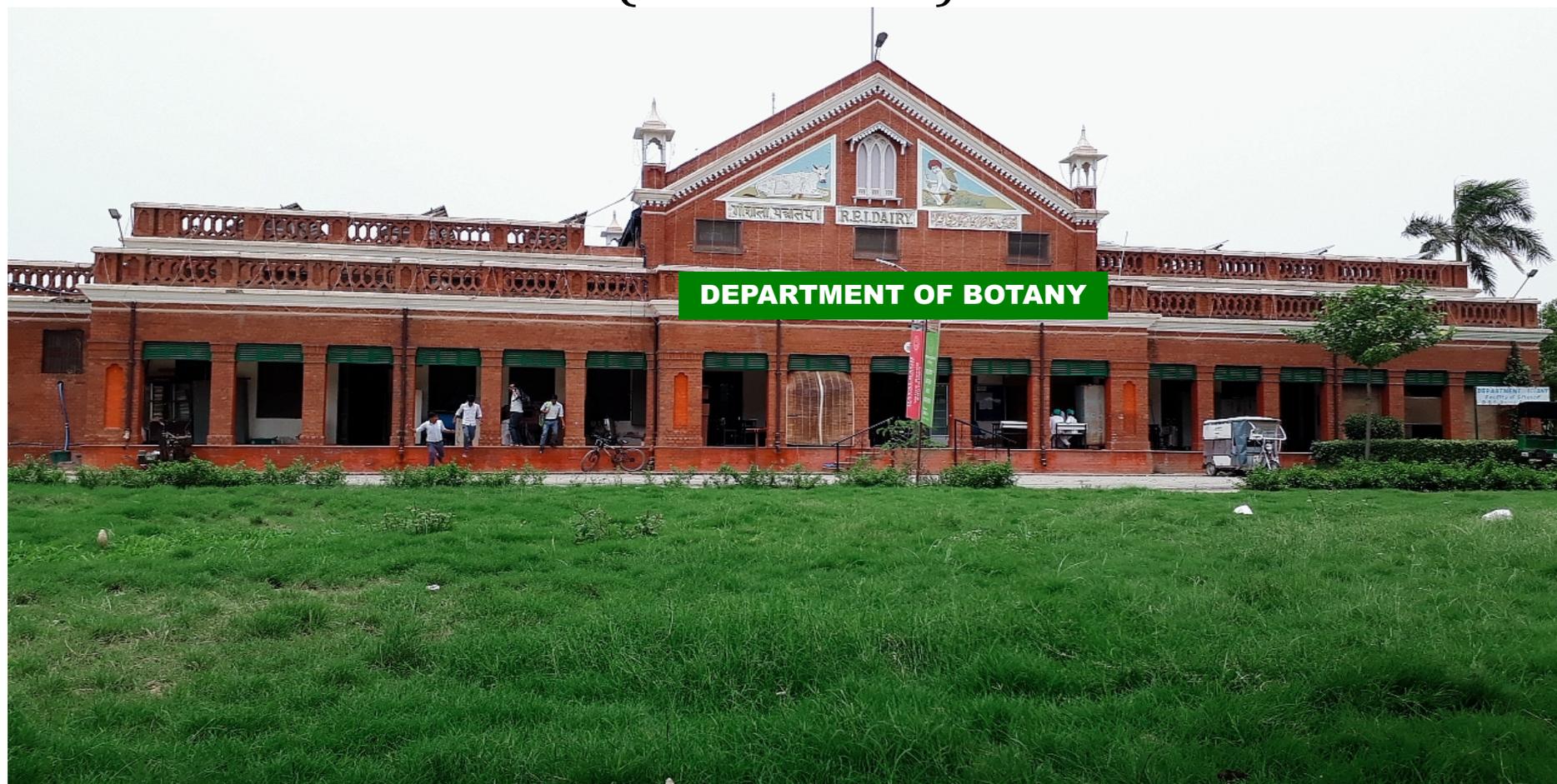




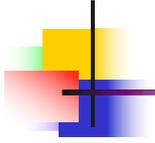
Department of Botany

Brief Profile & Progress Report

(2013-2019)



<https://www.dei.ac.in/dei/science/index.php/aboutbotany>



Bird's eye view

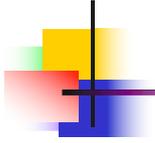
- Department profile**
- Programmes offered**
- Teaching/Learning milestones**
- Research highlights**
- Collaborations**
- Facilities available**
- Future roadmap**
- Labs-on-land/Outreach programs**

Department at a Glance



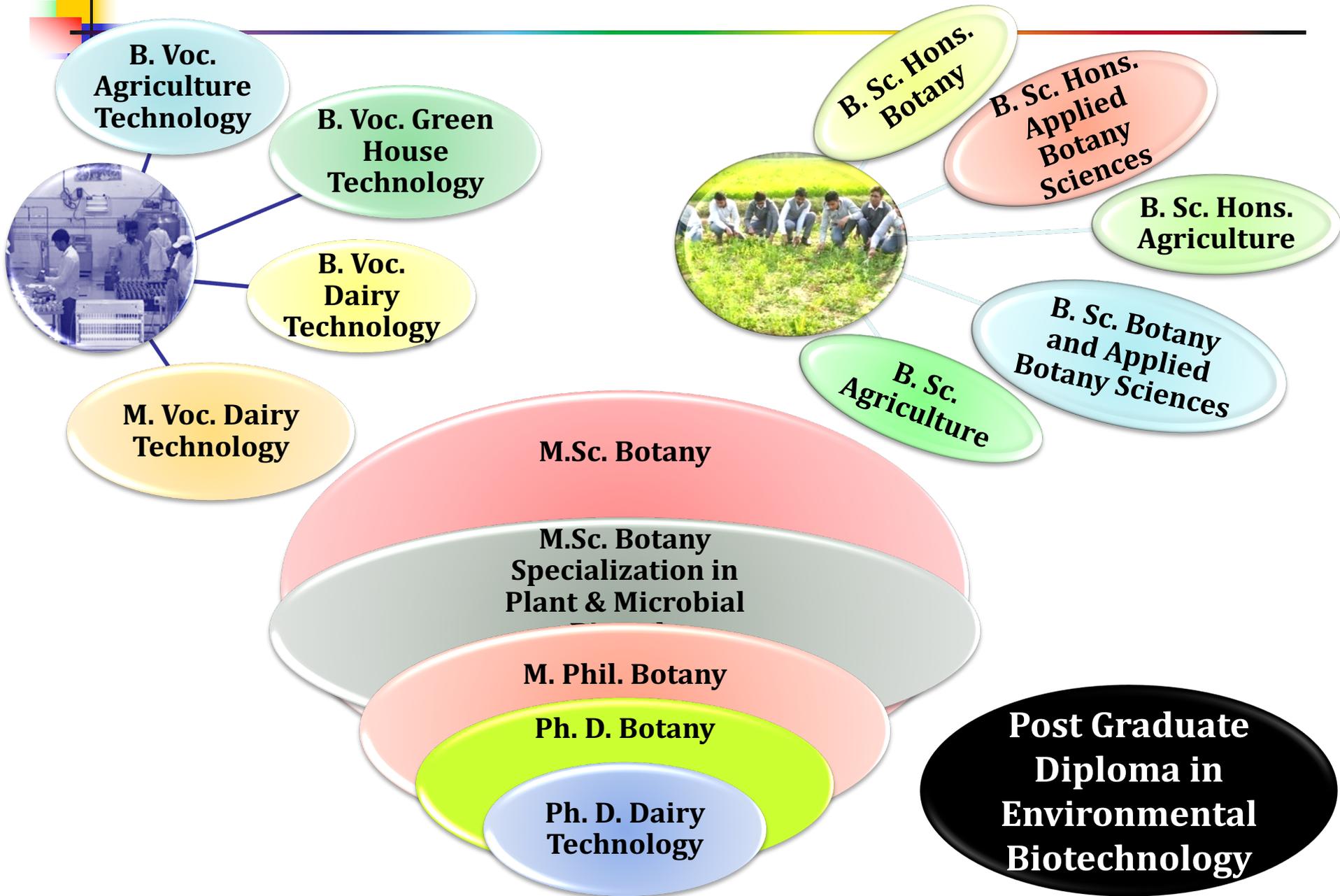
- The Department of Botany was established in early 1970 as a part of REI Degree College affiliated to Agra University.
- The Department became an independent part of DEI since 1981. Post-graduate teaching started in 1986
- Staffed with well qualified faculty.
- Aimed to provide effective teaching and research at each level of study.
- Strongly committed towards Hi-tech research relevant to the society and especially farmers.

- 
- **The thrust areas of research are Microbiology, Environment & Ecosystem Studies, Plant Biotechnology, Plant Tissue Culture, Plant Molecular Biology, Virology, Phycology, Biodiversity Parks & Conservation, Natural Products and Agriculture.**
 - **Laboratories are well organized and equipped with highly sophisticated and analytical instruments facilitating good quality research and teaching-learning activities.**
 - **UGC-SAP supported Department.**



Major Achievements

Courses conducted by Department





**Microbiology
&
Virology**

Agriculture

**Plant
Tissue Culture,
Biotechnology,
& Molecular
Biology**

**Environment
&
Ecosystem
Studies**

**Thrust Areas
of Research**

Phycology

**Biodiversity
Parks &
Conservation**

**Natural
Products**



Research Funding

**Major funding :
UGC-SAP Rs 50 lakh
(2018)**

Internal Funding:

Maintenance:

Rs 1.75 Crore

Non-recurring:

Rs. 6.0 Crore

External Funding:

**Funds generated from extra-
mural projects:**

Projects completed:

Rs 1.35 Crore

Projects in progress:

Rs 23 lakh



Research Publications & Awards

- **Journals: 99**
 - **Intl./Natl. Conf. Proc: 109/8**
 - **Books/Book Chapters: 5/9**
- **Citations:**
 - **Journals: 1128**
 - **Impact Factor : 10.5-0.12**
- **Review:**
 - **Theoretical and Experimental Plant Physiology (TXPP)**
 - **In Vitro Cellular & Developmental Biology – Plant**
 - **Acta Physiologiae Plantarum**
 - **Plant Biotechnology Journal**
 - **Scientia Horticulturae**
 - **Plant Growth Regulation**

Publications in:

- *Carbohydrate Polymers*
- *Plant and Cell Physiology*
- *Industrial Crop & Products*
- *Environ. Sci. & Pollution Research*
- *Plant Cell Tissue and Organ Culture*
- *Laser physics*
- *Essential Oil Research*
- *Indian J. Pharmaceutical Sciences*
- *National Academy Science Letters*
- *Proc. Natl. Academy of Sciences*
- *International journal of plant Reproductive Biology*
- *Journal of Pharmacognosy and Phytochemistry*

Research Output

- **Ph.D. awarded: 13**
- **Ph.D. submitted: 10**
- **Ph.D. enrolled: 25**
- **M.Phil awarded: 9**
- **M.Phil submitted: 2**

▪ **Scientific Events Organized:**

- **National Conferences/Workshops/Seminars: Value-based Science, Engineering, Management Quality Education: Trends and Policy VALEDU 2015, 30-31 October, 2015**
- **Seminars from distinguished visiting scientists: National Seminar on Plant and Microbes in Human welfare, Dept. of Botany, 28th & 29th March 2016**
- **National conference on Bioprospecting and Bioactive Compounds from Microbes and plants, 28-29 March, 2019.**
- **One day workshop on Agriculture in Dayalbagh and DEI-Past, Present and future, 1st September, 2018.**

Patent

FORM 1
THE PATENTS ACT, 1970
(OF 1970)
The Patents Rules, 2003
APPLICATION FOR GRANT OF PATENT
(For sections 7, 54 & 135 and Rule 20(i))

(FOR OFFICE USE ONLY)
Appn No. 742/KOL/2009
Filing Date: 15-5-2009
Amount of Fee Paid:
CIBR No. 317-1
Signature:

1. Applicant
Name/Surname:
Address:
INSTITUTE OF LIFE SCIENCES
An Autonomous Institute under department of
Biotechnology, Govt. of India, Noida Square,
Charanbagh, BHR 751 023, Gurgaon, India,
an Indian Institute.

2. Inventor (i)
Name/Surname:
address:
1. Nrisingha Dey
2. Rajiv Ranjan
3. Alok Kumar
INSTITUTE OF LIFE SCIENCES
An Autonomous Institute under department of
Biotechnology, Govt. of India, Noida Square,
Charanbagh, BHR 751 023, Gurgaon, India,
an Indian Institute.

4. I.B. Maiti
KENTUCKY TOBACCO RESEARCH AND DEVELOPMENT
CENTER
University of Kentucky,
Lexington, Kentucky-40546,
Kentucky, U.S.A.
All are Indian citizens

3. Title of the
Invention: NOVEL SUB-GENOMIC TRANSCRIPT PROMOTER DNA FRAGMENTS
AND A METHOD FOR OBTAINING SUB-GENOMIC PROMOTER DNA
FRAGMENTS FOR FIGWORT MOSAIC VIRUS

4. Address for
correspondence
of applicant
in India:
U.S. DAVAR & CO.
12, Ballo Kichik Dutt Garden Lane Kolkata-700010
Phone: 91-33-2241-1996, 2241-8914, 2241-1060/1061
Fax No. 91-33-2241-1248, 2241-5291 (Day)
91-33-2241-0862/2241-8292/2241-7165
91-33-2241-1146 (Night)
E-mail: india@u.s.davar.com
india@u.s.davar.com
india@u.s.davar.com

5. Priority particulars of the
Application filed in
Foreign country:
COUNTRY: NA
APPLICATION NO.: NA
FILING DATE: NA
NAME OF THE APPLICANT(S): NA
TITLE OF THE INVENTION: NA

INTELLECTUAL
PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Form 24 of The Patents Rules)

क्रमांक : 033102844
SL No : 033102844



पेटेंट नं. / Patent No. : 292986
जापेदन नं. / Application No. : 742/KOL/2009
पेटेंट करने की तारीख / Date of Filing : 15/05/2009
पेटेंते / Patentee : INSTITUTE OF LIFE SCIENCES

प्रमाणित किया जाता है कि पेटेंते की उपरोक्त जापेदन में उल्लेखित NOVEL SUB-GENOMIC TRANSCRIPT PROMOTER DNA FRAGMENTS AND A METHOD FOR OBTAINING SUB-GENOMIC PROMOTER DNA FRAGMENTS FOR FIGWORT MOSAIC VIRUS नामक आविष्कार के लिए, पेटेंट जापेदन, 15/05/09 के उपरोक्त दिनांक अर्थात् 15th day of May 2009 में दाखिल की जापेदन के लिए पेटेंट अर्जित किया गया है।
It is hereby certified that a patent has been granted to the patentee for an invention entitled NOVEL SUB-GENOMIC TRANSCRIPT PROMOTER DNA FRAGMENTS AND A METHOD FOR OBTAINING SUB-GENOMIC PROMOTER DNA FRAGMENTS FOR FIGWORT MOSAIC VIRUS as disclosed in the above mentioned application for the term of 20 years from the 15th day of May 2009 in accordance with the provisions of the Patents Act, 1970.

INTELLECTUAL
PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS



पेटेंट कार्यालय
THE PATENT OFFICE
Controller of Patents

पेटेंट की तिथि : 16/02/2018

ध्यान दें - इस पेटेंट में परिवर्तन के लिए पेटेंट की तिथि अर्थात् 15th day of May 2011 से और उसके समय से पहले के लिए लागू है।
Note - The fees for renewal of this patent, if it is to be maintained via fee / has fallen due on 15th day of May 2011 and on the same day in every year thereafter.

❖ Novel sub-genomic transcript promoter DNA fragments and a method for obtaining sub-genomic promoter DNA fragments from figwort mosaic virus.

Name of Inventors: Nrisingha Dey, Rajiv Ranjan, Alok Kumar and I. B. Maiti

Patent No-292986

Award Date: 16/02/2018

Awards and Recognitions

- **Faculty awards and recognitions**
 - International: **2**
 - National: **10**
 - Best paper awards: **5**
 - Visiting Professorship: **5**
 - Visiting scientists: **6**
 - Invited talks: **6**
 - Abroad: **1**
 - In India: **5**
- Fellows, Professional bodies: **5**
- Members of editorial boards of journals: **9**
- Members of review boards of journals: **15**



Chronological Progression

**Greenhouse Technology and
B.Sc. (Hons.) Agriculture 2018**

**Applied Botany Science, Agriculture
Technology, Labs-on-land 2017**

Orchard & medicinal plantation at Solan 2016

**SAP awarded Department
Started dairy Technology 2015**

Biodiversity park 2014

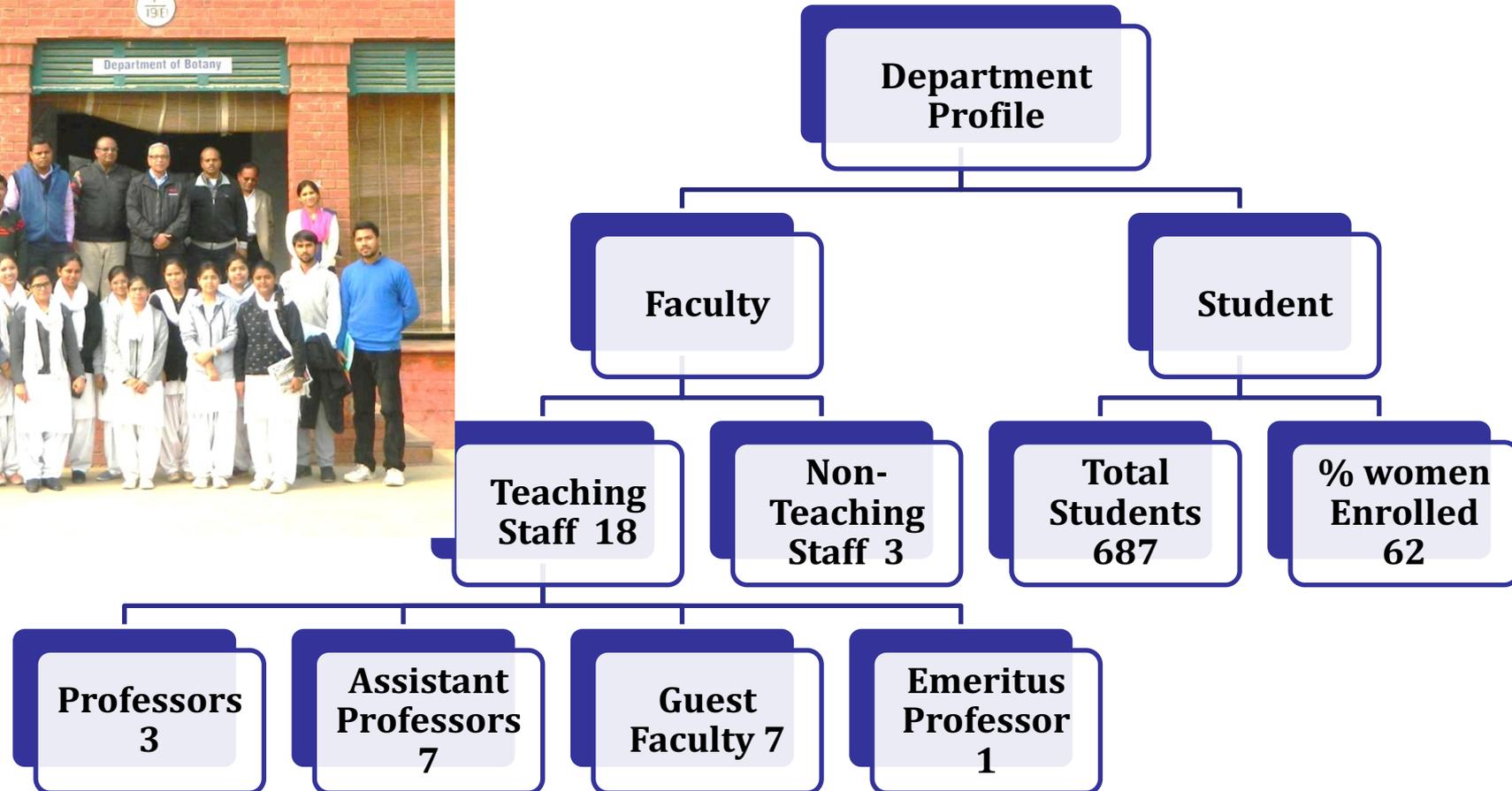
M. Sc. In Plant & Microbial Biotech 2012

PG Diploma in EBT 2011

**Science Faculty,
PG Programme 1986**

REI building, B.Sc. 1981

Department Profile



Teaching Staff:

Ph.Ds : 100%

% Women: 25

Teacher-student ratio: 1:20

Teachers are also available from other departments as per requirement.

Governance, Leadership & Management

Departmental Committees

- *Class Committees*
- *Proctors*
- *Programme Co-ordinators*
- *Time-Table Committee*
- *UG and PG Moderation Committees*
- *Board of Studies*
- *Examination*

Members of Institute Committees

- ✓ *Academic Council*
- ✓ *Institute Time Table Committee*
- ✓ *Institute of Eminence*
- ✓ *Magazine Committee*
- ✓ *Alumni Relations Committee*
- ✓ *Examination Committee*
- ✓ *Faculty Board of Studies*

Programmes Offered

1. B.Sc. (Hons) Botany
2. B.Sc. (Hons) Applied Botany Sciences
Botany, Zoology (Main),
Chemistry (Ancillary subject)
Environment Sciences (Non-Faculty)
3. B.Sc. (Hons.) Agriculture
3. B.Voc. Courses
 - (i) Dairy Technology
 - (ii) Agriculture Technology
 - (iii) B.Voc. Greenhouse Technology
5. M.Sc.
 - i) Botany
 - ii) Plant and Microbial Biotechnology
6. M.Voc. Dairy Technology
7. M.Phil. Botany
8. Ph.D. Botany & Dairy Technology
9. PG Diploma in Green Technology



B. Voc. Dairy Technology



B. Voc. Agriculture Technology

S.No.	Courses	Number of Students			Student Enrollment & Profile
		Men	Women	Total	
1	B.Sc. I	11	54	65	Teacher-Student Ratio: 1:20
2	B.Sc. II	05	25	30	
3	B.Sc. (Hons) III Botany	04	08	12	
4	B.Sc. (Hons) I Applied Botany	04	39	43	
5	B.Sc. (Hons) II Applied Botany	09	30	39	
6	B.Sc. (Hons) I Agriculture	54	11	65	Women Enrollment: 62%
7	B.Voc. I Agriculture & Dairy Tech	89	14	103	
8	B.Voc. II Agriculture Tech.	14	66	70	Reservation: As per UGC
9	B.Voc. II Dairy Tech	50	04	54	
10	B.Voc. III Dairy Tech	41	05	46	
11	B.Voc. I Greenhouse Technology	6	59	65	
12	M. Voc. I year Dairy Tech	04	12	16	Department is also involved in teaching, Agriculture Operations, Environmental Sciences and Rural Development
13	M. Voc. II year Dairy Tech	06	-	06	
14	PG I year Botany	5	11	16	
15	PG II year Botany	-	16	16	
16	M.Phil.	-	02	02	
17	Ph.D.	03	25	28	
18	Post-Doctoral	01	-	01	
	Total	306	381	687	

S. No.	Name of Research fellow	Year of enrolment	Duration of fellowship	Type of the fellowship	Granting agency	Qualifying exam if any (NET, GATE, etc.)
1	Mrinalini Prasad	2013	2013-2018	DST INSPIRE	DST	-
2	Shivshankar Gautam	2014	-	-	-	CSIR-UGC NET (LS)
3	Nupur Raghav	2014	2014-2016			-
4	Teg Bahadur Singh	2015	-2018- Till now	CSIR-UGC	CSIR-UGC	NET-JRF and ICAR-NET
5	Nitesh Verma	2015	Ongoing since 2016	RGNF	UGC	UGC NET (LS) EVS
6	Sonal Singh	2015	2013 - 2018	RGNF	UGC	-
7	Arti Yadav	2015	Ongoing since 2016	DST-INSPIRE	DST	DBT-JRF, CSIR-UGC NET-JRF
8	Anshu Singh	2016	Ongoing since 2017	RGNF	UGC	ICAR-NET
9	Dipinte Gupta	2016		DAE-BRNS	BRNS	GATE
10	Chandan Maurya	2016	Ongoing since 2017	RGNF	UGC	GATE
11	Richa Saxena	2016	-	-	-	-
12	Preksha Shrivastav	2016	-	-	-	-
13	Anamika Gupta	2016	-	-	-	-
14	Shubha Dhawan	2017	-	-	-	-
15	Karuna singh	2017	-	-	-	-
16	Prasuna	2017	-	-	-	-
17	Achal Mogla	2018	-	-	-	-
18	Deepika Goyal	2018	Ongoing since 2019	-DST INSPIRE	-	CSIR-UGC NET (LS) and GATE
19	Sujata Shekhar	2018	-	-	-	-
20	Parul Tyagi	2018	-	-	-	-
21	Lovely Singh	2018	-	-	-	-
22	Laccy	2018	-	-	-	-
23	Mehazabeen	2018	-	-	-	-
24	Versha Dixit	2018	-	-	-	-
25	Nitesh Rathore	2018	-	-	-	-
26	Suman	2019	-	-	-	-
27	Pooja	2019	-	-	-	GATE
28	Prachi	2019	-	-	-	-
29	Mamta	2019	-	-	-	-
30	Manaswi	2019	-	-	-	-

Learning Activities by UG Students

Agriculture Operation: an aspect of Sigma Six Q



B. Voc. Agriculture Technology



B. Voc. Dairy Technology



B.Sc. (Hons) Agriculture students planting Strawberry plants



Innovations in Teaching

Collaboration and visits to Institutes, Industries and R & D labs, Extra, Remedial, support from Research scholars



Experience-based Learning : *Learning by doing: Work-based Training*

- *Protected Cultivation*
- *Precision Farming*
- *Extraction of Essential Oils*
- *Production of Flavoured Dairy Products*
- *Extraction of Natural Products (Herbal Tea, Aloe Vera juice, Rose water, Neem Hand Wash etc*
- *Soil Testing*

Student-centric methods, such as experiential learning, participative learning and problem solving methodologies



Teaching Methodology:

*GDs,
Projects,
Self-Study,
Field work,
Term papers,
Active learning,
Multimedia aids,
Research colloquia.*

- **Evaluation :**
- *Continuous internal and external assessment,*
- *New innovative features added :*
 - ✓ *DHAs,*
 - ✓ *Weekly Class Assignments,*
 - ✓ *Grading,*
 - ✓ *Moderation,*
 - ✓ *Remedial Exams,*
 - ✓ *Online viva-voce exams of PhD through video-conferencing*

Agricultural Activities of the Department



Teaching/Learning Milestones

Parks or Gardens

Fruit orchard and Herbal garden at Himachal Pradesh

Biodiversity park in R.E.I.

Medicinal and Herbal garden in Dairy Campus

Fruit orchard; and plants for essential oil at Bahadurpur

Multi dimensional Phytodiversity Park with conservatory for local medicinal plants Bahadurpur

Biodiversity Park cum Fruit orchard at Seminar Hall Complex

Funding

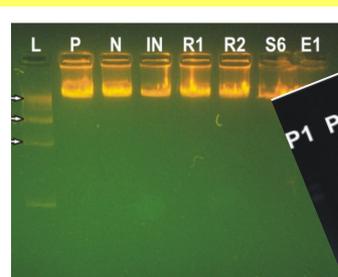
UGC - SAP

Laboratories

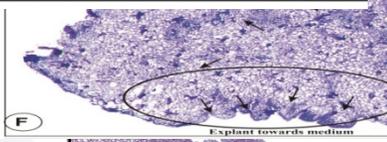
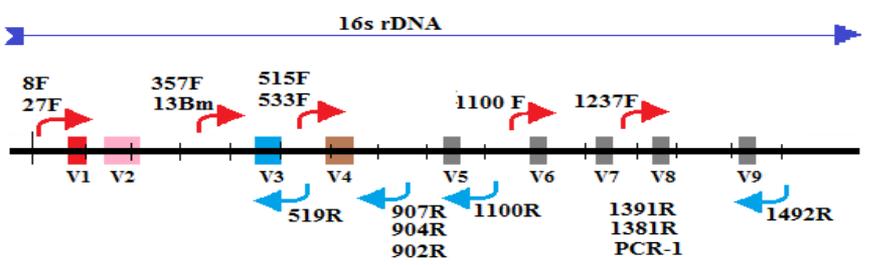
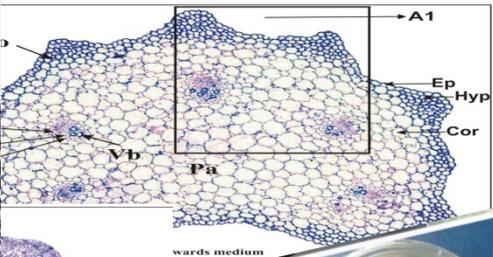
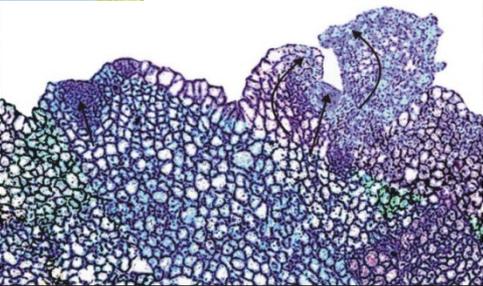
Dairy plant

Food & dairy product testing lab

Research & Development Highlights



**R.E.I. BIODIVERSITY P
LAB ON LAND**
TOTAL PLANTS: more than
TOTAL TYPES OF GENUS: m



Direct shoot regeneration from nodal, internodal and petiolar segments of *Longum L.* and in vitro conservation of indexed plantlets

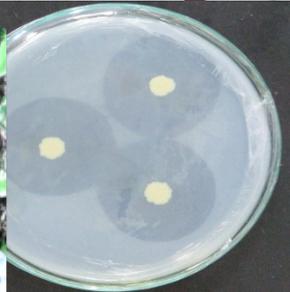
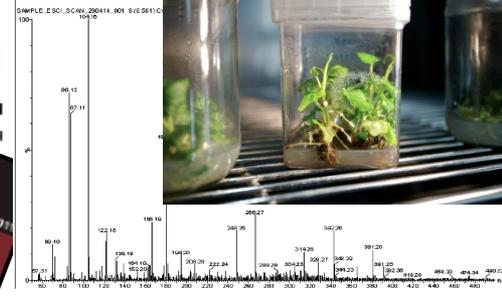
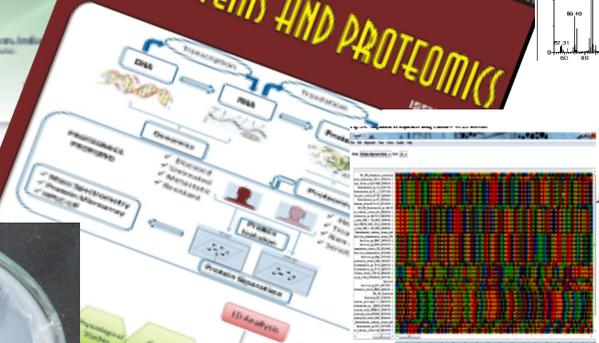
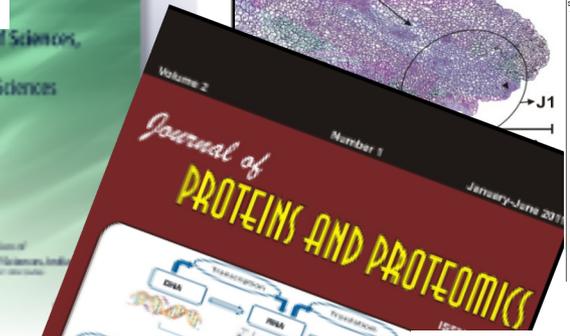
Dolly Rani & Prem Kumar Dantu

Plant Cell, Tissue and Organ Culture (PCTOC) Journal of Plant Biotechnology

ISSN 0147-4807 Volume 13 Number 1 Plant Cell The Organ Cult (2012)

National Academy of Sciences, India
Section B: Biological Sciences

Official Publication of The National Academy of Sciences, India

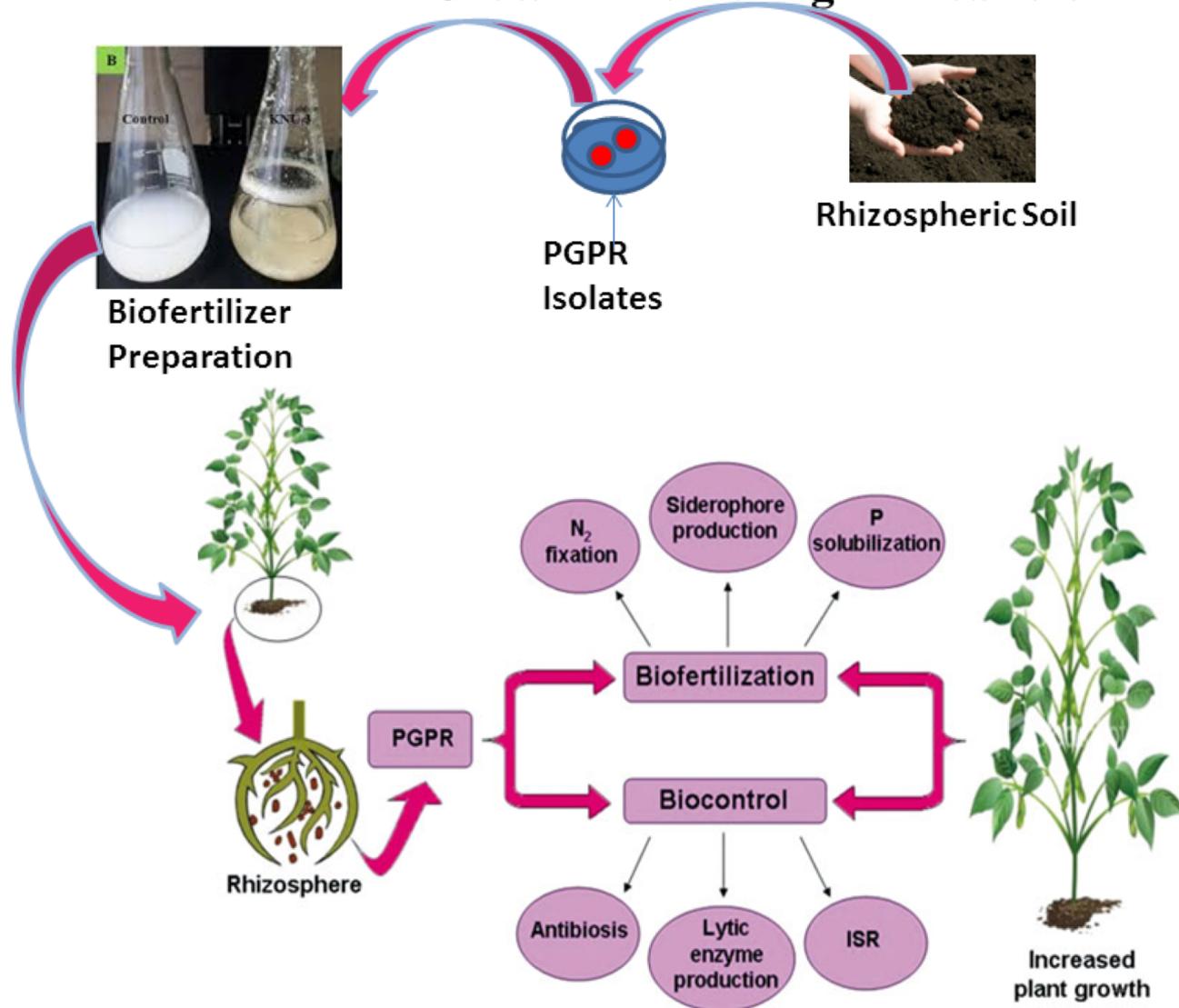


Research Activities in the Department



Research on Biofertilizer Production

Plant Growth Promoting Rhizobacteria



Research on Plant Tissue Culture



Piper longum



Draccena



Citrus Micrograft

Tylophora indica

Micropropagation



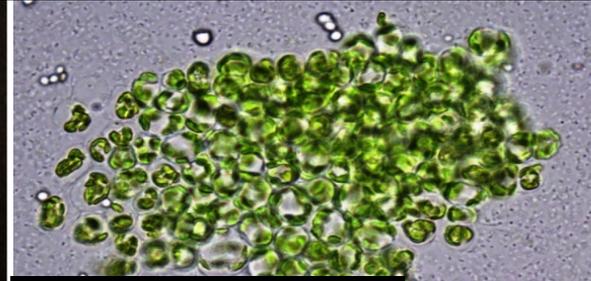
Rice Anther Culture



Citrus Callus



Oryza sativa



Citrus protoplast



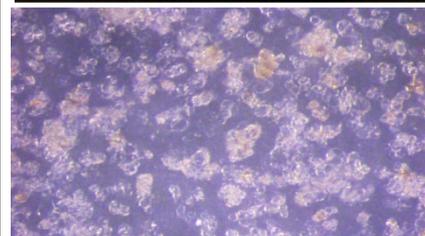
Asparagus



Citrus



Tylophora indica

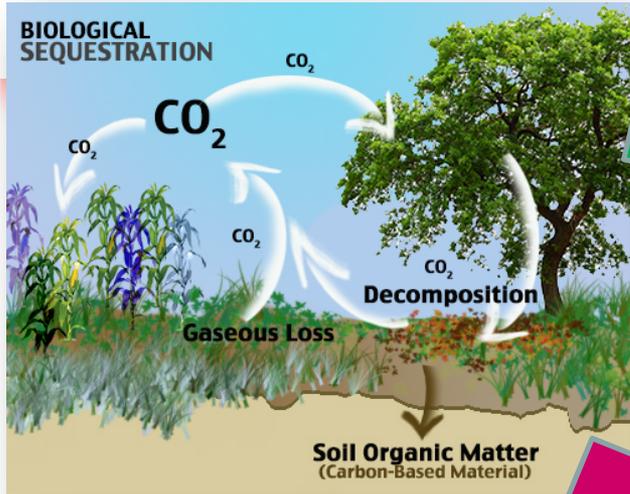


Citrus protoplast



Draccena

Research on Ecosystem and Climate Change



Carbon sequestration

Survey of local flora

Physicochemical properties and heavy metal analysis of water samples from the biodiversity park

Physicochemical properties and heavy metal analysis of soil samples from the biodiversity park

Establishment of public awareness towards environment

**R.E.I. BIODIVERSITY PARK
LAB ON LAND**

TOTAL PLANTS: more than 1500

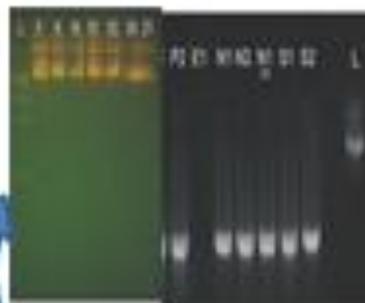
TOTAL TYPES OF GENUS: more than 140

Study of Ecosystem dynamics

Establishment of repository of plants



Molecular characterization



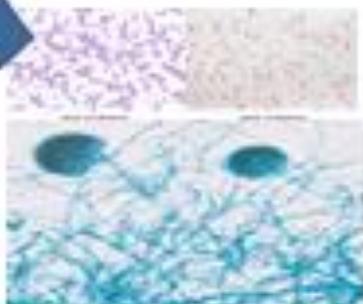
Phylogenetic Sequencing



Research on Biotechnological applications of Endophytes in Allspice



Biochemical characterization



Treatment of Endophytes with other crops to enhance growth and yield

Endophytes

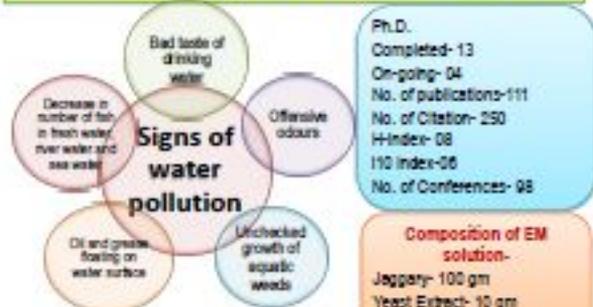


Morphological characterization

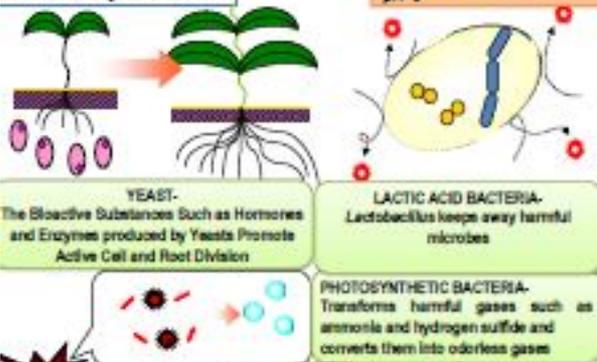
Research on Waste Water Remediation

MICROBIOLOGY

REMEDICATION OF WASTE WATER BIOREMEDIATION ↔ MYCOREMEDIATION



EM mainly contains-



This combination can produce EM POWER!!

Mycoremediation

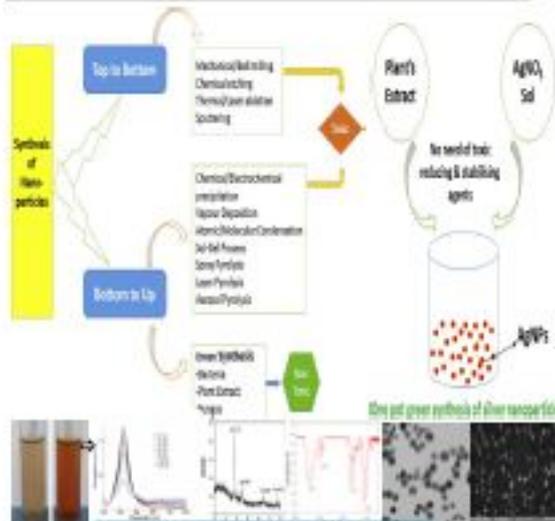


AEROMICROBIOLOGY

- Biological and chemical characterization of aerosol was done at an urban site in Agre in India through plate.
 - PM₁₀ and PM_{2.5} samples were collected at the sampling site by Pribtech sampler using filter paper as collecting surface.
- >The maximum concentrations of bacteria and fungi colonies were found in PM₁₀ samples in comparison to PM_{2.5} samples.
 >Through SEM analysis the shape of bacterial cell can be evaluated which helps in the identification.
 >The area with heavy vehicular traffic have much higher concentrations of airborne bacteria and fungi, as compared to concentrations in more naturally influenced areas such as urban parks, forests or coastal sites.

Nanobiosynthesis from biological resources

In recent years, the development of competent green chemistry methods for synthesis of metal nanoparticles (NPs) has become a main limelight of researchers. Biological synthesis of nanoparticles using plant extract (Litchi/Mango/Walnut (peels), papaya/bitter gourd (seeds) and fungi (*Trichoderma* sp.) is currently under exploitation.



ALLELOPATHY

- The phenomenon of one plant having detrimental effect on another through the production and excretion of toxic chemical compounds is called allelopathy.
 - Allelopathy is the indirect harmful effect through excretion of chemical substances.
- Ph.D. Completed-08, On-going-02**
No. of publications-75
No. of Citation- 64
H-Index- 05
I10 Index-01
No. of Conferences-70
Visits Abroad-03

Allelopathic Chemicals

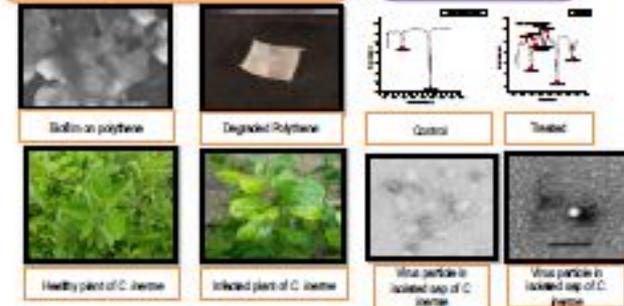


Way of Releasing Allelochemicals



VIROLOGY

- Biodegradation of polythene by monoculture of fungi and bacteria as well as consortium of microorganism.
- Biological and molecular characterization, isolation and purification of virus infecting *Cleome danarium* (L.) Gaertn exhibiting mosaic symptoms, in Agre



PHYCOLOGY

- Remediation through algae (*Spirogyra* sp., *Filiphora* sp., *Spirulina platensis*, *Spirulina maxima*, *Hydrocoleum reticulatum* and *Chlorella minutissima*) against waste water provides an effective and environmentally acceptable options.
- Impact of different carbon sources on lipid content of different algal strains perspective to biofuel



Edible water bottles

Research on Protected Cultivation

1. Construct poly houses in Dayalbagh Educational Institute dairy.



2. The computer sensors were fixed in poly houses, and it works on the basis of nodes and nodes are differentiate based on weather like temperature, humidity and soil moisture and etc.



Internet of thing(IOT) in poly house.

3. Data of polyhouse is being recorded by sensors and displayed on computer.



4. Under the polyhouse healthy tomatoes plant grow through protected cultivation.



Plant virus identification

Clerodendrum inerme, plant of interest

Survey for disease



Characterization

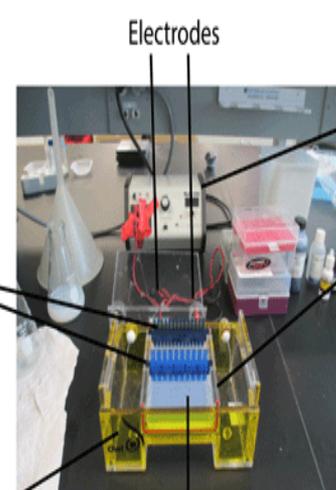
Molecular

PAGE

Polyacrylamide Gel Electrophoresis

(PAGE)

Agarose gel



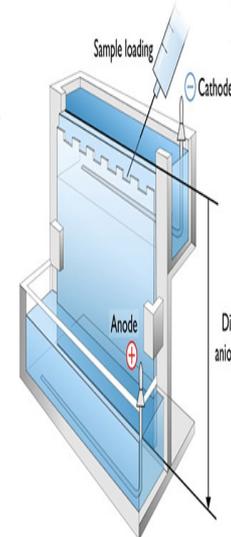
Well Combs

Gel Box

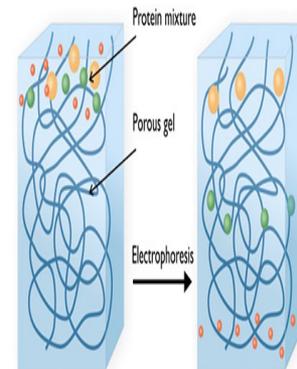
Agarose Gel

Voltage Source

Casting Tray

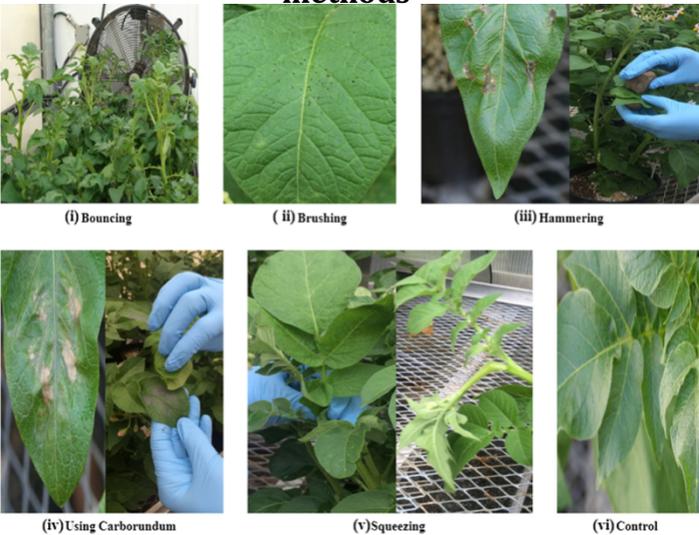


Direction of anion migration



Biological

Through sap inoculation, vector and graft methods



(i) Bouncing

(ii) Brushing

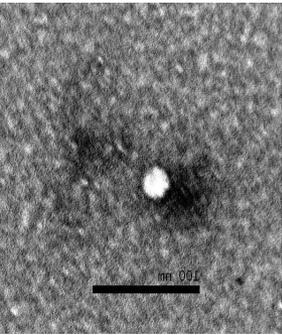
(iii) Hammering

(iv) Using Carborundum

(v) Squeezing

(vi) Control

Isolation of virus particles and identification

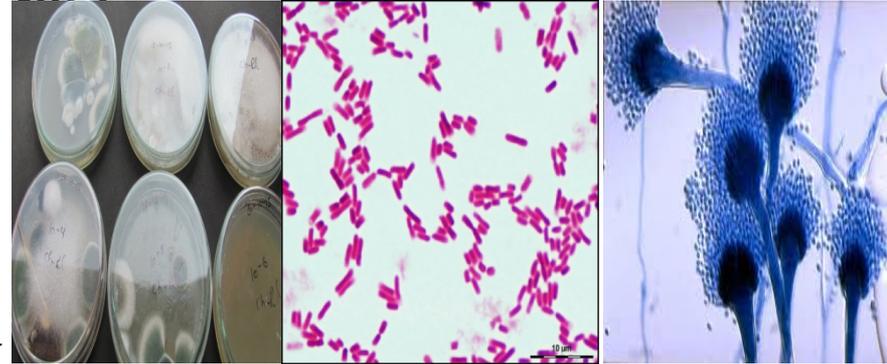


Degradation of polythene through microbes



Polythene in nature after use by humans, which can not be easily degraded

Isolation of micro-organisms (Fungi & Bacteria) from soil (polythene waste dumping site)



**BIODEGRADATION
PROCESS**

In vitro Biodegradation

FLASKS CONTAINING POLYTHENE STRIPS WITH SCREENED FUNGI IN SYNTHETIC MEDIUM

In vivo Biodegradation

POTS CONTAINING STERILE SOIL AND POLYTHENE STRIP WITH SCREENED FUNGI



Research Publications

Journals	Impact factor	Plant And Cell Physiology	4.59
Renewable & Sustainable Energy Reviews	10.5	Plos One	4.4
International Journal Of Pharmaceutical Research And Bioscience	6.97	Cell Biochembiophys	4.3
International Journal Of Pure & Applied Bioscience	6.52	Journal Of Science And Engineering Research	4.2
International Journal Of Applied Engineering Research	5.78	Crit. Rev. Plant Sci	4.18
Molecular Plant	5.4	Plant Cell Tissue And Organ Culture	4.17
Current Topics In Virology	5.4	Indian J. Genet., Suppl	4.16
International Journal Of Current Microbiology And Applied Sciences	5.38	Biophysical Reviews And Letters	4.01
International Journal Of Pure And Applied Biosciences	5.35	Bioremediation And Biodegradation	3.98
International Journal Of Pharma And Biosciences	5.12	Bioremediation And Biodegradation	3.76
Vegetos	5.00	Atmospheric Environment	3.629
Journal Of Advances In Scientific Research And Reviews	4.96	Laser Physics	3.6
Journal Of Energy Research And Environmental Technology	4.9	A Journal Of Multidisciplinary Advance Research	3.56
		Advances In Plant Science	3.5
		Journal Of Agroecology And Natural Resource Management	3.12

Research Publications

International Journal Of Current Microbiology And Applied Sciences.	2.93
International Journal Of Engineering & Technical Research	2.91
Environmental Science And Pollution Research	2.91
Environmental Science And Pollution Research	2.7
Atmospheric Pollution Research	2.606
Atmospheric Pollution Research	2.606
American. J. Microbiol	2.13
J Foodtechnol	1.79
Int Journal Of Plant Reproductive Biology	1.79
Aerosol Air Qual Res	1.637
Indoglobal Journal Of Pharmaceutical Sciences3	1.52
International Journal Of Nano Dimensions	1.5
Journal Of Ethnobiology And Ethnomedicine	1.48

Journal Of Chemical, Biological And Physical Sciences	1.45
International Journal Of Research In Pure And Applied Microbiology	1.43
International Journal Of Scientific Research	1.39
Genetic Resources And Crop Evaluation	1.29
Asian Journal Of Biochemical And Pharmaceutical Research	1.2
International Journal Of Advanced Research	1.17
Ind. J. Plant Sci	1.16
American Journal Of Phytomedicine And Clinical Therapeutics	1.15
International Journal Of Research	1.138
International Journal Of Research	1.13
Health, Energy And Environmental Perspectives	1.12
International Journal Of Environment Engineering And Management	1.021
Asian Academic Research Journal Of Multidisciplinary	0.91

Research Publications

Journal Of Medicinal Plant Research	0.9
Indian Journal Of Applied Research	0.8
International Journal Of Conservation Science	0.677
Journal Of Nanomaterials And Biostructures	0.63
Journal Of Entomological Research	0.400
International Journal Of Pharma Science Research	0.27
International Journal Of Research In Pure And Applied Microbiology	0.12

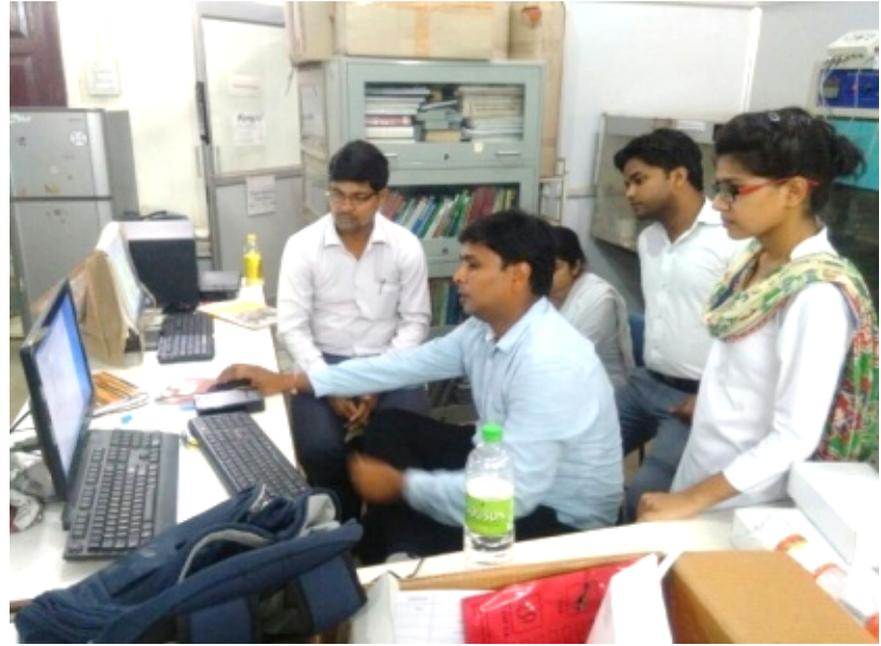
Conference and Symposia Organized



Workshops Organized



Scientists from Li-COR, USA demonstrating IRGA at Seminar Hall Complex



Expert from Sciencetech, Gwalior demonstrating about IOT Sensors



Awards & Recognitions

Awards

- Young Scientist Travel Award by DST for Canada (2011)
- Winner of State Level Orissa Biotech Olympiad
- INSA Summer Fellowship (Dr. Rajiv Ranjan) from IASc-INSA-NASI
- Won best poster prize in Asian Congress on Biotechnology 2013
- 3rd best poster prize in International Symposium on Plant Signalling and Behaviour, held in March 2014
- Bronze medal in iGEM-2017

Resource Person & Invited Speaker

- National Seminars on Cultivation, Conservation & Utilization of Medicinal Plants
- Tissue Culture Training Programmes
- National Seminar on Plants & Human Welfare
- Virus Induced Gene Silencing 2016
- SPHEEHA
- VIROCON 2013
- HNB Garhwal University

Fellows & Members

Members of Society and Association

- **Indian Botanical Society**
- **International Society for Morphologists**
- **International Society for Plant Biotechnology, U.S.A**
- **International Society for Horticulture, U.S.A**
- **International Seed Testing Association (ISTA), Switzerland**
- **The International Eucalyptus Genome Network (EUCAGEN), South Africa**
- **Indian Virological Society**
- **System Society Of India**
- **Society of Human Resource and Innovation**
- **Society of Biotechnology and Bioinformatics, Bhubaneswar**
- **Bamboo society of India, Bangalore**
- **The Indian Science Congress Association**
- **The Blue Planet Society**
- **Society of Plant Research**
- **Society of Plant Biochemistry and Plant Biotechnology**
- **The Italo Latin American Society of Ethanomedicine**
- **The Ethanobotanical Society**

Fellows & Members

Editorial Board

- Journal of Living World
- Indian Journal of Mycology and Plant Pathology
- Journal of Microbial World PENCIL
- International Journal of Botany
- Research Journal of Medicinal Plants
- Asian Journal of Biological Sciences
- Journal of Biological Sciences
- Journal of Applied Sciences
- Life Sciences Leaflets
- Int. J. of Botany
- Research J. of Medicinal plants
- Asian J. of Biological Sciences
- J. of Biological Sciences
- J. of Applied Sciences

Executive Member

- Journal of Vegetos

Biography Appeared in

- Marquis Who's Who in the world (USA) 2014

Reviewers for Journal

- **Int. J. of Advances in Plant Science**
- **In Vitro Cellular & Developmental Biology – Plant**
- **Theoretical and Experimental Plant Physiology (TXPP)**
- **In Vitro Cellular & Developmental Biology – Plant**
- **Acta Physiologiae Plantarum**
- **Plant Biotechnology Journal**
- **Scientia Horticulturae**
- **Plant Growth Regulation**
- **Theoretical and Experimental Plant Physiology (TXPP)**
- **In Vitro Cellular & Developmental Biology – Plant**
- **Acta Physiologiae Plantarum**
- **Plant Biotechnology Journal**
- **Scientia Horticulturae**
- **Plant Growth Regulation**

Member in Institute Committees

- **Member, Academic Council, 2007-2008.**
- **Member, Department Board of Studies.**
- **Member, Faculty Board of Studies.**
- **Member, Faculty Examination Committee.**
- **Member, Faculty Co-curricular Activities.**



Panel Experts

- **Brain Storming Meeting to develop a Road Map and Action Plan for the area of Synthetic Biology organized by Department of Biotechnology, Govt. of India, CGO Complex, Lodhi Road, New Delhi on 10/08/2017 under chairmanship of DBT, Secretary.**
- **Making recommendations for CBD scientific body on synthetic biology and conservation, sustainable management of environment 8th September 2017 at**
- **TransDisciplinary University, Bengaluru, India**

Awards and Recognitions

- Faculty awards and recognitions

International: 2

National: 10

Best paper awards: 5

Visiting Professorship: 5

Visiting scientists: 6

Invited talks: 6

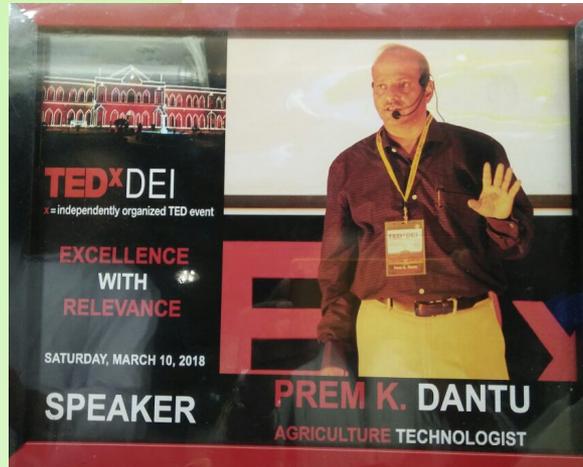
- Abroad: 1

- In India: 5

- Fellows, Professional bodies: 5

- Members of editorial boards of journals: 9

- Members of review boards of journals: 15



TEDxDEI



IGEM 2017

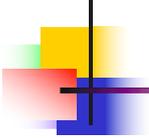


Jiwaji University 2018

Presentations by Faculty

- Integrated East-West Forum (TSC-2019) at Interlaken, Switzerland organized by DEI and Center for consciousness Studies, University of Arizona
- **“Recent techniques in DNA and protein analysis”**, organized by Jiwaji University, Gwalior, 2018.
- **“Microbes in Human Welfare”** organized by Department of Biochemical Engineering and Biotechnology, IIT, Delhi, 2018.





Faculty as External Examiners

- **Jiwaji University, Gwalior**
- **ITM University, Gwalior**
- **Kanpur University, Kanpur**
- **Rajasthan University, Rajasthan**
- **CCS University, Meerut**
- **University of Delhi, New Delhi**
- **IARI, New Delhi**

Student Achievements

Awards: 2

Fellowships: 12

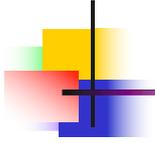
- DST-INSPIRE 2
- DST INSPIRE SRF 2
- DST-SERB 1
- Rajiv Gandhi National Fellowships 6
- Rajiv Gandhi National Fellowships SRF 3
- DEA-BRNS 1
- UGC Funded 2

Success in National Competitive Exams

- UGC-CSIR NET: 4
- ICAR NET: 2
- DBT: 1
- GATE: 5
- SLET: 2



**Rajiv Gandhi National Fellowship (RGNF)
Scheme for SC & ST Candidates**



Student Awards

Sakshi Sharma : “Best paper presentation/ Young system scientist award” in the conference, Paritantra (2013)

Deepika Goyal: SHE –Scholarship [Inspire] in 2013

Nupur Raghav: Director’s Medal in M.Phil. in 2012

Anamika Gupta: Director’s Medal in M.Phil. in 2013

Arti Yadav: Director’s Medal in M. Sc. in 2015

Preksha Shrivastav: Director’s Medal in M.Sc. in 2016

Deepika Goyal: Director’s Medal in B.Sc (H) & M. Sc. in 2017

Preksha Shrivastav: 3rd prize in Scientific talk organized by D.E.I.

Mrinalini Prasad and Dipinte Gupta: Instructor judge at iGEM 2017

National Competitive Exam Qualified by Students

**CSIR NET LS
& JRF**

**DBT
JRF**

Arti Yadav :- DBT JRF 2015

**ASRB
NET**

**Anshu Singh:- ASRB -NET 2016
Teg Bahadur :- ASRB -NET 2017**

GATE

- **Arvind Kumar:- NET (LS) 2013**
- **Shiv Shankar Gautam:- :- NET (LS) 2013**
- **Arti Yadav :- CSIR NET (JRF) 2015**
- **Dharmendra Kumar:- CSIR NET (JRF) 2015**
- **Deepika Goyal:- CSIR- NET (LS) 2016**
- **Teg Bahadur :- CSIR NET (JRF) 2017**

- **Dipinte:- GATE 2015**
- **Chandan Maurya :- GATE 2016**
- **Deepika Goyal:- GATE 2016**
- **Kratika Yadav:- Gate 2019**

Alumni Achievements

- Universities/Colleges: 6
- Govt College, Saharanpur;
- RMS Agriculture University, Gwalior
- Research Laboratories: 5
- TERI, New Delhi
- IARI, New Delhi
- University of Missouri, USA
- University of Thailand, Thailand
- Industry: 2
- INTERTEK, Gurgaon
- KVS



Intertek



University of Missouri



International Talks

**International Talks
Organised every year.**

Total talks (2013-2019): 37



**Dr. Melissa, Michigan State
University, USA**



**Dr. Vibha Shrivastav, Michigan State
University, USA**

National Talks



**Dr. Bhupinder Singh,
IARI, New Delhi**



**Dr. Prem Kumar Dantu,
DEI, Agra**



**Dr. Rajkamal Bhatnagar,
ICGEB, New Delhi**



Dr. Sharmita Gupta, DEI, Agra



Dr. A K Pradhan, University of Delhi

National & International visit by DEI Students and Faculty



MIT, Boston, USA



Michigan State University, USA



IARI, New Delhi



International Visitors from Universities



Plantation by students



Talks in the Department by Students of University of Arkansas, USA



Tours organized by Department

**M.Sc. Ist & 2nd Semester
Students at IARI New Delhi,
2015-2016**



**Students at YS Parmar
university, Solan HP 2019**

**Students at Agriculture orchard
in IARI New Delhi, interacting
with Dr. Tara Saraswathi and
Dr. Murtaza Hasan**



Work Experience Courses

1. Maintenance of Botanical Gardens
2. Dairy Products
3. Modern Crop Production
4. Protein Production Technology: Mushroom & Spirulina cultivation
5. Cell & Molecular Techniques



Scholar's Awards & Recognitions



Ms. Anamika Gupta
NBAIM 2019



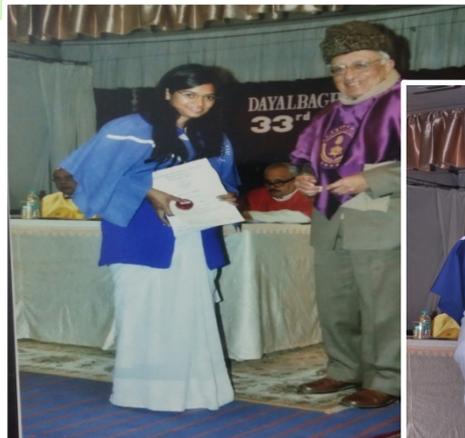
Ms. Preksha Shrivastav
IARI-ICAR, Delhi, 2019



GEENPAH 2019, HIMCS ,
Mathura



Ms. Sonal, CytoGene
2018



Ms. Arti Yadav,
Director's medal
winner 2014



Ms. Anamika Gupta
Director's medal winner
2015



Ms. Preksha Shrivastav
Director's medal winner 2015



Ms. Deepika Goyal,
Director's medal
winner 2015

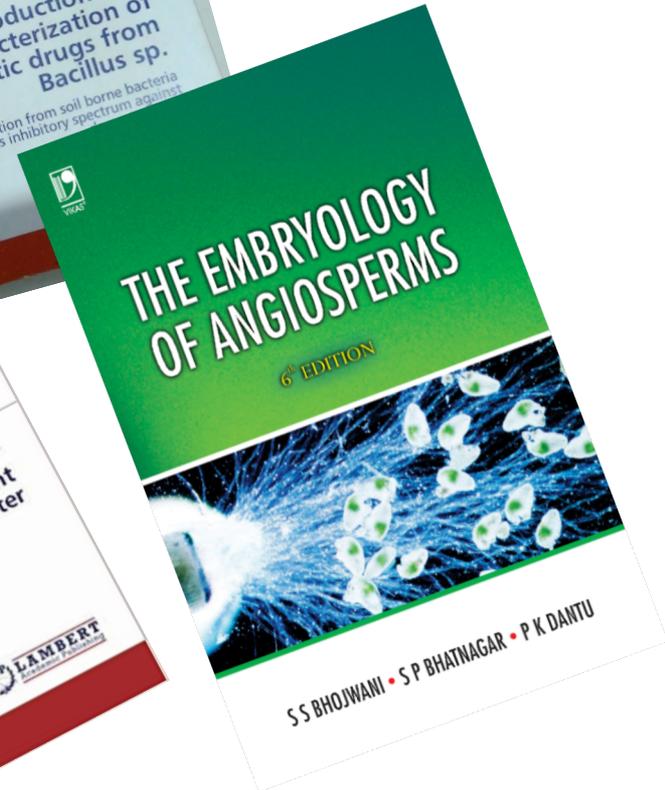
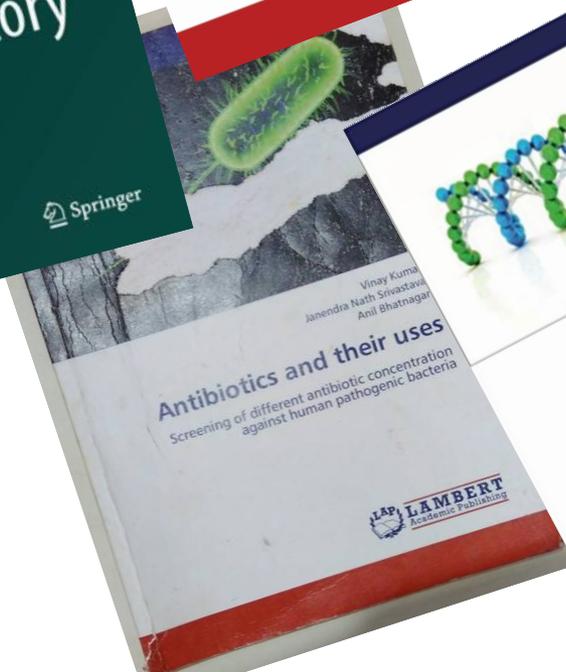
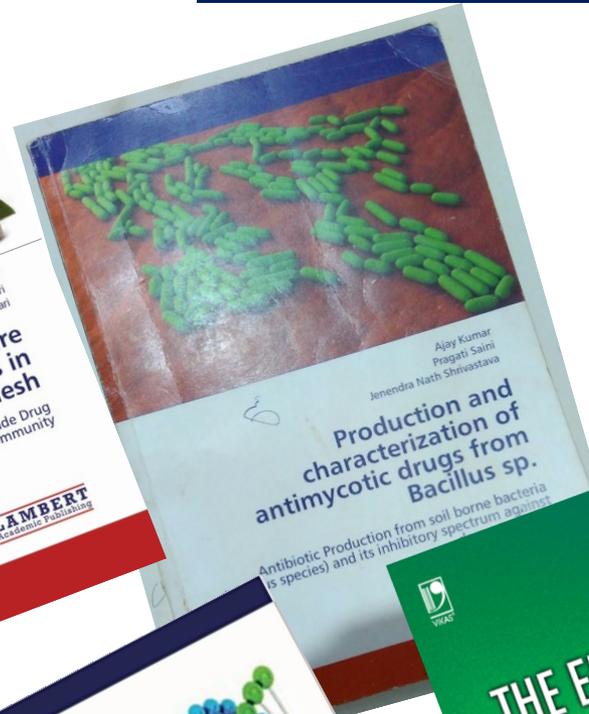
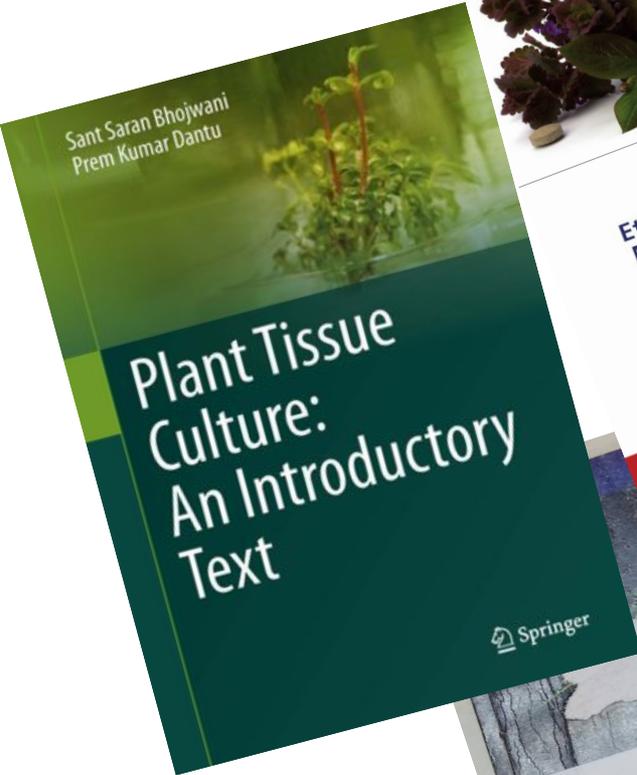
Conference, Training and Workshops attended by Researchers



Research work Demonstration by students



Books Published



Book Chapters

Sustained Shoot Multiplication and Method for Overcoming In Vitro Browning in Medicinally Important Plant, *Piper chaba* Hunt

Dolly Rani · Prem Kumar Dantu

Received: 16 December 2013 / Revised: 2 November 2014
© The National Academy of Sciences, India 2014

Abstract The current study on *P. chaba* plant regeneration in *P. chaba* was achieved in vitro supplemented with auxin and cytokinin.

Chapter 2 Nutrient Uptake, Removal, and Cycling in Eucalyptus Species
Akbar Ali, M. Naveen, Faris Ahmad Dar, Mohd. Akrom M. Haniffa, Mainuddin, Prem Kumar Dantu, and Prajwalan Singh

Abstract Eucalyptus (family Myrtaceae), represented by one of the most dynamic and productive tree species in the world, is a major source of wood and pulp. The maintenance of plants plays a significant role in the production of secondary products. The amount of nutrients is related to secondary production and storage of nutrients aspect is an important aspect in the study of the tree through different nodes and branches.

Keywords *Piper*, Activated charcoal, In vitro browning

23 Molecular Approaches for Abiotic Stress Tolerance in Plants

Suzena Mishra, Diprto Gupta, and Rajiv Ranjan

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Abiotic stress, in simple words, could be referred to as the extreme environmental conditions that affect the growth and development. These stresses are the major cause of crop loss by 30 to 30% (100	407



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Publishers Since 1807

NOPOYKITab

Protoplast Culture and Somatic Hybridization

U.K. Tomar¹ and P.K. Dantu²
¹Ind Forest Research Institute, New Pal Road, Jodhpur-342005
²Dept. of Botany, Durgabai Educational Institute, Dayabagh, Agra-202 005
E-mail: ukumar@icri.res.in

In plants, where truly distant species could be crossed, it has always not been possible to obtain full hybrids between desired individuals because of sexual incompatibility barriers. This has often proved to be a serious handicap in crop improvement programs through hybridization. With the ability of isolating protoplasts from plant cells using enzymes in the early 1960s by E. C. Cocking, the interest in genetic modification of somatic cells in higher plants has developed. Within a decade, Takai et al. (1971) regenerated complete plants from leaf protoplasts of tobacco increased the potential of protoplast culture techniques.

Not only isolated protoplasts but their fusion product, a somatic hybrid, can also be regenerated into whole plants. Plant protoplasts can also take up foreign DNA, through their cell walls.

Somatic Embryogenesis

P. K. Dantu¹ and U. K. Tomar²
¹Dept. of Botany, Durgabai Educational Institute, Dayabagh, Agra-202 005
²Ind Forest Research Institute, New Pal Road, Jodhpur-342 005
E-mail: ukumar@icri.res.in

Development of an embryo from zygote is termed as embryogenesis and egg cell with sperm is a prerequisite for this process. Additionally, in some cases, somatic embryogenesis may be formed by meristematic cells outside the ovule or termed adventitious embryos. However, an instance of ex vivo somatic embryogenesis was reported by Steward and Odian (1965). Plants are unique in exhibiting totipotency when given proper in vitro conditions. The state in which embryonic program is active in somatic cells is called as somatic embryogenesis. This is the formation of a bipolar structure with a root/shoot apical meristem. Some somatic embryos formed whether in direct or indirect zygotic embryogenesis.

The first report of somatic embryogenesis was given by Steward and Odian (1965) and thereafter the number of species in which somatic embryogenesis has been reported has increased. This is one of the most important for crop improvement. Somatic embryogenesis is also used in the study of plant development and molecular biology.

Comparative Analysis of Phytochemicals of Healthy and Symptomatic *Clerodendrum inerme*

Sonal, Sharmita Gupta, Yati Prabha and S. K. Soni

Abstract	15
Introduction	15
Materials and Methods	15
Results and Discussion	15
Conclusion	15
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MoUs



UofA
DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System



Dr. Yashwant Singh Parmar University of Horticulture & Forestry
Nauni, Solan - 173 230 (Himachal Pradesh) India



BeejSheetal

MoUs signed with Universities



Dr. Yashwant Singh Parmar University of Horticulture & Forestry

Nauni, Solan - 173 230 (Himachal Pradesh) India



**UNIVERSITY OF
ARKANSAS.**



**UNIVERSITY
OF MANITOBA**

MoUs signed with Universities



Michigan State University, USA



**Govind Ballabh Pant University of Agriculture and Technology,
Pantnagar.**

Research Collaborations

International

- Michigan State University, USA
- University of Arkansas, USA
- Kiel University, Germany
- University of Manitoba, Canada

National

Universities

- Dr. Y.S. Parmar Agricultural University for Horticulture & Forestry, Nauni, H.P.
- Govind Ballabh Pant University of Agriculture and Technology, Pantnagar.
- Aligarh Muslim University, Aligarh
- Indian Agriculture Research Institute, New Delhi

Companies

- Jain Irrigation, Jalgaun, Maharashtra
- Beej Sheetal Pvt Ltd., Jalna, Maharashtra
- Saveer Biotech Ltd, New Delhi

New Equipments Added



IRGA, Photosynthesis Analyser



Realtime PCR with bacterial identification kit



Flame Photometer



Tensiometer Sensor

Rural assistance activities

Botany Department has developed and maintains:

- Botanical garden in Science Faculty
- Biodiversity park in R.E.I. Intermediate College
- Medicinal and herbal garden in Dairy Campus
- Fruit orchard at Seminar Hall Complex
- A multi-dimensional phytodiversity park with conservatory for local medicinal plants, fruit orchard, and plants for essential oil at Bahadurpur
- Fruit orchard and herbal garden at Himachal Pradesh
- Polyhouses at dairy campus for cultivation of some crops



REI Biodiversity Park

BOUGAINVILLEA
GARDEN

BIRDS &
BUTTERFLY
GARDEN

MULTIGRAFTED
&
RARE PLANTS

SUCCULENT &
GYMNOSPERM
GARDEN

PALM PLANTATIONS

TROPICAL FRUIT GARDEN
CITRUSES: PHALSE-AAM-KATAHAL
ANAR: AMROOD-CHIKU-BER
ANJEEB: BER-SHARIFA-JAMUN

TEMPERATE FRUIT GARDEN
AADU LOKHART
NAK PLUM
NASHPATI AALUBHUKHARA

ARBORETUM
(TYPES OF TREE SPECIES)

ARBORETUM 2
(TYPES OF TREE SPECIES)

In 2016

Area: 10 Acres; Challenges: Sandy Soil; Irrigation issues; high temperatures & low humidity during Summers

**Seminar Hall
complex Orchard**



Now

Sigma Six Qualities & Values

- Almost 9000 trees planted that naturally sequester Carbon and clean the environment and enrich with oxygen
- Orchard developed will be a source of income for students without means



Strawberry Plantation



Seminar Hall complex Orchard

Padahan (near Solan, HP)



Aadu



Fig

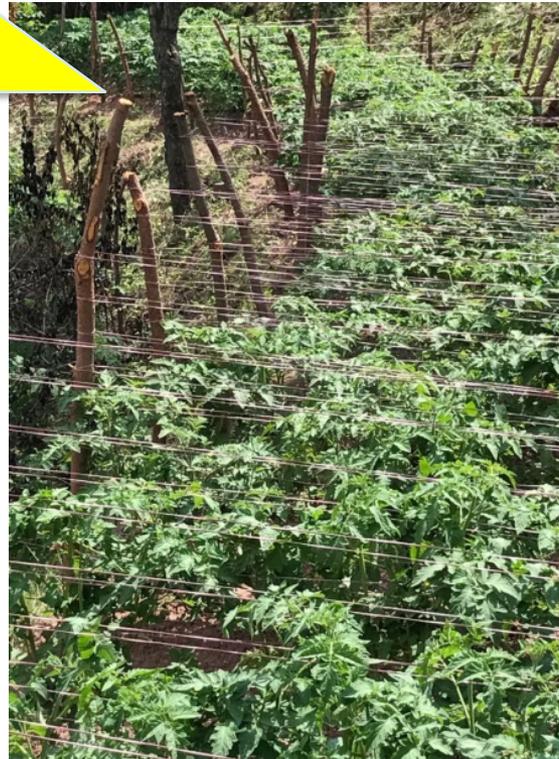


Kiwi



Nectrine

Padahan (near Solan)



**Tomato
Cultivation**

Winter Training Camp Organised for School Students



2015



2016



Labs-on-land/Outreach Programmes



Padahan, H.P.



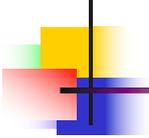
***Aloe Vera* at Herbal Garden**



Smart Agriculture



REI Biodiversity Park Tomatoes (Padahan) Cheeku, Jatropa Field Seminar Hall Complex



Institute Vision

- Agriculture is one of the three key goals DEI has identified as its vision plan.
- The Academic Plan promotes the science of agriculture in teaching and research to benefit rural economy and the environment.
- Carry out high-quality research in agriculture and sustainable agriculture, by developing low-cost and innovative solutions to problems that face the nation.

Department Vision

Department of Botany keeping in line with the Institute vision will be working towards:

- **Developing Faculty of Agriculture**
- **Smart / Precision agriculture & developing herbal gardens**
- **Developing Multi-climatic Greenhouses**
- **Bioprospecting for important molecules & microbes (UGC SAP objective)**
- **Plant metabolomics & Synthetic biology**
- **Ecosystem dynamics & climatic change (biodiversity parks)**
- **Nanotechnology; Phyto and bioremediation**
- **Natural products extraction & development**



Thank you



Picturesque Padahan, Sirmaur District, Himachal Pradesh