

Curriculum Vitae

Shatrupa Ray

M.Sc.,PhD.

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Objective

By integration of my higher education and practical knowledge I am seeking a position that will utilize my skills and offer the chance for advancement as well as allow me the opportunity to gain additional skills and experience.

Research Interests

Endophytic bacteria, Host-endophyte interactions, Bacterial outer membrane vesicles, Microbial Secondary metabolites, Phyto-rhizomicrobiota cross talk

Academic Credentials

- **Post-Doctoral fellow** (2019-2021; 2021-current date) at Institute of Plant Protection, Department of Plant Pathology and Weed Research, Agricultural Research Organization, Volcani, Israel.
- **Senior Research fellow** (2017-2019) at Department of Mycology and Plant Pathology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.
- **Doctor of Philosophy** in Industrial Microbiology (2017) from Department of Botany, Institute of Sciences, Banaras Hindu University, Varanasi, Uttar Pradesh, India.
- **Master of Science** in Industrial Microbiology (2011) from School of Life Sciences, Devi Ahilya University, Indore, Madhya Pradesh, India (First Division, Percentage 71.68%).
- **Bachelor of Science** in Industrial Microbiology (2009) from Department of Sciences, Patna Women's College, Patna, Bihar, India (Distinction, Percentage 79.4 %).

Research Experience

1. Experience of **one (I) year** as a Post-doctoral fellow in the field of *“identification of new sources of resistance to bacterial pathogens of tomato”* under the supervision of Dr. Doron Teper, Department of Plant Pathology and Weed Research, Institute of Plant Protection, Agricultural Research Organization, Volcani, Israel.
2. Experience of **two (II) years** as a Post-doctoral fellow in the field of *“study of the role of bacterial outer membrane vesicles during plant colonization and attempt to use artificially fabricated nano-vesicles to induce host resistance and control bacterial infection.”* under the supervision of Dr. Ofir Bahar, Department of Plant Pathology and Weed Research, Institute of

Plant Protection, Agricultural Research Organization, Volcani, Israel.

3. Experience of **one and a half years as a senior research fellow** in the field of ***“Development of inoculation technique of endophytic bacteria onto host plants under field conditions”*** under the supervision of Prof. H.B. Singh, Department of Mycology and Plant Pathology, Institute of Agricultural Sciences, Banaras Hindu University.
4. Experience of five (5) **years as a PhD student** in field of ***plant-endophytic bacteria interactions in terms of growth promotion and defense*** as a PhD student under the supervision of Prof. Surendra Singh, Department of Botany, Institute of Sciences, and co-supervision of Prof. H.B. Singh, Department of Mycology and Plant Pathology, Institute of Agricultural Sciences, Banaras Hindu University. Title of research is ***“Exploiting bacterial endophytes from agricultural and medicinal crops for enhancing growth and defense in okra”***.
5. Under took M.Sc. dissertation for **six (6) months** on ***“Isolation and molecular characterization of bacteriophages specific for E.coli”*** under the supervision of Prof. Gopal Nath, Department of Microbiology, Institute of Medical Sciences, Banaras Hindu University.

Area of specialization

- Plant-rhizospheric microbes interaction in context of induction of defense related genes
- Endophytic bacterial secondary metabolite mediated defense gene activation in plants
- Endophytic secondary metabolite mediated induction of growth promoting genes in plants

Techniques well Versed With

- DNA cloning and transcript analysis
- q-PCR
- 2-D electrophoresis
- HPLC
- Electrophoretic techniques like Native PAGE, SDS-PAGE, Agarose gels etc.
- Western blot analysis
- Different kinds of centrifugation
- Fluorescence spectrophotometer
- UV-VIS spectrophotometer
- Confocal microscopy
- Scanning Electron Microscopy
- Transmission Electron Microscopy

Research Articles

1. **Ray, S., Singh, P., Singh, J., Singh, S., Sarma, B. K., Singh, H. B.** (2023) Killed fungal pathogen triggers antifungal metabolites in *Alcaligenes faecalis* for plant defense. *Physiological and Molecular Plant Pathology*, 101996. [Web-Link](#)
2. **Ray, S., Singh, S., Sarma, B. K., Singh, H. B.** (2016) Endophytic *Alcaligenes* isolated from Horticultural and Medicinal crops promotes growth in okra (*Abelmoschus esculentus*). *Journal of plant growth regulation*, 35(2), 401-412. [Web-Link](#)
3. **Ray, S., Singh, V., Singh, S., Sarma, B. K., Singh, H. B.** (2016) Biochemical and histochemical analyses revealing endophytic *Alcaligenes faecalis* mediated

- suppression of oxidative stress in *Abelmoschus esculentus* challenged with *Sclerotium rolfsii*. ***Plant Physiology and Biochemistry***, 109, 430-441. [Web-Link](#)
4. **Ray, S.**, Mishra, S., Bisen, K., Singh, S., Sarma, B. K., Singh, H. B. (2017) Modulation in phenolic root exudate profile of *Abelmoschus esculentus* expressing activation of defense pathway. ***Microbiological Research***, 207, 100-107. [Web-Link](#)
 5. **Ray, S.**, Swapnil, P., Singh, P., Singh, S., Sarma, B. K., Singh, H. B. (2020). Endophytic *Alcaligenes faecalis* mediated redesigning of host defense itinerary against *Sclerotium rolfsii* through induction of phenolics and antioxidant enzymes. ***Biological Control***, 150, 104355. [Web-Link](#)
 6. Singh, P., Singh, J., **Ray, S.**, Rajput, R. S., Vaishnav, A., Singh, R. K., Singh, H. B. (2020). Seed biopriming with antagonistic microbes and ascorbic acid induce resistance in tomato against Fusarium wilt. ***Microbiological Research***, 126482. [Web-Link](#)
 7. Mishra, S., Yang, X., **Ray, S.**, Fraceto, L. F., Singh, H. B. (2020). Antibacterial and biofilm inhibition activity of biofabricated silver nanoparticles against *Xanthomonas oryzae* pv. *oryzae* causing blight disease of rice instigates disease suppression. ***World Journal of Microbiology and Biotechnology***, 36(4), 1-10. [Web-Link](#)
 8. Saxena, A., Mishra, S., **Ray, S.**, Raghuwanshi, R., Singh, H. B. (2019). Differential Reprogramming of Defense Network in *Capsicum annum* L. Plants Against *Colletotrichum truncatum* Infection by Phyllospheric and Rhizospheric *Trichoderma* Strains. ***Journal of Plant Growth Regulation***, 1-13. [Web-Link](#)
 9. Singh, J., Singh, P., Vaishnav, A., **Ray, S.**, Rajput, R. S., Singh, S. M., Singh, H. B. (2021). Belowground fungal volatiles perception in okra (*Abelmoschus esculentus*) facilitates plant growth under biotic stress. ***Microbiological Research***, [Web-Link](#)
 10. Bisen, K., **Ray, S.**, Singh, S. P. (2019). Consortium of compatible *Trichoderma* isolates mediated elicitation of immune response in *Solanum melongena* after challenge with *Sclerotium rolfsii*. ***Archives of Phytopathology and Plant Protection***, 52(7-8), 733-756. [Web-Link](#)
 11. Singh, V., Keswani, C., **Ray, S.**, Upadhyay, R. S., Singh, D. P., Prabha, R., Sarma, B.K., Singh, H.B. (2019). Isolation and screening of high salinity tolerant *Trichoderma* spp. with plant growth property and antagonistic activity against various soilborne phytopathogens. ***Archives of Phytopathology and Plant Protection***, 52(7-8), 667-680. [Web-Link](#)

- BK, Keswani C. (Eds). *Advances in PGPR Research*. CABI. pp. 218-233. [Web-Link](#)
2. **Ray, S.**, Singh, J., Rajput, R. S., Yadav, S., Singh, S., Singh, H.B. (2019) A Thorough Comprehension of Host Endophytic Interaction Entailing the Biospherical Benefits: A Metabolomic Perspective. In: Jha S. (Ed) *Endophytes and Secondary Metabolites*. Springer, Cham. pp. 1-19. [Web-Link](#)
 3. **Ray, S.**, Singh, P., Singh, J., Singh, H. B. (2019) Host–endophytes cross-talk: an essential prerequisite for plant ecosystem functioning. In: Singh JS (Ed) *New and Future Developments in Microbial Biotechnology and Bioengineering*. Elsevier. pp. 307-317. [Web-Link](#)
 4. **Ray, S.**, Singh, J., Rajput, R.S., Singh, H.B., Singh, S. (2018) Endophytic bacteria: an essential requirement of phyto nutrition. *Nutrition and Food Science International Journal*, 1-5. [Web-Link](#)
 5. Singh, H. B., Keswani, C., **Ray, S.**, Yadav, S. K., Singh, S. P., Singh, S., Sarma, B. K. (2015). *Beauveria bassiana*: biocontrol beyond lepidopteran pests. In: Sowjanya Sree K, Verma A. (Eds.). *Biocontrol of Lepidopteran Pests*. Springer International Publishing. pp. 219-235 [Web-Link](#)
 6. Singh, V., **Ray, S.**, Bisen, K., Keswani, C., Upadhyay, R. S., Sarma, B. K., Singh, H. B. (2017) 20 Unravelling the Dual Applications of *Trichoderma* spp. as Biopesticide and Biofertilizer. In: Singh HB, Sarma BK, Keswani C. (Eds). *Advances in PGPR Research*. CABI. pp. 364-374. [Web-Link](#)
 7. Rajput, R. S., Singh, P., Singh, J., **Ray, S.**, Vaishnav, A., Singh, H. B. (2019). Seed Biopriming Through Beneficial Rhizobacteria for Mitigating Soil-Borne and Seed-Borne Diseases. In: Sayyed RZ. (Ed). *Plant Growth Promoting Rhizobacteria for Sustainable Stress Management*. Springer, Singapore. pp. 201-215. [Web-Link](#)
 8. Singh, J., Singh, P., **Ray, S.**, Rajput, R. S., Singh, H. B. (2019). Plant Growth-Promoting Rhizobacteria: Benign and Useful Substitute for Mitigation of Biotic and Abiotic Stresses. In: Sayyed RZ. (Ed). *Plant Growth Promoting Rhizobacteria for Sustainable Stress Management* (pp. 81-101). Springer, Singapore. pp. 81-101. [Web-Link](#).

Patents filed

1. Method of production of biofilm from endophytic bacteria and uses thereof (Application no. 201911000580; dated: 05.01.2019)
2. Nano-formulation and method of preparation thereof for plant parasitic nematodes and plant growth promotion (Application no. 201911013791; dated: 05.04.2019)
3. Synergistic composition for rapid reproduction of earthworms (Application no. 201911016131; dated: 24.04.2019)

Conferences/ Fellowship/Awards

- Awarded with Indo-Israel ARO fellowship scheme (2019-2021)
- Presented a talk at the Israeli Society for extracellular vesicle research annual meeting (December 2020)
- Awarded Best Researcher (2020) in the International Scientist Awards on Engineering, Medicine and Science.
- Qualified National Eligibility Test (NET-2017) in Agricultural Microbiology conducted by Indian Council of Agricultural Research (ICAR-ASRB).
- Paper presented in National Symposium on Impact on Climate change on plant-microbe interactions and its implications (ICCPMI-2015), 18-19th Dec 2015.
- Delivered oral presentation in National Workshop on Advances in PGPR Research, 7-8th Oct 2014.
- Delivered oral presentation in National Conference on Systematic Approach in Implementation of Informational and Resource Saving Technologies in Food-Crop production: Prerequisite for Eco-Balancing, 23-24th Nov 2013.
- Awarded Junior Research Fellowship by UGC-RET, 2013.
- Poster presented in National Conference on Microbes Promoting Crop Health, Productivity and Sustainability, 26-27th Oct 2013.
- Qualified National Eligibility Test (NET-LS, 2012) in Life Sciences conducted by Council of Scientific and Industrial Research (CSIR).
- Member of editorial board of Frontiers in Environmental Microbiology.

Membership of Scientific bodies

- Life Member of Association of Microbiologists of India (AMI)- 08/11/2014.
- Life Member of Indian Science Congress Association – 30/08/2016.
- Life Member of Asian PGPR Society of Sustainable Agriculture- 09/04/2016.

References

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Declaration

I hereby declare that all the informations given above are true to the best of my knowledge

Place: Rishon LeZion, ISRAEL

Date: 23/01/2023

A handwritten signature in black ink, slanted upwards to the right, appearing to read 'Shatrupa Ray'.

(Shatrupa Ray)