


Curriculum Vitae



Title		First Name	Manu	Last Name	Agarwal	Photograph
Designation	Professor					
Address	Room No. 9, Department of Botany University of Delhi, Delhi 110007					
Phone No Office						
Residence	0120-4793202					
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Email	agarwalm71@gmail.com ; magarwal@botany.du.ac.in					
Web-Page						
Educational Qualifications						
Degree	Institution	Year	Details			
B.Sc.	Rohilkhand University	1993	Subjects: Zoology, Botany, Chemistry			
M.Sc.	Goa University	1995	Subjects: Marine Biotechnology			
M.Phil	University of Delhi	1997	Thesis topic: "High temperature induced protein alterations associated with germination of seeds in rice, maize and wheat with emphasis on 104 and 90 kDa proteins."			
Ph.D.	University of Delhi	2002	Thesis topic: "Molecular characterization of high and low molecular weight heat shock genes/proteins from rice (<i>Oryza sativa</i> L)"			
Career Profile						
University of Delhi	Professor	Jan 2014 onwards	Research and Postgraduate teaching			
University of Delhi	Associate Professor	Jan 2011-Jan 2014	Research and Postgraduate teaching			
University of Delhi	Reader	Jan 2008- Jan 2011	Research and Postgraduate teaching			
TERI University, India	Associate Professor	July 2007-Jan 2008	Research and Postgraduate teaching			
University of California Riverside, USA	Postdoctoral research associate	Jan 2004-April 2007	Research			
University of Arizona Tucson, USA	Postdoctoral research associate	Sept 2002-Dec 2003	Research			
Administrative Assignments						
<p>Member Purchase Committee.</p> <p>Involved in Infrastructure development and maintenance in the Department.</p> <p>Ex-member for Bioinformatics Setup in the Department</p> <p>Coordinator and Nodal Officer for M.Sc. and M.Phil./Ph.D. Entrance examination Year 2019</p> <p>Coordinator and Nodal Officer for M.Sc. and M.Phil./Ph.D. Entrance examination Year 2018</p> <p>Coordinator and Nodal Officer for M.Sc. and M.Phil./Ph.D. Entrance examination Year 2018</p> <p>Coordinator for M.Sc. Entrance examination Year 2016</p> <p>Other day-to-day activities for smooth functioning of the department.</p>						
Areas of Interest / Specialization						

My research interests are in understanding the gene regulation mechanisms in plants subjected to stressful environments. Our lab utilizes a combination of genomics and genetics approaches to decipher gene regulation at transcriptional, post-transcriptional, translational and post-translational levels. One of the major interest of my lab is to understand the hierarchical intricacies of Heat Shock Factors (HSFs) that not only regulate heat shock response (HSR), but also play an active role in other abiotic stresses as well. Other projects in lab include biotechnological approaches to improve stress tolerance in crop plants and using reporter mutagenesis screens to isolate and implicate components in abiotic stress signaling pathways.

Subjects Taught

Molecular Genetics, Recombinant DNA technology, Molecular and Cell Biology and Genomics.

Time table of the subjects taught during the current semester

S.No.	Subject	Days	Time	Classroom
1.	Recombinant DNA Technology and Proteomics	(i) Monday (Theory and Practical) (ii) Thursday (Theory and Practical)	(i) Monday: Theory 9.40 AM-10.35 AM Practical 10.45 AM-4.05 PM (ii) Thursday: Theory 9.40 AM-10.35 AM Practical 10.45 AM-4.05 PM	Theory #37 Practical # Lab26
2.	Genomics and Proteomics	Wednesday (Practical)	Wednesday Theory: 10.35 A.M. – 12.25 P.M. Practical 1.20 P.M. - 5.30 P.M.	Theory: Room No 208 New Extension Block Practical: Lab # 22
3.	Dissertation	Thursday Friday Saturday	Thursday 2.15 PM-5.00 PM Friday 2.15 PM-5.00 PM Saturday 8.45 AM-5.00 PM	Room # 203
4.	Ph.D. Coursework EL:20 Regulation of Eukaryotic Gene Expression	EL:20 Friday	11:30 AM-1:30PM	Theory: Committee room Practical: As per the location of instrument

Research Guidance

- **Ph.D. students (awarded)** - 4
- **Students currently registered for Ph.D.** - 6
- **M.Sc. dissertation students from other Institutions (Goa University).** - 1

Publications Profile

<u>Year of Publication</u>	<u>Title</u>	<u>Journal</u>	<u>Co-Author</u>
2019	Identification and characterization of miRNAs during flag leaf senescence in rice by high-throughput sequencing	Plant Physiology Reports. Volume 24(1):pp 1–14.	Jyothish Madambikattil Sasi, Cheeni Vijaya Kumar, Balaji Mani, Ankur R Bhardwaj,

			Manu Agarwal, Surekha Katiyar- Agarwal
2018	Standardization of Hydroponics based procedure for High-Throughput Screening and its Application for identification of differential host response in Safflower against <i>Fusarium oxysporum carthamii</i> .	Vegetos- An International Journal of Plant Research. Vol 31 (2): 5-11.	Bharti Kukreja, Gopal Joshi, Esha Sharma, Rupam Kapoor, Shailendra Goel, Arun Jagannath, Amar Kumar, Manu Agarwal
2018	Ambreen H, Kumar S, Kumar A, Agarwal M , Jagannath A, Goel S. Association Mapping for Important Agronomic Traits in Safflower (<i>Carthamus tinctorius</i> L.) Core Collection Using Microsatellite Markers.	Front Plant Sci. 2018 Mar 29;9:402	Ambreen H, Kumar S, Kumar A, Jagannath A, Goel S.
2017	Shukla N, Yadav R, Kaur P, Rasmussen S, Goel S, Agarwal M , Jagannath A, Gupta R, Kumar A 2017 Transcriptome analysis of root-knot nematode (<i>Meloidogyne incognita</i>)-infected tomato (<i>Solanum lycopersicum</i>) roots reveals complex gene expression profiles and metabolic networks of both host and nematode during susceptible and resistance responses	Molecular Plant Pathology	Shukla N, Yadav R, Kaur P, Rasmussen S, Goel S, Jagannath A, Gupta R, Kumar A
	Kaur P, Shukla N, Joshi G, VijayaKumar C, Jagannath A, Agarwal M , Goel S, Kumar A 2017 Genome-wide identification and characterization of miRNAome from tomato (<i>Solanum lycopersicum</i>) roots and root-knot nematode (<i>Meloidogyne incognita</i>) during susceptible interaction	PLoS ONE12(4): e0175178	Kaur P, Shukla N, Joshi G, VijayaKumar C, Jagannath A, Goel S, Kumar A
2016	Kumar S, Ambreen H, Variath MT, Rao AR, Agarwal M , Kumar A, Goel S, Jagannath A Utilization of molecular, phenotypic, and geographical diversity to develop compact composite core collection in the oilseed crop, Safflower (<i>Carthamus tinctorius</i> L.) through maximization strategy.	Frontiers Plant Sci7:1554	Kumar S, Ambreen H, Variath MT, Rao AR, Kumar A, Goel S, Jagannath A
	Patial V, Krishna R, Arya G, Singh VK, Agarwal M , Goel S, Jagannath A, Kumar A Development of an efficient, genotype independent plant regeneration and transformation protocol using cotyledonary nodes in safflower (<i>Carthamus tinctorius</i> L.)	Journal of Plant Biochemistry and Biotechnology25:42 1-432	Patial V, Krishna R, Arya G, Singh VK, Goel S, Jagannath A, Kumar A
	Rubina Chongtham, Sonia Waikhom, Amar Kumar, Shailendra Goel, Manu Agarwal and <u>Arun Jagannath</u> .. Evaluation of different hosts and laboratory conditions for rearing of the mustard aphid (<i>Lipaphis erysimi</i>) and their use for screening	Vegetos	Rubina Chongtham, Sonia Waikhom, Amar Kumar,

	of aphid-resistant transgenic plants of the oilseed crop, <i>Brassica juncea</i> (Indian mustard).		Shailendra Goel, and Arun Jagannath ..
2015	Sinha S, Raxwal VK, Joshi B, Jagannath A, Katiyar-Agarwal S, Goel S, Kumar A and Agarwal M . De novo transcriptome profiling of cold-stressed siliques during pod filling stages in Indian mustard (<i>Brassica juncea</i> L.)	Front Plant Sci 6:932	Sinha S, Raxwal VK, Joshi B, Jagannath A, Katiyar-Agarwal S, Goel S, and Kumar A
	Mani B, Agarwal M and Katiyar-Agarwal S. Comprehensive Expression Profiling of Rice Tetraspanin Genes Reveals Diverse Roles During Development and Abiotic Stress.	Front Plant Sci 6:1088	Mani B, and Katiyar-Agarwal S
	Ambreen H, Kumar S, Murali TV, Joshi G, Bali S, Agarwal M , Kumar A, Jagannath A and Goel S. Development of Genomic Microsatellite Markers in <i>Carthamus tinctorius</i> L.(Safflower) Using Next Generation Sequencing and Assessment of Their Cross-Species Transferability and Utility for Diversity Analysis	Plos One 10 (8), e0135443	Ambreen H, Kumar S, Murali TV, Joshi G, Bali S, Kumar A, Jagannath A and Goel S
	Ankur R Bhardwaj, Gopal Joshi, Bharti Kukreja, Vidhi Malik, Priyanka Arora, Ritu Pandey, Rohit N Shukla, Kiran G Bankar, Surekha Katiyar-Agarwal, Shailendra Goel, Arun Jagannath, Amar Kumar and Manu Agarwal . Global insights into high temperature and drought stress regulated genes by RNA-Seq in the economically important oilseed crop, <i>Brassica juncea</i> .	BMC Plant Biology: 15:9; DOI: 10.1186/s12870-014-0405-1 .	Ankur R Bhardwaj, Gopal Joshi, Bharti Kukreja, Vidhi Malik, Priyanka Arora, Ritu Pandey, Rohit N Shukla, Kiran G Bankar, Surekha Katiyar-Agarwal, Shailendra Goel, Arun Jagannath, Amar Kumar
2014	Shivendra Kumar, Heena Ambreen, T. V. Murali, Sapinder Bali, Manu Agarwal , Amar Kumar, Shailendra Goel and Arun Jagannath. Assessment of genetic diversity and population structure in a global reference collection of 531 accessions of <i>Carthamus tinctorius</i> L. (safflower) using AFLP markers.	Plant Molecular Biology Reporter . DOI: 10.1007/s11105-014-0828-8 .	Shivendra Kumar, Heena Ambreen, T. V. Murali, Sapinder Bali, Amar Kumar, Shailendra Goel, Arun Jagannath.
	Pandey R, Joshi G, Bhardwaj AR, Agarwal M , Katiyar-Agarwal S. A comprehensive genome-wide study on tissue-specific and abiotic stress-specific miRNAs in <i>Triticum aestivum</i> .	PLoS One: 9(4):e95800	Pandey R, Joshi G, Bhardwaj AR, Katiyar-Agarwal S.
	Bhardwaj AR, Joshi G, Pandey R, Kukreja B, Goel S, Jagannath A, Kumar A, Katiyar-Agarwal S, Agarwal M . A genome-wide perspective of miRNAome in response to high temperature, salinity and drought stresses in <i>Brassica juncea</i> (Czern) L.	PLoS One: 26;9(3):e92456	Bhardwaj AR, Joshi G, Pandey R, Kukreja B, Goel S, Jagannath A, Kumar A, Katiyar-Agarwal S.
	Lakhotia N, Joshi G, Bhardwaj AR, Katiyar-Agarwal S, Agarwal M , Jagannath A, Goel S, Kumar A. Identification and characterization of miRNAome in root, stem, leaf and tuber developmental stages	BMC Plant Biol. 14:6.	Lakhotia N, Joshi G, Bhardwaj AR, Katiyar-Agarwal S, Jagannath A, Goel S, Kumar A

	of potato (<i>Solanum tuberosum</i> L.) by high-throughput sequencing.		
2012	Singh A, Mittal D, Lavania D, Agarwal M , Mishra RC, Grover A. OsHsfA2c and OsHsfB4b are involved in the transcriptional regulation of cytoplasmic OsClpB (Hsp100) gene in rice (<i>Oryza sativa</i> L.). Bhardwaj AR, Pandey R, Agarwal M and Katiyar-Agarwal S. Northern Blot Analysis for Expression Profiling of mRNAs and Small RNAs.	Cell, Stress and Chaperones. 17(2):243-54 Methods in molecular biology. 883:19-45	Singh A, Mittal D, Lavania D, Mishra RC, Grover A. Bhardwaj AR, Pandey R and Katiyar-Agarwal
2011	Agarwal M , Singh A, Mittal D, Sahi C, Grover A. Cycloheximide-mediated super-induction of genes involves both native and foreign transcripts in rice (<i>Oryza sativa</i> L.)	Plant Physiol Biochem. 49(1):9-12.	Singh A, Mittal D, Sahi C, Grover A.
2011	Ji L, Liu X, Yan J, Wang W, Yumul RE, Kim YJ, Dinh TT, Liu J, Cui X, Zheng B, Agarwal M , Liu C, Cao X, Tang G, Chen X. ARGONAUTE10 and ARGONAUTE1 Regulate the Termination of Floral Stem Cells through Two MicroRNAs in Arabidopsis.	PLoS Genetics. 7(3): e1001358.	Ji L, Liu X, Yan J, Wang W, Yumul RE, Kim YJ, Dinh TT, Liu J, Cui X, Zheng B, Liu C, Cao X, Tang G, Chen X.

Publications in the Last one year

1. JM Sasi, CV Kumar, B Mani, AR Bhardwaj, M Agarwal, S Katiyar-Agarwal. 2019. Identification and characterization of miRNAs during flag leaf senescence in rice by high-throughput sequencing. *Plant Physiology Reports*. Volume 24(1):pp 1–14.

Conference Organization/ Presentations (in the last three years)

1. 20th ADNAT convention and international symposium on "Genome editing technologies and their application in biology, medicine and agriculture". February 16-18, **2017**. KIIT University.
 - Mohapatra P, Singh DH, Mishra G, Shukla RN, **Agarwal M**, Jagannath A, Kumar A, Ozias-Akins P, Hanna WW, and Goel S. "Understanding developmental aspects of apomixis through small RNA profiling, degradome and cell specific marker in sexual and addition lines in *Pennisetum glaucum*".
2. 2nd International conference on Technological Advancement for Sustainable Agriculture and Rural development (TASARD-India), February 20-22, **2017**. Society for Plant Research (VEGETOS) and African-Asian Rural Development Organisation (AARDO).
 - Mohapatra P, Singh DH, Sharma M, **Agarwal M**, Jagannath A, Kumar A, Ozias-Akins P, Hanna WW, and Goel S. "Elucidation of developmental aspects of apomixis through cell specific molecular markers in sexual and addition lines of *Pennisetum glaucum*".
3. National Conference on "Plant Science Research: Looking beyond 21st century for environmental and agricultural revolution", February 5 – 7, **2016**. Society for Plant research (VEGETOS) and Department of Botany, University of Delhi.

- Bharti Kukreja, Ankur R BHardwaj, Varsha Garg, Gopal Joshi, Aabha, Somya Sinha, Dinesh Singh, Kiran G. Banker, Kirti Kulkarni, Shailendra Goel, Surekha Katiyar-Agarwal, Arun Jagannath, Amar Kumar and **Manu Agarwal**. "Comparative analysis among salt tolerant and sensitive genotypes of *Brassica juncea*." Abstract: p99.
 - Bharti Kukreja, Rachita Yadav, Ramneek Gupta, Gopal Joshi, Rupam Kapoor, Shailendra Goel, Arun Jagannath, Amar Kumar and **Manu Agarwal**. "Expression changes of miRNAs in Safflower genotypes upon infection of soil borne fungus *Fusarium oxysporum*". Abstract: p21.
4. EMBO conference on "Signaling in Plant Development", September 20-24, **2015**. Brno, Czech Republic.
 - Somya Sinha, Vivek Kumar Raxwal, Arun Jagannath, Surekha Katiyar-Agarwal, Shailendra Goel, Amar Kumar and **Manu Agarwal**. "Cold stress mediated transcriptional variability during siliques development in Indian Mustard (*Brassica juncea* L.)".
 5. National Symposium on "Germplasm to Genes: Harnessing Biotechnology for Food Security and Health", August 9 – 11, **2015**. IARI, New Delhi. India.
 - Bharat Joshi, **Manu Agarwal**, Amar Kumar, Shailendra Goel and Arun Jagannath. Analysis of expression level variations of the Gibberellin signalling gene, *GASA4* in bold-seeded and small-seeded varieties of *Brassica juncea* (Indian Mustard) during seed development. Abstract: p 11.
 6. International Conference on Low Temperature Science and Biotechnological Advances, April 27 – 30, **2015**. NASC Complex, New Delhi, India.
 - Somya Sinha, Vivek Kumar Raxwal, Arun Jagannath, Surekha Katiyar-Agarwal, Shailendra Goel, Amar Kumar and **Manu Agarwal**. De novo transcriptome of cold-stressed siliques reveal distinct gene expression patterns during pod filling stages in Indian mustard (*Brassica juncea* L.). Abstract: p 176. **Won Best Poster Award**.
 7. 2nd International Hemipteran-Plant Interactions Symposium, June 22-25, **2014**. University of California, Riverside, CA, USA.
 - Rubina Chongtham, Vidhi Malik, Gopal Joshi, **Manu Agarwal**, Amar Kumar, Shailendra Goel and Arun Jagannath. *De novo* transcriptome of the mustard aphid, *Lipaphis erysimi*. Abstract: p 57.
 8. International Symposium on Plant Signaling & Behavior, March 7 – 10, **2014**. Department of Botany, University of Delhi, Delhi – 110007.
 - Vivek Kumar Raxwal, Sourav Ghosh, Shailendra Goel, Arun Jagannath, Amar Kumar, Vinod Scaria and **Manu Agarwal**. Landscape of open chromatin during abiotic stress in Arabidopsis. Abstract: p 112.
 - Shukla N, Chauhan R, Kaur P, Joshi G, Katiyar-Agarwal S, **Agarwal M**, Arun Jagannath, Goel S, Shankar R and Kumar A. Transcriptome profiling of roots of susceptible and resistant tomato cultivar sat various stages of infection with root knot nematode (*Meloidogyne incognita*). Abstract: p 82.
 - Kaur P, Cheeni V, Joshi G, Heisnam d, Katiyar-Agarwal S, **Agarwal M**, Arun Jagannath, Goel S and Kumar A. Identification and characterization of miRNAome of tomato roots infected with root knot nematode (*Meloidogyne incognita*). Abstract: p 73.
 9. International Conference on Plant Biotechnology, Molecular Medicine and Human Health and 7th Annual Convention of ABAP, October 18-20, **2013**. University of Delhi South Campus, New Delhi – 110021.
 - Shivendra Kumar, Heena Ambreen, T. V. Murali, Sapinder Bali, **Manu Agarwal**, Amar Kumar, Shailendra Goel and Arun Jagannath. Analysis of genetic diversity in a representative global collection of *Carthamus tinctorius* L. using AFLP. Abstract: p 255.
 - Heena Ambreen, Shivendra Kumar, T.V. Murali, Gopal Joshi, Sapinder Bali, **Manu Agarwal**, Amar Kumar, Arun Jagannath and Shailendra Goel. Isolation and characterization of microsatellites from the oilseed crop, *Carthamus tinctorius* L. using next generation sequencing. Abstract: *As Addendum*. **Won Best Poster Award**.
 - Sonia Waikhom, Jyotsna Singh, Bharat Joshi, Rubina Chongtham, **Manu Agarwal**, Shailendra Goel, Amar Kumar, A.K. Singh and Arun Jagannath. Development of transgenic plants using lectin genes from onion and garlic for introduction of aphid resistance in the oilseed crop, *Brassica juncea* (Indian mustard). Abstract: p 243.
 - Vandna Patial, T.V. Murali, Arun Jagannath, Shailendra Goel, **Manu Agarwal** and Amar Kumar. Genetic transformation and improvement of oil quality in Safflower (*Carthamus tinctorius*). Abstract: p 175.
 - Ankur R. Bhardwaj, Rohit Nandan Shukla, Kiran Bankar, Arun Jagannath, Shailendra Goel, Surekha Katiyar-Agarwal, Amar Kumar and **Manu Agarwal**. Transcriptome profiling and identification of regulatory genes under high temperature stress in the oilseed crop, *Brassica juncea* (Indian mustard). Abstract: p120.
 - H. Dinesh Singh, Gopal Joshi, Ankur R. Bhardwaj, **Manu Agarwal**, Surekha Katiyar-Agarwal, Arun Jagannath, Amar Kumar, Peggy Ozias-Akins, Wayne W. Hanna and Shailendra Goel. Comparative small RNA analysis at different developmental stages of embryo sac in sexual and apomictic addition lines of *Pennisetum glaucum*. Abstract: p150.
 - Somya Sinha, Vivek Kumar Raxwal, Arun Jagannath, Amar Kumar, Shailendra Goel and **Manu Agarwal**. Synthetic microRNA mediated silencing of negative regulators to enhance frost tolerance in *Brassica juncea*. Abstract: p256.

- Vivek Kumar Raxwal, Sourav Ghosh, Somya Sinha, Rajsekhar R. Reddy, Surekha Katiyar-Agarwal, Shailendra Goel, Arun Jagannath, Amar Kumar, Vinod Scaria and **Manu Agarwal**. Ultra high resolution mapping of HSF A5 binding reveals new insights into HSR regulation. Abstract: p267.

10. International Plant and Animal Genome Conference XX January 14-18, **2012**. San Diego, CA, USA

- Heisnam D. Singh, Gopal Joshi, Ankur R. Bhardwaj, Surekha Katiyar-Agarwal, **Manu Agarwal**, Arun Jagannath, Peggy Ozias-Akins, Wayne W. Hanna, Shailendra Goel. Profiling of smRNAs unique to apomictic addition lines in *Pennisetum glaucum*.

Research Projects (Major Grants/Research Collaboration)

ICAR-NASF Project: PI in the project "Identification of super donors and alleles for spikelet fertility and low chalkiness under thermal stress in rice" (2018-2021).

DBT Project: PI in the project "Global perspective of transcriptome, proteome and metabolome of root knot nematode effectors conferring host specificity and host response to them during disease development" (2019-2022).

DST-SERB Project: PI in the project "Identification of miRNAs from contrasting lines of *Carthamus* and their contribution intolerance against *Fusarium wilt*" (2019-2022).

DBTs Twinning Programme for the NE: PI in the DBT project "Exploration of genome-wide polymorphism, imprintomes and methylomes to unfold the genetic, epigenetic and evolutionary mysteries of basal angiosperms with emphasis on *Nymphaea L.*" (2016-2019).

DST-PURSE Grant Phase II: PI in DST-PURSE grant on "Genetic and genomic approaches for improvement of the oilseed crop, *Carthamus tinctorius* (Safflower)." (2014 – 2017).

DST-PURSE Grant Phase I: PI in DST-PURSE grant on "Genetic and genomic approaches for improvement of the oilseed crop, *Carthamus tinctorius* (Safflower)." (2010-2013).

DBT-Centre of Excellence Grant Phase I: PI in DBT project on "Transgenic approaches for frost resistance in mustard", Satellite Project under 'Centre of Excellence on Genome Mapping and Molecular Breeding of *Brassicacae*' awarded to University of Delhi South Campus and University of Delhi, Delhi (2009 – 2015).

DBT-RNAi Consortium: PI in DBT project "Development- and stress-specific genomics of small non-coding RNAs in Brassica sps., rice and wheat Phase II" (2012-2015).

DBT-RNAi Consortium: PI in DBT project "Development- and stress-specific genomics of small non-coding RNAs in Brassica sps., rice and wheat Phase I" (2008-2012).

Awards and Distinctions

- CSIR (NET) Fellowship by Council of Scientific and Industrial Research, Ministry of Human Resource Development, Government of India (1995-2000).
- Department of Biotechnology Fellowship by Government of India for pursuing studies leading to M.Sc. Biotechnology (1993-1995).

Association with Professional Bodies

- Life member, Indian Society of Plant Morphologists, Department of Botany, Delhi University, Delhi.
- Life Member, Indian Society of Translational Research, School of Life Sciences, JNU, New Delhi.

Other Activities

Involved with reviewing manuscripts from different journals. Also, have served as thesis examiner for Ph.D. thesis from NBRI, NIPGR and IARI.

Signature of Faculty Member

