of *Mesua ferrea*: insight into the dynamic pattern of evolution and comparison with species from recently diverged families. ***Gene,*** (in minor revision)

- Sahu S, Rajbonshi MP, Gujre N, Gupta MK, **Shelke RG**, Ghose A, Rangan L, Pakshirajan K, Mitra S (2021). Bacterial strains found in the soils of a municipal solid waste dumping site facilitated phosphate solubilization along with cadmium remediation. ***Chemosphere***, https://doi.org/10.1016/j.chemosphere.2021.132320

- **Shelke RG**, Basak S, Rangan L (2020). Development of EST-SSRs markers for *Pongamia pinnata* by transcriptome database mining: cross-species amplification and genetic diversity. ***Physiology and Molecular Biology of Plants***, https://doi.org/10.1007/s12298-020-00889-w

- Rout GR, Bansal A, Swain D, Jadhao KR, **Shelke RG**, Panda SK (2020). Overexpression of ICE1 gene in mungbean (*Vigna radiata* L.) for cold tolerance. ***Plant Cell, Tissue and Organ Culture*** (PCTOC), 1-16. DOI:10.1007/s11240-020-01944-w

- **Shelke RG**, Rangan L (2020). The role of transposable elements in *Pongamia* unigenes and protein diversity. ***Molecular Biotechnology,*** 62: 31. Doi.org/10.1007%2Fs12033-019-00223-0.

- **Shelke RG**, Rangan L (2019). Isolation and characterisation of Ty1-*copia* retrotransposons from Pongamia pinnata. ***Trees- structure and function***, 1-12. https://doi.org/10.1007/s0046

- Basak S, Chakrabartty I, Hedaoo V, **Shelke RG**, Rangan L (2018). Assessment of genetic variation among wild *Alpinia nigra* (Zingiberaceae) population: an approach based on molecular phylogeny. ***Molecular Biology Reports***, 1-13. doi.org/10.1007/s11033-018-4458-3.

- Das R*, **Shelke RG***, Rangan L, Mitra S (2018). Estimation of nuclear genome size and characterization of Ty1-*copia* like LTR retrotransposon in *Mesua ferrea* L. ***Journal of Plant Biochemistry and Biotechnology***, 1-10. doi.org/10.1007/s13562-018-0457-7 (* Equal contribution).

- Ramesh AM, Singh A, **Shelke RG**, Scott PT, Gresshoff PM, Rangan L (2016). Identification of two genes encoding microsomal oleate desaturases (FAD2) from the biodiesel plant *Pongamia pinnata* L. ***Trees- structure and function***, 30(4): 1351-1360.

- **Shelke RG** and Das AB (2015). Analysis of genetic diversity in 21 genotypes of Indian banana using RAPDs and IRAPs markers. ***Proc. Natl. Acad. Sci., India, Sect. B Biol. Sci.***, 85(4):1027–1038. DOI 10.1007/s40011-015-0505-1.

Conferences

- **Shelke RG** and Rangan L (2019). Identification and characterization of genic repeat elements from *Pongamia pinnata* genome for genetic diversity analysis. *Indian Plant Science Congress 2019*, held on January 23 - 25, 2019 at SRM Institute of Science & Technology, Kattankulathur, Chennai -603203.

- Rangan L, Das R, **Shelke RG** (2018) Estimation of nuclear genome size and its correlation with Ty1-copia like LTR retrotransposon and cell phenotypic traits. *Global Plant and Molecular Biology Conference (GPMB)*, Rome 20-23rd September 2018.

- Das R, **Shelke RG** and Rangan L (2018). Genome size and Ty1-*copia* retroelements in biofuel crops. *24th ISCB International Conference (ISCBC-2018)*, held on 11th -13thJanuary 2018 at Manipal University Jaipur, India.

- **Shelke RG** and Rangan L (2018). Study of expression of repetitive elements and their application for gene linked marker development in *Pongamia pinnata. Genomics Analysis &Technology Conference (GATC 2018)*, held on 8th - 9th January 2018 at Guwahati University, India.

- **Shelke RG** and Rangan L (2017) Identification and characterization of Long interspersed nuclear elements (LINEs) in *Pongmia, Ricinus and Jatropha*. *International Symposium on Plant Biotechnology for Crop Improvement (ISPBCI 2017)*, 20th-22nd January 2017, IIT Guwahati, India.

- **Shelke RG** and Rangan L (2017) Identification and characterization of Long interspersed nuclear elements (LINEs) in *Pongamia, Ricinus and Jatropha*. *Research Conclave'17,* 16th-19th March 2017, IIT Guwahati, India.

- Das R and **Shelke RG** (2016) Genome Mining in Potential Biofuel Crops of North-East India- Genome Diversity and Correlation with Cell Plasticity. *Research Conclave'16,* 17th- 20th March 2016, IIT Guwahati, India.

- Rangan L, Singh A, **Shelke RG**, Das R, Ramesh AM, Kesari V, Scott P & Gresshoff P (2015) New positives of biotech research in renewable energy resources- Success story of Pongamia In: *Proceedings National Seminar on Biofuel A Search for New Fire SIBBR&D*, Cochin 17- 18 Dec 2015 , pp 22-25

- Singh A, **Shelke RG**, Das R, Jahan I, Rangan L, Khare A, Panda AN (2015) Unravelling *Pongamia*- Genomic and Phylogenetic Studies. *Research Conclave'15,* 16th-19th March 2015, IIT Guwahati, India.

- **Shelke RG**, Das R, Rangan L (2015) Evolution and distribution of LTR retrotransposons in *Pongamia pinnata* and its correlation with genome size. *Second International Conference on Biotechnology and Bioinformatics (ICBB-2015),* 5th-8th February 2015, Pune, India.

- L Rangan, **RG Shelke**, A Singh, R Das, AM Ramesh, V Kesari (2015) Morphological, biochemical and genomic studies in Pongamia. Central University Hyderabad.

- **Shelke RG**, Ramesh AM, Rangan L (2014) Identification and characterization of copia like retrotransposons fromthe genome of *Pongamia pinnata*. *National Conference on Perspective and Trends in Plant Sciences and Biotechnology,* 21st-23rd February 2014, Chandigarh, India.

- Rangan L, Kesari V, Ramesh AM, **Shelke RG**, Singh A (2013) Advancement in Potential Tree Legume- Pongamia pinnata. *National Seminar on Tree Biotechnology* 2013, 23-24 September, Coimbatore, TN. (Invited Plenary Talk)

- **Shelke RG** and Das AB (2011) Genetic diversity in some Indian Banana (Musa ssp.) germplasms using random amplified polymorphic DNAs (RAPDs). *99th Indian Science Congress Association*, Jan 3rd-7th January 2012, K.I.I.T University, Bhubaneswar, India.

- Das AB, **Shelke RG**, T Schwarzacher, J. S. (Pat) Heslop-Harrison (2011) Genetic characterization of Indian banana

(Musa sp.) through hAT like transposable elements and RAPD markers. *International Conference on Plant Science in Post Genomic Era (ICPSPGE -2011) in association with Society for Plant Physiology and Biochemistry, New Delhi, Jyoti Vihar, (GPMH -215),* 17th-19th February 2011, Sambalpur University, India.

Technical Expertise

- *Agrobacterium*-mediated transformation, Plant tissue culture and general Microbiology techniques.
- Recombinant DNA techniques, Molecular cloning, DNA labeling and hybridization.
- Genomic assembling (low coverage), Mitochondria and chloroplast genome assembly, Transcriptome assembling and validation, Annotation, Gene ontology (Web-based analysis).
- Molecular (DNA) markers, DNA barcoding, Diversity analysis and evolution study.
- Flow cytometry: Genome size estimation, Cytology.
- Stress biology and functional genomics.
- Repetitive sequence mining and analysis: LTR retrotransposons and SSR mining, Analysis of repetitive element, integration in genome and protein-coding genes.
- Chemotyping, phenotyping and breeding work in *Cannabis*
- Have experience of working in polyploid species of Banana (*Musa acuminata* and *Musa balbisiana*).
- Expertise of genomics work in different plants like *Cannabis*, rice, *Jatropha*, castor and ironwood.

Fellowships/ Exam Qualified

- 2018 (ARS-NET) Agriculture Scientist Recruitment Board, ICAR, New Delhi.
- 2018 (SRF) Department of Biotechnology (DBT), New Delhi.
- 2017 (JRF) Department of Biotechnology (DBT), New Delhi.
- 2014 (SRF) Indian Institute of Technology Guwahati- Human Resource Development, New Delhi.
- 2012 (JRF) Indian Institute of Technology Guwahati- Human Resource Development, New Delhi.
- 2012 (SRF) Indian Council of Agriculture Research (ICAR), New Delhi.
- 2011 Graduate Aptitude Test in Engineering (GATE).
- 2009 Indian Council of Agriculture Research (ICAR), New Delhi.
- 2009 Jawaharlal Nehru University (JNU) - Department of Biotechnology (DBT), New Delhi.
- 2009 Maharashtra Council of Agriculture Education and Research, Pune (MCAER).

GenBank Submissions

- 2021 *Lithocarpus dealbatus* chloroplast genome assembly accepted in GenBank under accession number MZ322408.
- 2021 *Pongamia pinnata* chloroplast genome assembly accepted in GenBank under accession number MW752444.
- 2019 *Mesua ferrea* Chloroplast genome assembly accepted in GenBank under accession number MT621164.
- 2013-2018 Submitted more than 80 retrotransposons genes in NCBI database from *Pongamia, Mesua*, castor and *Jatropha*.

Workshops

- 2021 Attended Multi Omics Box Workshop orginised by decode life, 1st - 20th December 2021.
- 2020 Attended Multi Omics Box Workshop orginised by decode life, 23rd November to 6th December 2020.
- 2019 Participated in 20th INDO-US Flow Cytometry Symposium cum Workshop on Application of Flow Cytometry in Biotechnology, March 13-16th 2019.
- 2018 Participated in Genomics, Analysis and Technology conference (GATC-2018), NGS workshop and conference, 7th to 9th March 2018.
- 2017 Attended Indo-Japan Workshop on Translation Agriculture Avenues for International Cooperation, 2017
- 2016 Participated in 9thTCS Annual Event & Flow Cytometry Workshop on Flow Application in Basic, Applied and Clinical Biology (FABACTCS 2016).
- 2012 Attended Indo-Japan DBT workshop for Fostering Research, Collaboration and Innovation in Translation Bioresources in Northeast India, 1st October 2012.

Co-curricular Activities

- 2018 Member of Brahmaputra Hostel Management Committee, IIT Guwahati, Assam.
- 2008 Participated in NSS Program, 2008, organized by PDKV, Akola.

Declaration

I hereby declare that the above-written particulars are true and correct to the best of my knowledge and belief.

Date: 29/03/2022 Rahul G. Shelke
Place: Lucknow, UP, India

Referees:

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