



**CENTRE OF ADVANCED FACULTY TRAINING  
IN  
CROP PHYSIOLOGY,  
N.D. UNIVERSITY OF AGRICULTURE & TECHNOLOGY,  
KUMARGANJ, FAIZABAD.**

**Introduction:**

The Department of Crop Physiology was established in the year 1978. M.Sc. was started in 1983 and Ph.D. during 1986. Till now about 85 M.Sc. (Ag.) and 37 Ph.D. students have been awarded degree. Students of this department are serving on various administrative/teaching /research posts in state/central government departments. The numbers of seats in the department have increased; now it is 14 in M.Sc. (Ag.) and 4 in Ph.D.

The department is internationally recognised for its work on abiotic stresses particularly on submergence, drought and salinity. A number of National and International projects have been run in the department. At present 5 International and 2 National projects are in the department. The department has released 5 submergence tolerant rice varieties under CURE project namely Swarna Sub 1, Narendra Mayank, Narendra Narayani, Narendra Jalpushpa and NDR 8002. Besides this, a number of technologies have been developed to enhance the productivity potential of submergence and salt affected soils.

Recognizing the achievements of the department, the ICAR awarded Centre of Advanced Faculty Training (CAFT) in Crop Physiology in 1995. The department is continuously organizing advanced training courses each year on various aspects of plant physiology since its inception.

**Objectives of the CAFT:**

1. To impart advanced training to the scientists and academic staff within the National Agriculture research and education and extension system in the country.
2. Training and retraining to the faculties of Universities/Institutes in enhancing their capabilities in use of educational innovations, modern teaching and research methodology along with serving as repository of ideas and information in concern discipline.

**Faculty: Name & Designation (as per 30.09.2011):**

Name	Designation	Expertise Areas
Dr. A.H. Khan	Head of Department	Weed Physiology, PGR, Salinity and Temperature Stress
Dr. A.K. Singh	Assistant Professor	Physiology of Submergence and Drought
Dr. S.P. Singh	Assistant Professor	Mineral Nutrition and Salt Stress
Dr. R.K. Yadav	Assistant Professor	PGR and Salt Stress
Dr. Raj Bahadur	Assistant Physiologist	Pulse Physiology

Dr. Gulab Singh	Rice Physiologist	Rice Physiology
Dr. H.P. Singh	Seed Physiologist	Seed Physiology
Dr. M.P. Singh	Assistant Professor	Mineral Nutrition

❖ **Four posts are vacant-** Hon'ble Vice-chancellor is making effort to full fill posts

#### **Human Resource Development:**

Particulars of short courses/training programme for HRD conducted during XI plan period

Sl. No.	Name of the programme	Period	No. of Participates		
			Internal	External	Total
1.	Harnessing Productivity Potential of Salt Affected Areas: Physiological and Molecular Approaches (2007-08)	21 Days	07	15	22
2.	Sustainable Improvement in Plant Productivity Under Stress Environments (2008-09)	21 Days	06	16	22
3.	Role of Growth Regulators in Productivity Enhancement and Value Addition in Agricultural and Horticultural Crops (2008-09)	21 Days	09	11	20
4.	Crop Improvement Under Submergence and Salt Stress: Physiological and Molecular Approaches (2010-11)	21 Days	09	14	23
5.	Crop Improvement under Changing Environment: Physiological and Molecular Approaches (2011-12)	21 Days			21

**Infrastructure Development (equipment):** Non recurring contingency was not allotted during entire 11<sup>th</sup> five year plan. But we purchased some equipments from the funds provided by other agency. The equipments purchased during this period are

1. Atomic Absorption Spectrometer
2. Moisture Meter
3. Electronic Balance
4. Flame Photometer
5. Double beam uv-vis spectrophotometer

**Renovation of lecture room/ laboratory:** Seminar hall was renovated in the year 2008-09 from the fund received from central assistance.

**Library upgraded:** Books are purchased every year from the budget given under CAFT.

**Awards/recognition:**

- ❖ Vice-Chancellor of the University awarded commendation card to the HOD Crop Physiology for the release of Swarna Sub 1 variety under the CURE project funded by IRRI.
- ❖ Letter of Appreciation was given to Dr. P.C. Ram (Former Head, Crop Physiology) from Programme Leader, International Rice Research Institute Philippines for out standing contribution in rainfed lowland rice research and management.

**Publications:**

**International Journal:**

- Khan, A.H. 2011. Conquering water stress with Sub 1 rice varieties in Faizabad, India. CURE, IRRI News latter Vol. 1 (1) pp 3-4.
- Singh, R.K., Redona, E., Gregorio, G.B., Salam, M.A, Islam, M.R., Singh, D.P., Sen, P., Saha, S., Mahata, K.R., Sharma, S.G., Pandey, M.P., A.G., Sajise, R.D., Mendoza, M.C., Toledo, Dantem, A., A.M., Ismail, Paris, T.R., Haefele, S.M., Thomson, M.J., Zolvinsiki, S., Singh, Y.P., Nayak, A.K., Singh, R.B., Singh, V.K., Shrama, D.K., Gautam, R.K., Ram, P.C., Singh, P.N., Verma, O.P., Singh, A. and Lang, N.T. 2010. The right rice in the right place: systematic exchange and farmer- based evaluation of rice germplasm for salt- affected areas. CAB international 2010. Tropical delta and costal zones: pp 166-182.
- Prashant, V.; Alok, K. and Singh, S.P. 2010. Sequence analysis of Nagina-22 drought tolerant EST<sup>s</sup> for drought specific SSR<sub>s</sub>. *International Journal of Plant Science*. **5** (1): 174-176.
- Prashant, V.; Alok, K. and Singh, S.P. 2010. Bio-informatics approaches through SNPs for tolerance in rice. *Int. J. of Plant Sci*. **5** (1): 331-336.
- Sarkar, R.K., Reddy J.N., Das, K.K., Ram, P.C., Singh, P.N., Mazid, M.A., Sommut, W., Pane, H., Sharma, S.G. and Ismail, A.M 2009. Biophysical constraints in flood-prone ecosystems: Impacts and prospects for enhancing and sustaining productivity. Limited Proceedings No. **15**, pp 67-81.
- Ram, P.C., Mazid, M.A., Ismail, A.M., Singh, P.N., Singh, V.N., Haque, M.A., Singh, U., Ella, E.S. and Singh, B.B. 2009. Crop and resource management in flood-prone areas: farmer's strategies and research development. Limited Proceedings No. **15**, pp 82-94.
- Ram, P.C., Singh, P.N., Verma, O.P., Ismail, A, Singh, N, Srivastava, A, Singh, Punam, and Singh, R.K. 2008. Improving water and Land productivity through technology interaction in saline sodic soils of indo genetic basin. Submitted to, Second CPWF International forum on water and food IFWF, being held in Ababh, Ethiopia from 9-14 November, 2008.
- Srivastava, A.K., Singh, P.N., Kumar, S., Ram, P.C., and Ismail, A., 2007. Physiological Changes Associated with Submergence Tolerance in Genetically Divers

**Indian Journal:**

- Singh, Nirbhay, Bahadur, Raj, Singh, R. P. and Yadav, R. K. 2011. Effect of seed soaking with zinc nutrition on growth and yield of chickpea (*Cicer arietinum* L.). *J. of Food Legume* **24** (3) : 261-262.
- Yadav, S.K.S., Prasad, S., Yadav, R.K., Yadav, V.K. and Ram, Preet 2010. Phosphorus effect on growth, biochemical changes and yield of rice plant during submergence. *Asian Journal of Bio Science* -5 (1) 129-133.
- Singh, S.; Aradhan, S. K.; Singh, N. K.; Singh, A. K.; Singh, R. K.; Tyagi, J. P.; Singh, V.N. and Chandra, R. 2009. Genetic analysis of agro-morphologic traits under normal and delayed condition parting in rain fed lowland rice (*Oryza sativa*). *J. of Agricultural Science*. **79** (12): 1036-1041.
- Singh, A.K.; Singh, S.; Singh, Anurudh; Pradhan, S.K., Tyagi, J.P. and Singh, Alok 2009. Physiological marker traits associated with sub-mergence tolerance of lowland rice (*Oryza sativa*). *Ind. J. of Agricultural Science*. **79** (a): 687-693.
- Bahadur Raj, Chaturvedi, G. S., Singh, R. P. and Singh, Nirbhay 2008. Effect of soil moisture levels on chlorophyll, nitrogen, protein and starch contents in lentil genotypes (*Lens culinaris* Medic). *Ad. Plant Sci.*, **20** (II) Supple. 93-97.
- Kushwaha, D.S., Bahadur, Raj, Rajput, R.K., Singh, R.P. and Yadav, R.K. 2008. Effect of plant growth regulator and chemicals on growth, yield, and yield attributes and grain quality of mungbean [*Vigna radiata* (L) Wilczek]. *Ad. Plant Sci.*, **20** (II) Supple. 81-83.
- Pandey, B., Singh, R.P. and Bahadur, Raj 2008. Identification and analysis of protein from wild species of pigeon pea (*Cajanus cajan* L. Millspaugh) in way to develop resistant against pod borer (*Helicoverpa armigera*). *Ad. Plant Sci.*, **20** (II) Supple. 91-92.
- Singh, M.P., Bahadur Raj, Yadav, R.K., Singh, S.N. and Tomar, S.K. 2008. Influence of *Rhizobium* and phosphorus on pod yield and quality of cow-pea (*Vigna unguiculata* L. Walp.). *Academy of Plant Science*, **20** (II) Supple. 53-54.
- Rajput, R.K., Katiyar, T.P.S., Yadav, A.S., Kumar, V., Upadhyay, M.K. and Bahadur, Raj 2008. Performance of hybrid rice on yield, uptake, NUE and root characteristics under different moisture regimes and split application of nitrogen. *Ad. Plant Sci.*, **20** (II) Supple. 85-87.
- Yadav, R.K., Bahadur Raj, Singh, Nirbhay and Chaturvedi, G.S. 2008. Effect of bioregulators on growth and grain yield in field pea. *J. of Food Legume* **21**(3): 206-207.
- Singh, Sanjay; Singh, A.K.; Singh, H.P. and Singh, R.S. 2008. Genetic analysis for seed germination callus induction and survival of rice under salt at in vitro condition. *Oryza*. Vol. **4** (1) : 12-17.

- Prashad, Shambhoo, Ram, P.C., Singh, M.P., Yadav, R.K. and Singh, Jitendra 2008. Physiological status and field of maize genotypes under upto logging regimes. *International Journal of plant Science Agricultural society*, vol. **3** (1), 101-105.
- Yadav, R.K., Bahadur, Raj, Singh, Nirbhay and Chaturvedi, G.S. 2008. Effect of regulators on growth and grain yield in field pea (*Pisum sativum* L.). *Journal of food legumes*. **21**, No. 2008, pp- 206-207.
- Kumar, Mukund, Singh, Satyendra Kumar, Ram, P.C., Singh, P.N. & Singh, S.P. 2007. Nutrient Management in Nursery for Improving Submergence tolerance and productivity of Low land rice (*Oryza sativa* L.). *Advances in Plant Science* **20** (11) Supple: 121-123.
- Ram, P.C.; Singh, P.N., Singh, N., Kumar S., Singh, S.P., Singh, B.B. & Ismail, A. 2007. Molecular and Physiological aspects of yield enhancement in rice under submerged environments. National Seminar on Plant Physiology: Physiological and Molecular Approaches for Increasing yield and quality of Agricultural, Horticultural and Medicinal Plant under changing Environment on 29-30 Nov. & 1 December, 2007. Organized by Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli (M.S.) pp- 33-40.
- Singh, N.K.; Singh, S. and Singh, A.K. 2007. Study of heterosis in rice (*Oryza sativa* L.) using line and under maling system. *Oryza*, Vol. **44** (3): 260-263.
- Singh, S.P.; Verma, D.K.; Singh, S.K. and Kumar, Mukund 2007. Effect of new herbicide on growth and yield parameters of wheat (*Triticum aestivum* L.). *Advances in Plant Science*. **20** (II): 117-120.
- Mishra, Roopam; Chaturvedi, G.S. and Singh, S. P. 2007. Influence of potassium application on biochemical component of upland rice expressed to water deficit at vegetative stage. *Advances in Plant Science*. **20** (II): 137-140.
- Ram, P.C.; Singh, P.N.; Singh, N.; Kumar, S.; Singh, S.P.; Singh, B.B. and Ismail, A. 2007. Molecular and physiological aspects of yield enhancement in rice under sub-merged environment. Proceeding of National seminar in plant physiology, 29-30 Nov. and 1 Dec. 2007 Dapoli, Maharashtra.
- Singh, Uma; Ram, P.C.; Singh, S.P. and Yadav, R.K. 2007. Beneficial effects of seed priming with GA<sub>3</sub> on growth and biochemical constituents of Urdbean under saline condition. *Annals of Agri. Bio. Research*, **12** (2): 127-132.
- Kumar, Mukund; Singh, S.K.; Ram, P.C.; Singh, P.N. and Singh, S.P. 2007. Nutrient management in nursery for improving submergence tolerance and productivity of lowland rice (*Oryza sativa* L.). *Advance in Plant Science*, **20** (II): 121-123.
- Kushwaha, D.S., Raj, Bahadur, Rajput, R.K., Singh, R.D. and Yadav, R.K. 2007. Effect of plant growth regulator and chemicals on growth, yield attributes and grain quality of (*Vigna radiata* L.). *Advances in Plant Science* (II) supplement 81-83.
- Singh, Uma, Ram, P.C., Singh, S.P. and Yadav, R.K. 2007. Beneficial effect of seed priming with GA, on growth and biochemical constitues under saline condition. *Annals of Agri. Bio research* **12** (2) : 127-137.

Singh, M.P., Bahadur Raj, Yadav, R.K., Singh, S.N. and Tomar, S.K. 2007. Influence of *Rhizobium* and phosphorus on pod yield and quality of cow-pea (*Vigna unguiculata* L. Walp.). *Ad. Plant Sci.* (II) Supple. 53-54.

Yadav, P.K. Khan, A.H. and Yadav, A.S. 2007. Effect of herbicides on biochemical and growth parameters of chickpea (*Cicer arietinum*). *Indian J. Agricultural Sci.* 77 (8) 542-543.

#### **Chapter Published in Books:**

1. Khan, A.H., Shukla, R.P., Chaturvedi, Sumit and Chaturvedi, G.S. (2009). Mode of Action of Herbicides in Plant, In Book : Physiological and Biotechnological Manipulations for Enhancing Plant Productivity, pp- 125-137, Pointer Publisher, Jaipur.
2. Singh, A.K., Singh, B.N., Singh, V.N. and Chaturvedi, G.S. (2009). Physiology of cereal crops: Perspective and molecular Approaches, pp- 121-144, Pointer Publisher, Jaipur.
3. Srivastava, Avinash, C., Singh, A.K., Tikku, A.K. and Pal, Madan (2009). Mineral Nutrition of Temperate Fruit Crops, pp- 264, Pointer Publisher, Jaipur.
4. Ram, P.C., Singh, Uma, Singh, P.N., Singh, Punam, Singh, S.P., Verma, O.P., Srivastava, A.K., Mauriya, A.K., Chaturvedi, G.S., Singh, B.B. and Ismail, A.M. (2009). Adoption to plants to flooding stress: Strategies for improving tolerance and productivity: pp- 66-99, Pointer Publisher, Jaipur.
5. Chaturvedi, G.S., Singh, A.K., Singh, S.P., Singh, V.N., Singh, Uma, Singh, P.N., Singh, R.P. and Singh, Anuradha (2009). Research contribution of some Indian plant Physiologist. Abiotic Stresses and Plant Productivity, 99- 237-250, Pointer Publisher, Jaipur.
6. Ram, P.C., Singh, P.N., Punam, Verma, O.P. Srivastava, A.K., Mauriya, A.K., Mauriya, D.C. Singh, V.K. and Ismail, A.M. (2009). Physiology and molecular approaches of yield improvements under excess water stress environments. Crop Production under Diverse Environments, pp- 15-38, Pointer Publisher, Jaipur.

#### **Books:**

- 1) G.S. Chaturvedi, P. C. Ram, A.K. Singh (2009) Physiological Basis of Crop Production & Improvement, Published by Pointer Publisher, Jaipur
- 2) G.S. Chaturvedi, P. C. Ram (2009) Crop Production Under Diverse Environments, Published by Pointer Publisher, Jaipur
- 3) G.S. Chaturvedi, P. C. Ram, (2009) Physiological and Biotechnological Manipulations for Enhancing Plant Productivity, Published by Pointer Publisher, Jaipur
- 4) G.S. Chaturvedi, P. C. Ram, (2009) Abiotic Stresses and Plant Productivity, Published by Pointer Publisher, Jaipur

**Bulletin Published for the Farmers:** (Technology developed for rice under submergence & salt affected soils)

1.  $ck < + xzLr \{ks=ksa esa /kku dh lQy [ksrh\% vk/kqfud rduhd$
2.  $\text{Ålj Hkwfe dh mRikndrk } c < + kus dh vk/kqfud rduhfd;kj$

**Manual:**

Year	No. of Manuals /Instructional Material
2007-08	One laboratory manual and one update
2008-09	One laboratory manual and one update
2008-09	One laboratory manual, and one update
2010-11	One laboratory manual and one update
2011-12	Under Preparation

**Any other:**

- ❖ **Linkage with international network and other organisations-**  
**IRRI-** Consortium for Unfavourable Rice Environment (CURE)  
**STRASA** - Stress tolerance Rice for Africa and South Asia  
**BMZ-** Enhancing and Stabilizing the Productivity of Salt Affected Area by Incorporating Genes for Abiotic Stress  
**IFAD-** "Improved Rice Crop Management for Raising Productivity in Submergence Prone and Salt-Affected Rainfed Low lands in South Asia"  
**ACIAR, Australia-** Wheat Improvement for Water Logging, Salinity and Element Toxicities in Australia and India  
**RKVY** - Rashtriya Krishi Vikas Yojana  
**UPCAR-** Establishment of Leaf Tissue Analysis Laboratory
- ❖ **Scientist Visited the Department-** A number of National and International scientists visited department during this period and discussed about the various experiments of international projects and also visited the project sites.
- ❖ **Scientists of the Department visited abroad:**  
 Dr. P.C. Ram, IRRI, Philippines, Manila  
 Dr. A.H. Khan, Kathmandu Nepal  
 Dr. A.K. Singh, IRRI, Philippines, Manila  
 Dr. S.P. Singh, IRRI, Philippines, Manila

**Financial Statement:****Expenditure under CAFT during XI plan**

Head	2007-08	2008-09	2009-10	2010-11	2011-12
Operating cost of Training	17,7,000.00	3,54,000.00	-	3,75,000.00	Training is scheduled from 9-29 Nov. 2011.
Recurring Contingency	1,51,759.00	1,98,723.00	-	1,09,177.00	
Non- Recurring Contingency	-	-	-	-	
T.A.	5,913.00	8,858.00	-	4,392.00	
Library	50000.00	50000.00	-	19580.00	
<b>TOTAL</b>	<b>384672</b>	<b>611581</b>	<b>0</b>	<b>508149</b>	