Evaluative Report of the Department (2016-2017)

1. **Name of the Department** : Plant Molecular Biology

2. **Year of Establishment** : 1988

3. **Is the Department part of school/ Faculty of the University?** : Faculty of Interdisciplinary and Applied Sciences.

4. **Names of the programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)**

   1. M.Sc. in Plant Molecular Biology and Biotechnology
   2. Ph.D. in Plant Molecular Biology

5. **Interdisciplinary programmes and Departments involved:**

   1. M.Sc. programme in "Plant Molecular Biology and Biotechnology" has two Papers offered by sister Departments at UDSC (one each by Biochemistry and Microbiology).
   2. Additionally, the department offers a course on Bioinformatics for the students of the parent institution and the other departments under the faculty, e.g Biochemistry, genetics, Microbiology etc.
   3. Ph.D. programme offered by DPMB has three Papers, which are also opted by students from other Departments at UDSC and vice-versa.

6. **Courses in collaboration with other universities, industries, foreign institutions, etc**.

   None.

7. **Details of programmes discontinued, if any, with reasons:**

   M.Phil. programme in Plant Molecular Biology, which was operational from 1990 till 2011, has been discontinued because it was felt that the programme has lost relevance in the present research and academic scenario in the field of Plant Molecular Biology, Moreover, now Ph.D. programme has mandatory course work, as per UGC guidelines.

8. **Examination system:** Annual/Semester/Trimester/Choice Based Credit System

   1. M.Sc. Programme: Semester System
   2. Ph.D. Programme: Choice Based Credit System

9. **Participation of the department in courses offered by other Departments:**

   The Department teaches a Paper at the M.Sc. level**,** i.e**. "**Introduction to Bioinformatics (PMBB 0804)", which is opted by students from Department of Biochemistry and Department of Microbiology.

10. **Number of teaching posts sanctioned, filled and actual(**Professors/Associate Professors/Asst. Professors/others)

	Sanctioned	Filled	Actual (including CAS & MPS)
Professors	04	09	09 (4+5 through CAS)
Associate Professors	05	05	01 (1 through CAS)
Assistant Professors	04	01	01

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance:**

Name	Qualification	Designation	Specialization	Number of Year of Experience	Number of Ph.Ds. produced (in last 5 years)
Dr.A.K. Tyagi	Ph.D.	Professor	Plant Gene Expression, Genomics & Biotechnology	29	-
Dr. J.P. Khurana	Ph.D.	Professor	Photobiology, Signal Transduction and Plant Genomics	29	5
Dr. Paramjit Khurana	Ph.D.	Professor	Plant Biotechnology & Genoinformatics	29	7
Dr. Anil Grover	Ph.D.	Professor	Functional Genomics of Abiotic Stress	28	3
Dr. Indranil Dasgupta	Ph.D.	Professor	Molecular Plant Virology	20	6
Dr. Madan Mohan	Ph.D.	Professor	Plant genomics, Biotic Stress, Molecular analysis of Plant/Insect interaction	10 in the University and additional 20 in research institute	2
Dr. A.K. Sharma	Ph.D.	Professor	Regulation of Gene Expression and Biotechnology	20	3
Dr. Sanjay Kapoor	Ph.D.	Professor	Functional Genomics- Plant Reproduction – Heterosis- Gene Regulation – Seed Development	14	6
Dr. G. K. Pandey	Ph.D.	Professor	Calcium mediated signaling under abiotic and biotic stress	9	4
Dr S. Raghuvanshi	Ph.D.	Associate Professor	Genomics and Bioinformatics	9	3

Dr S. Katiyar-Agarwal	Ph.D.	Assistant Professor	Small RNA-mediated gene regulation in plants	9	1

12. **List of senior visiting Fellows, Adjunct faculty, Emeritus professors:**

None

13. **Percentage of classes taken by temporary faculty programme –wise information**

None

14. **Programme-wise Student Teacher Ratio:**

Year	Programme	Student:Teacher Ratio
2012-2013	M.Sc.	1.2:1
	Ph.D.	5.3:1
2013-2014	M.Sc.	1.2:1
	Ph.D.	5.6:1
2014-2015	M.Sc.	1.2:1
	Ph.D.	4.9:1
2015-2016	M.Sc.	1.33:1
	Ph.D.	5.5:1
2016-2017	M.Sc. Ph.D.	1.2:1 5.5:1

15. **Number of academic support staff (technical) and administrative staff; sanctioned, filled and actual**

Category	Sanctioned	Filled	Actual
Administrative	2	1	2
Technical	10	7	10
MTS	4	4	4

16. **Research thrust areas recognized by major funding agencies:**

Structural and Functional Genomics, Biotic and abiotic stresses, Photobiology, Signal transduction, Epigenetic modification, Plant-virus interactions, Small RNA in stress responses, and Bioinformatics.

17. **Details Number of faculty with ongoing projects in the last four years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.**

1. Number of faculty with ongoing projects in the last four years from National agencies: 46

2. Number of faculty with ongoing projects in the last four years from International agencies: 01

3. Total grants received: 4795.34 lakhs

For details see table given below

S. No.	Investigator(s)	Title of Project	Duration	Funding Agency /Amount Sanctioned (in lakhs of rupees)
1.	Dr. S. Raghuvanshi	Development of knowledge based database of rice	2009-2013	DBT 135.9
2.	Dr. Girdhar K. Pandey	RNAi mediated down regulation of CBL-CIPKs and phosphotases in Rice in Abiotic stress condition and their Biotechnological implication.	2010-2013	DBT 26.20
3.	Prof. P.Khurana	SNP discovery and trait-specific global transcriptome analysis of Indian mulberry" between DU and the Department of Crop Physiology, University of Agricultural Sciences, GKVK Campus, Bangalore.	2010-2015	DBT 62.41
4.	Prof. J.P. Khurana Prof. P. Khurana	"Physical mapping and sample sequencing of wheat chromosome 2A – International Wheat Genome Sequencing Consortium (India)" jointly with DU and two other collaborating Institutes, Indian Agricultural Research Institute, New Delhi and Punjab Agricultural University, Ludhiana.	2010-2015	DBT 751.46
5.	Prof. Anil Grover	J.C. Bose Fellowship	2011-2016	DST 68
6.	Dr. A. K. Sharma	Transcriptome analysis and genetic manipulation of tomato targeted at folate enhancement	2011-2016	DBT 190
7.	Prof. Paramjit Khurana	Multiplication and field evaluation of transgenic mulberry for the abiotic stress tolerance and suitability for silk rearing.	2013-2017	DBT 31.56
8.	Prof. Paramjit Khurana	J.C. Bose Fellowship	2012-2017	DST 68
9.	Prof. Paramjit Khurana	Functional genomics of thermal stress in Indian Wheat	2014-2017	DBT 58.87
10.	Prof. I. Dasgupta Dr. A. K. Sharma	Development of viral resistant okra using RNAi approach.	2012-2017	DBT/BIPP 100
11.	Prof. I. Dasgupta	Functional dissection of geminiviral promoters for developing heterologous gene expression systems.	2012-2015	DBT/BICL 28.80
12.	Dr. S. Katiyar - Agarwal	Deciphering the role of *Oryza sativa* heat shock transcription factors during leaf senescence.	2012-2015	UGC 10.33
13.	Dr. S. Katiyar - Agarwal	Whole genome and transcriptome changes as a consequence of allo and auto polyploidy in *Vigna* L.	2012-2015	DBT-NER 46.55
14.	Prof. J.P. Khurana	J.C. Bose Fellowship	2012-2017	DST 68
15.	Dr. Girdhar K. Pandey	Functional Characterization of voltage-dependent anion channel (VDAC) gene family in *Arabidopsis* under oxidative stress and potassium derived conditions.	2013-2016	DAE/BRNS 24.18
16.	Prof. J.P. Khurana Prof. Paramjit Khurana Prof. Anil Grover	CPMB Phase IV – Centre for Advance Research and Innovation on Plant Stress and Developmental Biology	2013-2016	DBT 367.085
17.	Dr S. Katiyar-Agarwal	Investigating the role of rice tetraspanin proteins in abiotic stress and development	2013-2016	DBT 41.81
18.	Dr. A. K. Sharma	Delay of fruit ripening of tomato by expression of mutant etr1-1 gene encoding ethylene receptor of *Arabidopsis*	2013-2016	DBT 27

19.	Dr. Girdhar K. Pandey	Functional analysis of rice calcineurin B-like associated kinase, OsCIPK25 in abiotic stress conditions	2014-2016	CSIR 23
20.	Dr.Girdhar K. Pandey	Enhancement of starch accumulation and grain filling by dual specificity protein phosphatase AtDSP in *Arabidopsis* and OsPP42 in rice	2014-2017	DBT 47
21.	Prof. Anil Grover	Genetic analysis of the regulation of Hsp 100 promoter activity by heat shock in rice and *Arabidposis*	2014-2017	DST 95
22.	Dr. A. K. Sharma	Tomato ripening network	2015-2020	DBT 130.98
23.	Prof. Sanjay Kapoor	Characterization of Molecular Components Involved in Pollen Abortion During High Temperature Stress	2015 – 2019	DBT-NWO 150.07
24.	Prof. Sanjay Kapoor	Sub-project IV: Characterization of Gene Regulatory Networks and Transcriptional Mechanisms that Control Male Gametophyte, under National Rice Functional Genomics Consortium Project entitled, Development in Rice Functional Characterization of Genetic and Epigenetic Regulatory Networks Involved in the Reproductive Development in Rice	2015 – 2020	DBT 167.40
25.	Prof. J.P. Khurana	Functional validation of genes involved in regulating transition to flowering in rice.	2015-2020	DBT 140 Lakhs
26.	Prof. Girdhar K. Pandey	Functional characterization of Arabidopsis CCX 1 and 2 (Ca2+ Cation exchangers) under abiotic stress conditions	2015-2017	DBT 48.79
27.	Prof. Girdhar K. Pandey	Functional characterization of rice CCX2 (Ca2+ cation exchangers) under abiotic stress conditions.	2015-2017	DBT 46.43
28.	Professor Akhilesh K. Tyagi	J.C.Bose fellowship	2007 -2017	121.1 lakhs
29.	Professor Akhilesh K. Tyagi	Functional characterization of genetic and epigenetic regulatory networks involved in the reproductive development in rice	2015 - 2020	9,87,41,600 Lakhs
30.	Professor Arun K. Sharma	Regulation of ripening in tomato by manipulation of epigenome	2016-2021	91.74 lakhs

18. **Inter-institutional collaborative projects and associated grants received:**

a) National collaboration

b) International collaboration

S. No.	Investigator (s)	Title of Project and collaborating partners	Duration	Funding Agency /Amount Sanctioned (in lakhs of rupees)
1.	Prof. Madan Mohan Prof. Deepak Pental Dr. S. Kapoor	"Development of Barstar/Barnase lines in rice for use in hybrid rice".	2008-2013	CSIR 280

2.	Prof. A.K. Tyagi Prof. J.P. Khurana Prof. Indranil Dasgupta Dr. S. Kapoor	National consortium for functional genomics of rice (NCFGR): Phase-II; "Functional analysis of gene regulatory networks during flower and seed development in rice", with IISC., Bangalore, DRR & MKU Osmania University	2009-2014	DBT 350
3.	Prof. J.P. Khurana Dr. Sanjay Kapoor	"Bioprospecting of genes and allele mining for abiotic stress tolerance", with NRCPB, IARI and many other ICAR labs.	2009-2014	NAIP ICAR, New Delhi (UDSC Component) 285
4.	Dr. Saurabh Raghuvanshi	"Development of knowledge based database of rice" between DU and National Bureau of Plant Genetic Resources, New Delhi, Directorate of Rice Research, Hyderabad, Central Rice Research Institute, Cuttack and Indira Gandhi Krishi Viswavidyalaya Raipur.	2009-2014	DBT 135.9
5.	Prof. P.Khurana	"SNP discovery and trait-specific global transcriptome analysis of Indian mulberry" between DU and the Department of Crop Physiology, University of Agricultural Sciences, GKVK Campus, Bangalore.	2010-2013	DBT 62.41
6.	Prof. J.P. Khurana Prof. P. Khurana	"Physical mapping and sample sequencing of wheat chromosome 2A – International Wheat Genome Sequencing Consortium (India)" jointly with DU and two other collaborating Institutes, Indian Agricultural Research Institute, New Delhi and Punjab Agricultural University, Ludhiana.	2010-2014	DBT 751.46
7.	Prof. J.P. Khurana r	"Phenomics of moisture deficit and low temperature stress tolerance in rice" jointly with NRCPB, IARI, funded by ICAR.	2011-2015	Funded by ICAR (NFBSFARA); UDSC component, 152
8.	Prof. Indranil Dasgupta	"Generation of virus resistant rice for India: Diversifying transgenic resistance to popular varieties" Phase-II between DU and Bidhan Chandra Krishi Viswavidyalaya, Kalyani, West Bengal and Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu.	2011-2014	DBT, 22.25
9.	Prof. Indranil Dasgupta	"Development of viral resistant okra using RNAi approach" in collaboration with Nirmal Seeds,	2012-2017	BIPP 100.00

		Pachora, Maharashtra		
10.	Dr. S. Katiyar-Agarwal	"Genome wide screening of factors for RNAi in sf21 cells and identification of antiviral compounds from chemical combinatorial library" between DU and International Centre for Genetic Engineering and Biotechnology, New Delhi.	2012-2014	DBT, 17.60
11.	Prof. P. Khurana	"Multiplication and field evaluation of transgenic mulberry for abiotic stress tolerance and suitability for silkworm rearing" between Department of Plant Molecular Biology and the Department of Crop Physiology, University of Agricultural Sciences, GKVK Campus, Bangalore.	2012-2015	DBT 31.56
12.	Dr. S. Katiyar-Agarwal	"Development and stress- specific genomics of small non-coding RNAs in rice, Brassicasps. and wheat" (Phase II) between DU, The Energy and Resources Institute (TERI), New Delhi and International Centre for Genetic Engineering and Biotechnology, New Delhi.	2012-2015	DBT 49.74
13.	Prof. J.P. Khurana	Network project entitled "Understanding genome organization and gene expression in response to different hexachlorohexane (HCH) isomers in HCH degrading bacteria and the HCH dumpsite. jointly with DU and Indian Institute of Technology, Bombay and University of Hyderabad (School of Life Sciences).	2012-2015	DBT 49.00
14.	Dr. S. Katiyar-Agarwal	"Whole genome and transcriptome changes as a consequence of allo and auto polyploidy in *Vigna* L" between DU and North Eastern Hill University, Shillong.	2012-2015	DBT-NER 46.55
15.	Prof. Indranil Dasgupta	"Functional dissection of geminiviral promoters for developing heterologous gene expression systems" between DU and Assam Agricultural University, Jorhat, Assam.	2012-2015	DBT–NE Twinning 28.80
16.	Dr. Saurabh Raghuvanshi	"Profiling of small non-coding regulatory RNAs in Indian rice cultivars" between DU and International Centre for Genetic Engineering and Biotechnology, New Delhi and The Energy and Resources Institute (TERI) University.	2012-2015	DBT, 85.0

S. No.	Investigator (s)	Title of Project and International collaborating partners	Duration	Funding Agency /Amount Sanctioned (in lakhs of rupees)
1.	Dr. S. Kapoor	"Molecular-physiological Characterization of Epigenetic Components Affecting Plant Development Under Drought and High Temperature Stress". It is a collaboration between three institutions Radboud University Nijmegen, The Netherlands Wageningen University, The Netherlands National Research Centre (NRC) Tahrir Str., Dokki, Cairo 12311 Egypt	2008-2013	funded by NWO of Netherlands and DBT of India

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

1. The Department has received DST-FIST Level II grant in the year 2007, amounting to approximately Rs. 1.5 crores. This has been utilized to procure a high-end piece of equipment (confocal microscope), which has been extensively used by Departmental students, students from other Departments in University of Delhi and researchers from various universities and institutes in the country in the last five years. It is still being used heavily and its use has resulted in a number of publications in high (Impact Factor journals.
2. The Department has received DST-FIST grant (Level II) in the year 2012 with a total grant of Rs. 4.3 crores, which has been used to procure additional equipment such as BIACORE (a facility to study inter-molecular interactions at very high sensitivity), Photosynthesis measurement system, Super-Speed centrifuge, Real-time PCR, Bioanalyzer, etc.
3. A plant Growth Facility, sanctioned in the project will be erected, once appropriate approvals are obtained. There are additional funds available for enhancing the networking facility and building instrumentation infrastructure.
4. The Department has obtained funds from UGC-SAP (DRS Phase III), by which infrastructure for M.Sc. teaching and research has been made available.

20. **Research facility with national recognition:**

1. Major facilities include Confocal microscope (by DST-FIST grant in the year 2007) and BIACORE (by DST-FIST grant in the year 2012), which are facilities meant to be made available to researchers from all over the country. The confocal microscope facility has been used by a number of scientists at the national level. BIACORE has become operational only recently.

2. The Department has excellent Genomic facility which includes two DNA Analyzer for sequencing a part of chromosomes of rice, tomato towards an international effort of sequencing of rice genome and tomato genome. These had also been employed for physical mapping of chromosome 2A of hexaploid wheat as part of the International Sequencing effort.

21. **Special research laboratories sponsored by industry/corporate bodies:**

None

22. **Publications (in the last four years):**

Nature of Information	**Total**
Numbers of Papers published in peer-reviewed journal (national/international)	164
Monographs	00
Chapters in Books	22
Books Edited	07
Books with ISBN with details of publisher	04
Numbers listed in international databases: (for e.g. Web of Science, Scopus, Humanities International complete, EBSCO host, etc.)	Nil
Citation index range/average:	605-5900
SNIP	00
SJR	00
Impact Factor (average)	4.2
h-Index (average)	22-35

23. **Details of patents and income generated:**

Patent no. 278167, title "A DNA construct for gene silencing in rice".

24. **Areas of consultancy and income generated:**

The potential discovery ((US Patent No. 07728122 and Eurasian Patent no. 013229) been commercialized to a seed company, which has paid a total royalty of Rs. 7.0 lakhs to University of Delhi till date.

25. **Faculty selected nationally/internationally to visit other laboratories /industries /institutions in India and abroad:**

All faculty members have close links with national and international laboratories for collaborative research programmes and regularly visit those institutions. The following are the significant visits in this category:

Prof. J. P. Khurana was Leader of the Delegation and Coordinator for a visit to UK in May 2012 jointly sponsored by Department of Biotechnology, Government of India, and BBSRC, UK, to attend a Workshop at John Innes Institute, Norwich, and visit to Rothamsted Experimental Station and University of Nottingham.

Several Faculty members of DPMB were part of delegations visiting various research institutes and/or industries under the BIPP programme of Department of Biotechnology, Government of India, to provide technical input and assess the progress being made under

the Joint venture programmes funded by DBT. This is now being coordinated by BIRAC, established by DBT.

2012-13

Prof. Paramjit Khurana:

1. Visited Pepsico Co ltd, Jalandahar on July 16, 2012
2. Visited Aditya Biotech.ltd., Raipur, Chhattisgarh on August 24, 2012

2013-14

Prof. Paramjit Khurana

1. Visited Aditya Biotech and Devleela Biotechs, Raipur on April 26, 2013
2. Visited Aditya Biotech, Raipur, on October 20, 2013

2015-16

Prof. Paramjit Khurana

1. Visited Atul Biotech, Jodhpur on November 10, 2015
2. Visited TERI Biotch labs, Gwalphari on March 30, 2016
3. Prof. J.P. Khurana, Prof. Paramjit Khurana and Dr Arun Sharma have been involved in International Initiative on Tomato Genome Sequencing and participated in workshops organized to review the progress. They were also involved in organizing an International Conference in New Delhi (SOL 2009), where nearly 350 scientists participated from nearly 20 countries (120 from overseas).
4. Recently another International conference ISRFG 2013) was also organized jointly with NIPGR, New Delhi (by Professor A.K. Tyagi and Professor J.P. Khurana) where more than 100 scientists participated from overseas, and in total > 400 delegates participated.
5. Prof. J. P. Khurana visited Queensland University of Technology, Brisbane, and attended a Joint meeting of DST-DBT with the Ministry of Science & Technology, Sydney, Australia, and visited some Institutes, from February 9-13, 2015.
6. Prof. Anil Grover was invited speaker at SPOT-ITN conference "Stress biology and crop fertility", Sorrento, Naples, Italy (March 18-22, 2015)**.** He also went to King Saud University, Saudi Arabia as Visiting Professor, (2012-13; 2013-14). He was Invited member of International Society of Plant Molecular Biology (ISPMB) USA (2013) and Member of the International Scientific Advisory Board of International Plant Molecular Biology Meeting (ISPMB), Jeju, Korea, 2012. He was invited speaker at 7th International Rice Genetics Symposium, Manila, Philippines (2013). He also Co-chaired session at VI International Congress on Stress Proteins in Biology and Medicine, Sheffield, UK (2013)
7. Professor Indranil Dasgupta visited Northwest University of Agriculture, Shnnaxi Province, China, Zhejiang University, China and Martin-Luther University, Halle, Germany from 12.11.2015 to 14.12.2015.
8. Professor Sanjay Kapoor lead a six-member DBT (Government of India sponsored) delegation to Egypt to develop bilateral scientific collaborations in the field of Biotechnology from 23.10.2015 to 28.10.2015.

2016-17

1. Visiting Professor at Institute of AgriBiotechnology, Jiangsu Academy of Agricultural Sciences, Nanjing, China (2017).

26. **Faculty serving in National committees/Editorial Boards, etc.**

Prof. Akhilesh K. Tyagi

National committees:

1. JC Bose National Fellowship Award, DST, Government of India, 2007-2017.
2. President, National Academy of Sciences, India (2015-2016)
3. President, Indian Society for Plant Physiology, New Delhi (2017-2018)
4. Chairman, Finance Committee, Biotech Park, Lucknow (2016-2019)
5. Member, Apex Committee for Plant Biotechnology and Allied Areas, DBT (2016-2019)
1. Member (exofficio), Central Advisory Board of Education, DHE, MHRD, GoI(2015-2016)
2. Member (ex-officio), The Court, JNU, New Delhi (2009-2016)
3. Member, Promotions and Assessment Committee, IISc, Bangalore (2016-2018)
4. Member, PMC on Solanaceae Genome Initiative, DBT, New Delhi (2015-2018)
5. Member, SAC for DBT-IISc Partership Program, DBT, New Delhi (2013-2018)
6. Member, SAC for ILS, Bhubneshwar (2012-2018)
7. Member, Governing Body, CIAB, Mohali (2012 onwards)
8. Member, Governing Board, SRI, Delhi (2014 onwards)
9. Member (ex-officio),Board of Directors, Mohali Biotechnology Park, Mohali (2014- 2016).
10. Member, School Board, SLS, CUR, Ajmer (2014-2017)
11. Member, SAC, Bose Institute, Kolkata (2014-2017)
12. Member, Research Board, MSSRF, Chennai (2014-2016)
13. Member, Board of Governors, UNESCO Regional Biotechnology Centre, NCR Del hi, Faridabad (2011-2015)
14. Member, Governing Body, Biotech Park, Lucknow (2011 onwards)
15. Member, RAC, National Bureau of Plant Genetic Resources, New Delhi (2011-2014)
16. Member, Standing Committee on RRI, JNU, New Delhi (2011-2013)
17. Member, Patent Facilitation Committee, DBT, New Delhi (2011-2014)
18. Member, Academic Council, IARI, New Delhi (2011-2013)
19. Member, Expert Committee for Ramalingaswami Re-entry Fellowship, DBT (2010-2012) Member, Expert Committee for Tata Innovation Fellowship, DBT (2010-2012, 2014- 2017).
20. Member, Task Force on Bioinformatics, Computational and Systems Biology, DBT (2010- 12, 2014-2017)
21. Member, Technical Advisory Committee (TAC) for CEIB, DBT (2009-12)
22. Member, Steering Committee of National Bioresource Development Board, DBT (2007-12)

International Committees:

1. Co-Chair, Indo-US Joint Working Group (JWG) on Agriculture, 2016.
2. Patron and Chair, National Organizing Committee, 3rdInternational Plant Physiology Congress, New Delhi, 2015.
3. Member, Advisory Board, Asian Federation of Biotechnology, RoK, 2015.
4. Co-Chair, BBSRC(UK) DBT(India) Crop Genomics & Technologies Initiative Assessment Panel, 2014.
5. Member, Membership Advisory Committee in Biological Systems and Organisms, The World Academy of Sciences, Italy, 2013-2018.
6. Chairman, 11thInternational Rice Functional Genomics Symposium Organizing Com mittee, 2013.

7. Member, Organizing/Advisory/Scientific Committee of 10th/11th/12th/13/14th International Rice Functional Genomics Symposium, 12/13/14/15/16.

Editorial Board:

1. Member, Editorial Board, Transgenic Research, 2000 onwards; MGG, 2007 onwards; Rice, 2008 onwards; International Journal of Plant Genomics, 2009 onwards; PeerJ 2012-2014; Journal of Plant Biochemistry and Biotechnology, 2007 onwards; ISA of NISCAIR, ISA, 2011-2013, 2015-2017; Everyman's Science, ISCA, 2010-2013

Prof. J. P. Khurana

National committees:

1. General Secretary, National Academy of Sciences, India (2010-2013).
2. Vice-President, Indian National Science Academy, New Delhi (2014).
3. Secretary, Plant Tissue Culture Association, India (March 2010 onwards).
4. Chairman, DST – SERB Committee on Young Scientist's Fast-Track Scheme.
5. Member, Council of Indian Science Congress Association (ISCA), Kolkata
6. Member of several committees constituted by DBT, DST, CSIR and ICAR, and IUSSTF (Indo-US Fund).

Editorial Boards:

1. Journal of Biosciences, Indian Academy of Sciences, Springer.
2. Journal of Plant Biochemistry and Biotechnology, Springer.
3. Indian Journal of Microbiology, Springer.

Prof. Paramjit Khurana

National committees:

1. Nominated NASI Member to the Council, Indian National Science Academy, 2017.
2. Convenor, Sectional Committee VII (Plant Sciences), Indian National Science Academy, 2017.
3. Birbal Sahni Award Medal of the Indian Botanical Society for 2017.
4. Professor S.K. Sinha Memorial Lecture Award of the Indian Society of Plant Physiology for the year 2017.
5. External Expert, Board of Studies, Mahila Mahavidyalaya, Banaras Hindu University, Varanasi.
6. Member, Taskforce on Human Resource Development, Department of
7. Biotechnology, Ministry of Science & Technology, Government of India.
8. Member, Taskforce on Silk Biotechnology, Department of Biotechnology,
9. Ministry of Science & Technology, Government of India.
10. Member, Taskforce on BioCARE, Department of Biotechnology, Ministry of
11. Science & Technology, Government of India.
12. Member, Taskforce on 'Value- Added Biomass & Products from Natural
13. Resources', Department of Biotechnology, Government of India.
14. Member, Taskforce on National Bioscience Award for Career Development,
15. 2011, Department of Biotechnology, Government of India.
16. Member, Governing Body, Institute of Home Economics, University of Delhi.
17. Member, Governing Body, Univ. Hostel for Women, University of Delhi.
18. Member, Governing Body, College of Nursing, Holy Family Hospital, University of Delhi.

19. Member, Academic Council, TERI University, New Delhi-110070.
20. Member, "Working Group on Enrichment of Knowledgebase" to formulate 12th Five Year Plan, Planning Commission, Department of Science and Technology, New Delhi.
21. Member of the Apex Committee on Agricultural Biotechnology, Department of Biotechnology, Government of India, for 2014-2017.
22. Member, Star College Advisory Committee of Maitreyi College, Univ. of Delhi.
23. Member, Star College Advisory Committee, Miranda House, University of Delhi.
24. Member, Star College Advisory Committee, Ramjas College, University of Delhi.
25. UGC Nominee on SAP advisory committee of University of Rajasthan.
26. UGC Nominee on School Board of Life Sciences, NEHU, Shillong.
27. Member of the Advisory committee of HRD-DBT program at GB Pant Univ. Agricultural Sciences, Pantnagar.
28. Member, Special Committee of the School of Environmental Sciences, Jawaharlal Nehru University, New Delhi.
29. Member, Special Committee of the School of Computational & Integrative Sciences, Jawaharlal Nehru University, New Delhi.
30. Nominated NASI member to the Science Education Panel of the three National Science Academies (2013-2015)
31. Foreign Secretary, The National Academy of Sciences, Allahabad, India, (2013 and 2014).
32. National Co-coordinator for Women Scientist and Nutrition Programme of the National Academy of Sciences, Allahabad, India.

International committees

1. Fellow, The World Academy of Sciences, Trieste, Italy, 2016.

Editorial Board

1. Editorial Board, Journal of Seribiodiversity, Central Silk Board, Hosur, India.
2. Editorial Board, Physiology and Molecular Biology of Plants, Springer, India.
3. Editorial Board, Proc. National Academy of Sciences, Section-B- Biological Sciences, India (2012-2013).

Prof. Anil Grover

National committees:

1. Member, National Committee, INSA-IUBS (2016-2020).
2. Member, SAP Committee of UGC, Jammu University, Jammu and Kashmir (2012)
3. External Expert, Pt. Ravishankar Shukla University, Chattisgarh, India (2013-2016)
4. Member, Academic Council, DAV University, Jalandhar, India (2013-)
5. Member, Academic Committee of JNU for Central Institute of Medicinal & Aromatic Plants, Lucknow, India (2013-2015)

International committees

1. Member, Board of Directors, 11th International Congress of Plant Molecular Biology
2. at Iguazu Falls, Brazil (October 25-30, 2015).
3. Invited External Examiner for B.Sc. (Hons.) students at University of Mauritius, Mauritius (June 14-June 21, 2015)

Editorial Board:

1. Guest Editor, Plant Reproduction journal (special issue on pollen development).
2. Member, Editorial Board, Plant Physiology and Biochemistry (Elsevier till date)
3. Member, Editorial Board, Plant Science (Elsevier till date)

Prof. Indranil Dasgupta

National committees:

1. Awarded J. C. Bose Fellowship by the Department of Science and Technology, Government of India on 26.12.2016 for a period of five years.

Editorial Board :

1. Indian Journal of Virology.
2. Journal of Biosciences.

Prof. Sanjay Kapoor

1. Fellow, National Academy of Sciences, Allahabad
2. Member, Governing Body, College of Vocational Studies (2015 onwards)
3. Associate Editor: Journal of Plant Biochemistry and Biotechnology.

Prof. A. K. Sharma

1. Fellow, National Academy of Sciences, Allahabad

Prof. G. K. Pandey

1. Editorial Board member, Scientific Reports, NPG
2. Associate Editor, Frontier in Plant Sciences
3. Academic Editor of PLoS One
4. Associate Editor, Plant Molecular Biology Reporter
5. Editorial Board member of Plant Signaling and Behavior
6. Editorial Board member of Current Biotechnology
7. Editorial Board member of Current Genomics
8. Associate Editor, Dataset in Science
9. Associate Editor, Journal of Biomedical Science and Engineering
10. Editorial Board member, Journal of Molecular Biology and Molecular Imaging

Dr. Surekha Katiyar-Agarwal

1. DBT Innovative Young Biotechnologist Award (IYBA), 2012.

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs.

Faculty members are involved in carrying out advanced research themselves and in fact deliver lectures regularly in the workshops organized by many Universities across India on regular basis. Department also hosted a Refresher course Life Sciences Bio. Sciences Bioinformatics in the Department, from Feburary 25 – March 16 2013, in collaboration with Department of Genetics.

28. S**tudent projects:**

Percentage of students doing in-house projects including inter-departmental projects:

Year	Programme	Percentage
2012-2013	M.Sc.	100%
2013-2014	M.Sc.	100%
2014-2015	M.Sc.	100%
2015-2016	M.Sc.	100%
2016-2017	M.Sc.	100%

Percentage of students doing projects in collaboration with industries /universities:

Year	Programme	Percentage
2012-2013	M.Sc.	100%
	Ph.D.	10-15%
2013-2014	M.Sc.	100%
	Ph.D.	10-12%
2014-2015	M.Sc.	100%
	Ph.D.	10-16%
2015-2016	M.Sc.	100%
	Ph.D.	10-15%

29. **Awards/recognition received at the national and international level by Faculty:**

Prof. A.K. Tyagi:

1. President, National Academy of Sciences, India, 2015-2016.
2. JC Bose National Fellowship Award, DST, Government of India, 2007-2017.
3. TN Khoshoo Memorial Lecture Award, TOSI, 2015.
4. Archana Sharma Memorial Lecture Award, WAST, 2014.
5. SK Sinha Memorial Lecture Award, ISPP, 2013.
6. Shri Ranjan Memorial Lecture Award, NASI, 2012.
7. SK Mukherjee Commemoration Lecture Award, ISCA, 2012.
8. Director, National Institute of Plant Genome Research, New Delhi, 2009-2016.
9. Executive Director-in-Charge, National Agri-food Biotechnology Institute, Mohali 2013- 2016.
10. Chairman, PAC Plant Sciences, DST, 2007-2015.
11. Delivered 50 invited lectures in national/international meetings.

Prof. J. P. Khurana:

1. Fellow, National Academy of Sciences, India (NASI), 2000 onwards.
2. Fellow, Indian National Science Academy (INSA), New Delhi, 2004.
3. Fellow, National Academy of Agricultural Sciences (NAAS), New Delhi, 2005.
4. Fellow, Indian Academy of Sciences, Bangalore, India, 2006.
5. Fellow, The World Academy of Sciences (TWAS), Trieste, Italy.
6. 'Tata Innovation Fellowship' by the Department of Biotechnology, Government of India, for three years, March 2010-February 2013.
7. Secretary, Plant Tissue Culture Association of India, 2010-2016.

8. Prof. S.S. Katiyar Endowment lecture Award by the Indian Science Congress Association during its 100th Session, held at Kolkata, January 2012-2013.
9. Sir J.C. Bose National Fellow, DST, June 2013-2018.
10. Professor H.E. Street Memorial Lecture given under the auspices of Plant Tissue Culture Association (PTCA), India, 2013-2014.
11. Professor J.C. Sengupta Endowment Lecture Award by the West Bengal Academy of Sciences & Technology (WAST), October 2014.
12. Prof. H.C. Arya Memorial Gold Medal awarded by the Plant Tissue Culture Association of India (PTCA-I), January 2015.
13. Dr B.P. Pal Memorial Lecture Award by National Academy of Sciences, India (NASI), 2015.
14. Lifetime Achievement Award by SciGenome Research Foundation, during the NGBT conference held in Hyderabad, October 2015.

Prof. Paramjit Khurana

1. Fellow, National Academy of Sciences, (NASI), Allahabad, India, 2003 onwards.
2. Fellow, Indian Academy of Sciences, Bangalore, India, 2010.
3. Fellow, National Academy of Agricultural Sciences (NAAS), India, 2014.
4. Fellow, Indian National Science Academy (INSA), New Delhi, 2011.
5. Fellow, The World Academy of Sciences (TWAS), Trieste, Italy.
6. Certificate of Honour, Gantavaya Sansthan on International Women's Day, 2011.
7. Prof. Archana Sharma Memorial Award, Indian Science Congress Association, 2011-2012.
8. Bharat Ratna Rajiv Gandhi Mahila Shakti National Award conferred by Academy of Grassroots Studies and Research of India, in collaboration with Rajiv Rural Development Foundation, Tirupati, 2013.
9. Nominated member NASI member to Science Education Panel of the three National Science Academies, 2013-2014.
10. Foreign Secretary, National Academy of Sciences, Allahabad, India, 2013-2014.
11. Nominated NASI member to the Science Education Panel of the three National Science Academies, 2013-2015.
12. Sir J.C. Bose National Fellow, DST, 2012-2017.
13. Shri Ranjan Memorial Lecture Award by The National Academy of Sciences, India, 2014.
14. Member of the Apex Committee on Agricultural Biotechnology, Department of Biotechnology, Government of India, 2014-2017.
15. Co-Chair of BIOCARE programme of DBT, Government of India, 2014-2017.
16. Chairperson, PAC on Plant Sciences of SERB, Government of India, 2015-2017.
17. NASI member to the Council, Indian National Science Academy, 2016 & 2017.
18. Nominated NASI Member to the Council, Indian National Science Academy, 2017.
19. Convenor, Sectional Committee VII (Plant Sciences), Indian National Science Academy, 2017.
20. Birbal Sahni Award Medal of the Indian Botanical Society for 2017.
21. Professor S.K. Sinha Memorial Lecture Award of the Indian Society of Plant
22. Physiology for the year 2017.

Prof. Anil Grover

1. Sir J.C. Bose National Fellow, Department of Science and Technology, Government of India, 2011-2015; 2015-2020.
2. Indo-Australia Visiting Fellowship award, Indian National Science Academy, 2013.
3. Visiting Professorship, King Saud University, Saudi Arabia, 2012-13; 2013-14.

Prof. Indranil Dasgupta

1. Fellow, National Academy of Sciences India, Allahabad, 2009.
2. Fellow, Indian Academy of Sciences, Bangalore, 2010.
3. Fellow, Indian National Science Academy, New Delhi, 2014.
4. Awarded J. C. Bose Fellowship by the Department of Science and Technology, Government of India on 26.12.2016 for a period of five years.

Prof. Madan Mohan:

1. Fellow, Indian National Science Academy, 2004.
2. Fellow, National Academy of Agricultural Sciences, 2000.

Prof. Sanjay Kapoor:

1. Associate Editor, Journal of Plant Biochemistry and Biotechnology, 2010 onwards.
2. Fellow, National Academy of Sciences, India, Allahabad, 2013.

Prof. Arun K. Sharma

1. Fellow, National Academy of Sciences, India, Allahabad, 2012.

Prof. Girdhar K. Pandey:

1. Visiting Professor, Jiangsu Academy of Agricultural Sciences, Nanjing, Jiangsu, China

Dr. Surekha Katiyar-Agarwal:

1. DBT Innovative Young Biotechnologist Award (IYBA), 2012

30. Seminars/ Conferences organized and source of funding(national/international) with details of outstanding participants, if any).

July 2012 to June 2013

1. Organized the "Fascination of Plants Day' Function at University of Delhi South Campus, New Delhi, on May 18, 2012.
2. Organized UGC-SAP Workshop on "Challenges in Molecular Biology & Biotechnology" at UDSC, in March 2012.
3. The Department organized a two-day National Symposium using funding from DST-FIST grant on 27th and 28th September 2013, which was attended by over 100 Departmental staff and students, 40 college teachers of Delhi University and about 50 undergraduate students of various colleges. The symposium featured 12 speakers, who are well-known plant scientists, including Prof. S.C. Maheshwari. There was also a poster presentation by Ph.D. students and a panel discussion on teaching and training in plant sciences.

July 2013 to June 2014

1. Organized the 11th International Symposium on Rice Functional Genomics (ISRFG-2013) at Hotel "The Grand". New Delhi, jointly with NIPGR, New Delhi, from November 20-23, 2013. (Among 110 were from overseas).
2. Organized UGC-SAP Workshop on "Advances in Molecular Biology & Biotechnology" at UDSC, in March 2014.

July 2014 to June 2015

1. Delivered the CSIR Foundation Day lecture at Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, in September 2014.
2. Organized UGC-SAP Workshop on "Recent Development in Molecular Biology & Biotechnology" at UDSC, in March 2015.

Professor Girdhar K. Pandey

3. Organized the International Symposium on Plant Biotechnology for Crop Imporivement, by IIT-Guwahati, Assam, in January 20-21, 2015.

July 2015 to June 2016

Professor Girdhar K. Pandey

1. Organized the International symposium and annual meeting of Korean Society for Applied Biological Chemistry, by Pyeongchang Campus Seoul National University, Pyeongchang, South Korea in August 18, 2015.
2. Organized UGC-SAP Workshop on "Advances in Molecular Biology & Biotechnology" at UDSC, in March 2016.
3. Organized International Plant Physiology Congress 2016 jointly with JNU under the AEJIS of the Society of Plant Physiology, India.

July 2016 to June 2017

Professor Paramjit Khurana

1. Organized the National Academy of Sciences, India (NASI), NASI AWARD LECTURES on November 25, 2016 at Biotech Building, UDSC, New Delhi.
2. NASI-BHU Teachers Training Workshop at Institute of Science, BHU on February 10 & 11, 2017 on "Dawn of Genomics Era in Plant Sciences"

Professor Indranil Dasgupta

1. Conference title: 8th International Geminivirus Symposium and the 6th International ssDNA Comparative Virology Workshop, dates 7.11.2016 - 10.11.2016, funded partially by Science and Engineering Research Board, Department of Science and Technology, Government of India, Indian National Science Academy, New Delhi and Council of Scientific and Industrial Research, New Delhi.

Professor Girdhar K. Pandey

1. Organized the 3rd International Conferance of Plant Genetic and Genomics by Agrigenomics Chandigarh in July 20, 2017.

31. **Code of ethics for research followed by the Departments:**

The applicable clearances for Animal Ethics and genetically modified organisms are obtained from institutional bodies through Institutional Biosafety Committee on regular basis. The Department follows strict anti-plagiarism policy in all its research. The principles and practices of these policies are discussed with research students from time-to-time.

32. **Student profile:**

Name of the programme	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
M.Sc.					
2012-2013	456	3	7	100	100
2013-2014	1400	4	8	100	100
2014-2015	600	3	8	100	100
2015-2016	567	4	6	100	100
2016-2017	616	2	8	100	100
Ph.D.					
2012-2013	115	5	4	100	100
2013-2014	204	4	5	100	100
2014-2015	25	3	3	100	100
2015-2016	179	3	8	100	100
2016-2017	200	2	5	100	100

No student failed in any final examination.

33. **Diversity of students:**

Name of Programme	Percentage of students from the same university	Percentage of students from other universities in the state	Percentage of students from universities outside the state	Percentage of students from other countries
M.Sc.				
2012-2013	80	Nil	20	Nil
2013-2014	70	10	20	Nil
2014-2015	90	Nil	10	Nil
2015-2016	90	Nil	10	Nil
2016-2017	100	Nil	Nil	Nil
Ph.D.				
2012-2013	30	20	50	Nil
2013-2014	20	10	70	Nil
2014-2015	20	30	50	Nil
2015-2016	70	Nil	30	Nil
2016-2017	60	10	30	Nil

34. How many students have cleared various National Exams (Civil Services/ Defence Services/NET/SET/GATE) and other competive examinations? Give details category-wise.:

An average of 60% of our M.Sc. students clear NET/GATE during the course or immediately after finishing the course.

Sr. No.	Year of admission	Total students	No. cleared NET	Total

1.	2012	12	1 (GATE) 1(GATE) 1(ICMR)	3
2.	2013	12	1(CSIR-LS) 1(NET-JRF) 1(DBT-JRF)	3
3.	2014	12	1(CSIR) 1(NET-JRF)	2(LS)
4.	2015	10	1(CSIR-JRF) 1(CSIR-LS) 1(NET-JRF) 1(GATE)	4
5.	2016	12	1(DBT-JRF) 1(CSIR-LS) 2(UGC NET-JRF)	4

35. Student progression:

Student progression	**Percentage against enrolled**
PG to Ph.D.	
2012-2013	10
2013-2014	20
2014-2015	30
2015-2016	20
2016-2017	30
Ph.D. to Post-doctoral	
2012-2013	Nil
2013-2014	10
2014-2015	Nil
2015-2016	Nil
2016-2017	Nil
Employed **Campus selection** **Other than campus recruitment**	
2012-2013	Nil
2013-2014	70
2014-2015	75
2015-2016	Nil
2016-2017	Nil
Entrepreneurs	Nil

36. Diversity of staff:

Percentage of faculty who are graduates of the same university	
2012-2013	60
2013-2014	60
2014-2015	60
2015-2016	60

2016-2017	60
From other universities within the state	Nil
From universities from other states 2012-2013 2013-2014 2014-2015 2015-2016 2016-2017	 40 40 40 40 40
From universities outside the country	Nil

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc., etc. during the assessment period:

None

38. Present details of departmental infrastructural facilities with regards to:

a) Library: The Department maintains a library consisting of about 100 volumes of books used by the M.Sc. and Ph.D. students routinely. These are issued from the South Campus Library on an Annual basis.

b) Internet facilities for staff and students: Available to all staff at the level of Faculty members and officers. There are six computers with internet facility exclusively meant for M.Sc. students in a separate room meant for this activity. All laboratories in the Department have internet facilities used by Ph.D. students.

c) Total number of class rooms: Three

d) Class room with ICT facility: Three

e) Students' laboratories: One (combined also with a class room)

f) Research laboratories: Eleven

g) Instrument Facility: Three, exclusively meant for Ph.D. students.

h) Cold rooms and culture rooms: Two and six respectively, meant for Ph.D. students.

39. List of doctoral, post-doctoral students and Research Associates

Ph.D Students			
2012-2013	**2013-2014**	**2014-2015**	**2015-2016**
1. Amrapali 2. Archana Singh 3. Balaji M 4. Chanderkant Chadhary 5. Jyothish MS 6. Manisha Sharma 7. Santosh Kumar	1. Akanksha Bhatnagar 2. Cheeni Vijaya Kumar 3. Lalit Dev Tiwari 4. VibhaVerma 5. Richa 6. Garima Singh	1. Saroj Kumar Jha 2. Madhvi Naresh 3. Utkarsh Raghuvanshi 4. Sibaji 5. Kanwaljeet Kaur	1. Deepika Sharma 2. Gautam Gawande 3. Kanika Gupta 4. Karan Agarwal 5. Kamlesh Kumari

8. Alka Shankar 9. Eshan Sharma	7. Ritesh Kumar 8. Satyam Vergish 9. Nisha Negi	6. Shaloo Meena	6. Neelima Boora 7. Pratibha Gaur 8. Priya Gambhir 9. Ridhi Khurana 10. Simran Marwah 11. Vijendra Singh
2016-2017			
1. Aishwarye Sharma 2. Barkha Ravi 3. Harsha Samtani 4. Lisha Khungar 5. Ragini Singh 6. Ringyao Jajo 7. Sanchi Bhimrajka			

M.Sc. students (Final)

Amit Kumar
Bhavya Shree
Gayatri Tripathi
Neelam
Nikhil
Prakhar
Shivangi Dabas
Somesh Thapliyal
Suraj Singh Swati Mahiwal
Tonu Angaila Chithung

M.Sc. (Previous)

Aakriti Jain
Ankit
Atreyee Sardar
Himanshi Choudhary
Himanshi Gautam
Monika Sshrivastva
Nidhi Yadav
Sarvesh Jamwal
Shivam Chaudhary
Shruti Saini

40. Number of post graduate students getting financial assistance from the university.

10 out of 21

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.

Programme offered to M.Sc. students has been revised on regular basis. Realizing the need that students prefer to have a Degree in Biotechnology, the name of the course offered has been expanded from "M.Sc. in Plant Molecular Biology" to "M.Sc. in Plant Molecular

Biology and Biotechnology" and suitable changes in curriculum also incorporated. Changes were also incorporated during the semesterization in the year 2007-08, that involved series of meetings of the Faculty members and informal feedback from students.

42. Does the Department obtain feedback from

a. Faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

Regular meetings of the Departmental staff council are held in which the teaching-learning-evaluation processes are discussed in detail and the minutes kept for future references.

b. Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

M.Sc. students are given a feedback form to complete on the teaching-learning-evaluation process and their feedback is kept for study by the faculty.

c. Alumni and employers on the programmes offered and how does the department utilize the feedback?

The alumni are regularly invited during the Departmental symposia and conferences, where they closely interact with the Departmental staff. The Department undertakes educational tours for M.Sc. students, where they visit and interact with various potential employers in industries and the interactions are used to modify the curriculum, if found necessary.

43. List of distinguished alumni of the department (Maximum 10)

1. Dr. Amitabh Mohanty, Lead, Discovery Research, E.I. DuPont India, Pvt. Ltd., Hyderabad
2. Dr. Rita Gandhi, Scientist, E.I. DuPont India, Pvt. Ltd., Hyderabad
3. Dr. Ashok Chaudhary, Professor, Guru Jambheshwar University of Science and Technology, Hisar
4. Dr. Amit Dhingra, Associate Professor, Washington State University, USA
5. Dr. Laxman Gangwani, Associate Faculty Member, Texas Tech University, USA
6. Dr. Mukesh K Malik, Senior Application Scientist, Beckman Coulter Ltd.,
7. Washington DC, USA
8. Dr Vijay Sharma, President - Monsanto Asian Connection, Monsanto Company, USA.
9. Dr Pradeep Jain, Principal Scientist, NRCPB, IARI, New Delhi
10. Dr Mukesh Jain, Associate Professor, Jawarharlal Nehru University, New Delhi
11. Dr Archna Chugh, Assistant Professor, Kusuma School of Biological Sciences, IIT, New Delhi.
12. Dr Ritu Kulshreshtha, Assistant Professor, Department of Biochemical Engineering and Biotechnology, IIT, New Delhi.
13. Dr Jitendra Thakur, Staff Scientist IV, NIPGR, New Delhi.
14. Dr Ashwerya Lakshmi, Staff Scientist IV, NIPGR, New Delhi.
15. Dr. Anandita Singh, Assistant Professor, TERI University, New Delhi.
16. Dr Dibendu Kumar, Director of Genomics, Genomics Core Facility, Waksman Institute of Microbiology, Rutgers University, USA..
17. Dr Ravi Vaidyanathan, Institute of Molecular and Cell Biology, A*STAR, Biopolis, Singapore.

18. Dr Subha Vij, Temasek Life Sciences Laboratory, Singapore
19. Dr Somika Bhatnagar, Tree Biotechnology Lab, Temasek Life Sciences Laboratory Limited, Singapore.
20. Dr. Hitesh Kathuria, Assistant Professor, Indiana University, USA
21. Dr. Meenu Kapoor, Professor, GGS Indraprastha University, New Delhi
22. Dr. Ashwani Pareek, Professor, Jawaharlal Nehru University, New Delhi
23. Dr. Sneh Lata Singla-Pareek, Scientist, International Centre for Genetic Engineering and Biotechnology, New Delhi.
24. Dr Shalini Lal, Associate Professor, Ranchi University, Bihar.
25. Dr Himanshu Dubey, ICAR, Ranchi, Bihar.
26. Dr Arnab Goswami ,Associate Professor National Institute of Immunology, New Delhi.
27. Dr Basantha Borah, Assistant Professor, Assam Agricultural University, Assam.
28. Dr Ujjaini Dasgupta, Scientist, Amity University, Gurugram
29. Dr Chandan Sahi, Associate Professor, IISER, Bhopal.
30. Dr Vikrant Gupta, Principal Scientist, CIMAP, Lucknow.
31. Dr Manu Aggarwal, Associate Professor, Department of Botany, University of Delhi, Delhi.
32. Dr Saloni Mathur, Staff Scientist III, NIPGR, New Delhi.
33. Dr Pinki Aggarwal, Staff Scientist III, NIPGR, New Delhi.
34. Dr Jitendra Giri, Staff Scientist III, NIPGR, New Delhi.
35. Dr Harsh Chauhan, Assistant Professor, IIT, Roorkee.
36. Dr Amol Solanke, Scientist III, NRCPB, New Delhi.
37. Dr Sachin Kotak, Assistant Professor, IISC, Bangalore.

44. Give details of student enrichment programmes:

The Department periodically holds Special Lectures by distinguished scientists on topics of contemporary interest. The Department holds Annual Symposium under UGC-SAP programme, which consist of day-long lecture series by well-known scientists. The details are as follows:

Special Lecture series

S. No.	Year	Speaker
1.	2012	Dr. D. S. Brar, Retired Scientist, International Rice Research Institute, Manila, Philippines.
2.	2014	Dr Rajnish Khanna, Stanford University, USA.
3.	2014	Dr Smrutisanjita Behera, University of Milano, Italy.
4.	2014	Dr Manash Chatterjee, BenchBio Pvt. Ltd, Gujarat.
5.	2016	Professor Eduardo Blumwald, University of California, USA

Speakers in the Annual Symposium under the UGC-SAP programme

S. No.	Year	Speaker	Title
1.	2012	Dr. Anurag Agarwal, Institute of Genomics and Integrative Biology, New Delhi	The next challenge in asthma genomics: Mechanistic understanding of genotypic risk.
2.		Dr. Swapan Datta, Indian Council for Agricultural Research, New Delhi	GM crops: Future in India.
3.		Dr. Niranjan Chakraborty,	Quest for stress-responsive proteins in

		National Institute for Plant Genome Research, New Delhi.	the extracellular matrix: a comparative proteomic approach.
4.		Prof. Anil Grover, Department of Plant Molecular Biology, University of Delhi South Campus.	Rice heat stress biology.
5.		Prof. Rameshwar P. Sharma, University of Hyderabad	Mutants as an aid to understand tomato morphogenesis.
6.	2014	Prof. A.S. Raghavendra, University of Hyderabad	Photorespiration: An adaptive response of plant cells to sustain and protect photosynthesis under abiotic stress.
7.		Dr. Anjan Banerjee, Indian Institute of Science Education and Research, Pune	Phloem-mobile signals that control tuberization in potato.
8.		Prof. Indranil Dasgupta, Deptt. of Plant Mol. Biol., Univ of Delhi S. Campus, New Delhi	Understanding plant viruses to develop useful tools for virus resistance, gene expression and silencing in plants.
9.		Dr Sudhanshu Vrati, NII, New Delhi	Development of Japanese encephalitis vaccine candidates.
10.		Dr Ashis Nandi, Jawaharlal Nehru University, New Delhi	Mechanism of systemic acquired resistance development in plants.
11.	2015	Prof. Anil K. Tripathi, CIMAP, Lucknow	Regulators of oxidative stress response in a plant growth promoting rhizobacterium
12.		Dr. T.R. Sharma, NRCPB, New Delhi	Molecular Basis of Rice-Maganporthe oryzae Interaction and its Significance in Rice Breeding
13.		Prof. Supriya Chakraborty, Jawaharlal Nehru University	Viral pathogenesis vis-à-vis host response during development of leaf curl disease in tomato
14.		Dr. Sanjay Kapoor, University of Delhi South Campus	Insights into role of MADS29 and evolution of cereal-type seed development
15.		Prof. Ramesh Bamezai, Jawaharlal Nehru University	Beyond genome screening to understand complex biology of sporadic breast cancer - in vivo and in vitro studies
16.	2016	Dr Naveen Khanna, ICGEB	A designer dengue vaccine candidates
17.		Dr. Jan Willem Ligterink, Wogeningen University, The Netherland	Use of Phenomics, Transciptomics, and Metabolism to shed light on mechanisms of abiotic stress tolerance in seed and seedlings
18.		Prof. Sudip Chattopadhyay, NIT, Durgapur	CAP7 and HYS work in a concerted manner to regulate *Arabidopsis* seedling development
19.		Dr Ivo Rieu, Radbond University, The Netherland	The negative effect of high temperature on pollen development is mediated by tapetal function
20.		Dr. Saurabh Raghuvanshi, University of Delhi South Campus	miRNA mediated stress regulatory network: Discovery and Integration.
21	2017	DR. Alok Sinha, NIPGR, NEW DELHI	'Mitogen Activated Protein Kinase: Role in Seedling Development in Arabidopsis and Submergence Tolerance in Rice'
22		DR. Samir Sawant, NBRI, Lucknow	'The Role of Histone Acetylation in the Cotton Fibre Development'

23		DR. Kuldeep Singh, NBPGR, New Delhi.	'Crop Genetic Diversity: Documentation, Conservation and Utilization'
24		DR. Beena Pillai, IGIB, Delhi	'Histone Variants in Neurogenesis: Lead, Side-kick or Cameo?
25		PROF. Arun K. Sharma, DPMB, UDSC	'Regulation of Tomato Fruit Quality'

45. List the teaching methods adopted by faculty:

For M.Sc. program:

1. The teaching methods generally include Powerpoint presentations and overhead projectors to display slides to explain certain points in the lectures.
2. Practical classes include hands-on experiments in the laboratories and glasshouses.
3. Students give seminars and are evaluated as part of internal evaluation.
4. Students also write tutorials on topics given.
5. Forth semester is for Dissertation wherein the students do in-house projects for about 6 months and submit their dissertation thesis at the end. This is then followed by a brief presentation of their work and examined by a board of members.

For Ph.D. program:

1. The teaching methods generally include PowerPoint presentations and overhead projectors to display slides to explain certain points in the lectures.
2. Friday seminars area a must for the Ph.D. students and included in their assessment.
3. Sometimes, there are taken to other institutions and departments for site visits.
4. Students are encouraged to attend Seminars/Lectures organized by other departments/Universities/ Institutions etc. in and around Delhi.
5. Students are also encouraged to undertake studies aboard as part of their research work.
6. Specialized training workshops are also organized for the students to handle advanced equipments.

46. How does the Department ensure that programme objectives are constantly met and learning outcomes are monitored?

The Department has constant interaction with students and monitors their performances in the class tests, tutorials and assignments given to them.

47. Highlight the participation of students and faculty in extension programmes:

There are no Extension programmes undertaken by the Department.

48. Give details of "beyond syllabus scholarly activities" of the Department:

Educational trips have been organized for M.Sc. students of Semester III to various industries, universities and national laboratories in the country. This enriches the

students perception of research scenario and the demands of professional work-culture in settings separated from Universities. Details are given below:

S. No.	Month and Year	Details of places visited
1	September, 2012	a) Department of Plant Sciences, University of Hyderabad b) Centre for Cellular and Molecular Biology, Hyderabad c) Du-Pont Plant Sciences, Hyderabad d) International Crop Research Institute for Semi-arid Tropics, Patancheru, Hyderabad e) Directorate of Rice Research, Hyderabad.

49. State whether the Department is accredited by other agencies. Give details.

The teaching programmes and the research output of the Department have been evaluated under UGC-SAP and DST-FIST and both agencies have recognized the excellent work being carried out in the Department.

50. Briefly highlight the contributions of the Department in generating knowledge:

The Department had participated in the Rice Genome Sequencing Programme, an International effort, which has resulted in the first detailed genome sequence of an important crop plant. It has also participated in the Tomato genome project, which has been also completed and is currently part of the Wheat genome project. The Department has generated important information on abiotic stress response in plants, catalogued the genes expressed during flower and seed development, contributed to our understanding of virus-plant interactions, fruit ripening, heat stress and various small RNAs during plant stress response. The Department has developed and patented various promoters and has also commercialized one patented product to an industry.

51. Five major Strengths, Weaknesses, Opportunities and Challenges faced by the Department:

Strengths:

- Excellent Faculty profile,
- Latest research infrastructure,
- Modern teaching programmes,
- Collaboration with national and international research groups
- Robust external funding (through competitive mode).

Weaknesses:

- Shortage of funds for maintenance of facilities,
- Insufficient opportunities for making teaching as a career in Delhi University Colleges for students completing Ph.D. from the Department,
- Fall in the number of academic support staff and lack of training and encouragement to the existing support staff.
- Lack of space for fieldwork and inadequate space for containment facilities for evaluation of transgenic crop plants.

Opportunities:

- Increasing interests from industry in plant biotechnology,
- Adequate government funding for collaborative projects,
- Participation in international student exchange programmes (eg. Erasmus Mundus with European Countries),
- Collaborative teaching and projects with other Universities and Research Institutions and better training and incentives to support staff.

Challenges:

- To maintain standards of quality research being undertaken by the Department over the years.
- Updating the M.Sc. teaching programme to cater to the needs of students and academia keeping in mind the contemporary needs and aspiration of this area of knowledge.
- To meet the expectation of the industries as well as students in terms of career prospects.

52. Future plans of the Department:

1. The Department plans to build on the achievements in the last 25 years to develop excellence in training, teaching and research in Plant Molecular Biology and Biotechnology.
2. Apart from the cutting-edge science it is currently undertaking, the Department plans to develop additional infrastructure and skills to analyze gene functions, networks in systems biology, phenotyping, promoter analysis and products developed around these objectives.
3. The Department is eager to interact more closely with industries, to develop collaborative projects and to initiate product-oriented research.
4. The Department will try and expand its international collaboration and to obtain bilateral funding from government and international funding agencies.
5. In teaching, the Department will strive to improve and suitably modify the M.Sc. programme and to monitor and bring excellence to its Ph.D. programme in the form of publications in journals of high impact factor and in obtaining patents.
6. It will further strengthen its status as an excellent center for the teaching, training and conducting inter-disciplinary research in Plant Molecular Biology.