

Dr. Asha S
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**Department of Molecular Biology &
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College of Agriculture, Vellayani

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Summary

I pursued my Phd from Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala. During my Phd research, I elucidated the role of diverse small RNAs during *Phytophthora capsici* interaction in *Piper nigrum* plants, for which I received the prestigious ICAR-JN Award. I have conducted my post-doctoral research at ICAR-CTCRI, India with KBC-KSCSTE fellowship and DST SERB-NPDF; and Oklahoma State University, USA with Fulbright-Nehru Postdoctoral Fellowship. During my post-doctoral research, the role of pathogen derived small RNAs during virus and oomycete infections were studied in different crop plants. My research findings were published in peer-reviewed international Journals. My current research focuses on identification of molecular biology of stress response of plants and crop improvement.

Research Highlights

- Characterized the gene regulatory role of diverse functional small RNAs during infection of oomycete pathogen *P. capsici* on black pepper plants.
 - Characterised the functional small RNAs derived from tRNAs and rRNAs from the black pepper plants.
 - Elucidated the critical role of pathogen derived small RNAs during SLCMV infection in cassava plants.
 - Genome-wide analysis of the critical role of Pathogenesis-Related Protein-1 (*PR-1*) genes in black pepper
 - Characterized the role of microRNAs in abiotic stress responses in plants through transcriptomics.
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Experience

- Joined Kerala Agricultural University as Assistant Professor (Plant Biotechnology) in the year 2021
 - Postdoctoral Fellow (2017-2021)
 - DST KIRAN -IPR Women Scientist (2016)
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Education

- Graduated in Agricultural Science from Kerala Agricultural University (2005)
 - Post Graduation in Plant Biotechnology from Kerala Agricultural University (2009)
 - Ph.D in Biotechnology from Rajiv Gandhi Centre for Biotechnology/University of Kerala (2016)
 - PG Diploma in Intellectual Property Rights, IGNOU, New Delhi (2017)
 - Postdoctoral Fellow (Kerala Biotechnology Commission (KBC)-KSCSTE at ICAR-CTCRI (2017)
 - DST SERB-National Post Doctoral Fellow at ICAR-CTCRI (2018)
 - Fulbright-Nehru Postdoctoral Fellow at Oklahoma State University, USA (2018-2020)
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Area of Specialization

Plant microbe interactions, Molecular biology of stress response of plants, Transcriptomics, Intellectual Property Rights

Awards & Recognitions

- CEEB-JN scholarship for M.Sc in Plant Biotechnology (2006-2008)
 - CSIR-JRF NET 2009 for doing Ph.D in Biotechnology
 - ICAR- NET (2009)
 - Outstanding Poster Presentation Award International Conference on Legacy of Nitric Oxide Discovery: Impact on Disease Biology (2013)
 - DBT Travel Grant for attending Plant Genomics Congress (2014)
 - DST-KIRAN IPR WOSC (2016)
 - Best Poster Presentation Award - EMBO Conference Micro and metabolic regulators in plants (2017)
 - ICAR Award 2017 - Jawaharlal Nehru Award for the Outstanding Doctoral Thesis (2017)
 - KBC-KSCSTE Post-doctoral Fellowship: (2017)
 - DST-SERB NPDF (2018)
 - Fulbright-Nehru Postdoctoral Fellowship (2018-2020)
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Research Projects

Completed

1. Elucidation of small RNA mediated gene regulatory mechanisms during virus-plant interactions. Council (P) Order No.208/2017/KSCSTE dtd 12.07.2017 at ICAR-CTCRI, Thiruvananthapuram
2. Characterization of small RNA mediated gene regulatory mechanisms during Virus-plant interactions. PDF/2017/000914 at ICAR-CTCRI, Thiruvananthapuram, Kerala, India
3. Elucidation of small RNA mediated cross-kingdom RNAi mechanisms in Tomato: Phytophthora interactions (Award No 2393/FNPDR/2018) at Dept of Biochemistry and Molecular Biology, Oklahoma State University, Stillwater, USA

Publications

Journal Articles (Scopus indexed)

1. **Asha S**, Mohammad S, Makesh Kumar T. (2023) High throughput sRNA sequencing revealed gene regulatory role mediated by pathogen-derived small RNAs during Sri Lankan Cassava Mosaic Virus infection in Cassava. 3 Biotech. 13(3):95. doi: 10.1007/s13205-023-03494-2
2. Kattupalli, D, **Srinivasan, A**, Soniya, E.V. (2021) A Genome-Wide Analysis of Pathogenesis-Related Protein-1 (PR-1) Genes from *Piper nigrum* Reveals Its Critical Role during *Phytophthora capsici* Infection. Genes 12(7):1007
3. Puli COR., Zheng Y, Li YF, Jagadeeswaran G, Suo A, Jiang B, Sharma P, Mann R, Ganesan G, Gogoi N, **Srinivasan A**, Kakani A, Kakani VG, Barakat A and Sunkar R. (2021) MicroRNA profiles in Sorghum exposed to individual drought or heat or their combination. Journal of Plant Biochemistry and Biotechnology, 30: 848–861.
4. **Asha S**, and E. V. Soniya (2017) The sRNAome mining revealed existence of unique signature small RNAs derived from 5.8SrRNA from *Piper nigrum* and other plant lineages. Scientific Reports 7, 41052; doi: 10.1038/srep41052.
5. **Asha S**, and E. V. Soniya (2016) Transfer RNA derived small RNAs targeting defence responsive genes are induced during *Phytophthora capsici* infection in black pepper (*Piper nigrum* L.). Frontiers in Plant Science 7:767

6. **Asha S.**, Sweda S and E.V. Soniya (2016) Unravelling the complexity of microRNA mediated gene regulation in black pepper (*Piper nigrum* L.) using high throughput small RNA profiling. *Plant Cell Reports* 35:53–63
7. **Asha S**, Nisha J, E.V. Soniya (2013) In silico characterisation and phylogenetic analysis of two evolutionarily conserved miRNAs (miR166 and miR171) from black Pepper (*Piper nigrum* L.). *Plant Molecular Biology Reporter* 31:707–718
8. Joy N, **Asha S**, Mallika V, Soniya EV (2013) De novo Transcriptome Sequencing Reveals a Considerable Bias in the Incidence of Simple Sequence Repeats towards the Downstream of ‘Pre-miRNAs’ of Black Pepper. *PLoS ONE* 8(3): e56694.

Books/Chapters in Books

1. Soniya E.V., **Asha S**, Athira Menon, Divya Kattupalli. (2023). Transcriptomics in response of biotic stress in plants, Ali, M.A and Lee J (ed), *Transcriptome Profiling*, Academic Press, pp 285-303. ISBN 9780323918107
2. Makesh Kumar, T., Divya, K., **Asha, S**. (2021). Transgenic Technology for Disease Resistance in Crop Plants. In: Singh, K.P., Jahagirdar, S., Sarma, B.K. (eds) *Emerging Trends in Plant Pathology*. Springer, Singapore. https://doi.org/10.1007/978-981-15-6275-4_23 . ISBN 9789811562747

Student Guidance (Major Advisor/ Advisory Committee member)

M. Sc.

Within KAU: Completed: 2; Ongoing: 7

Outside KAU: Completed : 4

Ph. D

Within KAU: Ongoing : 6

Other Institutional Responsibilities

1. Student Advisor/faculty mentor of 10 Undergraduate students.
2. Class teacher of 2022 admission B.Tech (Biotechnology)
3. KAU Nodal Officer of Block Level Agricultural Knowledge Centre -Ithikkara Block, Kollam.
4. Internal members of Institutional Biosafety Committee (IBSC)
5. Member of Scientific Manuscript Editing and Publication Cell, COA, Vellayani
6. Member of Library Development Committee of COA, Vellayani.