

**Department of Plant Physiology
Institute of Agricultural Sciences
Banaras Hindu University**

Evaluative Report of the Department

1. **Name of the Department:** Plant Physiology
2. **Year of establishment:** 1969
3. **Is the Department part of a School/Faculty of the university?:** Yes
4. **Names of Programmes/ Courses offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., etc.):** UG, PG & Ph. D.
5. **Interdisciplinary courses and departments involved:**
 - i. Laboratory Techniques: Plant Physiology & Soil Sci & Agric. Chemistry departments.
 - ii. Plant Tissue Culture: Plant Physiology & Genetics & Plant Breeding departments.
 - iii. Soil & Plant Health Clinic: Plant Physiology, Soil Sci & Agric. Chemistry, Entomology & Agric. Zoology & Mycology & Plant Pathology departments.
6. **Courses in collaboration with other universities, industries, foreign institutions, etc.:**
Nil
7. **Details of programmes / courses discontinued, if any, with reasons:** Nil
8. **Annual/ Semester/Choice Based Credit System:** Semester with choice base credit system
9. **Participation of the department in the courses offered by other departments:** As given in Point No. 5
10. **Number of teaching posts sanctioned and filled (Professors/Associate Professors/Asst. Professors)**

	Sanctioned	Filled
Professor	1	-
Associate Professor	4	3
Assistant Professor	4	3

11. Faculty profile with name, qualification, designation and specialisation (D.Sc./D.Litt./ Ph.D./M.Phil., etc.)

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D. students guided for the last 4 years
Dr.(Mrs. B. Bose)	Ph.D.	Professor	Plant Physiology and Plant Biochemistry: Metabolism, plant growth and development, seed physiology, stress physiology	32	3
Dr. J.P. Srivastava	Ph D	Professor & Head	Plant Physiology	30	3
Dr. A. Hemantaranjan	Ph.D.	Professor	Plant Physiology	28	2
Dr. Padmanabh Dwivedi	Ph.D. (Cantab)	Associate Professor	Stress Physiology, Plant Tissue Culture, Biodiversity Management	19	1
Dr. Pravin Prakash	Ph.D.	Assistant Professor	Stress Physiology, Plant Growth Regulators	10	2
Dr.(Mrs.)Vijai P.	Ph.D.	Assistant Professor	Plant Physiology	6	-

12. List of senior Visiting Fellows, faculty, adjunct faculty, emeritus professors: Nil

13. Percentage of classes taken by temporary faculty – programme-wise information: Nil

14. Programme-wise Student Teacher Ratio

UG: 90:1

PG: 3.5:1

Ph D: 3:1

15. Number of academic support staff (technical) and administrative staff: sanctioned and filled

Name of Post	No. of Sanctioned Post	Filled	Vacant
Junior Clerk	1	Filled	-
STA	1	Filled	-
Technical Assistant	3	Filled	-
Lab Attendant	3	2	1

16. Research thrust areas recognized by funding agencies:

- Plant growth and development.
- Mineral nutrition of crop plants.
- Stress Physiology and plant water relationship.
- Micro propagation of medicinal and aromatic plants and pharmacognosy.
- Carbon and nitrogen metabolism and their interaction in signal transduction in plants: a molecular approach.
- Seed technology and post-harvest physiology.

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies and grants received project-wise.

S. No.	Pi/Co-PI	Project Title	Funding Agency	Total out lay (Rs. Lakh)
1	Dr. J. P. Srivastava (Co-PI)	Nutritional management for improving soil quality and sustaining productivity of rice-wheat cropping system	USAID-AIP	19.044
2.	Dr. J. P. Srivastava (Co-PI)	Development of drought tolerant cultivars of pigeonpea	UPCAR	51.58
3	Dr. Padmanabh Dwivedi (PI)	Nitric Oxide as signaling agent in Plant Pathogen interaction	DST, New Delhi	33.56
4	Dr. P. Prakash (Co-PI)	AKI-Pigeonpea genomics initiative	ICAR	30.00
5	Dr. P. Prakash (Co-PI)	Selection and utilization of waterlogging tolerant cultivars of pigeonpea	NFSM	68.50

18. Inter-institutional collaborative projects and grants received

a) All India collaboration b) International

S. No.	Pi/Co-PI	Project Title	Funding Agency	Total out lay (Rs. Lakh)
1	Dr. J. P. Srivastava (Co-PI)	Nutritional management for improving soil quality and sustaining productivity of rice-wheat cropping system	USAID-AIP, and Ohio University, USA	19.044
2	Dr. P. Prakash (Co-PI)	AKI-Pigeonpea genomics initiative	ICAR-ICRISAT, IIPR,	30.00
3	Dr. P. Prakash (Co-PI)	Selection and utilization of waterlogging tolerant cultivars of pigeonpea	NFSM- JNKVV, IARI, ICRISAT, IIPR, PAU, HAU	68.50

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

20. Research facility / centre with

- state recognition: Nil
- national recognition: Nil
- international recognition: Nil

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

- Plant/leaf tissue analysis lab: Created under National Horticulture Mission
- Plant tissue culture lab

22. Publications:

Number of papers published in peer reviewed journals (national / international): 49

Monographs

Chapters in Books: 21

Books edited: 06

Books with ISBN with details of publishers

- * Panwar, J. D. S. and **Srivastava, J. P.** 2012. Pulse Productivity: Physiological Constraints. ICAR, New Delhi. (Under Publication).
- * Prasann Kumar and Padmanabh Dwivedi. 2012. Polyamines, Heavy Metals and *Stevia rebaudiana* Bertoni under *in vitro* condition (2012). Lambert Academic Publishing, Germany. ISBN-10: 3659201472
- * Hemantaranjan, H. 2011. Plant Physiology under changing environment. Omega Scientific Publishers, Jodhpur. ISBN:9788172336936
- * Singh, B. D. and Srivastava, J. P. 2011. Plant Tissue Culture & Plant Biotechnology. Kalyani Publishers, New Delhi, India. ISBN: 978-81-272-7063-6

Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, EBSCO host, etc.)

Citation Index – range / average:

- * SNIP
- * SJR
- * Impact Factor – range / average: NAAS rating range 3.5 to 7.7 (of all publications of Department)
- * h-index: 10 (Total)

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

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

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

- INSA-DFG Visiting scientist, University of Wurzburg, Germany (**Dr P. Dwivedi**)
- Visiting professor: Cornell university & UC Davis, USA under AIP-USAID programme (**Dr J. P. Srivastava**)
- Visited Cornell University, USA for training in e-learning (**Dr. (Mrs.) Vijai P.**)

26. **Faculty serving in**

- a) National committees: YES, b) International committees: NO c) Editorial Boards: YES, d) any other (please specify)

27. **Faculty recharging strategies**

- Attending Refresher & orientation as participant & resource persons
- Attending seminar/symposium regularly
- Interacting with farmers, participating in farmers fair & kisan gosthies

28. **Student projects**

- percentage of students who have done in-house projects including inter-departmental projects:

Programme	Number of candidates who did in house project	Number of candidates who did in interdepartmental project
M.Sc.(Ag.)	32	10
Ph.D.	6	1

- **percentage of students doing projects in collaboration with other universities / industry / institute:** Nil

29. **Awards / recognitions received at the national and international level by**

Faculty:

- Mahila Ratan Gold Medal Award (2009). of International Inst. of Education and Management ,India (Prof (Mrs.) B. Bose).
- Best Educationist Award (2009) of Indian Solidarity Council, India (Prof (Mrs.) B. Bose).
- Rastriya Vidya Samman Puraskar Award of EGSI (India) (2010) (Prof (Mrs.) B. Bose).

- Rajiv Gandhi Siromani Award of International Inst. of Education and Management ,India (2010) (Prof (Mrs.) B. Bose)
- Rashtriya Shiksha Samman Puraskar(2011) and Gold Medal of Indian Society for Industry and Intellectual Development, India (Prof (Mrs.) B. Bose)
- Prof. H.S. Srivastava Memorial Award -2012, of Society for Plant Research, India, (Prof (Mrs.) B. Bose)
- Vice-President Indian Society for Plant Physiology (Prof. J. P. Srivastava & Prof. A. Hemantaranjan)
- Vice President, Prof. H S Srivastava Foundation, Lucknow (Prof. B. Bose)
- Shiksha Rattan Puraskar Award of India International Friendship Society, New Delhi (A. Hemantaranjan and P. Dwivedi)
- Prof Hira Lal Chakravarty Award of Indian Science Congress Association (Dr PadmanabhDwivedi)
- INSA-DFG Fellowship under INSA International Exchange Programme (Dr Padmanabh Dwivedi)
- Prof Y. S. Murty Medal Award of Indian Botanical Society (Dr Padmanabh Dwivedi)
- Fellow Indian Society for Plant Physiology & Indian Botanical Society (Dr Padmanabh Dwivedi)
- Chaired Technical sessions during National Seminar of Plant Physiology, 2009 (Prof. A. Hemantaranjan)
- Technical Editor, Intl. J Agric Env Biotech (Dr. P. Dwivedi); Associate Editor, Journal of Functional and Env Botany (Dr. P. Dwivedi); Member, Editorial Board of Agricultural Science Digest (Prof. A. Hemantaranjan), Indian J Plant Physiology (Prof. B. Bose); Executive member of Prof. H S Srivastava Foundation and Indian Assoc of Biol Sciences (Prof. B Bose)

Doctoral / post doctoral fellows :

1. Ms. Ruchi Bansal, Ph. D. scholar, got Second Prize in Paper Presentation during National Seminar in Plant Physiology, organized at BHU in Nov. 2010.
2. Sananda Mondal Ph.D.student got second prize in poster presentation in National symposium on Advances in Biotechnological Research in Agri-Horticultural Crops for Sustaining Productivity, Quality Improvement and Food Security, 14-16 September, SVPUAT, Merrut(2010) (paper Enhancing the performance of late sown Sesame (*Sesamum indicum* L.) crop, raised from hydro and nitrate salt primed seeds:Sunil Kumar, Sananda Mondal and Bandana Bose
3. Sananda Mondal recieved the first prize in poster presentation on a paper entitled"An impact of seed priming in disease resistance-a review"Presented in "ICMPB-2012-International Conf.on Mycology and Plant Pathology Biotechnological Approches, February 27-29, 2012, at BHU,Varanasi

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

(i) Winter School on Emerging Trends in Plant Physiological and Biotechnological Paradigms for Sustainable Agriculture. February 2-22, 2009.

Teachers from various parts of the country participated in it and Prof. D.K. Das Gupta, Formerly Vice-Chancellor, Vidhan Chandra Krishi Viswa Vidyalaya and Dean, Faculty of Agriculture and Veterinary Science, University of Kolkata, Dr. G.C. Srivastava, Professor, Division of Plant Physiology, IARI, New Delhi, Prof. R.S. Dwivedi, Director, Institute of Bio-Engineering and biological Sciences, Varuna Bridge, Varanasi., Prof. B.B. Singh, FNAAS, Formerly Vice-Chancellor, N.D. University and Technology, Kumarganj Faizabad delivered lectures in the Winter School.

(ii) SAARC workshop on biodiversity conservation. September 21-22, 2010

Scientists from India, Pakistan, Bangladesh, Srilanka and Nepal attended the workshop. Eminent speakers included Padmashri Prof. P. Pushpangadan, (Former Director, NBRI, and currently DG, Amity Institute on Herbal Products Development, Trivandrum), Prof. A. N. Mukhopadhyay, Ex VC, AAU, Jorhat, Dr. M. Sanjappa, Director, BSI Kolkata, Mr. R. Sikder, Divisional Forest Officer, Dept. of Forest, Bangladesh, Dr. Raza Bhatti, Director, Centre for Biodiversity & Conservation, Shah Abdul Latif University, Pakistan, Dr. A. A. Kulatunga, Director, Natural Resource Management, Sri Lanka, Mr. Gamini Gamage, Director, Ministry of Env, Sri Lanka.

(iii) National conference on plant physiology. November 24-26, 2010

Eminent Plant Physiologists from various parts of the country, including Prof. G. S. Sirohi, Prof. S. K. Sopori, Prof. D. K. Dasgupta, Dr. G. S. Murty, attended it

31. Code of ethics for research followed by the departments:

It is strictly followed.

32. Student profile course-wise: Admitted during 2008-09 to 2012-13

Name of the Course (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
M.Sc. (Ag.)		48	9	100%	100%
Ph.D.		13	9		

33. Diversity of students

Name of the Course (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
M.Sc.(Ag.)	15	15	60	-
Ph.D.	58	33	9	-

34. How many students have cleared Civil Services and Defence Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

Assistant Professor	4
Agricultural Research Scientist	2
State Agricultural Officer	2
DST-Inspire Award	3
Rajeev Gandhi Fellowship	5
NET Qualified	8

35. Student progression (2012-13)

Student progression	Percentage against enrolled
UG to PG	3
PG to M.Phil.	-
PG to Ph.D.	4
Ph.D. to Post-Doctoral	-
Employed	-
<ul style="list-style-type: none"> • Campus selection • Other than campus recruitment 	-
Entrepreneurs	Nil

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	16.66
from other universities within the State	33.33
from universities from other States	50.00
from universities outside the country	Nil

37. Number of faculty who were awarded Ph.D., D.Sc. and D.Litt. during the assessment period: Nil

38. Present details of infrastructural facilities with regard to

- a) Library: Available
- b) Internet facilities for staff and students: Available
- c) Total number of class rooms: 1
- d) Class rooms with ICT facility: Internet facility in all labs.
- e) Students' laboratories: 1
- f) Research laboratories: 7

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

a) from the host university:

S.No.	I.D. No.	Name
1.	PP-0849	Ms. Savita Jangde
2.	PP-0851	Mr. Pratap Singh
3.	PP-0816	Ms. Radha Singh
4	PP-0817	Mr. Brajesh Kumar Mishra
5	PP-0948	Ms. Sananda Mondal
6	PP-0950	Mr. Surinder Kumar
7.	PP-1048	Mr. Abhishek Kumar Srivastava
8	PP-11060	Mr. Sunil Kumar
9	PP-11061	Ms. Akanksha Jaiswal
10	PP-11062	Mr. Dinesh Kumar Yadav
11	PP-11063	Ms. Preeti Singh
12	PP-11064	Mr. Navin Pradhan
13	PP-11065	Ms. Bhawna Pant
14	PP-11066	Ms. Ankita Chandola
15	PP-12090	Anuj Kumar Singh
16	PP-12091	Ms.Sushmita
17	PP-12092	Pankaj Arya
18	PP-12093	Krishna Kumar Jangid
19	PP-12094	Prasann Kumar

b) from other universities: Nil

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

Nil

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology. Yes, considering local and regional needs.

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?

The matter is discussed in the meeting of Board of Studies of the Department, which includes all the teachers fo the Department and two expert members from other universities of the country.

b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback? Informally students are asked for their feedback/suggestions for improvement of teaching/learning and teacher-student relationship.

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

43. List the distinguished alumni of the department (maximum 10):

Dr. N. K. Anantarao, formerly Dy. Director General, ICAR, India; Dr. P. C. Bora, formerly Vice-Chancellor, Assam Agricultural University, Jorhat, India; Prof. B. B. Singh, Formerly Vice-Chancellor, N.D.U.A.T, Faizabad, India; Dr. G. C. Srivastava, formerly Head, Division of Plant Physiology, IARI, New Delhi, India; Dr. S. Z. Haider, Scientist, Soil Salinity Research Institute, Sukkur, Sindh, Pakistan; Dr K. L. Mukherjee, Professor & Director, Medical Lab, Baltimore, Maryland USA; Prof. R. Rajagopal, Univ. of Norway, Norway; Dr. K. B. Raj Bhandari, Formerly Director of Agriculture, Nepal; Dr. A. P. Singh, F. R. I. Rotoura, New Zealand; Dr. U. S Gupta, Ahmedu Bello University, Nigeria; Dr. Ram Snehi Dwivedi, formerly Principal Scientist & Head, Division of Plant Physiology, IISR, Lucknow; Dr. V. K. Datta, Natural Resources Institute, Chatham, UK; and Dr. G. P. Pillai, Weed Science Lab., USDA-ARS, Maryland, USA, Prof. Ayman-Al-Ouda, University of Damascus, Syria.

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts: External scientists/experts are invited for lectures:

Year	Name of External scientist/ expert
18.3.2009	Dr. B.B. Singh, Ex-V.C. NDUAT, Faizabad
19.3.2009	Dr. Y. P. Abrol , Ex-Head, Div. of Plant Physiology, IARI, New Delhi
29-3-2010	Dr. P. C. Ram, Ex-Head, Dept. of Crop Physiology, NDUAT, Faizabad
23-3-2010	Dr. Ajay Arora, Principal Scientist, Div. of Plant Physiology, IARI, New Delhi
28-2-2012	Dr. J. D. S. Panwar, Ex-Head, Div. of Plant Physiology, IARI, New Delhi
24.3.2012	Dr. R. Ezekiel, CPRI, Shimla
05.3.2012	Dr. Vishwanathan Chinnusamy, Principal Scientist, Div. of Plant Physiology, IARI, New Delhi

45. List the teaching methods adopted by the faculty for different programmes.

General lecture, seminars, group discussion, assignments, brain storming session, practical training.

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

By getting feedback from each teacher before conducting mid-term and end-term examinations about the course covered by individual teachers teaching specific courses.

47. Highlight the participation of students and faculty in extension activities.

Students participate in kisan mela, kisan gosthies and conferences by presenting research findings

48. Give details of “beyond syllabus scholarly activities” of the department. Students prepare subject based models and are asked/encouraged to present seminars/deliberate on relevant topics in the subjects

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. Graded by NAAC

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied:

- Evolved efficient micro-propagation protocols of important medicinal plants (*Stevia*, *Gymnema*, *Tylophora*, *Artimesia*)
- Evolved tissue culture protocol for rice somatic embryogenesis
- Demonstrated aerenchyma formation under waterlogging stress in water logging resistant pigeonpea genotype
- Identified rapid method to screen out waterlogging resistant maize (low nitrogen requiring) and pigeonpea (low H₂O₂ content under waterlogging), and terminal heat resistance in wheat and tomato genotypes
- Yield enhancement and improvement in nitrogen and stress metabolism with nitrate seed hardening (rice, wheat, mustard) treatment
- Relevance of Zn and B in regulating source-sink
- Establishment of threshold level of salicylic acid for improvement of anti-oxidant system in mitigation of drought and salinity stresses in chick pea and mung bean.

51. Detail any five Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strength:

- Qualified teaching staff
- Excellent internet and library facility

Weaknesses:

- Paucity of lab space for individual teachers
- Limitation of funds

Opportunities:

- ICAR is liberally providing funds

Challenges:

- To attract quality students in PG & Ph D.

52. Future plans of the department.

Research:

- Physiological, biochemical and molecular basis of abiotic (drought, heat, waterlogging, salinity and heavy metals) stress resistance in plants
- Micro-propagation of important medicinal, aromatic and crop plants

Teaching:

Keeping regional needs in view, and to train youths to develop their own entrepreneurs, Institute of Agricultural Sciences, BHU in association with AIP-USAID (USA) is developing following innovative training programmes:

- Diploma in Seed Technology & Marketing
- Diploma in Vegetable production
- Certificate course in Bio-pesticides and Plant Health

Post-accreditation Initiatives

If the university has already undergone the accreditation process by NAAC, please highlight the significant quality sustenance and enhancement measures undertaken during the last four years. The narrative may not exceed ten pages.

As per directives of the University received from time to time.