

NAME: Dr. Rukmini Mishra

Designation: Associate Professor & Head,
Dept of Botany,
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About Me

Dr Rukmini Mishra has a PhD in Agricultural Biotechnology from ICAR-National Rice Research Institute, India. After PhD, she received the prestigious Young Scientist Award from the Dept. of Science & Technology, Govt. of India to work as a Young Scientist at the Centre for Biotechnology, SOA University. The research involved development of molecular diagnostic markers for development of anthracnose resistance in chilli pepper. After three years of successful research, she received the prestigious Talented Young Scientist Fellowship under the TYSP programme of the Ministry of Science and Technology, Govt. of China. Subsequently, she joined as a postdoctoral research associate at the Chinese Academy of Agricultural Sciences, Beijing, China, where she worked on Blast disease resistance in rice through CRISPR/Cas9 genome editing. She has more than 7 years of post-doctoral research experience and 5 years of teaching experience in the area of plant molecular biology, functional genomics and genetic engineering.

AREA OF INTEREST

Plant Breeding and Genetics, Plant Biotechnology, Molecular Biology

COURSES TAUGHT

Plant Biotechnology
Genetic engineering and genomics
Plant Tissue culture techniques
Plant Genomics

TEACHING EXPERIENCE 05 Years

RESEARCH EXPERIENCE 07Years

ADMINISTRATIVE/EXECUTIVE EXPERIENCE 05 Years

AWARDS & HONORS

- SERB POWER-GRANT Fellowship, SERB, DST, Govt. of India (2021).
- Eminent achiever award, Provost conclave, Centurion University of Technology and Management, 2021.
- Talented Young Scientist Program (TYSP), Chinese Academy of Agricultural Sciences, China (2017).
- International Travel grant from Dept. of Science and Technology, Govt. of India to attend the EPSO/FESPB Plant Biology Congress at Prague, Czech Republic (2016).
- Start-up Research Grant (Young Scientist Award), Science and Engineering Research Board (SERB), Department of Science and Technology (DST), Govt. of India (2014).
- Senior Research Fellow, Indian Council of Agricultural Research (ICAR), India (2007).

RESEARCH GUIDANCE

Ph.D.: 5 scholars

M.Sc.: 20 students

RESEARCH GRANTS

S. No	Title of the project	Funding Agency	Amount	Sanction year & duration
1	Engineering anthracnose resistance in chili pepper (<i>Capsicum annuum</i> L) using a single transcript CRISPR/Cas9 genome editing system (SERB-POWER grant) PI: Dr. Rukmini Mishra	SERB, DST, Govt. of India	30 Lakhs	3 years
2	Eco typing, chemo typing and genotyping of <i>Embelia ribes</i> Brum F. for authentic identification, selection of conservation of elites. PI: Rukmini Mishra	NMPB, Govt. of India	26 Lakhs	2 years

PUBLICATIONS

JOURNAL PUBLICATIONS = 35

1. Behera, D. U., Dixit, S., Gaur, M., Mishra, R., Sahoo, R. K., Sahoo, M., ... & Subudhi, E. (2023). Sequencing and Characterization of *M. morganii* Strain UM869: A Comprehensive Comparative Genomic Analysis of Virulence, Antibiotic Resistance, and Functional Pathways. *Genes*, 14(6), 1279.
2. Mahanty B, Mishra R, Joshi RK (2023) *Fusarium oxysporum* f.sp *cepae* small RNAs (Foc-sRNAs) promote disease susceptibility in onion (*Allium cepa* L.) through cross kingdom

- RNA interference. *Physiological and Molecular Plant Pathology*. 125: 102018. <https://doi.org/10.1016/j.pmpp.2023.102018>. (IF- 2.74).
3. Sahoo J, Mahanty B, Mishra R, Joshi RK (2023) Development of SNP markers linked to purple blotch resistance for marker-assisted selection in onion (*Allium cepa* L.) breeding. **3 Biotech**. 13: 137. <https://doi.org/10.1007/s13205-023-03562-7>. (IF-2.89).
 4. Mahanty B, Mishra R, Joshi RK (2023) Cross-kingdom small RNA communication between plants and fungal phytopathogens-Recent updates and prospects for future agriculture. **RNA Biology**. <https://doi.org/10.1080/15476286.2023.2195731>. (IF: 4.77).
 5. Mahanty B, Mishra R, Joshi RK (2023) Sexual differentiation in dioecious cucurbits-a molecular perspective. **Research Journal of Biotechnology**. 18(2): 118-126. <https://doi.org/10.25303/1802rjbt1180126> (IF-0.35).
 6. Mahanty B, Mishra R, Joshi RK (2022) Molecular characterization of Zn(II)2Cys6 cluster gene family and their association with pathogenicity of the onion basal rot pathogen, *Fusarium oxysporum* f. sp. *cepae*. **Physiological and Molecular Plant Pathology**. <https://doi.org/10.1016/j.pmpp.2021.101782>. (IF- 2.74)
 7. Mallick T, Mishra R, Mohanty S, Joshi RK (2022) Genome wide analysis of the potato soft rot pathogen *Pectobacterium carotovorum* strain ICMP 5702 to predict novel insights into its genetic features. *Plant Pathol J*. 38(2): 102-114. <https://doi.org/10.5423/PPJ.OA.12.2021.0190> (IF: 2.32).
 8. Nanda S, Kumar G, **Mishra R**, Joshi RK (2022) Microbe assisted alleviation of heavy metal toxicity in plants: A review. **Geomicrobiology Journal**. <https://doi.org/10.1080/01490451.2021.1979697>. (IF- 2.41)
 9. Das, D., & **Mishra, R.** (2021). SNP Markers and its Impact on Crop Improvement. *Asian Journal of Biological and Life Sciences*, 10(3), 539.
 10. Wei Z, Abdelrahman M, Gao Y, Ji Z, **Mishra R**, Sun H, Sui Y, Wu C, Wang C, ZhaoK (2021) Engineering broad-spectrum resistance to bacterial blight by CRISPR- Cas9-mediated precise homology directed repair in rice. **Molecular Plant**. 14(8):1215-1218. (IF: 13.01).
 11. **Mishra, R.**, Mohanty, J. N., Mahanty, B., & Joshi, R. K. (2021). A single transcript CRISPR/Cas9 mediated mutagenesis of CaERF28 confers anthracnose resistance in chilli pepper (*Capsicum annuum* L.). *Planta*, 254(1), 5
 12. Sharma R, Mahanty B, **Mishra R**, Joshi RK.(2021) Genome wide identification and expression analysis of pepper C2H2 zinc finger transcription factors in response to anthracnose pathogen *Colletotrichum truncatum*. **3 Biotech** 11(3):118. (IF: 2.45).
 13. Mishra R, Zheng W, Joshi RK, Zhao K (2021) Genome editing strategies towards enhancement of rice disease resistance. **Rice Science**. 28(3): 1-14. <https://doi.org/10.1016/j.rsci.2021.01.003> (IF- 4.41).
 14. Nanda S, Mishra R, Joshi RK (2021) Molecular basis of insect resistance in plants: current updates and future prospects. **Research Journal of Biotechnology**. (IF-0.35)
 15. Das, S., & Mishra, R. NEXT GENERATION SEQUENCING TECHNOLOGIES TOWARDS EXPLORATION OF MEDICINAL PLANTS.
 16. Bharat, S. S., Sahu, S., Sahu, S. S., Mohanty, P., Nanda, S., & Mishra, R. (2021). RNA Interference: A Functional Genomics Approach for Plant Disease Management. *Asian Journal of Biological and Life Sciences*, 10(2), 309.
 17. Joshi, R. K., Bharat, S. S., & Mishra, R. (2020). Engineering drought tolerance in plants through CRISPR/Cas genome editing. *3 Biotech*, 10(9), 400

18. Mishra, R., Mohapatra, R., Mahanty, B., & Joshi, R. K. (2019). Analysis of microRNAs and their targets from onion (*Allium cepa*) using genome survey sequences (GSS) and expressed sequence tags (ESTs). *Bioinformatics*, *15*(12), 907.
19. Wang C, Tariq R, Ji Z, Wei Z, Zheng K, **Mishra R**, Zhao K (2019) Transcriptome analysis of a rice cultivar reveals the differentially expressed genes in response to wild and mutant strains of *Xanthomonas oryzae* pv. *Oryzae*. **Scientific Reports** (Accepted, In Press) (**IF-4.37**).
20. Mishra, R., Joshi, R. K., & Zhao, K. (2020). Base editing in crops: current advances, limitations and future implications. *Plant Biotechnology Journal*, *18*(1), 20-31.
21. Mishra, R., Rout, E., Mohanty, J. N., & Joshi, R. K. (2019). Sequence-tagged site-based diagnostic markers linked to a novel anthracnose resistance gene RCt1 in chili pepper (*Capsicum annum* L.). *3 Biotech*, *9*, 1-13.
22. Mishra, R., Joshi, R. K., & Zhao, K. (2018). Genome editing in rice: recent advances, challenges, and future implications. *Frontiers in Plant Science*, *9*, 409924.
23. Mishra, R., & Zhao, K. (2018). Genome editing technologies and their applications in crop improvement. *Plant Biotechnology Reports*, *12*, 57-68.
24. Mishra, R., Mohanty, J. N., Chand, S. K., & Joshi, R. K. (2018). Can-miRn37a mediated suppression of ethylene response factors enhances the resistance of chilli against anthracnose pathogen *Colletotrichum truncatum* L. *Plant science*, *267*, 135-147.
25. Mishra, R., Rout, E., & Joshi, R. K. (2019). Identification of resistant sources against anthracnose disease caused by *Colletotrichum truncatum* and *Colletotrichum gloeosporioides* in *Capsicum annum* L. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*, *89*, 517-524.
26. Chand, S. K., Nanda, S., Mishra, R., & Joshi, R. K. (2017). Multiple garlic (*Allium sativum* L.) microRNAs regulate the immunity against the basal rot fungus *Fusarium oxysporum* f. sp. *Cepae*. *Plant Science*, *257*, 9-21.
27. Rukmini Mishra, R. M., Satyabrata Nanda, S. N., Rout, E., Chand, S. K., Mohanty, J. N., & Joshi, R. K. (2017). Differential expression of defense-related genes in chilli pepper infected with anthracnose pathogen *Colletotrichum truncatum*.
28. Mishra, R., & Rao, G. J. N. (2016). In-vitro androgenesis in rice: advantages, constraints and future prospects. *Rice Science*, *23*(2), 57-68.
29. Chand, S. K., Nanda, S., Rout, E., Mohanty, J. N., Mishra, R., & Joshi, R. K. (2016). De novo sequencing and characterization of defense transcriptome responsive to *Pythium aphanidermatum* infection in *Curcuma longa* L. *Physiological and Molecular Plant Pathology*, *94*, 27-37.
30. Chand, S. K., Nanda, S., Rout, E., Mohanty, J., Mishra, R., & Joshi, R. K. (2016). Identification and characterization of microRNAs in turmeric (*Curcuma longa* L.) responsive to infection with the pathogenic fungus *Pythium aphanidermatum*. *Physiological and Molecular Plant Pathology*, *93*, 119-128.
31. Mishra R., Rao G.J.N., Rao R.N., Kaushal P.: Development and characterization of elite doubled haploid lines from two indica rice hybrids. - *Rice Sci.* *22*: 290-299, 2015
32. Mishra, R., Rao, G. J. N., Rao, R. N., & Sharma, S. G. (2015). Physico-Chemical and cooking characteristics of anther derived doubled haploid lines of two elite indica hybrid rice varieties-Ajay and Rajalaxmi. *ORYZA-An International Journal on Rice*, *52*(1), 19-26.
33. Rukmini, M., Rao, G. J. N., & Rao, R. N. (2013). Effect of cold pretreatment and phytohormones on anther. *Journal of Experimental Biology*, *1*, 2.

34. Rao, G. J. N., Swain, D., Mishra, R., Prasad, D., Krishna, R. S., Rao, R. N., & Sahu, R. K. (2012). Marker based estimation of gene flow in tropical rice fields and its ecological consequences. *Tropical plant biology*, 5, 277-285.
35. Mishra, R., Rao, R. N., & Rao, G. J. N. (2011). Anther culture response of indica rice hybrids. *ORYZA-An International Journal on Rice*, 48(4), 375-377.

BOOK PUBLICATIONS : 10

1. **Genome Editing Technologies for Crop Improvement** (Dr. Kaijun Zhao, **Dr. Rukmini Mishra**, Dr. Raj Kumar Joshi eds. **Springer Nature Singapore Pvt Ltd. (Published)**).
2. **Biotechnology in Crop Improvement (Dr Rukmini Mishra**, Dr Ranjan Kumar Sahoo, Dr Raghu Gogada eds. Amazon Publishers.
3. **R Mishra**, M Mushtaq, RK Joshi (2022) Expanding the Scope of Base Editing in Crops Using Cas9 Variants. *Genome Editing Technologies for Crop Improvement*, 161-175(Dr. Kaijun Zhao, Dr. Rukmini Mishra, Dr. Raj Kumar Joshi eds. **Springer Nature Singapore Pvt Ltd** □)
4. **R Mishra**, RK Joshi, K Zhao (2022) Genome Editing Is Revolutionizing Crop Improvement. *Genome Editing Technologies for Crop Improvement*, 3-41(Dr. Kaijun Zhao, Dr. Rukmini Mishra, Dr. Raj Kumar Joshi eds. **Springer Nature Singapore Pvt Ltd**).
5. K Zhao, **R Mishra**, RK Joshi, YG Liu (2022) Genome Editing Toward Rice Improvement. *Genome Editing Technologies for Crop Improvement*, 211-240. (Dr. Kaijun Zhao, Dr. Rukmini Mishra, Dr. Raj Kumar Joshi eds. **Springer Nature Singapore Pvt Ltd**).
6. Z Wei, **R Mishra**, RK Joshi, K Zhao (2022) Targeted Gene Replacement in Plants Using CRISPR-Cas Technology. *Genome Editing Technologies for Crop Improvement*, 139-160(Dr. Kaijun Zhao, Dr. Rukmini Mishra, Dr. Raj Kumar Joshi eds. **Springer Nature Singapore Pvt Ltd**).
7. B Mahanty, SS Bharat, JN Mohanty, **R Mishra**, RK Joshi (2022) MicroRNA-Mediated in Field Crops. *Molecular Advances in Insect Resistance of Field Crops*, 369-392
8. **Rukmini Mishra**, Satyabrata Nanda and Raj Kumar Joshi (2018) The CRISPR/Cas genome editing tool in rice improvement. In, *Rice Science Biotechnological and Molecular Advancements* (Eds. R.K. Verma, P.P. Srivastava & ND Nadaf). **Apple Academic Press (Taylor and Francis group)**.
9. **Rukmini Mishra**, Jatindra Nath Mohanty, Deepak Kumar Verma, Raj Kumar Joshi, and Prem Prakash Srivastav (2018) Molecular markers and marker assisted selection (MAS) towards yields and quality improvement in Rice. Eds. D.K Verma, P. P. Srivastav & ND Nadaf). **Apple Academic Press (Taylor and Francis group)**.
10. Satyabrata Nanda, Jatindra Nath Mohanty, **Rukmini Mishra**, and Raj Kumar Joshi (2016)

Metabolic engineering of phenylpropanoids in Plants. Transgenesis and secondary metabolism. **Reference series in phytochemistry, Springer International Publishing AG.** DOI 10.1007/978-3-319-27490-4_30-1.

PARTICIPATION IN CONFERENCE & SEMINARS (AS INVITED/PLENARY/CHAIR)

- **Invited as a keynote speaker** for the International Conference on Agriculture for Sustainable Future “Agri Vision-2022”, March 06-08, 2022 at Ravenshaw University, Cuttack, Odisha.
- **Review editor** in Frontiers in Plant Science journal (Specialty section: Plant genomics)
- **Review editor** in Frontier in Genetics journal (Specialty section: Plant genomics) 2021.
- **Invited speaker** under the Young Investigator Lecture Forum of LifeTech-2020 for National Conference on “Advance in Life Science and Biotechnology (LifeTech-2020)” by the Dept. of Biotechnology and the Dept. of Life Science under the onus of Rama Devi Women’s University were during 27th-28th February, 2020.

OTHER INFORMATION

Plant germplasm registration: Rice tetra 5-40 of Rice (INGR20004)

Rukmini Mishra, GJN Rao, RN Rao, MJ Baig, Vinay Kumar, P Kaushal

Registered by Plant Germplasm Registration Committee (PGRC) of Indian Council of Agricultural Research on September 29, 2020.

1. Patent File number: 2021104155 (Granted). Year of grant- 2021

Methods for Molecular Mapping and Developing Diagnostic Markers for Detecting Anthracnose Resistance in Chili Pepper.

Mishra Rukmini, Joshi Raj Kumar, Rout Elojita, Mohanty Jatindranath

2. Patent File number: 2021105189 (Granted). Year of grant-2021

A Method for Creating Novel Anthracnose Resistant Pepper Plants Using Genome Modification Technique.

Joshi Raj Kumar, **Mishra Rukmini**, Mohanty Jatindranath, Mahanty Bijaylaxmi.