DRR

Directorate of Rice Research

Newsletter

VOL.9 NO. 2 RICE IS LIFE AUGUST—2010

ACTIVITIES AICRIP NEWS RESEARCH NOTES GLOBAL RICE NEWS

Director's message

I am pleased to present the third issue of eighth volume of DRR News letter. I compliment all the rice scientists for making 45th Annual Rice Group Meeting fruitful and successful. We have made significant progress during the last year by releasing 42 high yielding varieties (9 central and 33 state) for different agro-ecologies. This was possible with the contributions of scientists from different disciplines of DRR and AICRIP centers. Of these 9 central releases, 2 varieties *viz.,* DRR Dhan 38 and DRR Dhan 39 and one hybrid (DRRH-3) were developed by DRR. I feel that greater responsibility lies with the breeders to popularize the new varieities and hybrids in a big way to make the real impact. I look forward for more contributions in the from AICRIP centres in the form of research notes, novel technologies and news in future issues. We wish for a good monsoon and bumper harvest in ensuing season.

45th All India Rice Research Group Meeting

The 45th All India Rice Research Group Meeting (ARGM) was held at Anand Agricultural University, Anand, Gujarat during 4th - 6th April, 2010. Over 400 rice researchers from all over the country, representing ICAR institutes, SAUs, state departments of agriculture, private companies and scientists from International Rice Research Institute, Philippines actively participated in the meeting. Shri Dilip Sanghani, Hon'ble Minister of Agriculture, Government of Gujarat graced the function as Chief Guest. Dr. S. Ayyappan, Secretary, DARE & Director General, ICAR, Dr. S. K. Datta, Deputy Director General (Crop Sciences), ICAR, Dr. M. C. Varshneya, Vice-Chancellor, AAU, Anand, Dr. R. P. Dua, ADG (FFC) and Dr. B. C. Viraktamath, Project Director, DRR, Hyderabad addressed the delegates in the Inaugural session.

Dr.B.C.Viraktamath, Project Director, DRR welcomed the delegates and presented the research highlights and accomplishments for the year 2009. Project Director informed that 42 high yielding varieties (9 central and 33 state) were released and notified for different agro-ecologies during 2009-10. Of these 9 central releases, 2 varieties *viz.,* DRR Dhan 38 and DRR Dhan 39 and one hybrid (DRRH-3) were developed by DRR. He also informed that DRRH-3 is the first rice hybrid released in India possessing BPT type quality and has a potential to cover considerable area in the southern region where no hybrids are being grown in large scale.



The Chief Guest Shri Dilip Sanghani, Hon'ble Minister of Agriculture, Gujarat called for high technology research to meet the upcoming challenges of low availability of water, land use situations, increase in cost of inputs and labour shortage. Dr. S. Ayyappan, Secretary, DARE & DG, ICAR lauded the joint efforts of scientists from NARS and IRRI rice scientists towards development of improved rice production technologies including high yielding varieties and hybrids. He called for reinvigoration of research efforts in order to meet different kinds of domestic and overseas demands for rice. Dr. Ayyappan also felt that there is a need to create special groups to focus future areas of rice research such as C4 rice, bio-fortification, gene pyramiding etc. in the 12th plan. Dr. S. K. Datta, DDG (CS), ICAR appreciated the efforts of rice scientists for their contributions and pointed out the need for increase in rice production to fill the gap between potential and actual yield. Dr. Datta also emphasized on the importance of ICAR and IRRI collaboration and suggested for establishment of research foundations to provide suitable platform for strategic support to rice research. Dr. M. C. Varshneya, Vice-Chancellor, AAU in his Presidential address emphasized on need for further work in areas of water use efficiency with particular reference to SRI and aerobic rice, marker assisted research in BPH & WBPH management, methane emission, soil health cards, organic rice etc. Dr. R. P. Dua, ADG (FFC), ICAR felt the need for enhancing the level of heterosis and development of rice hybrids suitable for different ecologies and suggested for use of modern biotechnological tools more aggressively to





Courtesy call on Shri Naredra Modiji, Chief Minister of Maharashtra State by the organizers of 45th Annual Rice Group Meeting





Release of publications and felicitation of scientists

Ten publications were released on this occasion which includes 1. Hybrid Rice in India, 2. Weed Management in Rice, 3. Soil Related Problems and Management in Rice (from DRR), 4. Rice Varieties Atlas of Gujarat, 5. AAU at a Glance, 6. Business planning and development unit of entrepreneurs of Western India, 7. Rice Research at a glance, MRRS, Nawagam, 8. 5th Annual Report of AAU, 9. AAU Newsletter

(from AAU, Gujarat) and 10. Rice Research in rainfed and coastal areas of Gujarat (NAU, Gujarat). Rice workers of AICRIP who are due to retire during this year were felicitated on this occasion. The inaugural session was concluded with vote of thanks proposed by Dr. J. S. Prasad, Convener of the workshop and Head, Crop Protection, DRR, Hyderabad.

Special Sessions

Two special sessions *viz.,* 'IRRI Golden Jubilee Celebrations and 50 Years of Partnership with India' and 'Climate change in relation to production and productivity of rice' were held during the Workshop.

Commemorating IRRI golden Jubilee celebrations, Dr. J.K. Ladha, IRRI Representative for India highlighted some of the key areas of IRRI-India collaboration which include germplasm exchange (INGER), application of biotechnological tools for genetic enhancement of rice, integrated crop resource management and resource conserving technologies, establishment of major International consortia like CURE, RWC, STRASA and CSISA etc., human resource development and frontier research areas like developing drought and heat tolerance rice through application of genomic tools, development of C4 rice. IRRI has trained a total of 1249 rice scientists from India and ICAR has provided special funds to IRRI on research projects pertaining to (i) transgenics, (ii) genomics, (iii) biofortification and (iv) improving rice-wheat system. Dr. Ladha also made a special mention about the contribution of Swarna Sub 1 in mitigating the problem of early submergence in Eastern India. Following this, renowned scientists from IRRI and India delivered talks on emerging issues.

In another session on climate change, lectures were delivered by eminent scientists. They mentioned that impact of climate change could seriously hamper the production levels required to feed future generations. It was emphasized that integrated research strategy for drought tolerance, high temperature, submergence and salinity is the need of hour to deal with likely impact of climate change due to global warming. Development of genotypes having broad adaptation for abiotic stresses is one of the measures required to mitigate effects of climate change. Strategies for plant genetic resource management in the context of changing climate and IPR regime were also discussed.

Recommendations of 45th annual rice group meeting

The Variety Identification Committee (VIC) met under the Chairmanship of Dr. Swapan K. Datta, DDG (CS), ICAR on 4th April, 2010 and following 4 hybrids and 7 varieties were recommended for release for different states/ecologies.



Hybrids	Varieties
IET 19600 (CRHR 5), IET 20852 (CRHR 32), IET 20419 (Indam 200-017), IET 19766 (27P11)	IET 18558 (CRG-1190-1), IET 17612 (CR 898), IET 19969 (CR-780-1937-1-3), IET 19569 (R 1124-258-3-86-1), IET 19140 (CN 1383-5-11), IET 19795 (R 1243-1224-578-1), IET 20193 (RCM 21)

- Productivity of rainfed upland rice can be improved with the application of 60 N: 40-60 P_2O_5: 40 K_2O: 50 Zn SO_4: 500 kg/ha lime while for enhancing the grain yield of boro rice, transplanting of 25 days old nursery with single seedling/hill on 10th January with application of RDF was found optimum.

- Sowing of rice:dhaincha (1:1), spraying of pendimethalin (0.75 kg a.i./ha) as PE + one hand weeding at 60 DAS with 100 to 125% recommended dose of N application was promising for aerobic rice (Direct seeded under unpuddled conditions). Under direct seeded puddled condition, Metamifop 10 EC applied @ 100 g a.i./ha at 2-3 leaf stages of grasses, is found highly effective, while under transplanted conditions, application of Bispyribac sodium @ 35-50 g a.i./ha at 3-6 leaf stage of weeds was found effective.

- The best management practice for enhancing the productivity of aromatic rice is to plant between 1st July – 20th August, (location-specific) and application of 50% N through inorganic + 50% N through organic.

- Maximum yields were recorded with INM at Mandya and with 100% NPKZnS+ FYM at other locations in increasing the productivity @ 24-292kg/ha/yr was noticed with corresponding improvement in nutrient uptake and changes in soil fertility parameters.

- Validation for targeted yields indicated superiority of site-specific nutrient management over current fertilizer practices improving productivity by 33 – 57 per cent in irrigated system (Mandya) and by 15 -37 per cent in rainfed lowlands (Assam) with corresponding increase in nutrient use efficiency.

- Water productivity was higher in transplanted rice under saturated conditions utilizing about 2050 litres/kg grain and saving 20 – 30 per cent irrigation water. Straw incorporation (5 t/ha) along with GM (5 t/ha) or microbial culture produced highest increase in yields over straw removal in both seasons.

- Several traditional cultures like Njavara, Irrippu at Karaikal and Jawaphool at Titabar for high Fe content and Pokkali types at Karaikal and Kalajoha and Konjoha at Titabar were identified for Zn content.

- Adjusting sowing days early by 15 days resulted in meeting CNP and CDD requirements and improved yields across the locations ranging from 10.55^0 to 29.02^0 latitudes.

- Application of Boron @0.4ppm resulted in 4-8% yield improvement in IET 20979, IET 21007 and IET 21014 at 10 locations

- Based on the grain yield of genotypes across the locations, IET 21613, 21626, 21628, 21625 and 21605 were identified as suitable cultures for rainfed conditions. IET 21637 had better % germination at -10.0 bars of PEG induced water stress indicating drought tolerance.

- At Hyderabad center a significant increase (14% over control) in mean grain yield was observed under aerobic system. In general, hybrids had performed well under aerobic rice conditions. At PTB and MTU centres no significant differences were observed in grain yield between the two systems of cultivation. On the contrary at CBT location 17.6% grain yield reduction was recorded in aerobic condition as compared to the flooded control.

- Host plant resistance studies identified two promising donors *viz.,* INRC 8843 and 8867 for gall midge and five multiple resistant cultures *viz.*, RP 4681-16-2-569, RP 4680-1-2-23, RP 4684-35-1-732, RP 4684-35-1-733 and RP 4686-48-1-93.

- Biotype studies recorded changes in virulence in gall midge populations at Moncompu, Brahmavar and Pattambi. In view of this DRR may take up additional studies on this aspect.

- Chemical control studies identified Dinotefuran @30g a.i./ha as an effective insecticide against BPH.

- The screening efforts resulted in the identification of cultures resistant to multiple pathogens viz., IET 21151 (OR 2164-1; IR 68 / OR 1301-32) against Sheath rot, RTV and BLB; 21461 (NLR 20104; BPT 5204/ NLR 33359) for Leaf blast, Neck blast and Brown spot; 21473 (TTB 303-2-23; Kmj 1-17-2 / IET 10016) for Leaf blast, Neck blast and Sheath blight; VL 31320 against Leaf blast, Sheath blight, Brown spot and BLB and VL 30687 against Leaf blast, Neck blast and Sheath rot

- The fungicide metominostrobin 20 SC (200 g.a.i/ha) was effective against blast and hexaconazole 75 WG (48.75 g.a.i/ha) and metominostrobin 20 SC (200 g.a.i/ha) were effective against sheath blight.

AICRIP News

State Agriculture Research Station, Arundhatinagar, Tripura

The State Agriculture Research Station, Arundhatinagar was established in the year 1962 under the Department of Agriculture, Government of Tripura. The station is located at 22^0 52/ E latitude and 91^0 10 / N longitude having elevation of 12.6 m with sandy loam soil and pH range of 5.1 to 5.5. The main objective of the station is to disseminate the modern technologies among the farming community of Tripura by carrying out research on various aspect. The Research Units of this establishment namely Plant Breeding, Agronomy and Pest Management conducts basic research on different aspects of Crop Improvement, Crop Management and Crop Protection. The Government of Tripura looks forward to incorporate research programme on soil science under AICRIP during the coming years. This station was also associated with ICAR UNDP project for conduction of the Front line Demonstrations with Hybrids and HYV's.



Significant Achievements

Since inception, three high yielding rice varieties were released *viz*., AR-11 (1978-79) Swati (2003-04) Kali Khasa (2003-04). The tall indica rice – Harinarayan has also been improved. This culture was nominated in the AICRIP trials in *Kharif* 2009. Considering its popularity and demand among the farmers of Tripura, this culture is being proposed for state release. There are about 60 breeding lines for upland *Jhum* rice and aromatic rice available with the centre for their future use in breeding program. At present, the state has about 20 varieties and 2 hybrids under the breeder seed production.

The research station has also done work on popularization of System of Rice Intensification (SRI) that was readily accepted by farmers of Tripura in a big way. Realizing the success of SRI in the State an International Symposium on SRI was organized in 2007. Apart from these, present thrust of research lies with the new technologies like ICM, Aerobic Rice, as well as improvisation of shifting agriculture (*Jhum*) in the hills of Tripura. Bio-efficacy of new pesticides as well as screening of rice germplasm against biotic stresses is also been carried out. The station is also involved in Production Oriented Survey from time to time in different parts of Tripura to reveal problems and present scenario of paddy cultivation.





Second International Symposium on SRI organized at Agartala during 2007 by State Agriculture Research station

Discovering novel regulatory elements and alleles of two blast resistance genes (*Pik*^{h} and *Pi ta*) through allele mining strategy

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Directorate of Rice Research, Rajendranagar, Hyderabad-30

Rice blast is a major disease, caused by the filamentous ascomycete *Magnaporthe oryzae* (anamorph *Pyricularia oryzae*), leading to the yield loss up to 97%. Pyramiding of two or more effective resistance genes/alleles into elite cultivars enhances the durability and spectrum of resistance. Therefore, identification of novel and superior resistance alleles will be of immense help to achieve this objective. Allele mining is one of the best strategies to isolate/dissect novel alleles. Till now, more than 80 resistance genes were reported for rice blast and 12 of them were cloned. Among them, *Pik*^{h} and *Pi ta* are the major resistance genes which offer resistance for many diverse blast races of India and being used in different rice breeding programs. The available information of these genes enables us to isolate the novel *cis* regulatory elements and superior alleles of these genes through allele mining study. 27 landraces collected from North Eastern India and 127 accessions of wild *Oryza* species brought from IRRI were used in this study. These plant materials were screened for blast disease resistance and molecular markers linked to *Pik*^{h} and *Pi ta* were used to confirm the presence of respective genes. Using available *Pik*^{h} and *Pi ta* sequence information primers were designed and used for amplification of promoter as well as allelic region of the genes separately. The targeted regions were amplified and sequenced from the selected rice accessions (4 clones per amplicon) (Table 1 and 2). Raw sequences were aligned with reported gene sequences to identify sequence level polymorphism. Allelic sequences were analyzed with FGENESH to predict the gene structure and amino acid sequence, which were compared with reported domains and also using the conserved domain database of the NCBI.

In case of *Pik*^{h} alleles, the sequence polymorphisms altered the gene structure in a way that susceptible alleles (LS1 and LS2) did not have any open reading frame (ORF) for the functional protein; all the other alleles have shown the presence of ORFs. The resistant (LR1, LR2) and susceptible alleles (LS1, LS2) of the landraces showed

considerable differences at nucleotide level, indicating common polymorphism of 45 SNPs and four InDels in the coding region and

10 SNPs in the promoter region, whereas alleles derived from wild species did not show any common variation among resistant and susceptible alleles. It was also observed that the nucleotide changes in the promoter region which altered the disease related TFBS such as, presence of ERELEE4 (ethylene responsive element) and SEBFCONSSTPR10A (silencing element binding factor) motif in promoter of resistant genotypes and absent in susceptible genotypes in case of *Pik*^{h} gene. Resistant allele derived from wild species WR-1 (*O. rufipogon* accession no. 106507) showed higher level of resistance than all other alleles including Tetep when tested against 25 isolates, which has substitutions in both NBS and LRR domains compared with the *Pik*^{h} allele derived from Tetep (Table 1).

The sequence comparison of *Pi ta* alleles with the reported Tadukan *Pi ta* allele revealed the presence of more variations in the non coding region than in the coding region. At the nucleotide level, the resistant (LR1, LR2) and susceptible alleles (LS1, LS2) of landraces differ considerably among themselves with the presence of two SNPs and five SNPs, respectively. Both susceptible alleles (LS1and LS2) also showed a similar variation to that of the Tadukan allele (resistance) by presence of four common SNPs at the nucleotide level, one amino acid (aa) substitution (serine instead of phenylalanine) at 641 residue at the protein level. However, there was no significant change in the amino acid length (902 aa) of the deduced protein of the various *Pi ta* alleles, except for LR1 (Table 2).

The efficacy of the identified resistance alleles of both genes (in LR1, LR2, WR1, WR2, and WR3) can be further tested using all the isolates collected from India. This can become a resource for use in conjunction with known alleles to develop durable resistance in upcoming blast resistance breeding programs.

Table 1. List of genotypes selected for the *Pik*^{h} allele mining with phenotype for blast resistance and allele sequence details. (R – Resistance; S – Susceptible)

	Name	Phe-notype with code	*Pik*^{h} ACC No:	Variations in Allele		Allele length of *Pik*^{h} (bp)	Variations in ORF		Pro-tein length (AA)	Variations in protein level	
				No. of SNPs	No. of InDels		No. of SNPs	No. of InDels		Sub-stituti ons	InDels
1	Tetep	R	AY914077	-	-	991	-	-	330	-	-
2	Ammana Bavo	LR1	GU258506	13	1^	1206	2	1 ^	401	3	2 ^
3	Boha Thulasi Joha	LR2	GU258507	7	1^	1206	-	1 ^	401	-	2 ^
4	Podumoni Ahu	LS1	GU258508	7	-	0	-	-	0	-	-
5	Bizor II	LS2	GU258499	19	1^	0	-	-	0	-	-
6	*O. rufipogon* (Acc no:106507)	WR1	GU258500	45	2 ^	1023	37	2 ^/1▼	340	20	2 ^/1▼
7	*O. barthii* (Acc No:100931)	WR2	GU258501	48	1^	1029	29	1^/1▼	343	15	1 ^/ 1▼
8	*O.latifolia* (Acc no:101207)	WR3	GU258505	54	6 ^	537	42	2 ▼	178	19	3 ▼
9	*O. rufipogon* (Acc no: 106279)	WS1	GU258502	19	1 ^/ 1▼	1206	3	2 ^	401	2	2 ^
10	*O. rufipogon* (Acc no: 106512)	WS2	GU258503	56	1^	1068	34	1^	356	16	1 ^
11	*O. rufipogon* (Acc no: 81978)	WS3	GU258504	47	2 ^	1146	35	2 ^	381	18	2 ^

^ - Insertion; ▼ - Deletion

Table 2. List of genotypes selected for the *Pi ta* allele mining with phenotype for blast resistance and allele sequence details (R – Resistance; S – Susceptible).

S.No	Name	Phenotype with code	*Pi ta* ACC No:	SNPs/ InDels In Entire allele	SNPs /InDels in ORF	Protein Length (AA) of Pita	Substitutions /deletion in protein level
1	Tadukan	R	AF207842	-	-	-	-
2	Ammana Bavo	LR1	GU269201	9 SNPs /1▼	3 SNPs /1 ▼	888	3 substitutions / 1 ▼
3	Boha Thulasi Joha	LR2	GU269202	21	5	902	4
4	Podumoni Ahu	LS1	GU269203	7	3	902	2
5	Bizor II	LS2	GU269204	19	4	902	2

▼ - Deletion

Institutional Activities

Research Advisory Committee (RAC) meeting

The second meeting of the reconstituted Research Advisory Committee of the Directorate of Rice Research was held on 14th May, 2010 under the chairmanship of Dr. P. Raghava Reddy, Vice-Chancellor, ANGRAU, Hyderabad. Members attended the meeting include Dr. R.P. Dua, ADG (FFC), ICAR, Dr. K. Krishnaiah, Ex-Project Director, DRR, Dr. J.L. Dwivedi, Sr.Plant Breeder, NDUAT, Faizabad, Mr. K.V. Krishna Rao, Progressive Farmer, Raichur, Dr. B. C. Viraktamath, Project Director, DRR,Dr. C.S. Reddy, Member Secretary, DRR, Drs. J.S. Bentur, K.V. Rao, S.P. Singh, N. Sarla, S.R.Voleti, T. Ram, A.S.Hari Prasad and P. Hema Shankari.

Dr. B.C. Viraktamath, Project Director, presented an overview of the achievements of DRR including AICRIP. For the first time as many as 9 varieties by CVRC and 33 Varieties by State Variety Release Committees have been released during 2009-10. Variety Identification Committee has identified 7 varieties and 4 hybrids during the 45th Annual Workshop. Following this presentation, Principal Scientists from different disciplines presented detailed account of achievements under AICRIP and lead research. Each of the presentation was followed by elaborate and detailed discussions. These discussions led to the following recommendations.

Mr. K.V. Krishna Rao, progressive farmer and member, RAC, also made a presentation on his experience in growing basmati rice in southern India. Later in the afternoon, the RAC team met and interacted with all the scientists of DRR. They complimented the staff for their achievements but called for more concerted efforts to spread the proven technologies to the farmers through several avenues.

Focal Points and recommendations:

- The promising germplasm identified against major pests and diseases need to be used in the breeding program across the country. DRR to compile this information, conserve the material and supply to the centres for utilization.
- The variety identification may be based, in addition to the yield performance *per se*, on scores for cooking quality, resistance/tolerance to biotic and abiotic stresses.
- Physiological basis such as uptake, translocation, utilization, etc. for higher nutrient use efficiency in the cultures identified in Nitrogen-Variety and other trials may be studied in detail.
- Based on trials on SRI and ICM, best practices may be culled out and recommended in Package of Practices.Some of the earlier recommendations in respect of seed rate and fertilizer application need to be revised in the light of recent studies.
- Efforts to develop high yielding boro varieties should be accelerated through sharing of the promising lines and evaluating them in different regions.
- There is a need to standardize and bring out technical bulletins on agro-techniques/ cultural practices for zero tillage, SRI, aerobic rice etc.
- In the light of climate change, ideal sowing and planting time has to be determined. There is also a need to identify genotypes with tolerance to heat, cold and low light intensity.

- To improve head rice recovery, various dryers like IR driers, freeze drying etc.need to be tested and procedure to be standardized.

- The pin point- problem/black tip problem appearing in northern states and even in Andhra Pradesh has to be investigated thoroughly.

- There is an urgent need to develop robust IPM modules for planthoppers including development of better resistant varieties. Rat menace also needs to be factored into the IPM module.

- DRR may make available the new sources of resistance against major pests and diseases where the gene and linked markers are known along with information and technical assistance needed to the AICRIP breeding centres for marker assisted improvement of local varieties.

- Strengthening the linkages with farmers for efficient seed production and rapid technology transfer

The meeting ended with vote of thanks by Dr.J.S.Bentur.

Institute Research Council (IRC) meetings

The Institute Research Council (IRC) meetings were held during 2nd to 5th June, 2010 under the Chairmanship of Project Director, Dr. B.C. Viraktamath. Experts were invited from different organizations to participate in the IRC meetings and offer their comments. Section- wise experts invited are Dr. Ish Kumar, Syngenta private limited and Prof. Sivaramakrishnan, Professor and Head, Department of Biotechnology, ANGRAU on 2nd June 20101 for Crop Improvement section; Dr.L.Jalapathi Rao, Registrar, ANGRAU on 3rd June 2010 for Crop Production section; Dr. K.V.Seshu Reddy, Research Head: Field Crops and support Programs, MAHYCO on 4th June 2010 for Crop Protection section and Dr. S. S. Vinayagam, Director of RTP, NIRD on 5th June 2010 for Transfer of Technology & Training section.

All the scientists presented the results of their research work done during 2009 - 10 and technical programme for the next year (2010 – 11). Project Director reviewed the progress made under institute's lead research projects and stressed on doing basic work and generation of material. He emphasized on the importance of development of good technologies, 1 or 2 publications in peer reviewed journals from each project. He also urged to register the genetic stocks on priority basis. Six new research projects were approved by IRC during this meeting







Agritech- 2010

DRR had participated in the Agritech -2010 organised by Centre for Agriculture and Rural Development (CARD), New Delhi, from15th to 18th June, 2010 at the premises of ANGRAU. The improved rice production technologies were exhibited and rice related literature also distributed to the farmers. DRR had displayed improved high yielding rice varieties, hybrids, exhibits, specimens, farm implements and other products. In this 4 days event approximately 5000 farmers, farm women, trainees from different organizations, students, agriculture professionals from public and private sectors along with VIPs and general public visited DRR stall and acquainted with the latest development in rice production technology.



Under DBT Funded Project on Improving the Livelihoods of SC/ST Farmers through Rice Technology Interventions, 30 beneficiary farmers were brought for an **exposure visit to Agritech Exhibition**. This helped them in developing insights on latest developments in agricultural technologies that would help them plan crop management effectively. The visit was co-ordinated by Drs. Shaik N.Meera, Mangal sain and Muthuraman.

Kharif Training to the Farmers



Under DBT Funded Project on Improving the Livelihoods of SC/ST Farmers through Rice Technology Interventions, two day *kharif* training was organized during 10-11th June 2010 at KVK, Madanapuram. The 44 beneficiary farmers of Kharif 2010 have participated in the training to get know how and do how related to rice based cropping system. This will support the ongoing technological interventions. Scientists from DRR, Hyderabad, RARS (ANGRAU), Palem and KVK Madanapuram have delivered lectures and facilitated the learning in a practical way. Drs. Shaik. NMeera (PI) and Mangal Sain, Rajender Reddy and Muthuraman were the coordinators.

Participation in Meetings & Seminars

- Dr. B.C. Viraktamath, Project Director attended 11th Research Council meeting of SKUAST (J) as a member at Chatha, Jammu on 8th April, 2010.
- Dr. L.V. Subba Rao, Principal Scientist (Breeding) attended National Stakeholders Workshop of FAO sponsored project on "Establishment of the Information sharing mechanism for monitoring the implementation of Global Plan of Action at NBPGR, New Delhi on17th April, 2010.
- Dr. B.C. Viraktamath, Project Director and Dr. A.S. Hari Prasad, Senior Scientist (Hybrid Rice) participated in a National Seminar on "Quality Seed for Food Security" at IARI, New Delhi on 13th - 14th April, 2010.
- Dr. B.C. Viraktamath, Project Director attended 88th Review Committee on Genetic Manipulation (RCGM) meeting at DBT, New Delhi on 20th April, 2010.
- Dr.M.Mohan, Senior Scientist & member, ITMU participated in one day training on "Questel's Search engines for Patent Retrieval" on 27th April, 2010.
- Dr.R.M.Kumar, Principal Scientist (Agronomy) participated and delivered a lecture in a workshop on "Public Private Partnership for Rice Technologies held at NASC, New Delhi on 24th April, 2010.
- Dr.R.M.Kuamr, Principal Scientist (Agronomy) participated in SRI Workshop at MANAGE, Hyderabad on 4th May, 2010.
- Dr.L.V.Subba Rao, Principal Scientist (Breeding) participated in XXV Annual Group Meeting of National Seed Project (Crops) at CRIJAF, Barrackpore on 4 – 6th May, 2010.
- Dr. Chitra Shankar, Senior Scientist (Entomology) participated in a Training Programme on 'Creative Writing on Agriculture' at India Institute of Mass Communication, Dheukanal, Orissa on 10-15th May, 2010.
- Dr.B.C.Viraktamath, Project Director attended a meeting of all Directors with Member of Planning Commission at NAARM, Hyderabad on 13th May, 2010.
- Dr.B.C.Viraktamath, Project Director participated in Interface meeting for all Directors of Crop Science Division at DWSR, Jabalpur on 17-18th May, 2010.
- DRR Research Advisory Committee meeting held under chairmanship of Dr.P. Raghava Reddy, VC, ANGRAU at DRR on 14-15th May, 2010.
- Dr. S. N. Meera, Senior Scientist (TTT) attended National meet on Technological Innovations in Agriculture at NASC Complex, New Delhi. during 21-22nd May, 2010.
- Dr. R.M. Kumar, PS (Agronomy) attended a meeting on NFSM/SRI at AP Secretariat Hyderabad on 2nd June, 2010.
- Dr. J. S. Bentur, PS, attended the first Meeting of the Task Force on Special Tests for DUS characterization held at PPV &FR office in New Delhi on 16th June, 2010.

- Dr. Shaik N Meera visited IIT Kanpur for discussions related to the architectural issues of RKMP on 21st -24th June, 2010

Training

Mr. K. Ramulu, Technical Asst (Physiology) undergone training on use of physiological equipment at Division of Plant Physiology, IARI, New Delhi on 8th - 14th April, 2010.

Personalia

Appointments/Retirements/Promotions/Transfers

- Dr. C. S. Reddy superannuated on 30th June 2010 after serving DRR for 33 years.
- Mr. Balkamesh joined as Asst. Finance & Accounts Officer (officiating) on 24th April, 2010.
- Dr. S. Arun Kumar joined as Scientist (Agril. Extension) on 24th April, 2010.
- Mr. A. Premkumar joined as JAO (officiating) on 1st May, 2010.
- Mr. P. Prakash Babu joined as Administrative Officer on 10th May, 2010.
- Ms. P. Hemashankari, Scientist (SS) was relieved in the afternoon of 16th June 2010 on transfer to CMFRI Research Station, Chennai.

Distinguished Visitors

- Dr.M.V.Rao, MLC visited DRR on 12th May, 2010 and had meeting with scientists of crop improvement section.
- Dr. S.S. Virmani, Ex-Head, PBGB, IRRI, Philippines visited and interacted with scientists of Crop Improvement Section. on 24th March, 2010

Awards and Recognition

- Dr. J. S. Bentur, PS, Entomology, has been chosen as member of Task Force for Special Tests by PPV &FR Authority, MA, and GOI.

New projects

- Dr. J.S. Bentur, PS and PI of the National Fund sponsored project on “Molecular basis of insect-plant interaction in rice” presented the progress of the work at the review meeting held at NAIP Office, New Delhi on 28th June 2010 and appealed for extension of the project by two more years.

Forthcoming Events

Model training course on SRI sponsored by DOE: 4 – 11 August 2010
Hands on training for entomology co-operators: 2nd week of September

Lower methane emissions in rice plants with higher harvest index

Flooded rice fields are a significant source of atmospheric methane.. Ronald L. Sassand Ralph J. Cicerone from Department of Ecology and Evolutionary Biology, Rice University demonstrated that an inverse relationship exists between a rice plant's capacity to store photosynthetically fixed carbon as grain and seasonally emitted methane. Under a common set of climatic and agricultural conditions, lower methane emissions are observed from plots that contain rice plants with higher numbers of filled grain spikelets, indicating that plants that more closely approach their potential yield limit emit less methane to the atmosphere. These data support the hypothesis that higher methane emissions observed in the tropical wet season as opposed to the dry season are associated with lower harvest index values resulting in excess carbon that could not be allocated to rice grain. This excess carbon is then available to soil bacteria for the production and emission of additional methane. The photosynthetic activity of rice plants also correlates with methane production and emission.

If one hypothesizes that the allocation of photosynthates to various parts of the rice plant system increases with photosynthetic activity, the amount of biomass productivity and produced methane should both be proportional to the amount of solar radiation the plant receives. A 1% reduction in the solar radiation received during the critical growth period (heading ± 21 days) resulted in a 1.11% (r^2 = 0.99) reduction in grain yield and a 1.70% (r^2 = 0.75) reduction in methane emission. Although the effect of reduced radiation on methane emission is somewhat larger than that on grain yield, these results strongly suggest that rice grain filling and methanogenesis are similarly related to photosynthesis and that plant activity is tightly coupled to both methane production and emission.