Annual Report 2016-17

Department of Seed Science and Technology

UTTAR BANGA KRISHI VISWAVIDYALAYA
Pundibari, Cooch Behar,
West Bengal-736165

1. BACKGROUND

Seed Science and Technology has been established as a full-fledged Department in 2013 bifurcating the Genetics and Plant Breeding department in order to active participation in academic activities to enrich students seed science and technology and provide better service as well as awareness among the farmers of the northern parts of West Bengal about use of quality seed and their production technology.

2. FUNCTIONS

Teaching, Research and Extension in the field of Seed Science and Technology

2.1. Teaching

Teaching of Undergraduate, Postgraduate and Doctor of Philosophy students. Different courses like Crop Physiology and Principles of Seed Technology for Bachelors' and all ICAR approved courses of seed science for Master and Doctoral degree programmes are being offered.

2.2. Research

2.2.1. Research

Thrust areas under research programme are

- Genetic purity and seed quality
- Seed enhancement for unfavourable conditions
- Improvement of seed storability
- Standardizing processing needs in major field crops
- Standardization of seed production technology of individual crop
- Use of biotechnological tools for enhancement of seed science in respect of synthetic seed and molecular characterization for genetic purity

2.2.3. Extension

The main objectives of the extension work of this Department are:

- Seed Production through Farmers' Participatory mode
- Training on seed production technologies of major field crops of northern part of West Bengal
- Organizing trainings on Quality Seed Production of Field Crops under Tribal Sub Plant of MEGA-SEED Project, UBKV, Pundibari
- Formation of Self-help Group / Farmers' Society very involved in Quality Seed Production to develop the village based seed enterprises
- Working as talker in *Graneganje Anusthan* broadcasted by All India Radio, Sliguri, West Bengal

2.2.4. Teaching

2.2.4.1. Field of specialization for M.Sc. and Ph.D.: Seed Science and Technology

2.2.4.2. Undergraduate courses

i) Compulsory courses

Sl. No.	Course No.	Title	Credit Hours	Semester
1.	SST 351	Principles of Seed Technology	2 + 1	Sixth
2.	SST 101*	Introductory Crop Physiology	1 + 1	First
3.	SST 151*	Fundamental Crop Physiology	1 + 1	Second

*Vth Dean Committee recommended syllabus

2.2.4.3. Post graduate courses

Course No.	Course-Title	Credit Hour	Remarks
Core-Courses			
SST 501	Floral Biology, Seed Development and Maturation	1 + 1	First semester
SST 502	Principles of Seed Production	2 + 0	First semester
SST 503	Seed Production in Field Crops	2 + 1	First semester
SST 506	Seed Legislation and Certification	2 + 1	First semester
SST 507	Seed Processing and Storage	2 + 1	Second semester
SST 591	Master Seminar	1 + 0	Fourth semester
Minor/Supporting Courses			
SST 504	Seed Production in Vegetable Crops	2 + 1	First semester
SST 505	Seed Production in Flower, Medicinal, Fruits and Plantation Crops	2 + 1	First semester
SST 508	Seed Quality Testing	2 + 1	Second semester
SST 509	Seed Physiology	2 + 1	Second semester
SST 510	Seed Pathology	2 + 1	Second semester
SST 511	Seed Entomology	2 + 1	Second semester
SST 512	Seed Production in Pasture, Forage and Green Manure Crops	2 + 1	Third semester
SST 513	Seed Storage and Deterioration	1 + 1	Third semester
SST 514	Seed Marketing and Management	1 + 1	Third semester
SST 515	Emerging Trend in Seed Quality Enhancement	1 + 1	Third semester
SST 516$^{@}$	Data Base Management, Evaluation and Utilization of PGR	2 + 1	Fourth semester
Doctoral Degree Courses			
SST 601**	Hybrid Seed Production	1 + 1	First
SST 602$^{@@}$	*In situ* and *ex situ* Conservation of Germplasm	2 + 1	First
SST 603	Testing for Genuineness and Purity of Cultivar	1 + 1	Second
SST 604**	DUS testing for Plant Variety Protection	2 + 1	Third
SST 605**	Advances in Seed Science Research	1 + 0	Fourth
SST 691**	Doctoral Seminar- I	1 + 0	Second
SST 692**	Doctoral Seminar- II	1 + 0	Sixth

** Compulsory Courses; $^{@}$ Course enlisted with GP 516; $^{@@}$ Course enlisted with GP 609

2.2.4.4. Post graduate requirement:

i) For M.Sc.(Ag) Degree: B. Sc. (Ag.)

ii) For Ph.D. Degree: M. Sc. (Ag.) in Seed Science and Technology or M. Sc. (Ag.) in Genetics and Plant Breeding/ Plant Breeding or M. Sc. (Ag.) Plant Physiology

iii) Students' Achievement:

JRF: **SRF:** **ARS-NET:** **Others (Specify):** NA*

iv) Students' Placement:

Govt: Nil **Corporate:** 00 **Bank:** 01 **NGO:** Nil

Till date, two students passed from this Department. From the first batch of M. Sc., Mr. Murali H. A. works in Bank.

3. RESEARCH ACTIVITY

3.1. Areas of research

- Isolation distance requirements in view of GM varieties
- Review of seed certification standards
- GOT –seasonal requirements
- Genetic purity vis-a-vis trait purity
- Enhancement of pollen viability, stigma receptivity and seed setting
- Reduction of processing losses
- Alternate areas / protected cultivation methods for hybrid seed production
- Standardizing processing needs in high value crops and forage grasses
- Protein and oil content in GM cotton seed and its effect on longevity
- Optimization of hybrid seed production technology in field crops, vegetables and flowers
- Pollen collection methods and viability testing
- Management of seed borne diseases with biocontrol agents
- Seed enhancement for unfavorable conditions
- Identification of markers for hybrid confirmation and genetic purity testing
  GM seed testing
- Seed testing protocols and seed standards for forage crops, medicinal species and spices
- Molecular control of seed viability, vigour and invigoration
- Standardizations of priming, coating and pelleting technologies
- Development of technologies for maintenance of parental lines of SI and MS based hybrids
- Any other location specific problems

3.2. Research achievements

3.3. Research Project

Sl. No.	Name of PI/Co-PI	Title of the project	Sponsoring agency	Total budget (₹)	Status	Salient outcome
1.	Dr. Puspendu	To evaluate the effect of Triacontanol 0.1%	Godrej Agrovet Ltd.,	4.55 Lakhs	Ongoing	-

	Dutta-PI	EW on yield and it's phytotoxic effect in relation to health on tea bushes	Mumbai			
2.	Dr. Bidhan Roy	*In vitro* mass-multiplication and conservation of some endangered *Citrus species* of NEH Region of India	DBT	24.09 Lakhs	Ongoing	-
3.	Dr. Bidhan Roy	Improvement of traditional non-Basmati aromatic rice genotypes of northern part of West Bengal through induced mutation	Bhaba Atomic Research Centre, BRNS, Trombay	28.30 Lakhs	Completed successfully	• Three promising mutants have been isolated from Tulaipanji
4.	Dr. Bidhan Roy	Tribal Sub Plan under MEEGA-SEED Project (dissemination seed production technology among the tribal farmers)		ICAR-IISS, Mau, UP	5.0 Lakhs in each year	Continuing Project, Since 2013
5.	Dr. Bidhan Roy	'All India Coordinated Rice Improvement Project', VOLUNTARY CENTRE		ICAR-IIRR, Hyderabad	*	Continuing Project, Since 2007
6.	Dr. Bidhan Roy	University Research Mandate on Rice	Institutional (UBKV)	17.50 Lakhs	Ongoing	• Developed 43 medium duration advanced lines

*Amount depend on the number of trial per season (Rs. 20000.00/trial)

4. AWARDS AND GOLD MEDALS

1. **BHARAT VIKAS AWARD 2016,** Awarded by **Institute of Self Reliance**, Plot No: 103/B, HIG, BDA Duplex, Baramunda, Bhubaneswar-751003, E-Mail Us: isrindiacsr@gmail.com, Call Us: 0674-2354662, Visit Us: www.isrindia.com, on 10th December 2016 on the occasion of WORLD HUMAN RIGHTS DAY.

2. **NATIONAL TEACHING EXCELLENCE AWARD 2016,** Awarded by **International Benevolent Research Foundation** (IBRF), Kolkata in association with Confederation of Indian Universities (CIU), New Delhi on World Teachers' Day and One day National Seminar on Employment Centric Higher Education on 5th October 2016 at Science City Auditorium, Science City, Kolkata.

5. SCHOLARSHIPS, STIPENDS AND FELLOWSHIPS:

6. INFRASTRUCTURAL AND SUPPORT FACILITIES AVAILABLE

1. Seed Testing Laboratory funded by MEGA-SEED Project, ICAR - Indian Institute of Seed Science, Mau, UP.

2. PG class room

1. FACULTY AND STAFFS

7.1. Head of the Department: Dr. Bidhan Roy

7.2. Faculty

Sl. No.	Name	Designation	Specialization	Contact address
1.	Dr. Bidhan Roy	Associate Professor	• Seed Science and Technology • Plant Breeding	Department of Seed Science and Technology
2.	Dr. Puspendu Dutta	Assistant Professor	• Crop Physiology • Plant Stress Physiology • Germination and Seed Invigoration	Do
3.	Dr. Utpal Maity	Assistant Professor	• Plant Physiology and Plant Growth Regulation • Seed Processing	Do

c) Non teaching staffs

Sl. No.	Name	Designation	Contact address
1.	Ms. Nandita Chakdar	Technical Assistant	Department of Seed Science and Technology
2.	Mr. Narayan Anjay	Laboratory Attendant	Department of Seed Science and Technology

8. PAPER & BOOKS PUBLISHED

8.1. Books/Manuals/Reports

1. Mondal HA, Dutta P. 2017. Exploring Biotechnology for Quality Forest Planting Material. In: G. Shukla, N.A. Plala and S. Chakravarty (Eds.) *Forest Seed Science and Management*. New India Publishing Agency ISBN: 978-93-85516-75-7

2. Bidhan Roy, Surje Dinesh Tulsiram, Swanajit Debbarma. 2017. Agriculture Related Intellectual Property Rights with Particular Orientation to Forestry. In: Gopal Shukla, Nazir A. Pala, Sumit Chakravarty (Eds.) *Forest Seed Science and Management*, New India Publishing Agency, New Delhi, India. pp. 209-240.

3. Dutta P, Maity U, Roy B. 2017. Practical Manual on Crop Physiology. Department of Seed Science and Technology, UBKV, Pundibari, Cooch Behar.

4. Bidhan Roy. 2017. Annual Report 2016-17. TSP-MEGA-SEED Project, Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar 736165, West Bengal, INDIA. pp. 1-32.

8.2. Research Papers

1. Puspendu Dutta, Pintoo Bandopadhyay 2016. Arsenic Pollution in Agriculture: Its Uptake and Metabolism. *Plant System. Agriculture Research & Technology: Open Access Journal*. 555573. DOI:10.19080/ARTOAJ.2016.01.555573

2. Utpal Maity, Puspendu Dutta, Bijay Basant Laya 2016. Effect of plant growth regulators on growth, yield and quality of okra (*Abelmoschus esculentus* (L.) Moench). *Journal of Agroecology and Natural Resource Management*. 251-253.

3. Puspendu Dutta, Pintoo Bandopadhyay, Asok Kumar Bera 2016. Identification of leaf based physiological markers for drought susceptibility during early seedling development of mungbean. *American Journal of Plant Sciences*. 1921-1936.

4. Bidhan Roy. 2016. Impact of Tsunami of Sumatra-Andaman Earthquake on Vegetation of Coastal Swamps. *Indian Journal of Geo-Marine Science*. 45(10): 1334-1340.

5. Bidhan Roy, Dinesh Tulsiram Surje. 2016. Some special characteristics of Farmers' Varieties of rice (*Oryza sativa* L.) for testing of Distinctiveness. *Indian Journal of Plant Genetic Resources*. 29(2): 163-169.

6. Bidhan Roy. 2016. Toward Standardization of Cultivation of Kalo Nunia- A Local Cultivar of Rice (Oryza sativa L.) during Boro Season. *Journal of Agriculture and Technology*. 3(2): 60-63.

7. Bidhan Roy, Surje Dinesh Tulsiram, Swarnajit Debbarma. 2016. Genetic Variability of Local Cultivars of West Bengal and Adjoining States with Special Orientation to Northern Part of West Bengal. Proceeding of National Seminar on *"Biodiversity"-Prospectus: Threats and Current Scenario*, from 26-27th February, 2016. Tufanganj Mahavidyalaya, Tufangan, Cooch Behar, West Bengal, INDIA. pp. 11-16.

9. SEMINAR, SYMPOSIUM, CONFERENCE, TRAINING AND WINTER/ SUMMER/ REFRESHER COURSE/SHORT COURSE ATTENDED/ ORGANIZED

9.1. Seminar/ Symposium/ Conference

Sl. No.	Paper detail	Type of presentation
1.	Puspendu Dutta and Utpal Maity 2016. Enhancement of green leaf yield as a function of pigments by foliar application of Triacontanol in tea [*Camellia sinensis* (L.) O Kuntze]. International Conference On "Agriculture, Food Science, Natural Resource Management and Environmental Dynamics: The Technology, People and Sustainable Development", 13-14th August, 2016. FACC, BCKV- Kalyani, Nadia, West Bengal	Oral
2.	Utpal Maity, Puspendu Dutta, Bijay Basant Laya 2016. Effect of plant growth regulators on growth, yield and quality of Okra [*Abelmoschus esculentus* (L.) Moench]. International Conference On "Agriculture, Food Science, Natural Resource Management and Environmental Dynamics: The Technology, People and Sustainable Development" 13-14th August, 2016. FACC, BCKV- Kalyani, Nadia, West Benga	Oral
3.	Bidhan Roy and Dinesh Tulsiram Surje. 2017. 'Biodiversity of local cultivars of rice, of West Bengal- Their Characterization, Conservation and Subsequently Utilization for Rice Improvement' presented in International Conference on Biodiversity, Climate Change Assessment and Impacts on Livelihood at ASLTEE Grand Plaza, Kthmandu, Nepal organized by Central Department of Botany, Tribhuvan University Kirtipur Kathmandu, Nepal	Oral
4.	Murali MA, Ranjit Kumar, Bidhan Roy. 2017. Many Kernelled Rice (*Oryza sativa* L.) Cultivar from West Bengal- A Unique Distinctive Character for IPR, presented in	Poster presentation

	National Conference on 'Enhancing Nutritional Security through Climate Smart Farming Practices' from 17-18th March, 2017 at Regional Research Station, UBKV, Kalimpong, West Bengal organized by Cooch Behar Association for Cultivation of Agricultural Sciences, UBKV, Pundibari	

9.2. Work shop

Sl. No.	Seminar, Symposium, Conference, Training and Winter/Summer/Refresher course/short course	Faculty associated	Date	Venue	Attended/ Organised
1.	Sensitization Workshop on **"Learning, Entrepreneurship and Needs of Agro-Industry"**	P. Dutta	28th February-01st March, 2017	UBKV, Pundibari, Cooch Behar	Attended
2.	**Annual Rice Workers Group Meeting**	B. Roy	5-9th April, 2016	Indira Gandhi Krishi Viswavidyalaya, Raipur, Chhatishgar	Participation and interaction
3.	**Annual Review Meeting of Seed Project**	B. Roy	17-18th August, 2016	GBPUA&T, Pantnagar, Uttarakhand	Presented, participated and interaction

9.3. Winter/ Summer School

Sl. No.	Seminar, Symposium, Conference, Training and Winter/Summer/Refresher course/short course	Faculty associated	Date	Venue	Attended/ Organised
1.	Winter School on **"Abiotic and Heavy Metal Stress Management in Crop Through Physiological, Phytoremediation and Proximate Sensing Approaches"**	P. Dutta	2-22nd September, 2016	Department of Crop Physiology, Assam Agricultural University, Jorhat	Attended

10. ANY OTHER (Achievement)

10.1. Technology Development

10.1.1. Toward Standardization of Cultivation of Kalo Nunia- A Local Cultivar of Rice (Oryza sativa L.) during *Boro* Season

Local cultivars of rice are generally highly photoperiod-sensitive. A local aromatic cultivar- *Kalo Nunia* is being cultivated in northern part of West Bengal during *Kharif* season. In this endeavour, an attempt was taken to standardize the sowing time to induce flowering during *Boro* season. It was found that *Kalo Nunia* flowered during mid-April when it is sown before December. The field duration reduced by 75 days. Total number of grains per panicle increased. It retained the yield as compared to *Kharif* season. The most important character of the cultivar was the aroma, which also retained, but decreased drastically and classified as 'mild aroma'.

Fig. Cultivation of *Kalo Nunia* during *Boro* seaso. A) Plots of *Kalo Nunia* transplanted with the seedlings raised during fourth week of November, it flowered and harvesting in progress during second week of May; **B)** Panicle of *Kalo Nunia*; **C)** Plots of *Kalo Nunia* transplanted with the seedlings raised during second week of January did not flower.

10.1.2. Characterization of Farmers Varieties of Rice

Diversity of genotypes within a crop provides ample opportunity for further improvement of the crop. In this endeavor, 132 local landraces of rice (*Oryza sativa* L.) were collected from different parts of West Bengal, Assam and Manipur states of India and being conserved since 2009. Some of the landraces have been used in breeding programme to introduce unique desirable character to already cultivated variety. All those landraces were morphologically characterized following the Table of Characteristics in the "Guidelines for Conduct of Test for Distinctiveness, Uniformity and Stability" published by PPV and FRA, Government of India for individual crop may be referred (Anonymous, 2007). In this study, 58 characters were considered to see the morphological differences among the landraces. Every landrace possessed one or few distinctive features which made them different from each other. In respect of grain quality, 10 landraces showed very low content of amylose in endosperm, 12 were categorized as low amylose content, 61 were medium, and 49 were having high content of amylose in endosperm. Amylose content is an important rice grain quality parameter in respect of consumer preference. In India, consumers prefer medium (20-25%) amylose content in the endosperm. Out of 132 Landraces, 25 Landraces were found strong aromatic, 23 were mild aromatic and remaining 84 were non-aromatic.

Fig. Visit of **ICAR Monitoring Team** at the Rice Germplasm Conservation site of UBKV, Pundibari, Cooch Behar district

10.1.3. Evaluation of Advanced Lines at Famers' Field

Seven advanced lines were tested at four farmers' fields (**F1:** Shri Bharat Barman, Village- Kharikabari, Unishbisha G.P., Ghoskadanga, Mathabhnga-II, Cooch Behar dist.; **F2:** Jayantir Hat, Mathabhnga-II, Cooch Behar dist.; **F3:** Shri Benzamin Oraon, Village- Singhimari (Tribalpara), Patlakhawa G.P., Cooch Behar-II, Cooch Behar dist.; **F4:** Shri Ramkrishna Barman, Village- Petlanepra, Chhoto Salbari G.P., Sitalkuchi, Cooch Behar district) for their yield potential.

The advanced line- UBKVR-15 showed highest overall mean yield (7140.13 kg/ha) followed by UBKVR-1 (6979.25 kg/ha) and UBKVR-66 (6152.75 kg/ha). Some of the farmers from Sitlakuchi, Mathabhaga-II and Dinahata-II blocks have adopted UBKVR-1 for its productivity and cooking quality.

Fig. Field view of UBKVR- 15 and UBKVR-1.