

Curriculum vitae

Shivaraj S M

Assistant Professor

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Employment Details

Assistant Professor (September 2023 onwards): teaching engineering biology at the Department of Science, Alliance University, Bengaluru

Senior Research Associate (February 2021 -September 2023) in project entitled “Employing microRNAs to control Fusarium wilt in tomato” at CSIR-National Chemical Laboratory, Pune, Maharashtra

Research Associate (March 2020- November 2020) in project entitled “Developing sheath blight tolerance in rice using genome editing” at National Agri-food Biotechnology Institute, Mohali, Punjab

Post-Doctoral Researcher (February 2018 to February 2020) in project entitled “Understanding the mechanisms silicon accumulation in crop plants”, at University of Laval, Quebec City, Canada

National Postdoctoral Fellow (Apr 2016 - July 2017) in project entitled “Identification of genes conferring host resistance and non-host resistance to papaya ring spot virus (PRSV)” at National Research Centre on Plant Biotechnology (NRCPB), New Delhi, India.

Junior Research Fellow (Nov 2006 - Oct 2007) in project entitled “Breeding wheat for quality traits” at National Research Centre on Plant Biotechnology (NRCPB), New Delhi, India.

Academic Pursuits

- **Ph.D. (Plant Biotechnology)** from TERI University, New Delhi, India (2016, 79.2%)
- **M.Sc. Agriculture (Biotechnology)** from Indira Gandhi Agricultural University, Raipur (CG) India (2006, 81.7%)
- **B.Sc. Agriculture (4 years)** from University of Agriculture Sciences, Bangalore, India (2003, 83.3%)

National Level Qualifications and Awards

- CSIR-Senior Research Associateship (CSIR-SRA) (Scientists pool scheme) by **Council of Scientific & Industrial Research** (2021)
- National Post-Doctoral Fellowship by **Science Engineering Recruitment Board (SERB)** along with annual research grant for proposed project (2016)
- Qualified **National Eligibility Test (NET)** for Lectureship conducted by Agricultural Research Service, India (2010)
- Post Graduate Scholarship by **Department of Biotechnology, Govt. of India** for pursuing M.Sc. (Ag) Biotechnology from Indira Gandhi Agriculture University (2004).

Research grants received

- **CSIR** Research grant to work on the project “Employing microRNAs to control Fusarium wilt in tomato” at CSIR-National Chemical laboratory (NCL), Pune (2021-2024, ongoing)
- Research Grant from **SERB** to work on the project “Identification of genes conferring host resistance and non-host resistance to papaya ring spot virus (PRSV)” at National Research Centre on Plant Biotechnology (NRCPB), New Delhi (2016-2018).

Teaching and guiding experience

- Taught laboratory practical course for 3 years to students of MSc (Plant Biotechnology) at TERI University, New Delhi, India (2009 to 2012)
- Guided MSc and PhD (Plant Biology) students in their project work for two years at Laval University, Quebec Canada (2018 to 2020)
- Guiding two PhD (Plant Biotechnology) students in their project work since 2021 at CSIR-National Chemical Laboratory, Pune, India

Technical skills

- Designing artificial microRNAs and construct preparation, miRNA target prediction and validation.
- Gene isolation, cloning and transformation
- Development of transgenic plants (Arabidopsis, Tobacco, Tomato, Brassica) and characterization
- Gene expression analysis
- Functional genomics
- Bioinformatics analysis (phylogeny, NGS data analysis, synteny, gene structure prediction, etc.)

Membership in Scientific and Educational Societies

- Member of The Indian Society of Genetics and Plant Breeding (ISGPB)
- Member of Society for Plant and Agricultural Sciences (SPAS)

List of Publications

Research papers published in international journals

- 1) Aggarwal B, Rajora N, Raturi G, Dhar H, Kadam SB, Mundada PS, **Shivaraj SM**, Varshney V, Deshmukh R, Barvkar VT, Salvi P (2023). Biotechnology and urban agriculture: A partnership for the future sustainability. Plant Science 20:111903. <https://doi.org/10.1016/j.plantsci.2023.111903>.
- 2) Mandlik R, Sharma S, Rout P, Singh S, Raturi G, Rana N, Sonah H, Deshmukh R, **Shivaraj SM**, Nanda S, Kavar PG (2024). Genome-wide identification and characterization of Aquaporins in Rosa chinensis. The Journal of Horticultural Science and Biotechnology 99:311-25. <https://doi.org/10.1080/14620316.2023.2272153>.

- 3) Thakral V, Raturi G, Sudhakaran S, Mandlik R, Sharma Y, **Shivaraj SM**, Tripathi DK, Sonah H, Deshmukh R. (2024). Silicon, a quasi-essential element: Availability in soil, fertilizer regime, optimum dosage, and uptake in plants. *Plant Physiology and Biochemistry* 208:108459. <https://doi.org/10.1016/j.plaphy.2024.108459>.
- 4) Yadav S, Raazi Z, **Shivaraj SM**, Somani D, Prashant R, Kulkarni A, Kumar R, Biradar S, Desai S, Kadoo N. (2022). Whole Genome Sequencing and Comparative Genomics of Indian Isolates of Wheat Spot Blotch Pathogen *Bipolaris sorokiniana* Reveals Expansion of Pathogenicity Gene Clusters. *Pathogens* 12(1):1. (**Impact factor: 4.5**)
- 5) Vats, S., **Shivaraj**, S. M., Sonah, H., Patil, G., Roy, J., Sharma, T. R., Deshmukh, R. (2023). Efficient Regeneration and Agrobacterium-Mediated Transformation Method For Cultivated and Wild Tomato. *Plant Molecular Biology Reporter*, 1-12. (**Impact factor: 1.8**)
- 6) **Shivaraj SM**, Mandlik R, Bhat JA, Raturi G, Elbaum R, Alexander L, Tripathi DK, Deshmukh R, Sonah H (2022). Outstanding questions on the beneficial role of silicon in crop plants. *Plant Cell and Physiology* 63: 4-18. (**Impact factor: 4.9**)
- 7) Coskun D, Deshmukh R, **Shivaraj SM**, Isenring P, Bélanger RR (2021). Lsi2: A black box in plant silicon transport. *Plant and Soil* 466: 1-20. (**Impact factor: 4.1**)
- 8) Kumar V, Vats S, Kumawat S, Bisht A, Bhatt V, **Shivaraj SM**, Padalkar G, Goyal V, Zargar S, et al. (2021) Omics advances and integrative approaches for the simultaneous improvement of seed oil and protein content in soybean (*Glycine max* L.). *Critical Reviews in Plant Sciences*:1-24 (**Impact factor: 6.2**)
- 9) Devanna BN, Mandlik R, Raturi G, Sudhakaran SS, Sharma Y, Sharma S, Rana N, Bansal R, Barvkar V, Tripathi DK, **Shivaraj SM**, Deshmukh R (2021) Versatile role of silicon in cereals: health benefits, uptake mechanism, and evolution. *Plant Physiology and Biochemistry* 165: 173-186. (**Impact factor: 4.2**)
- 10) Sathe AP, Kumar A, Mandlik R, Raturi G, Yadav H, Kumar N, **Shivaraj SM**, Jaswal R, Kapoor R, Gupta SK, Sharma TR, Humira S (2021). Role of silicon in elevating resistance against sheath blight and blast diseases in rice (*Oryza sativa* L.). *Plant Physiology and Biochemistry* 166: 128-139. (**Impact factor: 4.2**)
- 11) Kumawat S, Aggarwal B, Rana N, Mandlik R, Mehra A, **Shivaraj SM**, Sonah H, Deshmukh R. (2021). Identification of aquaporins and deciphering their role under salinity stress in pomegranate (*Punica granatum*). *Journal of Plant Biochemistry and Biotechnology* 30(4):930-42. (**Impact factor: 1.5**)
- 12) Bhat JA, Rajor N, Raturi G, Sharma S, Dhiman P, Sanand S, **Shivaraj SM**, Sonah H, Deshmukh R. (2021) Silicon Nanoparticles (SiNPs) in Sustainable Agriculture: Major Emphasis on the Practicality, Efficacy, and Concerns. *Nanoscale Advances* 3: 4019-4028. (**Impact factor: 4.5**)
- 13) Thakral V, Bhat JA, Kumar N, Myaka B, Sudhakaran S, Patil G, Sonah H, **Shivaraj SM**, Deshmukh R. (2021) Role of silicon under contrasting biotic and abiotic stress conditions provides benefits for climate smart cropping. *Environmental and Experimental Botany* 9:104545. (**Impact factor: 5.5**)
- 14) **Shivaraj SM**, Sharma Y, Chaudhary J, Rajora N, Sharma S, Thakral V, Ram H, Sonah H, Singla-Pareek SL, Sharma TR, Deshmukh R. (2020). Dynamic role of aquaporin

- transport system under drought stress in plants. *Environmental and Experimental Botany* 184: 104367. **(Impact factor: 5.5)**
- 15) Kumawat S, Khatri P, Ahmed A, Vats S, Kumar V, Jaiswal R, Wang Y, Xu P, Mandlik R, **Shivaraj SM**, Deokar A, Sonaha H, Tilak Sharma TR, Deshmukh R. (2020) Understanding aquaporin transport system, silicon and other metalloids uptake and deposition in bottle gourd (*Lagenaria siceraria*). *Journal of Hazardous Materials* 124598. **(Impact factor: 10.5)**
 - 16) Singh S, Bhatt V, Kumar V, Kumawat S, Khatri P, Singla P, **Shivaraj SM**, Nadaf A, Deshmukh R, Sharma TR, Sonah H. (2020) Evolutionary Understanding of Aquaporin Transport System in the Basal Eudicot Model Species *Aquilegia coerulea*. *Plants* 9:799. **(Impact factor: 3.9)**
 - 17) Rasoolizadeh A, Santhanam P, Labbe C, **Shivaraj SM**, Germain H, and Belanger R (2020) Silicon treatment influences the localization and expression of *Phytophthora sojae* effectors in interaction with soybean. *Journal of Experimental Botany* 71: 6844-6855. **(Impact factor 6.99)**
 - 18) Mir ZA, Ali S, **Shivaraj SM**, Bhat JA, Singh A, Yadav P, Rawat S, Paplao PK, Grover A (2020). Genome-wide identification and characterization of Chitinase gene family in *Brassica juncea* and *Camelina sativa* in response to *Alternaria brassicae*. *Genomics* 112:749-763. **(Impact factor 5.7)**
 - 19) Coskun D, Deshmukh R, Sonah H, **Shivaraj SM**, Frenette-Cotton R, Tremblay L, Isenring P, and Bélanger R (2019). Si permeability of a deficient Lsi1 aquaporin in tobacco can be enhanced through a conserved-residue substitution. *Plant Direct* 3:e00163. **(Impact factor 3.0)**
 - 20) **Shivaraj SM***, Bhat JA*, Singh P, Navadagi DB, Tripathi DK, Dash PK, Solanke AU, Sonah H, Deshmukh R (2019). Role of Silicon in Mitigation of Heavy Metal Stresses in Crop Plants. *Plants* 8:71. **(Impact Factor: 3.9)**
 - 21) **Shivaraj SM**, Deshmukh RK, Sonah H, Belanger R (2019) Identification and characterization of aquaporin genes in *Arachis duranensis* and *Arachis ipaensis* genomes, the diploid progenitors of peanut. *BMC genomics* 20: 222. **(Impact factor: 3.9)**
 - 22) Tyagi S, Sri T, Singh A, Mayee P, **Shivaraj SM**, Sharma P, Singh A (2018) *SUPPRESSOR OF OVEREXPRESSION OF CONSTANS1* influences flowering time, lateral branching, oil quality, and seed yield in *Brassica juncea* cv. Varuna. *Functional & Integrative Genomics* 25:1-8. **(Impact factor: 3.4)**
 - 23) Tyagi S, Mazumdar PA, Mayee P, **Shivaraj SM**, Anand S, Singh A, Madhurantakam C, Sharma P, Das S, Kumar A, Singh A (2018) Natural variation in *Brassica FT* homeologs influences multiple agronomic traits including flowering time, silique shape, oil profile, stomatal morphology and plant height in *B. juncea*. *Plant Science* 277:251-266. **(Impact factor: 4.7)**
 - 24) **Shivaraj SM**, Jain A, Singh A (2018) Highly preserved roles of *Brassica MIR172* in polyploid Brassicas: ectopic expression of variants of *Brassica MIR172* accelerates floral transition. *Molecular Genetics and Genomics* 293: 1121–1138 **(Impact factor: 3.2)**

- 25) **Shivaraj SM**, Deshmukh RK, Bhat JA, Sonah H, Belanger R (2017) Understanding Aquaporin Transport System in Eelgrass (*Zostera marina* L.), an Aquatic Plant Species. *Frontiers Plant Science* 8: 1334 (**Impact factor: 5.7**)
- 26) **Shivaraj SM**, Deshmukh RK, Rai R, Belanger R, Agrawal P, Dash PK (2017) Genome- wide identification, characterization, and expression profile of aquaporin gene family in Flax (*Linum usitatissimum*). *Nature Scientific Report* 7: 46137; (**Impact factor: 4.3**)
- 27) **Shivaraj SM**, Singh A (2016) Sequence variation in *Brassica AP2* and analysis of interaction of *AP2-miR172* regulatory module. *Plant Cell Tissue and Organ Culture* 125: 191-206. (**Impact Factor: 2.7**)
- 28) **Shivaraj SM**, Dhakate P, Mayee P, Negi MS, Singh A (2014) Natural genetic variation in *MIR172* isolated from Brassicas. *Biologia Plantarum* 58: 627-640. (**Impact Factor: 1.3**)
- 29) Dhakate P, **Shivaraj SM**, Singh A (2014) Design of artificial miRNA for redundant silencing of Brassica SHP1 and SHP2: transient assay-based validation of transcript cleavage from polyploid Brassicas. *Acta Physiologiae Plantarum* 36: 2125-2135. (**Impact Factor: 2.3**)

Research articles published in national journals

1. Islam MA, **Shivaraj SM**, Kumar V, Phad DS, Sonah H, Bhushan S, Tripathi RK. (2021). Development of chloroplast microsatellite markers in Capsicum: Insight into evolution of “Bhut Jolokia” a clad of ghost chilli landraces. *Indian J. Genet.* 81:1.

Participation at International and National Conferences

- 1) Atri A, **Shivaraj SM**, Singh A (2017) Isolation and characterization of *MIR160:ARFs* from *Brassica* crop: In National Symposium on Plant Biotechnology: Current Perspectives on medicinal and crop plants, CSIR-IICB, Kolkata, West Bengal, India
- 2) **Shivaraj SM**, Dhakate P, Mayee P, Singh A (2014) Isolation and Characterization of *MIR172* and its target *AP2* from Brassicas presented at National Symposium on Advances in Plant Molecular Biology and Biotechnology, IISER-Pune, Maharashtra, India
- 3) Dhakate P, **Shivaraj SM** and Singh A (2014) Isolation and Functional Analysis of a *FLO/LFY* Ortholog *BjuLFY*, from *B.juncea* L.: In National Symposium on Advances in Plant Molecular Biology and Biotechnology, IISER-Pune, Maharashtra, India (Received best poster award)
- 4) **Shivaraj SM**, Dhakate P, Mayee P, Singh A (2010) Functional characterization of transcription factors, activators and miRNA genes regulating flowering time control in *Brassicas*: In Bangalore India Bio, Bangalore, Karnataka. 2-4 June 2010. (**Received the best poster award**), India

Contribution as a reviewer for peer-reviewed journals

Reviewed 32 research articles from various peer-reviewed journals as verified by the Publons (<https://publons.com/researcher/1325527/shivaraj-s-m/>)

Google Scholar link: <https://scholar.google.co.in/citations?user=gBOY5XQAAAAJ&hl=en>

References

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Personal Details

Name	Shivaraj S. M
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Mother's Name	Sarvamangala S.M.
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Nationality	Indian
Marital status	Married