

## Dr. Kamal Sharma, Ph.D

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### Education

- ☞ Post doctorate and teacher at Department of Genetics and Breeding, Czech University of Life Sciences, Prague, Czech Republic from March, 2013 to June 2015
- ☞ Ph.D, Biotechnology awarded on (24<sup>th</sup> December, 2011), Central Tuber Crops Research Institute, Trivandrum, India (Affiliated to Kannur University, Kannur, Kerala, India).
- ☞ M.Sc. (2003), Applied Botany from Bundelkhand University Jhansi, Uttar Pradesh, India
- ☞ B.Sc. (2001), Botany, Zoology, Chemistry from (Maharishi Dayanand University, Rohtak, Haryana, India)
- ☞ 10+2 (1998), from Haryana Board of School Education (Bhiwani, Haryana, India)
- ☞ Matric (1994), from Haryana Board of School Education (Bhiwani, Haryana, India)

### Research Experience

1. Superintendent, Gurugram University, Gurugram, Haryana, January, 2019 to December 2023.
2. Assistant Professor, Department of Botany, Indira Gandhi University, Meerpur, Rewari Haryana, September 2018 to December, 2018.
3. Assistant Professor, Department of Botany, Baba Mastnath University, Rohtak, Haryana, June 2015 to Aug., 2018.
4. Postdoctoral Researcher at CULS, Prague from March, 2013 to June 2015
5. Researcher at IITA, Nigeria (October 2008-September 2011)

Department of Genetics and Breeding, Czech University of Life Sciences, Prague, Czech Republic  
**Objectives**

Different polymorphisms exist in exon regions of S locus in populations of non-cultivated cherries. Knowledge of the structure of this important gene is crucial for pollination ratios cultural varieties in setting up production orchards but also from an ecological point of view. Wild cherries can be important pollinator for commercial orchards. I studied sequential polymorphisms of self-incompatibility locus (S-locus) in cultivated and wild cherries (*Prunus avium* L.).

I lead the cherry research project and some of my key area of research included:

- Comparative study of database data (multiple alignment) of known sequences
- Design of primers for amplification and sequencing of whole S-locus of cherry
- Optimisation of protocol for amplification and sequencing the locus
- Sequencing and analysis of variability (length and SNP polymorphisms) in S locus across the collection

### 2. Researcher (October 2008-September 2011)

International Institute of Tropical Agriculture in the Division of Virology & Molecular Diagnostics Unit, at Ibadan, Nigeria as Researcher (Dutch APO).

### **Objectives and Achievements of Projects:**

☞ Explored the genetic diversity and developed PCR based diagnostic tools for the detection of fungal and bacterial pathogens to IITA mandate crops.

- Determine the molecular biodiversity of *C. gloeosporioides* in cassava and yam, *C. zea-maydis* in maize.
- PCR based assay established for the diagnosis of *C. gloeosporioides* infecting yam and cassava.
- Develop PCR-based assays for the identification of fungal pathogens infecting cassava, yam and maize *P. savastanoi pv glycinea* in soybean, *X. axonopodis pv manihotis* in cassava.
- Establish the DNA bank of the type isolates of fungal and bacterial pathogens infecting cassava, yam, cowpea, soybean and maize.
- Molecular characterization of pathogens intercepted on germplasms import and export
- Assessment of *Colletotrichum* spp. infecting yam leaf, maize, cowpea and soybean seeds and *Cercospora* spp. infecting maize, soybean, sugarcane and Sesame in Nigeria
- Identification of *Phytophthora colocasiae* causing leaf blight in taro (*Colocasia esculenta*) in Nigeria and Ghana.
- Identification of soybean witches' broom disease caused by group 16SrII phytoplasma in soybean in Malawi and Mozambique.
- Identification of genetically distinct *Cercospora* species causing grey leaf spot of maize (*Zea mays* L.) in Nigeria.
- Establish PCR-based diagnostic tools for the identification *Cercospora zea-maydis*.
- Genetic characterization of *Fusarium verticillioides* associated with ear rot of maize in Nigeria.

### **3. Senior Research Fellow (February 2005 to August 2008)**

Division of Crop Protection, Central Tuber Crops Research Institute (CTCRI), Trivandrum, Kerala, India

**February 2008 to August 2008:** associated with project entitled "Molecular Diagnosis of Fungal Diseases of Cassava, Taro, Amorphophallus and Yams

#### **Achievements:**

☞ Standardized the efficient method of purification of DNA from propagules (in soil/planting material) of *Phytophthora palmivora* var *palmivora* causing cassava tuber rot, *Phytophthora colocasiae* causing taro blight, *Sclerotium rolfsii* causing Amorphophallus collar rot and *Colletotrichum gloeosporioides* causing anthracnose/die back in Yams.

☞ Developed an efficient diagnostic test for the detection of *Phytophthora palmivora* var *palmivora* causing cassava tuber rot, *Phytophthora colocasiae* causing taro blight, *Sclerotium rolfsii* causing Amorphophallus collar rot and *Colletotrichum gloeosporioides* causing anthracnose/die back in Yams.

**February 2005 to January 2008:** associated with project entitled “Elicitor Induced Resistance in Taro against *Phytophthora* Leaf Blight”

**Achievements:**

☞ Purified characterized and reported elicitor Protein in *Phytophthora colocasiae*. Further, full length of gene encoding elicitor protein in culture filtrate of *Phytophthora colocasiae* was characterized by PCR-cloning and blotting experiment. The expression of the corresponding elicitor gene during the disease cycle of *P. colocasiae* was analyzed.

☞ The effect of reported elicitor protein of *P. colocasiae* on the elicitation of defense-related enzyme and genes in suspension-cultured taro cells were analyzed.

☞ Standardized DNA isolation method for whole phytopathogen, fungi as well as for Tuber Crops plant.

☞ Conducted genotyping studies of *P. colocasiae* isolates and taro via molecular (RAPD, AFLP), biochemical (isozyme) markers and reported the molecular marker associated with *Phytophthora* leaf blight disease in taro.

☞ Employed suppressive subtractive hybridization (SSH), cDNA libraries, Northern blot analysis, high through put DNA sequencing, bioinformatics and identified defense related genes and transcription factor in taro induced by *P. colocasiae* infection.

☞ The BAP-mediated inhibitory effect of *P. colocasiae* was found *in vitro* and *in planta*. The BAP-mediated growth retardation of *P. colocasiae* provides evidence for its efficacy in a biological control for disease prevention and provides a new strategy to combat taro leaf blight.

☞ Developed the submerged fermentation for the mass production of *Trichoderma harzianum* for biocontrol of *Sclerotium rolfsii*

**4. Senior Research Fellow (October 2004 to January 2005)**

Division of Seed Science and technology, Indian Agricultural Research Institute (IARI), New Delhi, India

Project: Weed Seed Identification, conservation and documentation for improving seed quality evaluation

**Achievements:**

Characterized weeds seeds associated with crops like wheat, rice, maize etc.

**Grants/ Awards**

- 2008-2009 Opportunity grants (25000 USD). Project titled “Development of molecular tools for the reliable indexing of fungal pathogens for safe and expeditious movement of cassava, cowpea, soybean, maize and yam germplasms”. P.I. Kamal Sharma Co PI. Kumar PL. Ayodele M and Bandyopadhyay R.

- 2009-2010 Opportunity grants (29000 USD). Project titled “Determine biodiversity of major bacterial and fungal diseases of maize and yam”. P.I. Kamal Sharma Co PI. Kumar PL. Ayodele M and Bandyopadhyay R.
- 2010-2011 Yam opportunity grants (27500 USD). Project titled “Unravelling the virulence and population diversity of *Colletotrichum gloeosporioides* isolates from five countries in West African yam belt”. PI. Kumar PL. COPI Sharma Kamal, Zandjanakou-Tachin M and Bandyopadhyay R.

**Membership:** Life Member of Journal “Journal of Root Crop of Society, Trivandrum”, Kerala, India.

### Training

- Worked at Laboratory of Fruticultura with Dr. Ana Wünsch in Unidad de Fruticultura, Centro de Investigación y Tecnología Agroalimentaria (CITA) de Aragón, Avda. Montaña, Zaragoza, Spain and attained the training of characterization of S-allele of sweet cherry using capillary electrophoresis.
- Worked at Kompetenzzentrum Obstbau-Bodensee (KOB), Schuhmacherhof 6, Ravensburg, Germany with Dr. Haibo Xuan and attained the training of microsatellites marker applications on sweet cherry.

### Personal Details

**Date of Birth:** 24<sup>th</sup> September, 1979  
**Permanent Address:** House No. 24/12, Parvesh Nagar, Rohtak -124 001, Haryana (India)  
**Website** [http://www.researchgate.net/profile/Kamal\\_Sharma15/](http://www.researchgate.net/profile/Kamal_Sharma15/)

### Publications

1. Misra RS, Maheswari SK, Sriram S, **Sharma K** and Sahu AK. (2007). Integrated management of Phytophthora leaf blight disease of taro (*Colocasia esculanta* (L.) Schott). Journal of Root Crops. 33(2): 144-146.
2. Mishra AK, **Sharma K** and Misra RS. (2008). Effect of Benzyl amino purine on the pathogen growth and disease development of taro leaf blight caused by Phytophthora colocasiae. Journal of Plant Pathology. 90(2): 191-196.
3. Mishra AK, **Sharma K** and Misra RS. (2008). Genetic Relatedness of *Colocasia esculenta* as revealed by RAPDs. Asian and Australasian Journal of Plants Science and Biotechnology. 2 (2): 97-101.
4. Mishra AK, **Sharma K** and Misra RS. (2008). Simple and efficient method for fungal genomic DNA extraction. Gene, Genomes and Genomics. 2(1): 57-59.
5. Misra RS, **Sharma K** and Mishra AK (2008). *Phytophthora* leaf blight of Taro (*Colocasia esculenta*)-A review. Asian and Australasian Journal of Plants Science and Biotechnology. 2(2): 55-63.
6. Jeeva ML, **Sharma K**, Mishra AK and Misra RS. (2008). Rapid extraction of genomic DNA from *Sclerotium rolfsii* causing collar rot of *Amorphophallus*. Gene, Genomes and Genomics. 2(1): 60-62.
7. Misra RS, **Sharma K**, Mishra AK and Sriram S. (2008). Biochemical alterations induced in Taro in response to *Phytophthora colocasiae* infection. Advances in Natural and Applied Sciences. 2(3): 112-121.

8. Singh VK and **Sharma K.** (2008). Physiological and Biochemical changes during flowering of mango (*Mangifera indica*). International Journal of Plant Developmental Biology. 2(2): 100-105.
9. **Sharma K,** Mishra AK and Misra RS. (2008). A simple and efficient method for extraction of genomic DNA from tropical tuber crops. African Journal of Biotechnology. 7(8): 1018-1022.
10. **Sharma K,** Mishra AK and Misra RS. (2008). The Genetic Structure of Taro: A Comparison of RAPD and Isozyme Markers. Plant Biotechnology Reports. 2(3): 191-198.
11. **Sharma K,** Mishra AK and Misra RS. (2008). Analysis of AFLP variation of taro population and markers associated with leaf blight resistance gene. Academic Journal of Plant Sciences. 1(3): 42-48.
12. **Sharma K,** Mishra AK and Misra RS. (2009). Morphological, Biochemical and Molecular characterization of *Trichoderma harzanium* isolates for their efficacy as biocontrol agent. Journal of Phytopathology. 157(1): 51-56.
13. Mishra AK, **Sharma K** and Misra RS. (2009). Purification and characterization of elicitor protein form *Phytophthora colocasiae* and basic resistance in *Colocasia esculenta*. Microbiological Research. 164(6): 688-693.
14. **Sharma K,** Mishra AK and Misra RS. (2009). Identification and characterization of differentially expressed genes in the resistance reaction in taro infected with *P. colocasiae*. Molecular Biology Reports. 36 (6): 1291-1297.
15. Mishra AK, **Sharma K** and Misra RS. (2010). Cloning and characterization of cDNA encoding an elicitor of *P. colocasiae*. Microbiological Research. 165(2): 97-107.
16. Mishra AK, **Sharma K** and Misra RS. (2010). Isozyme and PCR- based genotyping of *Phytophthora colocasiae* associated with taro leaf blight. Archives of Phytopathology and Plant protection. 43(14): 1367-1380.
17. Misra RS, Mishra AK, **Sharma K,** Jeeva ML and Hegde V. 2011. Characterisation of *Phytophthora colocasiae* isolates associated with leaf blight of taro in India. Archives of Phytopathology and Plant protection. 44(6): 581-591.
18. Kumar PL, **Sharma K,** Tefera H, Tamò M. (2011). First report of soybean witches'-broom disease caused by group 16SrII Phytoplasma in soybean in Malawi and Mozambique. Plant Disease. 95(4): 492. (featured on the cover of Journal issue)
19. **Sharma K** and Misra RS. (2011). Molecular approaches towards analyzing the viruses infecting maize (*Zea mays* L.). Journal of General and Molecular Virology. 3(1): 1-17.
20. Bandyopadhyay R, **Sharma K,** Onyeka TJ, Aregbesola EA and Kumar PL. (2011). First report of taro (*Colocasia esculenta*) leaf blight caused by *Phytophthora colocasiae* in Nigeria. Plant Disease. 95(5): 618.

21. Omame E, Oduro KA, Cornelius EW, Opoku IY, Akrofi AY, **Sharma K**, Kumar PL and Bandyopadhyay R. (2012). First report of leaf blight of taro (*Colocasia esculenta*) caused by *Phytophthora colocasiae* in Ghana. *Plant Disease*. 96(2): 292.
22. Mishra AK, **Sharma K** and Misra RS. (2012). Elicitor recognition, signal transduction and Induced Resistance in Plants. *Journal of Plant Interactions*. 7(2): 95-120.
23. Senghor AL, **Sharma K**, Kumar PL, and Bandyopadhyay R. (2012). First report of Mango malformation disease caused by *Fusarium tuiense* in Senegal. *Plant Disease*. 96(10): 1582.
24. **Sharma K**, Bhattacharjee R, Sartie A and Kumar PL. (2013). An improved method of DNA extraction from plants for pathogen detection and genotyping by polymerase chain reaction. *African Journal of Biotechnology*. 12(15):1894-1901.
25. **Sharma K**, Mishra AK, Mehraj V and Duraisamy GS. (2014). Advances and applications of molecular cloning in clinical microbiology. *Biotechnology and Genetic Engineering Reviews*. 30 (1): 65-78.
26. **Sharma K**, Sedlák P, Zeka, D, Vejl P and Soukup J. (2014). The allele-specific PCR detection of sweet cherry self - incompatibility alleles S3, S4 and S9 using consensus and allele-specific primers in Czech Republic. *Horticultural Science*. 41(4): 153-159.
27. Sedlák P, Zeka D, Sedláková V, **Sharma K** and Vejl P. (2015). Phenotype and molecular diversity evaluation of some wild 2n Solanum species (super series Rotata). *Chilean Journal of Agricultural Research*. 75(2): 147-151.
28. **Sharma K**, Haibo X. and Sedlák P. 2015. Assessment of genetic diversity of Czech sweet cherry cultivars using microsatellite markers. *Biochemical Systematics and Ecology*. 63: 6-12.
29. **Sharma K**, Cachi AM, Sedlák P, Skřivanová A. and Wünsch A. (2016). S-genotyping of 25 sweet cherry (*Prunus avium* L.) cultivars from the Czech Republic. *Journal of Horticultural Science & Biotechnology*. 91(2): 117-121.
30. Shalini, Maurya V and **Sharma K**. 2016. Seasonal incidence of *Brevicoryne brassica* and *Plutella xylostella* on *Brassica oleracea* in Rohtak District. *Annals of Plant Protection Sciences*. 24(2): 319-323.
31. **Sharma K**, Korecký J, Patrizio–Soldateschi ED, Sedlák P. 2017. S-genotype diversity in wild cherry populations in the Czech Republic. *Scientia Agriculturae Bohemica*. 48 (1): 92–97.
32. Garg C, **Sharma K**, Sharma A and Ram K. 2019. Effect of Mannitol Concentration on Chilli Genotype. *Global Journal of Bio-Science and Biotechnology*. 8 (1) 2019: 15-19.
33. Manju, Kaur V, **Sharma K** and Kumar A. 2019. Identification of promising sources for drought tolerance in cultivated and wild species germplasm of barley based on root architecture. *Journal of Environmental Biology*. 40 (3): 309-315.

34. Manju, Kaur V, **Sharma K** and Jacob S. R. 2019. Assessment of Genetic Diversity in Cultivated and Wild Species Germplasm of Barley based on Morpho-agronomical and Root Architecture Traits. *Indian J. Plant Genet. Resour.* 32(3): 360-367.
35. Pawar D, Kumar N, Kumar A, Narwal D and **Sharma K**. 2022. Weeds infesting wheat crop in Rohtak, Haryana. *Agricultural Science.* 11(11):41-44.

#### **Conferences and Presentations**

1. **Sharma K**, Mishra AK, Misra RS. RAPD Variation among 14 isolates of *Phytophthora colocasiae* collected from India. *In: 14th Triennial Symposium of International Society for Tropical Root Crops, Central Tuber Crops Research Institute, Trivandrum, Kerala, India. November 20-26, 2006. pp. 168.*
2. Mishra AK, **Sharma K**, Misra RS. Presence of elicitor protein in the culture filtrates of *Phytophthora colocasiae*. *In: 14th Triennial Symposium of International Society for Tropical Root Crops, Central Tuber Crops Research Institute, Trivandrum, Kerala, India. November 20-26, 2006. pp 168.*
3. Misra RS, **Sharma K** and Mishra AK. Diseases of Edible Aroids in India and their management. *In: 14th Triennial Symposium of International Society for Tropical Root Crops, Central Tuber Crops Research Institute, Trivandrum, Kerala, India. November. 20-26, 2006. pp. 143.*
4. **Sharma K**, Mishra AK, Jeeva ML and Misra RS. Application of submerged fermentation for the mass production of *Trichoderma harzianum* for biocontrol of *Sclerotium rolfsii*. *In: National Seminar on Amorphophallus: Innovative Technologies, Rajendra Agricultural University, Patna, Bihar, India. July. 19-20, 2008. pp. 176-177.*
5. Jeeva ML, **Sharma K**, Mishra AK, Misra RS, Nair RR and Hegde V. Identification of *Sclerotium rolfsii* causing collar rot in *Amorphophallus* through PCR. *In: National Seminar on Amorphophallus: Innovative Technologies, Rajendra Agricultural University, Patna, Bihar, India. July. 19-20, 2008. pp. 174-175.*
6. Mishra AK, **Sharma K**, Jeeva ML and Misra RS. Genetic diversity and population genetic analysis of *Sclerotium rolfsii* associated with collar rot disease in *Amorphophallus*. *In: National Seminar on Amorphophallus: Innovative Technologies, Rajendra Agricultural University, Patna, Bihar, India. July. 19-20, 2008. pp. 178-179.*
7. **Sharma K**, Kumar PL, Ayodele M and Bandyopadhyay R. DNA based tools for accurate diagnosis of fungal pathogens of quarantine importance. *In: 1<sup>st</sup> International conference of IARSAF. Global agriculture and environmental sustainability: The challenges and solutions, International Institute of Tropical Agriculture, Ibadan, Nigeria. March. 17-20, 2009. pp. 55.*
8. **Sharma K**, Ayodele M, Bandyopadhyay R, Asiedu R and Kumar PL. Molecular characterization of *Colletotrichum gloeosporioides* responsible for anthracnose of yam and cassava in Nigeria, and

- development of a diagnostic PCR assay. In: 15th Triennial Symposium of International Society for Tropical Root Crops, International Potato Centre, Lima, Peru. November 2-6, 2009. pp 104.
9. **Sharma K**, Ayodele M, Bandyopadhyay R, Aregbesola EA, Menkir A and Kumar PL. (2010). Genetically distinct *Cercospora* species cause grey leaf spot of maize (*Zea mays* L.) in Nigeria. *Phytopathology*. 100 (6): S117.
  10. **Sharma K**, Ayodele M and Kumar PL. (2010). Genetic characterization of *Fusarium verticillioides* associated with ear rot of maize in Nigeria. *Phytopathology*. 100 (6): S117.
  11. **Sharma K**, P. Sedlák, P. Vejl and J. Soukup. Characterization of S-alleles in sweet and sour cherry by allele specific PCR amplification in Czech Republic. International Plant Breeding Congress, Antalya, Turkey. November 10-14, 2013. pp. 464.
  12. **Sharma K**, Sedlák P, Vejl P and Soukup J. 2014. Molecular analysis of genetic diversity of S-alleles in sweet cherry (*Prunus avium* L.) in situ collection with novel designed primers. 5th World Congress on Biotechnology held in Valencia, Spain from 25th to 27th June, 2014. pp. 215; *J. Biotechnol Biomater* 3(5): 215.
  13. Singh K, **Sharma K**, Zouhar M, Rysanek P. Classification of IMM genes in *Leptosphaeria maculans*: Causal agent of blackleg in *Brassica napus*. 5th World Congress on Biotechnology held in Valencia, Spain from 25th to 27th June, 2014. pp. 215; *J. Biotechnol Biomater* 3(5): 214.
  14. **Sharma K**, Sedlák P, Vejl P and Soukup J. Characterization of S-alleles in sweet cherry (*Prunus avium* L.). International scientific genetic conference XXVI 'Genetic Days' September 3-4, 2014 Prague, Czech Republic. pp. 220.
  15. **Sharma K**, Sedlák P, Vejl P and Soukup J. Characterization of S-alleles in sweet cherry and validation of S13 alleles using capillary electrophoresis and specific primers. GPZ 2014: Genetic Variation in Plant Breeding, September 23-25, 2014 Kiel, Germany. pp. 47.
  16. **Sharma K**, Sedlák P, Jiří Korecky, Vejl P and Soukup J. Determining of S-alleles in wild cherry population of Czech Republic. 3rd International Conference on Agricultural & Horticultural Sciences 27th to 29th October, 2014, Hyderabad, India pp. 140 (*Agrotechnol* 2014, 2:4).
  17. **Sharma K**, Sedlák P, Jiří Korecky, Vejl P and Soukup J. Genetic variation of S-alleles in wild and sweet cherry population of Czech Republic. 50<sup>th</sup> Croatian and 10<sup>th</sup> International Symposium on Agriculture Opatija, Croatia. 16th Feb- 20<sup>th</sup> Feb. 2015. pp116.
  18. Manju, Kaur V, **Sharma K** and Arya SS. Evaluation of Barley germplasms for root system architecture under polyethylene glycol simulated drought stress. International Conference on Advances in Agricultural and Biodiversity Conservation held at CCS University, Meerut, U.P. 27-28<sup>th</sup> Oct., 2017. pp. 349.



### Book/Monograph

1. **Sharma K**, Misra RS and Mishra AK. (2012). “Molecular approaches to manage taro leaf blight”. LAP Lambert Academic Publishing GmbH & Co. KG. ISBN-NR: 978-3-8465-0730-8. pp. 268.
2. Misra RS, Mishra AK and **Sharma K**. (2010). “Elicitor Induced Resistance in Taro against *Phytophthora* Leaf Blight: Recent Advances in leaf blight disease control”. LAP Lambert Academic Publishing GmbH & Co. KG. ISBN-NR: 978-3-8433-6650-2. pp. 276

### Article

1. Kumar PL and **Sharma K**. (2010). DNA barcodes for pathogens of African food crops. Frontiers. Edition 4, March, IITA publication.
2. Kumar TM, **Sharma K**, Mishra AK. (2006). Jaiv Taknik Dwara Kand Phasalo Ki Rog Nirodhak Ksamta Ka Vikas. Phal Phul (Hindi), Nov’06-Dec’06. Page No. 13-14. ISSN 0971-2984

### Reviewer

Agriculture Journal- <http://www.mdpi.com/journal/agriculture>

Online International Journal of Food Science - <http://onlineresearchjournals.org/OIJFS>