

Annual Report 2017-18

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

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
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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
4.	SST-251*	Principles of Seed Technology	2 + 1	Fourth

*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 ^{@@}	<i>In situ</i> and <i>ex situ</i> 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: 01** **Others (Specify): NA***

iv) Students' Placement:

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

Till date, four students passed from this Department. From the first batch of M. Sc., Mr. Murali H. A. works in Bank and Mr. Ranjeet Kumar working in NSC. After completion of M. Sc. two students got admission for perusing Ph.D.

Pictorial depiction of field practical



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 Dutta	To evaluate the effect of Triacantanol 0.1% EW on yield and it's phytotoxic effect in relation to health on tea bushes	Godrej Agrovet Ltd., Mumbai	4.55 Lakhs	Completed	Foliar application of Triacantanol at 3 weeks interval during 2 nd and 3 rd flushing enhance green leaf yield of tea
2.	Dr. Puspendu Dutta as Co-PI	Retrieval of biophysical parameters in Buxa tiger reserve using GISAT	SAC, Indian Space Research Organization	14.95 Lakhs	Ongoing	-
3.	Dr. Puspendu Dutta	Evaluation of the effect of ASL-Seaweed+ Humic GR on growth and yield of paddy	Acandian Seaplants Limited, Canada	1.50 Lakhs	Ongoing	-
4.	Dr. Bidhan Roy	<i>In vitro</i> mass-multiplication and conservation of some endangered <i>Citrus species</i> of NEH Region of India	DBT	24.09 Lakhs	Ongoing	-

5.	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
6.	Dr. Bidhan Roy	'All India Coordinated Rice Improvement Project', VOLUNTARY CENTRE		ICAR-IIRR, Hyderabad	*	Continuing Project, Since 2007
7.	Dr. Bidhan Roy	University Research Mandate on Rice	Institutional (UBKV)	17.50	Ongoing	<ul style="list-style-type: none"> Developed 43 medium duration advanced lines

4. AWARDS AND GOLD MEDALS

- 1. OUTSTANDING PAPER AWARD, 2017**, Awarded on the occasion of **2nd Regional Science and Technology Congress** (Northern Region), organized by Department of Higher Education, Science and technology and Biotechnology, Govt. of West Bengal, at Siliguri College, West Bengal

5. SCHOLARSHIPS, STIPENDS AND FELLOWSHIPS:

6. INFRASTRUCTURAL AND SUPPORT FACILITIES AVAILABLE

- Seed Testing Laboratory funded by MEGA-SEED Project, ICAR - Indian Institute of Seed Science, Mau, UP.
- 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	<ul style="list-style-type: none"> Seed Science and Technology Plant Breeding 	Department of Seed Science and Technology
2.	Dr. Puspendu Dutta	Assistant Professor	<ul style="list-style-type: none"> Crop Physiology Plant Stress Physiology Germination and Seed Invigouration 	Do
3.	Dr. Utpal Maity	Assistant Professor	<ul style="list-style-type: none"> 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. Bidhan Roy. 2017. Biodiversity of Local Cultivars of Rice (*Oryza sativa* L.). LAP LAMBERT Academic Publishing AG & Co. KG, Theodor-Heuss-Ring 26, 50668 Köln, Germany. pp. 1-241. ISBN-NR: 978-620-2-05760-8
2. Shovik Deb and Puspendu Dutta (2017). Wastewater in Agriculture: Possibilities and Limitations. In: A. Rakshit et al (Eds.) *Adaptive Soil Management: From Theory to Practices*. Springer Nature Singapore Pte. Ltd. DOI 10.1007/978-981-10-3638-5_10
3. Bidhan Roy. 2018. Consolidated Report of BRNS (BARC) sponsored project entitled, Improvement of traditional non-Basmati aromatic rice genotypes of northern part of West Bengal through induced mutation”.
4. Bidhan Roy. 2018. Annual Report 2017-18. TSP-MEGA-SEED Project, Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar 736165, West Bengal, INDIA. pp. 1-32.

8.2. Research Papers

1. Sanjib Bhadra, Bidhan Roy, T.S. Ghimiray. 2018. Polyethyleneglycol mediated rapid *in vitro* screening of rice (*Oryza sativa* L.) genotypes for drought tolerance. *Indian Journal of Genetics and Plant Breeding*. **78(1)**: 142-146.
2. B. J. Reddy, Rupsanatan Mandal, Moumita Chakraborty, Laksmi Hijam and Puspendu Dutta (2018) A Review on Potato (*Solanum tuberosum* L.) and its Genetic Diversity. *International Journal of Genetics*, **10 (2)**: 360-364. DOI: <http://dx.doi.org/10.9735/0975-2862.10.2.360-364>
3. Swarnajit Debbarma, Bidhan Roy. 2017. Genetic Diversity of Farmers' Varieties of Rice (*Oryza sativa* L.) with Special Orientation to Lodging Characteristics. *Journal of Rice Research*. **5**: 181. doi:10.4172/2375-4338.1000181
4. Bidhan Roy, M Ghosh, Mojahir Hussain. 2017. WINNER (Winter Nursery For Rice)- A Technology to Raise Winter Rice Nursery. *Journal of Agriculture and Technology*. **4(2)**: 49-51.
5. Bidhan Roy. 2017. Dwarf Genotype of Rice (*Oryza sativa* L.)- A Prospective Medium Duration Rice. *Journal of Agriculture and Technology*. **4(2)**: 58-61.
6. Bidhan Roy and Ashamanjon Barman. 2017. Two Tier System of Cultivating Field Crops as Relay Cropping in Rice Field – A New Concept to Improve the Livelihood of Resource Poor Farmers. *ICAR-IIRR News Letter*. **15(1)**: 34

7. Puspendu Dutta, Pintoo Bandopadhyay and Subhasis Mondal 2017. Seed P content: a potential marker of arsenic tolerance during early seedling growth of rice. *Seed Science and Technology* **45 (1)**: 179-188. <https://doi.org/10.15258/sst.2017.45.1.11>.
8. Hossain Ali Mondal, Suvendu Kumar Roy, Laksmi Hijam, Moumita Chakraborty, Puspendu Dutta, and Tapan Kumar Hath 2017. Differential Aphid Colony Establishment in Dolichos lablab Varieties Correlated with Some Plant Specific Factors That Impact on Aphid Fecundity. *American Journal of Plant Sciences*, **8**: 754-769. <https://doi.org/10.4236/ajps.2017.84053>
9. Shudhansu Mahato, Dinesh Tulsiram Surje, Swarnajit Debbarma, Bidhan Roy. 2017. Characterization of Some Aromatic Farmers' Varieties of Rice (*Oryza sativa* L.). *Indian Journal of Plant Genetic Resources*. **30(2)**: 120-129

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.	Bidhan Roy. 2017. Biodiversity of Traditional Land Races of Rice (<i>Oryza sativa</i> L.)- Important Reservoir of Valuable Traits. Presented in 2 nd Regional Science and Technology Congress (Northern Region), from 7 th to 8 th December, 2017 organized by Department of Higher Education, Science and Technology and Biotechnology, Govt. of West Bengal at Siliguri College, Siliguri.	Oral presentation
2.	Annual Rice Workers Group Meeting from 8 th to 11 th April, 2017, AAU, Jorhat, Assam	Participation and interaction
3.	Kajal Mog Chaudhuri and Puspendu Dutta 2018. Effect of brassinosteroids on photosynthetic parameters, yield and quality of produced seeds in wheat cultivars. Presented in "Innovative Farming For Food And Livelihood Security In Changing Climate" held on 12-13 th January, 2018 at FACC, BCKV, Kalyani, West Bengal	Poster

10. ANY OTHER (Achievement)

10.1. Technology Development

10.1.1. Development mutants from Tulaipanji

Eight desirable mutants were isolated from M₄ generation. All those eight mutants were photoperiod-insensitive (can be grown during *Kharif* as well as *Boro* seasons), medium duration (117-122 days), non-lodging, semi-dwarf (73.60-95.40 cm), medium slender grain and aromatic, with high yield potential. All eight mutants also retained the strong aroma like parent Tulaipanji. Mutants TP3-2, TP3-7 and TP3-4 showed very high in yield increment over the local cultivar (102.56, 94.08 and 91.01% respectively). Those three mutants will be sent for AICRIP trials (IVT-*Boro* and IVT-ASG) and those three mutants may be promoted for commercial cultivation after necessary trials and demonstrations. Mutation breeding is one of the most effective non-conventional methods of plant breeding to develop desirable

mutants. The main objective of this work have been achieved through development of semi-dwarf, high yield potential, non-lodging, photoperiod-insensitive mutants with slender grain and strong aroma from a local aromatic rice cultivar, Tulaipanji.

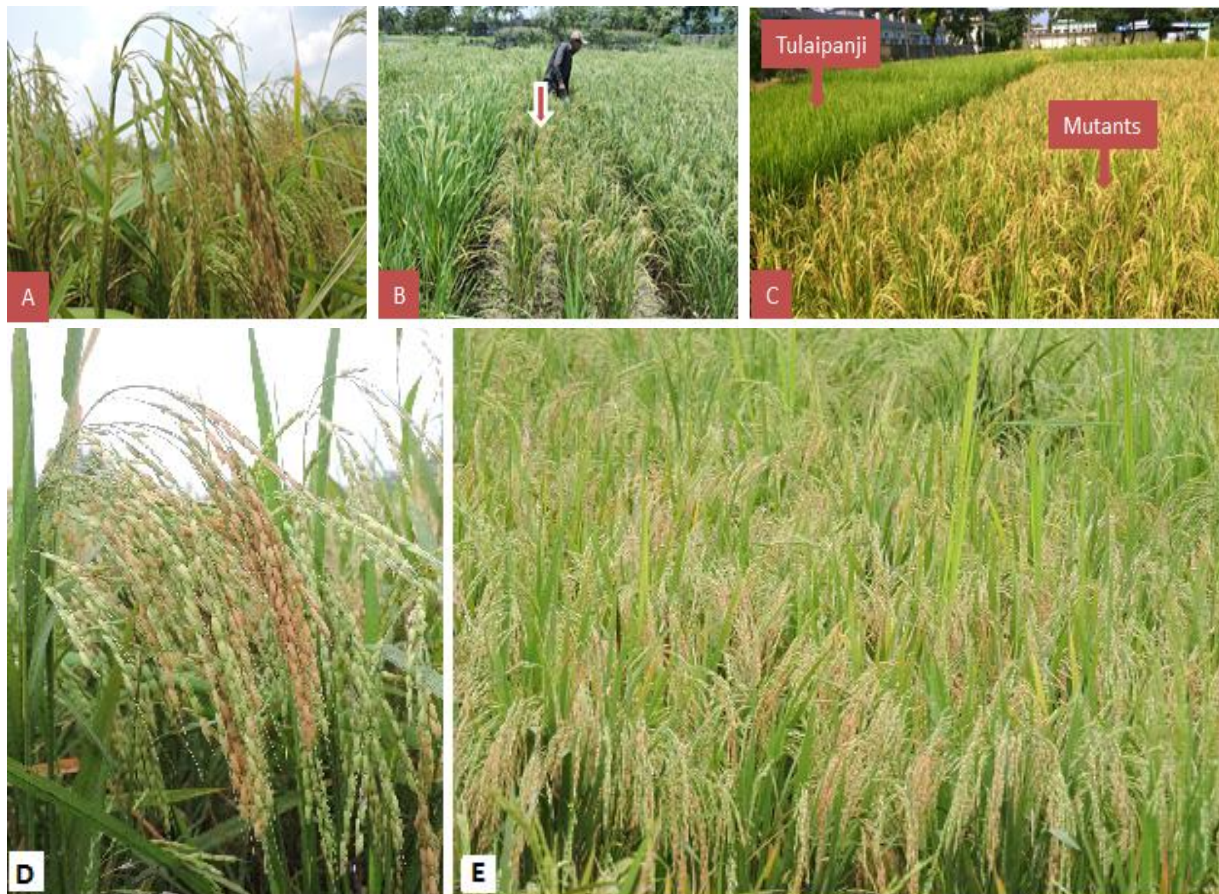


Fig. Tulaipanji mutants. A) Mutant- TP3-7 at maturity, it is semi dwarf, early as compared to Tulaipanji, yield advantage over Tulaipanji is 58%, mild aromatic; B) Mutant-TP3-5 at maturity, it is semi dwarf, early as compared to Tulaipanji, yield advantage over Tulaipanji is 74.81%, strong aromatic; C) Mutants at maturity while the Tulaipanji still at vegetative stage; D) Tulaipanji mutant with awn at the top of the panicles; E) Field view of mutants during *Boro* season.

10.1.2. Triaccontanol induced enhancement in green leaf yield of tea

Application of Triaccontanol increased leaf pigment contents and green tea leaf production. Foliar application of Triaccontanol 0.1% EW @ 0.25 g ai/ha produced maximum green tea leaf as well as maximum chlorophylls content in green tea leaf. No phytotoxic symptoms were observed in any of the treatments with test chemical during the experimental period on crop foliage.



Fig. A) Growth of new shoots (Flashing) of tea under Triacontanol treated plots; B). Plucking of tea leaves