

Curriculum vitae

Personal Details

Zahoor Ahmed Wani

PhD

NET (CSIR-JRF- 47th AIR)



Current professional contact details

Assistant Professor

Department of Botany

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Village – Dasbal,

Tehsil – Warwan

District – Kishtwar,

Jammu & Kashmir – 182205

India

Personal Information

Languages known: English, Urdu,
Purgi and Kashmiri.

Date of Birth: 15th of August 1986

Nationality: Indian

Marital Status: Married

Education

2012 -2017 PhD in Plant sciences from AcSIR–Academy of Scientific & Innovative Research (<http://www.acsir.res.in/>)

Place of work: CSIR–Indian Institute of Integrative Medicine (IIIM), Canal Road, Jammu, India (<http://www.iiim.res.in/>)

Thesis title: **Exploring the endophytic fungal community associated with *Crocus sativus* L. and its role in restructuring the apocarotenoid metabolism and stress adaptation.**

2009 – 2011 M.Sc. (Botany)

First Division

Department of Botany, University of Kashmir, Srinagar, J&K, India

2006 – 2009 B.Sc. (Botany, Zoology and Chemistry)

First Division

University of Kashmir,
Srinagar, J&K, India

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Research Experience

- June 2014 – June 2017 Senior Research Fellow, Plant Biotechnology Division, CSIR-Indian Institute of Integrative Medicine (IIIM), Canal Road, Jammu, J&K, India
- June 2012 – January 2014 Junior Research Fellow, Microbial Biotechnology Division, CSIR-Indian Institute of Integrative Medicine (IIIM), Canal Road, Jammu, J&K, India.

Awards and Honors

- June 2011 Qualified Joint CSIR-UGC Test for Junior Research Fellowship and Eligibility for Lectureship (NET) and secured 47th rank throughout the country (<http://www.csirhrdg.res.in/>).
- July 2011 Selected for integrated MPhil-PhD programme in School of Environmental Science, Jawaharlal Nehru University, New Delhi (<http://www.jnu.ac.in/>).

Membership of Scientific Societies

Member for Mycological society of India.

Member of J&K Science Congress.

Member of National academy of science India, J&K chapter.

Member of Scientific Literary Club (SLC), CSIR-IIIM, Jammu.

Member Botanical society, University of Kashmir, Srinagar.

Social work/organization

- Founder/chairman of a newly formed Non-governmental organization namely “WARWAN VALLEY ECO-TOURIST SOCIETY”, with WWF-India and CEET Jammu as Technical advisors, to work for the socio-economic betterment of Warwan valley and its people.
- Publish articles in leading local newspapers like Greater Kashmir, Early times, Ziraat Times etc. on various social and environmental issues.

Areas of Specialization

Broad area of specialization: Microbial ecology & Molecular Biology

Professional Competences and Skills Acquired

My Masters in Plant Sciences (2011) and the subsequent involvement in the pursuit of PhD for about five years have enabled me to develop better understanding and insight for the execution

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of R&D programmes. I have also developed competence for project/paper writing, fund raising and executing the research projects at my own. I have a team spirit too, so, working in a team is quite ok for me.

Molecular Biology Techniques

DNA and RNA isolation, cDNA synthesis, cDNA library construction and screening, Primer designing, PCR, RT-PCR, RACE, Molecular cloning, Plasmid DNA isolation, DNA sequencing and analysis, transcriptome analysis, development of Arabidopsis transgenic plants, Agrobacterium mediated transformation, electroporation, Gel electrophoresis.

Microbiology

Endophyte isolation, culturing and staining techniques, preservation techniques, morphological and molecular characterization, Bioactivity assays, fermentation.

Plant microbe interactions

Microbial formulation preparation, treatment of plants with microbes, *in situ* visualization of microbial symbionts by microscopic techniques, etc

Phytochemistry Techniques

TLC, HPLC, GC-MS, LC-MS.

Plant Tissue Culture

Tissue culture of some important medicinal and aromatic plants.

Microscopy

Light microscopy, Confocal microscopy.

Bio-informatics

Well versed in most of the bioinformatics softwares, Data mining, Nucleotide and Protein sequence analysis tools, Annotations of genes and proteins.

Computer Skills

Microsoft Office (Word, Excel, PowerPoint), Adobe Photoshop, Scientific softwares like Scifinder, GraphPad prism, EstimateS, PAST and MEGA etc.

Teaching Skills

I have been teaching Botany at graduate level since last two years at Government Degree College Kishtwar. I have also supervised six under-graduate and two post-graduate students from various disciplines of Biological Sciences for their dissertation work.

Resume of research work accomplished

Molecular Plant-microbe interaction studies in *Crocus sativus* L. and *Glycyrrhiza glabra* L

In this project we worked on exploring the micro biome associated with the Saffron and Glycyrrhiza plant and explore them for plant growth promoting properties to understand the benefits that the plant is deriving from endophytism. We were also trying to understand the molecular cross talks between the endophytes and the host plant, and how these interactions affect the metabolic flux in the symbiotic partners. We were able to establish a useful plant-microbe (*Crocus sativus*-*Mortierella alpina*) symbiotic association in Saffron plant to improve the growth performance, enhanced production of key metabolites and adaptation of the host plant to varied environmental/stress conditions, with special focus on Crocus corm rot disease which is one of the main causes of saffron yield loss. (Wani *et al.* 2016 *Fungal Biology*; Wani *et al.* 2017 *Scientific reports*; Wani *et al.* 2018 *Current Microbiology*, Arora *et al.* 2019 *Fungal Biology*).

Bioprospecting of endophytes for bioactive natural products

Our research also focused on establishment of a repository of novel microorganisms, particularly endophytes for isolation and characterization of bioactive molecules including Volatile Organic Compounds. Our rationale is based on the fact that certain microbes, selected from their natural ecological settings, may provide new and useful leads for industrial, medicinal and agricultural product discovery. We were able to isolate four new antimicrobial and cytotoxic metabolites *Phialomustin A-D* from an endophytic fungus, *Phialophora mustea*. (Arora *et al.* 2016 *Microbial Ecology*; Nalli *et al.* 2015 *RSC advances*, Wani *et al.* 2018 *Current Microbiology*).

OMICS approach to understand the apocarotenoid pathway in *Crocus sativus* L.

In this project our focus was on elucidating the biosynthetic and regulatory pathways of plant secondary metabolism. We use combinatorial OMICS approach for comprehensive investigations and large-scale gene discovery programs in plant secondary metabolism. With integration of transcriptome and metabolome profiling data, we develop extensive collections of genes which are involved in different plant secondary metabolic pathways. We have developed transcriptome map for saffron stigma and Saffron flower without stigma. This transcriptome data is being used for identification of genes involved in apocarotenoid biosynthesis and also transcription factors which regulate this process (Baba *et al.* 2015 *BMC Genomics*).

Referees

Dr. Nasheeman Ashraf

Senior Scientist

Plant Biotechnology Division

Indian Institute of Integrative Medicine

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Dr. Syed Riyaz-Ul-Hassan

Senior Scientist

Microbial Biotechnology Division

Indian Institute of Integrative Medicine

Canal Road, Jammu- 180001

srhassan@iiim.ac.in

Publications

- **Wani ZA**, Kumar A, Sultan P, Bindu K, Riyaz-Ul-Hassan S, Ashraf N* (2017) *Mortierella alpina* (CS10E4), an oleaginous fungal endophyte of *Crocus sativus* L. enhances apocarotenoid biosynthesis and stress tolerance in host plant. *Scientific Reports* 7(1):8598.
- Arora P, **Wani ZA**, Ahmad T, Sultan P, Gupta S, Riyaz-Ul-Hassan S* (2019) Community structure, spatial distribution, diversity and functional characterization of culturable endophytic fungi associated with *Glycyrrhiza glabra* L. *Fungal Biology* <https://doi.org/10.1016/j.funbio.2019.02.003>
- **Wani ZA**, Ahmad T, Nalli Y, Ali A, Singh AP, Vishwakarma RA, Ashraf N, Riyaz-Ul-Hassan S* (2018) *Porostereum* sp., Associated with Saffron (*Crocus sativus* L.), is a Latent Pathogen Capable of Producing Phytotoxic Chlorinated Aromatic Compounds. *Current Microbiology* doi: 10.1007/s00284-018-1461-9
- **Wani ZA**, Mirza DN, Arora P, Ashraf N, Riyaz-Ul-Hassan S* (2016) Molecular phylogeny, diversity, community structure and plant growth promoting properties of fungal endophytes associated with the corms of saffron plant: An insight into the microbiome of *Crocus sativus* Linn. *Fungal Biology* 120:1509 -1524.
- **Wani ZA**, Ashraf N, Mohiuddin T, Riyaz-Ul-Hassan S* (2015) Plant-endophyte symbiosis, an ecological perspective. *Applied Microbiology and Biotechnology* 99: 2955-2965.
- Arora P, **Wani ZA**, Nalli Y, Ali A, Riyaz-Ul-Hassan S* (2016) Antimicrobial Potential of Thiodiketopiperazine Derivatives Produced by *Phoma* sp., an Endophyte of *Glycyrrhiza glabra* Linn. *Microbial Ecology* 72:802-812.
- Nalli Y, Mirza DN, **Wani ZA**, Wadhwa B, Mallik FA, Raina C, Chaubey A, Riyaz-Ul-Hassan S*, Ali A* (2015) Phialomustin A-D, new antimicrobial and cytotoxic metabolites from an endophytic fungus, *Phialophora mustea*. *RSC Advances* 5: 95307-95312.
- Baba SA, Mohiuddin T, Basu S, Swarnkar MK, Malik AH, **Wani ZA**, Abbas N, Singh AK, Ashraf N* (2015). Comprehensive transcriptome analysis of *Crocus sativus* for discovery and expression of genes involved in apocarotenoid biosynthesis. *BMC Genomics* 16:698.
- Baba SA, Malik AH, **Wani ZA**, Mohiuddin T, Shah Z, Abbas N, Ashraf N* (2015) Phytochemical analysis and antioxidant activity of different tissue types of *Crocus sativus* and oxidative stress alleviating potential of saffron extract in plants, bacteria, and yeast. *South African Journal of Botany* 99: 80–87.

Patent filed

Zahoor A. Wani, Phalisteen Sultan, Nasheeman Ashraf, Syed Riyaz-Ul-Hassan, Ram A. Vishwakarma (2017). Microbial formulation based on an Endophyte, *Mortierella alpina*

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CS10E4, isolated from saffron, for plant growth promotion and inhibition of corm rot in *Crocus sativus*. Ref. No. 0074NF2017.

Book

Zahoor A. Wani (In press). Endophyte Biology; Recent findings from Kashmir Himalayas. Cambridge Scholars Publishing, UK.

Book chapter

Zahoor Ahmed Wani, Nasheeman Ashraf (2018) Transcriptomic studies revealing enigma of Plant-pathogen interaction. A. Singh, I. K. Singh (eds.), *Molecular Aspects of Plant-Pathogen Interaction*, Springer Nature Singapore Pte Ltd. https://doi.org/10.1007/978-981-10-7371-7_10

Conferences and Symposia

- Participated and presented paper in 3rd national conference on *Recent Trends in Sciences, Social Sciences and Humanities*, organized by Govt. PG College Rajouri, J&K, India on January 19-20, 2019.
- Participated and presented paper in International symposium on *Fungal Biology: Advances, Applications, and Conservation* and 45th Annual meeting of Mycological Society of India, Organized by NFCCI, MACS Agharkar Research Institute, Pune, India on November 19-21, 2018.
- Participated and presented paper entitled, “A fungal endophyte of *Crocus sativus* enhances apocarotenoid biosynthesis and stress tolerance in host plant” in 12th JK Science Congress 2017 (JKSC17), held on March 2nd to 4th, 2017 at University of Jammu, Jammu.
- Participated and presented paper in National Symposium *Mycological Research – Emerging Trends, Applications and Prospects* and 41st annual meeting of Mycological Society of India organized by Department of Botany, Punjabi University, Patiala, India on February 23-24, 2015.
- Participated and presented poster in 11th JK Science Congress 2015 (JKSC15), held on October 12 -14, 2015 at University of Kashmir, Hazratbal, Srinagar.
- Represented Department of Botany and participated in a debate entitled “Global Warming and its impact”, on Global Earth Day organized by Department of Geology and Geophysics in collaboration with Dean Students Welfare concluded at University of Kashmir, on May 3, 2010.
- Lecture delivered on various scientific topics related to endophyte biology and their association with plants in Scientific Literary Club of National Academy of Science, Jammu & Kashmir Chapter at CSIR-IIIM Jammu.
- Attended various seminars and workshops in CSIR-IIIM Jammu on various issues ranging from scientific work to social work.