

## **PUJA RAY**

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### **SUMMARY**

- Over 12 years of successful experience in weed and insect pest management; ecological research.
- Excellent ability to organize and carry out multidisciplinary research projects.
- Comprehensive experience and knowledge in applied entomology and plant pathology.
- Good fundamental and working knowledge of entomological and microbial techniques.
- Over 25 research publications in international journals in the areas of basic/applied entomology, mycology; and weed and insect pest management.
- Teaching experience at postgraduate level
- International living experience with good cross culture communication skills.

### **PROFESSIONAL EXPERIENCE**

**Assistant Professor, Zoology, Presidency University, India** **Nov. 12'-Present**

- Lecturing graduate and post graduate classes in Zoology
- Guiding student research in forest ecology, crop protection, biotechnology and various aspects of entomology and microbiology
- Present research in weed and insect pest management, butterfly ecology, fungal metabolites.

**Assistant Professor, Agri. Biotechnology, AKS University, India** **Aug. 12'-Oct. 12'**

- Lecturing graduate and post graduate classes in agricultural entomology and plant pathology

**Rhodes Post Doctoral Fellow, Rhodes University, S. Africa** **May 10'-June 12'**

- Studies on insects, *Ecritotarsus catarinensis* and *Neochetina* species as biocontrol agents for water hyacinth
- Isolation and identification of potential phytopathogens of aquatic weeds
- Designing and performing experiments on integrating insects and plant pathogens to develop a potential biocontrol system against weeds
- Interaction studies between insect and fungal biocontrol agents of water hyacinth
- Studies on developing new eco-friendly bioherbicidal agents of aquatic weeds for industrial production.
- Postdoctoral Representative at the Faculty Council

**CSIR-Senior Research Fellow, Tropical Forest Research Institute, India.** **Mar 08'-Mar 10'**

- Demonstrated excellent technical competencies through multi-disciplinary laboratory research.
- Investigated the life cycle and behaviour of indigenous parasitoids as a natural biocontrol agent against forest insect pests.
- Rearing of Tricogramma and Braconid parasitoids and their host.
- Reported 8 new Braconid parasitoids species and deposit it under National Forest Insect Collection database at Forest Research Institute Dehradun, India.

**ICAR-Senior Research Fellow**, Directorate of Weed Science Research, India. **Apr 05'-Mar 08'**

- Research on enhancing the biocontrol potential of *Zygogramma bicolorata* insects to increase its efficacy against weed *Parthenium hysterophorus*.
- Studies on biology, ecology revolving around diapauses aversion, herbicide resistance and temperature tolerance of parthenium beetle.
- Biology and host range study of several phytophagous insects (*Hymenia recurvalis*, *Spodoptera litura*, *Papilio demoleus*).
- Mass rearing of insects.
- Isolated and identified potential indigenous fungal agents and studied their biocontrol efficacy against weeds.

## EDUCATION

<b>PhD in BioSciences</b> , Directorate of Weed Science Research, India (Registered under: R. D. University, M.P.)	<b>2008'</b>
<b>B.Ed.</b> R. D. University, Jabalpur, M.P., India	<b>2001'</b>
<b>M.Sc.</b> in Zoology, Government Autonomous Science College, M.P., India	<b>2000'</b>
<b>B.Sc.</b> in Biology, M.H. College of Home Science and Science for Women, Jabalpur	<b>1998'</b>

## AWARDS AND HONOURS

- Awarded “**UGC Research Awards**” 2014-16.
- Awarded “**Young Scientist Award**” 2012, by the **Indian Society for Weed Science**, for research in weed biocontrol.
- Recipient of prestigious “**Rhodes Post-doctoral Fellowship**”, 2010-2012.
- Received “**State Young Scientist Award**”, in Life-sciences by M.P. Council of Science and Technology, 2009.
- “**Best Ph.D Thesis Award**” from **Indian Society for Weed Science**. 2008
- Received “**Junior Scientist Award**” Society for Basic and Applied Mycology, SBAM, India for innovative research in integrated management of water hyacinth”, 2008.
- “**Graduate Student Award**” and **travel grant** at **International Weed Science Congress**, Vancouver, Canada, 2008.

## PEER-REVIEWED PUBLICATIONS

**Total number of publications: 25 manuscripts, under review: 2, Conferences & Proceedings: 28**

- **Puja Ray** and Martin P. Hill. *More is not necessarily better: The interaction between insect population density and culture age of fungus on the control of invasive weed water hyacinth*. *Hydrobiologia* (In Press).
- **Puja Ray** and Sushilkumar. *Population dynamics and sex ratio of the two waterhyacinth weevils, Neochetina bruchi and N. eichhorniae in central India*. *Indian Journal of Weed Science* (In Press).
- Writuparna Dutta, Durga Ray and Puja Ray (2015) *Molecular characterization and host range studies of indigenous fungus as prospective mycoherbicidal agent of waterhyacinth, Eichhornia crassipes*. *Indian Journal of Weed Science* 47(1): 59–65.
- **Puja Ray** and Lakshmi Sumitra Vijayachandran (2013) *Evaluation of Indigenous Fungal Pathogens from Horse Purslane (Trianthema portulacastrum) for Their Relative Virulence and Host Range Assessments to Select a Potential Mycoherbicidal Agent*. *Weed Science*. 61 (4): 580-585.
- **Puja Ray** and Martin P. Hill. (2013) *Microbial agents for control of aquatic weeds and their role in*

*integrated management*. Invited review article. CAB Reviews. 8 (14): 1-9.

- **Puja Ray** and Martin P. Hill. (2012) *Impact of feeding by Neochetina weevils on pathogenicity of fungi associated with waterhyacinth in South Africa*. Journal of Aquatic Plant Management. 50: 79-84.
- **Puja Ray** and Martin P. Hill. (2012) *Fungi associated with Eichhornia crassipes Mart. Solms-Laubach (Pontederiaceae) in South Africa and studies on their pathogenicity*. African Journal of Aquatic Science. 37(3): 323–331.
- Sushilkumar and **Puja Ray** (2011). *Evaluation of augmentative release of Zygotogramma bicolorata Pallister (Coleoptera: Chrysomelidae) for biological control of Parthenium hysterophorus L.* Crop Protection. 30: 587-591.
- Sushilkumar and **Puja Ray** (2010). *Activity enhancement of Zygotogramma bicolorata, a biocontrol agent of Parthenium hysterophorus, by temperature regulated diapause aversion*. Biocontrol Science and Technology. 20(9): 903-908.
- M. Yousuf and **Puja Ray** (2010). *Record on species of Apanteles Foerster (Braconidae: Microgastrinae) from central India*. Bulletin of Pure and Applied Sciences. 29A: 31-46.
- M. Yousuf and **Puja Ray** (2010). *Description of two new species of Apanteles Foerster (Braconidae: Microgastrinae) from Chhattisgarh, India*. Entomon. 35(1): 1–8.
- **Puja Ray** and M. Yousuf (2009). *Record of two new species of Apanteles Foerster from Central India*. Journal of Bombay Natural History Society. 106 (3): 335-338.
- Poonam Dubey, **Puja Ray** and A.K. Pandey. (2009). *First record of entomopathogen Beauveria bassiana (Bals.-Criv.) Vuill on Zygotogramma bicolorata Pallister, a biocontrol agent of Parthenium hysterophorus L.* Journal of Plant Protection Research. 50(1):53-55.
- **Puja Ray**, Sushilkumar and A.K. Pandey (2009). *Influence of photoperiod on growth and mycoherbicidal potential of Alternaria alternata, a biocontrol agent of waterhyacinth*. Journal of Mycology and Plant Pathology. 39(3):458-461.
- M. Yousuf and **Puja Ray** (2009). *Braconids (Hymenoptera: Ichneumonoidea) as major parasitoids of insect pests* (Review Article). My Forest. 45 (4): 371-384.
- M. Yousuf and **Puja Ray** (2009). *Record of Chelonus Panzer (Braconidae: Cheloninae) from central India and their role in insect pest management*. Journal of Biopesticides. 2(2): 145-149.
- M. Yousuf and **Puja Ray** (2009). *Description of a new species of the genus Rogas Nees Von Esenbeck (Hymenoptera: Braconidae) from India*. World Journal of Entomology. 4(3): 184-187.
- **Puja Ray**, Sushilkumar and A.K. Pandey. (2009). *Impact evaluation of Neochetina spp. on different growth stages of waterhyacinth*. Journal of Plant Protection Research. 49(1): 7-13.
- **Puja Ray**, Durga Ray and A.K. Pandey. (2009). *Assessment of Colletotrichum gloeosporioides as mycoherbicidal agent against Parthenium hysterophorus L.* Pestology. 33(10): 26-28.
- **Puja Ray**, Sushilkumar and A.K. Pandey (2008). *Deleterious effect of herbicides on waterhyacinth biocontrol agents Neochetina bruchi and Alternaria alternata*. Biocontrol Science and Technology. 18 (5): 523-533.
- **Puja Ray**, Sushilkumar and A.K. Pandey (2008). *Survey and selection of potential pathogen for biological control of waterhyacinth*. Indian Journal of Weed Science. 40: 75-78.
- **Puja Ray**, A.K. Pandey and Sushilkumar (2008). *Alternaria alternata: a potential biocontrol agent of waterhyacinth*. Journal of Basic and Applied Mycology, 7: 43-45.
- **Puja Ray**, Sushilkumar and A.K. Pandey (2008). *Efficacy of pathogens of waterhyacinth (Eichhornia crassipes), singly and in combinations for its biological control*. Journal of Biological Control. 22 (1): 173-177.
- Sushilkumar and **Puja Ray** (2007). *Biology of Spodoptera litura Fabricius (Lepidoptera: Noctuidae) on some of its major weed hosts*. Entomon. 32 (4): 287-290.

- **Puja Ray**, A.K. Pandey and Sushilkumar (2007). *Investigations on the effect of nutrition and physical factors on biomass, toxin production and damage potential of Alternaria alternata, a biocontrol agent of waterhyacinth*. Journal of Basic and Applied Mycology, 6: 73-79.
- Nitish Singh Parihar, Vaishali Chaudhary, **Puja Ray** and A.K. Pandey (2007). *Mycoflora associated with the major broad leaved weeds infesting soybean fields*. Journal of Basic and Applied Mycology, 6: 80-81.
- Sushilkumar, **Puja Ray** and Shobha Sondhia. *Mass rearing techniques of Zygogramma bicolorata (Coleoptera: Chrysomelidae) to overcome its limitation during winter for biological control of Parthenium*. Indian Journal of Weed Science. (Accepted).

## RECENT ORAL PRESENTATIONS AND INVITED LECTURES

- *Studies on the role of insect feeding on waterhyacinth to enhance the pathogenicity of fungi associated with the noxious macrophyte*. Young Investigators Meeting 2015. Srinagar 27 March- 1 April 2015.
- *Prospects of biotechnology in enhancing weed management*. Symposium on Recent Advances in Biotechnology for Food and Fuel, The Energy and Resources Institute (TERI), India Habitat Centre Lodhi Road, New Delhi 19th - 20th November 2014
- *Practicability of integrating the indigenous fungal pathogens of waterhyacinth into its existing biocontrol programme in South Africa*. International Conference on Environmental Biology and Ecological Modelling (ICEBEM)", Vishva-Bharati, Santiniketan, W.B. 24- 26 February, 2014.
- *Insects can enhance the biocontrol potential of pathogens against weeds: A case study on aquatic weed, waterhyacinth in South Africa*. 24<sup>th</sup> International Congress of Entomology, 19-25, August 2012, Daegu, Republic of Korea.
- *A review of interactions between insect and fungal biocontrol agents of water hyacinth and our recent studies*. "XIII<sup>th</sup> International Symposium on Biological Control of Weeds (ISBCW 2011)", 11-16 September, 2011. Waikoloa Beach Marriott Resort & Spa Waikoloa, Hawaii, USA.
- *Fungi associated with Eichhornia crassipes in South Africa and studies on their pathogenicity* "38<sup>th</sup> annual workshop on the Biological and Integrated Control of Weeds", 30 August - 3 September 2010 at Buffelspoort Conference Resort, North-west Province, South Africa.
- *Role of insect agent, Ecritotarsus catarinensis in enhancing the biocontrol potential of water hyacinth with pathogens*. XVIIth Congress of the Entomological Society of Southern Africa, 3-6 July 2011, Bloemfontein, South Africa.
- *Augmentation of biocontrol agent, Zygogramma bicolorata Pallister as eco-friendly measure to control noxious weed, Parthenium hysterophorus L*. "2nd Bharatiya Vigyan Sammelan (Indian Science Congress)", December 1-3 2009 Organized by Madhya Pradesh Council of Science and Technology (MPCST) at School of Energy and Environmental Studies, Devi Ahilya Vishva Vidyalaya, Takshila Parisar, Indore, India.
- *Bioherbicides in integrated management of waterhyacinth*. "5th International Conference on Biopesticides: Stakeholders' Perspective (ICOB-V 2009)" April 26-30 2009. Organized by TERI (The Energy and Resources Institute), New Delhi, India, in collaboration with Society for Promotion and Innovation of Biopesticides (SPIB), at India Habitat Centre, New Delhi, India.
- *Aphidiines (Hymenoptera: Braconidae: Aphidiinae) as major parasitoids of aphid pests (Hymenoptera: Aphididae)*. "Central Zone Science Conference (Madhya Kshetriya Vigyan Sammelan)", February, 21-22 2009, Organized by M.P. Council of Science and Technology –at Govt. M. H. College of Science and Home Science, Jabalpur, India.
- *Possibilities of activity enhancement of Zygogramma bicolorata, a biocontrol agent of Parthenium*

*hysterophorus*, by temperature regulated diapause aversion. “5th International Weed Science Congress” June 23 – 27, 2008, held at Vancouver, Canada.

### GUIDING STUDENT RESEARCH

- **Deepa Mal, MSc Dissertation** (Jan-May 2015): Studies on disease causing potential of some phytopathogens associated with aquatic weed, water hyacinth. (Status: Completed).
- **Writuparna Dutta, PhD Dissertation** (Dec 2013- Present): Evaluation of microbial metabolites as bioherbicides (Status: Ongoing).
- **Samapika Nandi, PhD Dissertation** (Aug 2014- Present): Screening of *in-vivo* & *in-vitro* populations of some Apocynaceous plants of West Bengal encompassing their phytochemical, pharmacological and bio-controlling aspects (Status: Ongoing).

### ONGOING RESEARCH PROJECTS (As Principal Investigator)

Sl. No.	Title of Project	Name of Funding Agency	Amount (Rs.)	Date of initiation & Duration
1	Studies on enhancing biological control mechanism of aquatic weed, water hyacinth through integration of insects and fungal agents	DST (SERB-OYS Scheme)	20,20,000	Dec. 2013 to Dec. 2016
2	Evaluation of phytopathogens associated with some major aquatic weeds with emphasis on their toxin production	WB-DBT	22,13,000	Mar. 2015 to Feb. 2018
3.	Survey for collection and identification of phytopathogenic fungi associated with noxious weed, water hyacinth, <i>Eichhornia crassipes</i>	UGC	3,00,000 research grant + fellowship	Apr. 2015 to Mar. 2017

### TECHNICAL EXPOSURE

- Mass rearing of insects
- Biological and morphometric studies of insects
- TLC (Thin Layer Chromatography), HPLC (High Pressure Liquid Chromatography), Column chromatography, Spectrophotometer
- Solvent extraction
- Microbial techniques involved in mycoherbicide preparation, extraction and purification of secondary metabolites from microbes, biochemical studies of fungi
- Chemical and bio-pesticide formulation, application and its impact on non-target organisms
- Computer skills: MS Office, HTML, C++, Visual Basic, Oracle,
- Knowledge of statistical software – Genstat and SSPS.

### ADMINISTRATIVE EXPERIENCE

- Superintendent, Presidency University Girls' Hostel 2013- Present
- Postdoctoral Representative at the Faculty Council 2011-2012

## **RESEARCH INTEREST**

I am an entomologist with diverse research interest involving:

- Weed and insect pest management
- Activity enhancement of biocontrol agents
- Mycopesticide production and application
- Insect ecology, behaviour and biology
- Insect, pathogen and plant interaction
- Insect taxonomy and biodiversity
- Non-target impact of pesticides

## **STRENGTHS**

- Fluent in English
- Good Team Member
- Versatile and Quick learner.
- Able to produce quality work on time and within budget.

## **MEMBERSHIPS**

- Indian Society for Weed Science, India
- Society for Basic and Applied Mycology, India.
- Weed Science Society of America, USA.
- Society for Biocontrol Advancement, India.
- Entomological Society of America, USA
- Indian Science Congress, India.