



CENTRE OF ADVANCED FACULTY TRAINING GENETICS AND PLANT BREEDING Tamil Nadu Agricultural University, Coimbatore , Tamil Nadu

Introduction

The Centre for Plant Breeding and Genetics comprises seven component Departments each devoted to the research, development, training and seed production of the crops, rice millet, pulses, oilseeds, cotton, forage crops and Plant Genetic Resources. A new department called Department of Plant Genetic Resources was established during 2010 to collect, conserve, evaluate and characterize the plant genetics resources available in the state. Besides, basic research on cytogenetics, genetics and post graduate teaching are being carried out in separate wings.

The directorate is involved in improving almost all the crops for the betterment of mankind by conducting result-oriented, cost effective research, providing facilitated learning situation to the students to equip themselves with the latest technical know-hows and keeping them abreast with the traditional and modern aspects of crop improvement and by extending the technical knowledge in an effective way to the farmers for adoption.

Objective of CAFT

- To conduct training programmes for the scientists of SAU and ICAR institutes
- To conduct summer institutes wherever sanctioned by the council
- To conduct special lectures of invited faculty
- To conduct a research programme involving the postgraduate student(s)
- To equip post graduate laboratory

Faculty: Name & Designation (as on 30.09.2011)

Dr. K. Thiyagarajan
Director, CPBG and Course Director for CAFT

Professor and Heads	
Dr. K. Ganesamurthy Dept. of Oilseeds	Dr. A. John Joel Dept. of Plant Genetic Resources
Dr. A. Kalamani Dept. of Forage Crops	Dr. AR. Muthiah Dept. of Pulses
Dr. S. Robin Dept. of Rice	Dr. P. Veerabathiran Dept. of Millets
Dr. P. Vindhiyavarman Dept. of Cotton	

Professors	
Dr. J.R. Kannan Babu Redgram breeding	Dr. M. Maheswaran Genetics
Dr. N. Meenakshiganesan Education	Dr. G. Nallathambi Maize breeding
Dr. A. Nirmalakumari Small millets breeding	Dr. B. Selvi Sorghum Breeding
Associate Professors	
Dr. P. Amala Balu Cotton Breeding	Dr. C. Babu Forage breeding
Dr. K.N. Ganesan Maize breeding	Dr. S. Ganesh Ram Genetic Resources
Dr. M. Gunasekaran Cotton Breeding	Dr. P. Jayamani Greengram and Blackgram breeding
Dr. P. Jeyaprakash Rice breeding	Dr. T. Kalaimagal Soybean breeding
Dr. N. Manivannan Sunflower breeding	Dr. S. Manonmani Rice breeding
Dr. S. Rajeswari Rice breeding	Dr. S. Sivakumar Forage sorghum breeding
Dr. P. Sumathi Pearl millet breeding	
Assistant Professors	
Dr. R. Chandirakala Sunflower breeding	Dr. K. Iyanar Forage Breeding
Dr. R. Kalaiyarasi Education	Dr. D. Kumaresan Pulses Breeding
Dr. D. Malarvizhi Genetics	Dr. B. Meenakumari Sesame Breeding
Dr. D. Punitha Cotton Breeding	Dr. R. Pushpam Rice Breeding
Dr. A. Subramanian Minor millet breeding	Dr. K. Thangaraj Genetics
Dr. A. Yuvaraja Maize breeding	

Human Resource Development

Particulars of Short Courses / Training program for HRD conducted during XI plan period

S.No.	Name of the Program	Period	No. of Participants		
			Internal	External	Total
	CAS training				
1.	Innovative tools in Crop Improvement	2007-08	2	16	18
2.	Modern Approaches in Heterosis Breeding	2007-08	2	10	12
3.	Trait based genetic enhancement in crop plants	2008-09	2	14	16
4.	Genome Assisted Plant Breeding	2008-09	2	9	11
5.	Changing Environments, Biodiversity and Future Plant Breeding	2009-10	3	9	12
6.	Impact of genomics in crop improvement: Perceived and achieved	2010-11	3	22	25

7.	Breeding for Biotic and Abiotic stresses in crop plants: Problems and Perspectives from 9 th to 29 th November, 2011	2011-12			20
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Infrastructure development (equipments etc.):

- A separate laboratory for Marker Aided Selection has been established for applying molecular marker techniques in plant breeding genetics. Recently an additional 600 sq. ft of work area has been added to the MAS laboratory.
- A tissue culture laboratory has been established for conducting research on anther and embryo culture in various crops.
- Recently area of sterilisation has been increased with additional Laminar flow chambers
- Existing Cytogenetics Laboratory has been strengthened by adding a fluorescent microscope and facilities for microtomy.
- The Glasshouses of Genetics and Cytogenetics have been renovated.
- Recently the genetics glass house has been renovated and upgraded to facilitate the screening of transgenic plants and rice to Brown planthopper.
- The seminar hall has been renovated and provided with public address system, TV, VCR and other audio-visual aids. New furniture have provided to the seminar hall.
- A new LCD projector with remote operated projection screen has been added to the seminar hall.
- A separate computer room has been established with necessary facilities for the data analysis by the post graduate students. All the old computers have been upgraded with latest configurations.
- The library of Centre for Plant Breeding and Genetics has been improved to a very great extent and the credit goes to the CAFT in Genetics and Plant Breeding.
- All the recent books in the fields of genetics, cytogenetics, tissue culture, Molecular biology and plant breeding were purchased.
- The library in the centre remains as an immediate reference source for the teachers and students. Every year new books have been added to the library of the centre as well the central library of the university.

Awards/Recognitions

Dr. A. Nirmalakumari, Professor, was awarded the Best Woman Scientist Award by TNAU for the year 2007

Dr. P. Sumathi, Assoc. Professor was awarded "V.N.Veeraaghavalu Naidu, shield and Medal" for Agricultural Botony from Madras Agricultural Students Union, TNAU, Coimbatore, on 22.12.2009

Dr.A. Kalamani, Professor and Head, Forages was awarded the best women scientist award 2003 by the Tamil Nadu Agricultural University, Coimabtoe.

Dr. C. Babu, Assoc. Prof. (PBG) was awarded Best Team Researcher – 2007 by the Tamil Nadu Agricultural University, Coimabtoe.

Dr. K. Iyanar, Assistant Professor was awarded the Best Research Paper Award (Crop Research) – 2005

Dr. S. Sivakumar, Associate Professor was awarded JIRCAS Visiting Fellowship Award 2006 -Japan International Research Centre for Agricultural Sciences, Japan (2006 – 07)

Dr. S. Sivakumar, Associate Professor was awarded ICRISAT_Research Fellow 2007, (CGIAR- International Crop Research Institute for Semi Arid Tropics, India)

Dr. P. Jayamani, Associate Professor was awarded the Best Women Scientist Award from the Tamil Nadu Government for the year 2007.

Publication

List of Research Publications in SCI Journals coming from the Department during the last five years

- Asish K. Binodh, Manivannan,N. and Vindhivarman, P. 2007. Cluster analysis of yield traits in sunflower (*Helianthus annuus* L.). Madras Agric. J., 94(1-6): 27-31.
- Asish K. Binodh, Manivannan,N. and Vindhivarman, P. 2007. Cluster analysis of yield traits in sunflower (*Helianthus annuus* L.). Madras Agric. J., 94(1-6): 27-31.
- Asish K. Binodh, N.Manivannan and P.Vindhya Varman.2008. Character association and path analysis in sunflower. Madras Agric. J., 95(7-12):425-427.
- Asish K. Binodh, N.Manivannan and P.Vindhya Varman.2008. Character association and path analysis in sunflower. Madras Agric. J., 95(7-12):425-427.
- Asish K. Binodh, N.Manivannan and P.Vindhya Varman.2008. Combining ability analysis for yield and its contributing characters in Sunflower (*Helianthus annuus* L.). Madras Agric. J., 95(7-12):295-300.
- Asish K. Binodh, N.Manivannan and P.Vindhya Varman.2008. Combining ability analysis for yield and its contributing characters in Sunflower (*Helianthus annuus* L.). Madras Agric. J., 95(7-12):295-300.
- Chandirakala, R., G. Kandasamy and K. Thiyagarajan. 2008. Determination of fertility behaviour of thermo sensitive genic male sterile lines in rice. *Oryza*. Vol. 45 No. 2, 2008. pp. 110-114.
- Chandirakala, R., G. Kandasamy and K. Thiyagarajan. 2008. Characterization of Thermo Sensitive Genic Male Sterile lines in rice (*Oryza sativa* L.). *Plant Archives*. Vol. 8 No. 1, 2008. pp. 49-52.
- Chandirakala, R., G. Kandasamy and K. Thiyagarajan. 2008. Combining ability of TGMS lines for yield improvement in rice (*Oryza sativa* L.). *Plant Archives*. Vol. 8 No. 1, 2008. pp. 77-84.
- Chandirakala, R., G. Kandasamy and K. Thiyagarajan. 2010. Heterotic expression of two line hybrids in rice. *Oryza*. Vol. 47 (3): 248-251.
- Dwivedi,S.L., Puppala,N., Upadhyaya,H.D.,Manivannan, N.and Singh,S. 2008. Developing a Core Collection of Peanut Specific to Valencia Market Type. *Crop Sci*,48:625-632
- Fitzgerld, M., C. Bergman, A. Resurreccion, J.. Moller, R. Jimenez, R.F. reinke S. *Rajeswari* and N.T. Lang, 2009. Addressing the dilemmas of amylose in rice. *Cereal chemistry* 86 (5) 492-498.
- Geethanjali. S, Kadirvel. P, Gunathilagaraj. K and Maheswaran. M. 2009. Detection of quantitative trait loci associated with resistance to white backed planthopper (*Sogatella furcifera*) in rice (*Oryza sativa*). *Plant Breeding*. 128: 130-136.
- Govindaraj. P, Vinod. K.K, Arumugachamy. S and Maheswaran. M. 2009. Analysing genetic control of of cooked grain traits and gelatinization temperature in a doubled haploid population of rice by quantitative trait loci mapping. *Euphytica*. 166: 165-176,

- Kadirvel. P, Maheswaran. M and Gunathilagaraj. K. 2007. A new phenotypic screen to map quantitative trait loci associated with rice tolerance to planthoppers. *IRRN*. 32.2: 28-30.
- Kalaiyarasi, R. and P.Vaidyanathan. 2006. A novel breeding approach in quest of temperature sensitive genic male lines among rice inter subspecies derivatives. *Euphytica*, 150 (1-2) : 173-183
- Manivannan, N., Karthika, R., Punitha, B., Vindhiyavarman, P. and Muralidharan, V. 2008. Association pattern among the yield attributes in varieties and hybrids of sunflower (*Helianthus annuus* L.). *Helia*, 31(49): 83-90.
- Manivannan, N., Karthika, R., Punitha, B., Vindhiyavarman, P. and Muralidharan, V. 2008. Association pattern among the yield attributes in varieties and hybrids of sunflower (*Helianthus annuus* L.). *Helia*, 31(49): 83-90.
- Manivannan, N., Puppala, N. and Delikostadinov, S.G. 2007. Association between pod and kernel characteristics in valencia groundnut, *Arachis hypogaea* L. subsp. *fastigiata* var. *fastigiata*. *J. Oilseeds Res.*, 24(1): 170-171.
- Manivannan, N., Vindhiyavarman, P., Nigam, S.N., Muralidharan, V., Aruna, R. and Vijayabharathi, A. 2009. AMMI analysis of farmers' participatory variety selection trials in groundnut (*Arachis hypogaea* L.). *J. Oilseeds Res.*, 26: 92-94.
- Manivannan, N., V. Muralidharan and A. Mothilal. 2008. Combining ability analysis in groundnut (*Arachis hypogaea* L.). *Madras Agric. J.*, 95(1-6): 14-17.
- Manivel, P. and Manivannan, N. 2006. Path analysis under different environments in castor, *Ricinus communis* L. *J. Oilseeds Res.*, 23(1): 89-92.
- Manonmani, S, Senthilvel S., Fazlullah Khan A.K. and M. Maheswaran 2006. Molecular marker distance and its relation to expression of heterosis in Rice. *J. Genet. & Breed.* 60: (Accepted).
- Manonmani, S. 2006. Stability behavior parents and hybrids in rice. *Journal of Eco biology*, 18 (1) : 39 - 46
- Manonmani, S. K. Thiyagarajan and D. Malarvizhi, 2009. COMS 14A and COMS15A-CMS lines from popular rice varieties of Tamil Nadu, India with good grain quality. *IRRN*, 2009 (33) : 1-3
- Manonmani, S., K. Thiyagarajan and D. Malarvizhi. 2006. Isolation Free Method-An Easy way for Hybrid Seed Production in Rice. *Journal of Rice Research*, 1:(2): 174-175
- Meenkashisundram. M and Maheswaran. M. 2008. RAPD and ISSR analyses reveal low levels of genetic diversity in *Phyllanthus amarus*. *Acta Hort.* 765: 179-187.
- Rajeswari, S. S. Robin, R. Chandirakala, N. Premalatha and S. Muthuraman, 2010. Genetic analysis and character association of quality in rice. *Oryza*, 47(2): 86-90.
- Sangha. J.S, Chen. Y.H, Kadirvel. P, Jahn. G.C, Maheswaran. M, Adalla. C.B and Leung. H. 2008. Categories and inheritance of resistance to *Nilaparvata lugens* (Hemiptera: Delphacidae) in mutants of *indica* rice "IR64". *Journal of Economic Entomology*. 101: 575-583.
- Senthilvel. S, Vinod. K.K, Malarvizhi. P and Maheswaran. M. 2008. QTL and QTL x Environment effects on agronomic and nitrogen acquisition traits in rice. *Journal of Integrative Plant Biology*. 50: 1108-1117.
- Sivakumar. S, O.L. Franco, B. Thayumanavan, M. Manickam, M. Mohan and M. Mridula "Cloning and structural analyses of an Indian little millet (*Panicum sumatrense*) zein-like storage protein: implications for molecular assembly" *Biochemistry, Moscow* 71(11): 1183-91, 2006.
- Sivakumar. S, M. Mohan, O.L. Franco and B. Thayumanavan "Inhibition of insect-pests α -amylases by little and finger millet inhibitors" *Pesticide Biochemistry and Physiology*, 85: 155-160, 2006.
- Sivakumar. S., B. Thayumanavan and O.L. Franco "Isolation of RNA from Polysaccharide-Rich Seeds" *Journal of Preparative Biochemistry & Biotechnology*. 37: 1-10, 2007.
- Subashree, M. S. Robin, K.K. Vinod, S. Rajeswari, K. Mohana Sundaram and T.S. Raveendran. 2009. Trait identification and QTL validation for reproductive

stage drought resistance in rice using selective genotyping of near flowering RILs. *Euphytica* 166: 299-305.

Umadevi, M. P. Veerabhadhiran, S. Manonmani and P. Shanmugasundaram. 2009. "Studies on Some Important Floral Traits of CGMS Lines of Hybrid Rice (*Oryza Sativa* L.) *The IUP Journal of Genetics & Evolution, Vol. II, No. 3, pp. 7-11.*

Verulkar, S.B., N.P. Mandal, J.L. Dwivedi, B.N. Singh, P.K. Sinha, R.N. Mahato, P. Dongre, O.N. Singh, L.K. Bose, P. Swain, S. Robin, R. Chandrababu, S. Senthil, A. Jain, H.E. Shashidhar, S. Hittalmani, C. Vera Cruz, T. Paris, A. Raman, S. Haefele, R. Serraj, G. Atlin and A. Kumar. 2010. Breeding resilient and productive genotypes adapted to drought-prone rainfed ecosystem of India. *Field Crops Res.*117 (2-3) : 197-208

List of Publications in Conference Proceedings during last five years

Manivannan, N., Shoba, D. and Vindhivarman P. 2008. ISSR marker based genetic diversity analysis in foliar disease resistant and susceptible groundnut genotypes (*Arachis hypogaea* L.). In: Third International Conference for Peanut Genomics and Biotechnology on Advances in Arachis through Genomics and Biotechnology (AAGB-2008) held at ICRISAT, Hyderabad, INDIA during Nov 4-8, 2008.

Manivannan, N., Shoba, D. and Vindhivarman P. 2008. ISSR marker based genetic diversity analysis in foliar disease resistant and susceptible groundnut genotypes (*Arachis hypogaea* L.). In: Third International Conference for Peanut Genomics and Biotechnology on Advances in Arachis through Genomics and Biotechnology (AAGB-2008) held at ICRISAT, Hyderabad, INDIA during Nov 4-8, 2008.

Manonmani, S, A.Bhuvaneshwari, Thiyagarajan, K. and D. Malarvizhi. 2006. Quality characteristics of three line rice hybrids. *Industrialization of Hybrid Rice, Proceedings of International Conference on the Industrialization of Hybrid Rice, China, 97-101.*

Manonmani, S, Senthilvel S., Fazlullah Khan A.K. and M. Maheswaran 2006. Molecular marker – A tool to exploit heterosis in Rice. Paper presented in 5th International Rice Genetics Symposium held at Manila, Philippines from 19-23rd November 2005.

Manonmani, S., K. Mohana Sundaram, S. Robin, D. Malarvizhi, R. Pushpam and K. Thiyagarajan. Dissemination of Hybrid Rice Technology and Empowering farm women. 3rd International Rice Congress Vietnam National Convention Centre, Hanoi, Vietnam from Nov 8-12, 2010.

Manonmani, S., K. Thiyagarajan, K. Mohana Sundaram, S. Robin, D. Malarvizhi and T. S. Raveendran. Popularizing CORH 3 rice hybrid by Front Line Demonstrations. 3rd International Rice Congress Vietnam National Convention Centre, Hanoi, Vietnam from Nov 8-12, 2010.

Manonmani, S., D. Malarvizhi, Subbulakshmi, L., S. Ganapathy and K. Mohana Sundaram. 2008. Enhancement of yield in Hybrid Rice through System of Rice Intensification in Tamil Nadu Paper presented in SRI India 2008 1-3rd December, TNAU, Coimbatore.

Okuzumi, H, Tomotsugu Noguchi, Tatsuya Saguchi, Takuma Fujita, Eri Nonaka, Shinsuke Yamanaka, Koffi Kombate, Subbarayan Sivakumar, Kulandaivelu Ganesamurthy, Yasufumi Murakami "Application of the Restriction Landmark Genome Scanning (RLGS) method for analysis of genetic diversity between Asian and African Sorghum" Third National Plant Breeding Congress, *Electronic Journal of Plant Breeding*, 1(4): 1144-1147, July 2010.

Pushpam, R., S. Manonmani and K. Thiyagarajan. 2006. Performance of private and public bred rice hybrids in Tamil Nadu. *Proceedings of the 36th CSSP Scientific Conference. The Philippine Journal of Crop Science* May 8-12, 2006, 85.

Pushpam, R., S. Manonmani and K. Thiyagarajan. 2006. Developing tropical japonica parental lines for hybrid rice breeding. *Proceedings of the 36th CSSP Scientific Conference. The Philippine Journal of Crop Science*, May 8-12, 2006, 85.

- Rabindran R., S. Robin, Indranil Das Gupta, S. Bharathi, D. Ladhakshmi, V. Prakasam, K. Mohanasundram, R. Samiyappan and T.S.Raveendran. 2007. In International Conference on Emerging and Re-Emerging Viral Diseases of the Tropics and Sub-Tropics, held at New Delhi. Dec. 11th-14th, 2007. P. 21.
- Raveendran, T.S., J.Souframanien and S. Manonmani, 2008. Induction of Temperature Sensitive Male sterility in rice using Gamma Radiation. FAO/International Symposium on Induced Mutations in Plants, 12-15th August 2008, Vienna, Austria.
- Robin, S., T.S. Raveendran, N. Premalatha, M.Subashri, R.Manimaran, R.Pushpa, T. Senguttuvel, S. Rajeswari, R.Chandrababu, S.Shanmugasundaram, K. Mohana Sundaram and Thiyagarajan, K. 2006. Breeding for drought tolerance in rice: progress through integration of classical and molecular breeding techniques. In: 2nd International Rice Congress 2006 held at New Delhi from October 9-13, 2006. P: 67
- Robin, S., R. Chellammal, M. Mahendran, S. Rajeswari, K. Mohana Sundaram. Drought Resistant land race as a donar, improves performance of Rice under water stress environments. 3rd International Rice Congress Vietnam National Convention Centre, Hanoi, Vietnam from Nov 8-12, 2010.
- Sivakami Rajeswari, Robin, S., K. Mohana Sundaram, K. Thiyagarajan, 2010. Genetic analysis and selection of rice Grain quality characters for future breeding programmes. 3rd International Rice Congress Vietnam National Convention Centre, Hanoi, Vietnam from Nov 8-12, 2010.
- Sivakumar, S., C. Aruna, K. Ganesamoorthy, "Evaluation of Forage Sorghum genotypes for fodder yield and quality" In the abstracts of National seminar on Millets, P 114, November 12, 2010.
- Thiyagarajan K., Manonmani, S., K. Mohana Sundaram, S. Rajeswari, S. Robin, R. Rabindren, S.Suresh, Subbulakshmi, L, and T.S.Raveendran. 2008. CORH 3 - A short duration rice hybrid for Tamil Nadu. Abstracts of Second International Rice Congress, October 9-13, 2006, New Delhi, pp.201.
- Thiyagarajan K., Manonmani, S., K. Mohana Sundaram, S. Rajeswari, S. Robin, R. Rabindren, S.Suresh, Subbulakshmi, L, and T.S.Raveendran. 2008. CORH 3 - A short duration rice hybrid for Tamil Nadu. Abstracts of Second International Rice Congress, October 9-13, 2006, New Delhi, pp.201.
- Thiyagarajan K., S.Abirami, S.Robin, S. J.Jambhulkar and Manonmani, S, 2006. Development of TGMS Lines with Improved floral traits through mutation breeding in Rice. Trends in Research and Technologies in Agriculture and Food Sciences Abstracts, 18-20 December, 2006.

Financial Statement

Expenditure under CAFT during XI plan

Head	2007-08	2008-09	2009-10	2010-11	2011-12*
Operating cost of Training	3,27,244	3,31,471	1,68,095	3,24,142	3,75,000
Recurring Contingency	2,00,061	1,99,905	1,48,741	1,99,984	2,00,000
T.A. & D.A.	46,395	54,003	-	-	30,000
Library	49,995	49,785	30,000	29,992	30,000
Total	623695	635164	346836	554118	635000

* budget allotted