DRR

Directorate of Rice Research

Newsletter

Vol. 8 No: 2 RICE IS LIFE April - 2010

Activities AICRIP News Research Notes Global Rice News

New Year celebrations at DRR

Joie de vivre…



DRR Recreation Club organized a get-together on 1st January 2010 in which all the DRR staff participated with great zeal and zest. In his new year remarks, Project Director, Dr. B.C. Viraktamath recalled the progress made during last year *viz.,* varieties released, publications, awards received and externally funded projects obtained and congratulated all the staff members for their achievements. He also appreciated staff members who played a key role in various institutional activities. He released 2010 calendar of Society for Advancement of Rice Research. Recreation club also organized petty games for the staff followed by prize distribution ceremony.



Strengthening biotechnology

More space to increase pace…

Dr. Swapan Kumar Datta, Deputy Director General (Crop Sciences), ICAR laid the foundation stone for Biotechnology building Annexe on 25th February 2010. With the sanctioning of many biotechnology projects and increase in scientific/ project staff and students, a need has arisen for more work space. The Annexe building consisting of two floors with three laboratories and four scientists' rooms will be built with an estimated cost of Rs. 1.50 crores.



Rice varieties and hybrids released by DRR during 1968 – 2009

Besides playing a key role in coordinating the multi- disciplinary and multi- locational testing of varietal and crop management technologies, DRR has released several varieties and three hybrids during the last 45 years. These varieties were designated with popular names like Jaya, Sona etc till 2009. As advised by the Central Sub-committee on Crop Standards and Notification of Varieties (CSCCS & NV) to name the varieties denoting the institute which develops them, all the DRR varieties have been renamed starting from Jaya as DRR Dhan 1. The complete list of DRR renamed varieties is furnished for information to all the concerned.

Rice Varieties and Hybrids Developed by DRR

DRR Dhan	Variety	IET No.	Cross	Year of release	Days to 50% flowering	Released by	Released for the states of	Eco-system	Grain type
1	Jaya	723	TN1 / T141	1968	100	CSC on CSN & RV	GOA, DAMAN & DIU, GU, J&K, ME, HA, DEL, RJ,	IRM	LB
2	Cauvery	355	TKM 6 / TN1	1970	84	CSC on CSN & RV	AP, BI, WB,	RUP	SB
3	Sona	1991	GEB 24 / T (N)1	1972	96	CSC on CSN & RV	PU, HA	IRME	LS
4	Akashi	2914	IR 8 / N 22	1975	80	CSC on CSN & RV	MP, UP, BI,OR,WB, KA	RUP	SB
5	Rasi	1444	TN1 / Co.29	1977	84	CSC on CSN & RV	AP, MP, MH,	IRE	MS
6	Phalguna	2911	IR 8 / Siam 29	1977	115	SVRC	A.P.	RSL	LS
7	Sasyasree	2815	TKM 6 / IR 8	1979	95	CSC on CSN & RV	AP, KA, HA, UP	IRME	LS
8	Swarnadhan	5656	RPW 6-13 / Sona	1979	125	CSC on CSN & RV	AP, TN, KA, WB, AS, BI, OR	RSL	SB
9	Vikas	3116	TKM 6 / IR 8	1983	84	CSC on CSN & RV	AP, BI, MP, WB, KE,	IRSA	MS
10	Manasarovar	6314	RP 31-49-2 / Leb Muey Nahng	1983	120	CSC ON CSNN & RV	AP, TN	RSL	SB
11	Seshu	2881	IR 24 / T 141	1985	84	SVRC	A.P.	IRE	LS
12	Srinivas	2508	IR 8 / Latisail	1985	90	SVRC	A.P.	IRE	LS
13	Sonasali	7575	Sona / Manoharsali	1986	105	SVRC	A.P.	IRM	LB
14	Vikramarya	7302	RPW 6-13 / PTB 2	1986	105	SVRC	A.P.	IRM	LB
15	Prasanna	7564	IRAT 8 / N 22	1986	75	SVRC	A.P.	RUP	LS
16	Pranava	7999	Vikaraj / Benong 3	1988	120	CSC on CSN VRV	AP, TN, BI	RSL	LB
17	Suraksha	7946	Sasyasree / MR 1523	1988	103	CSC on CSN & RV	TR, AS	IRM	LB
18	Tulasi	7614	Rasi / Fine Gora	1988	70	CSC on CSN & RV	JH, CH, UP,	RUP	LS
19	Salivahana	7590	RP 5-32 / Pankaj	1988	128	CSC on CSN & RV	WB, TN, OR	RSL	SB
20	Nagarjuna	6315	Sona / Manoharsali	1988	120	SVRC	A.P.	RSL	LS
21	Aditya	7613	M 63-83 / Cauvery	1989	70	CSC on CSN & RV	AP, UP, TN	RUP	LB
22	Vibhava	6080	CR 44-35 / W 12708	1989	105	SVRC	A.P.	IRM	MS
23	Ravi	7991	M 63-83 / / RP 79-5 / Rikotu Norin 21	1989	75	SVRC	A.P.	RUP	MS
24	Kasturi	8580	Basmati 370 / CRR 88-17-1-5	1989	100	CSC on CSN & RV	UP, PU, HA, RJ, HP	SCR	LS
25	Ajaya	8585	IET 4141 / CR 98-7216	1992	105	CSC on CSN & RV	MP, BI, UP	IRM	LB
26	Nidhi	9994	Sona / ARC 14529	1996	84	SVRC	A.P.	IRE	LS
27	Triguna	12875	Swarnadhan / RP 1579-38	1997	98	SVRC	A.P.	IRME	LS
28	Krishna Hamsa	9219	Rasi / Fine Gora	1997	90	SVRC	A.P.	IRME	LS
29	Shanti	12884	RP 2633-25-2-3	2001	90-95	SVRC	A.P.	IRME	LS
30	Vasumati	15391	PR 109 / Pak. Basmati	2001	113	CSC on CSN & RV	UP, J&K, RJ,	SCR	LS
31	Dhanarasi	15358	C-11-A-41	2002	115-120	CSC on CSN & RV	AP, KA, TN	RSL	SB

DRR Dhan	Variety	IET No.	Cross	Year of release	Days to 50% flowering	Released by	Released for the states of	Eco-system	Grain type
32	Sugandhamati	16775	Pusa Basmati 1 / IET 12603	2004	114	CSC on CSN & RV	PU, J&K, HA	SCR	LS
33	Jarava	15420	B 32 Sel 4/ O.rufipogon 4/B 29-6	2005	113	CSC on CSN & RV	WB, AN, PUDUCHHERY	IRSA	SB
34	Improved Samba Mahsuri	19046	BPT 5204*4/ SS 11132007		105	CSC on CSN & RV	AP, CH, JH, OR, GU, MH, BI,	RSL	MS
35	Akshydhan	19367	BR 827-35 / SC5 109-2-2	2008	105	CSC on CSN & RV	AP, KA, TN, JH	IRM	LB
36	Varadhan	18940	9314 / BR 827-36	2008	95	CSC on CSN & RV	JH, UP, UT, HA	IRME	SB
37	Sampada	19424	Vijaya / C 14-8	2008	105	CSC on CSN & RV	BI, CH, MH, TN, KE	IRM	MS
38	DRR Dhan 38	20010	BPT 5204 / KMR-3	2009	106	CSC on CSN & RV	GU, AP	IRM	MS
39	DRR Dhan 39	19487	CSR 3 / Kasturi	2009	103	CSC on CSN & RV	OR, KE, GU	IRSA	LS
					HYBRIDS				
1	DRRH 1	-	IR 58025 A/ IR 40750 R	1997	100	SVRC	A.P.	IRME	LS
2	DRRH 2	18076	IR 68897 A/ DRR 714-2-1	2005	86	CSC on CSN & RV	HA, UT, WB, TN	IRE	LS
3	DRRH 3	19543	APMS 6A/ RPHR1005	2009	100	CSC on CSN & RV	AP, OR, , GU, MP, UP	IRME	MS

In addition to these, several DRR developed lines have been released by other States and also by other Countries.

Rice in Gujarat

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A prelude to 45th Annual Workshop…

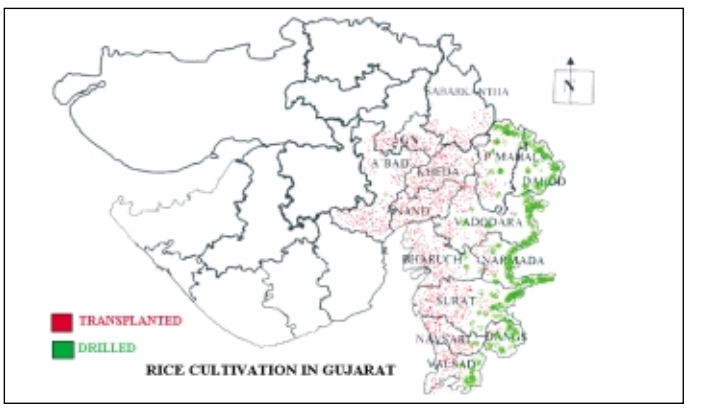
In Gujarat, rice occupies about 5 % of the gross cropped area of the state and accounts for around 14 % of the total food grain production. It is grown in an area of about 6.5 to 7.0 lakh hectares of land comprising nearly 45-50% of lowland (transplanted) and 50-55% of upland (drilled) rice (Map of the Gujarat State). The total production of rice in the state is about 9.0 to 10.5 lakh tones with a productivity of 1400 to 1600 kg ha^{-1}.

The data pertaining to the area, production and productivity of unirrigated (drilled), irrigated (transplanted) and total rice in the different agro-climatic zones of Gujarat State revealed that the average productivity in the state was only 1.4 to 1.6 t ha^{-1}. Further, it was observed that although the area under drilled rice and transplanted rice was almost equal, the productivity of drilled rice was only 0.9 to 1.0 t ha^{-1} whereas, the productivity of transplanted rice was around 1.8 to 2.0 t ha^{-1}. The poor productivity of drilled rice brings down the productivity of total rice in the state.

As a result of selection of elite local material during the earlier phase of rice research (1945-1972), a total of 10 traditional varieties *viz;* Sathi-34-36, Sukhwel-20, Kamod-118, Pankhali-203, Jirasal-280, Kada-176-12, Zinia-31, Nawagam-19, Krishna Kamod and Bhura Rata were released for cultivation. Using these local and traditional varieties either as male or female parent the present day improved rice varieties were evolved through hybridization and selection.

Rice Varieties Developed in Gujarat

The varieties *viz.* CR-138-928, GAUR-1, GAUR-2, GAUR-10, GAUR-100, released for cultivation during 1970-75 were popular initially but with the release of GR-3 and GR-11 these varieties are almost out of cultivation. The promising rice varieties released in Gujarat are listed in the following table:



Salient features of promising rice varieties released in Gujarat

Sl.No.	Variety	Year of Release	Parentage	Duration (D)	Yield t ha^{-1}	Grain Type
1.	GR-3	1977	N-19 X IR-9-60	105-110	5.250	M S
2.	GR-11	1977	Z-31 X IR-8-246	125-130	5.500	SS
3.	GR-4	1981	Z-31 X IR-8-246	110-115	4.750	SS
4.	SLR-51214	1983	Vijaya X PTB-21	125-130	4.470	M S
5.	GR-101	1984	IR-8 X P-203	130-140	4.080	M S
6.	GR-102	1987	IR-8 X P-203	130-140	4.000	M S
7.	GR-5	1990	Selection	95-100	2.000	LB
8.	GR-6	1991	GR-3 X Pusa-33	120-125	5.000	LS
9.	GR-103	1991	GR-11 X Masuri	130-135	5.250	SS
10.	Narmada	1991	TN-1 X Bas.370	140-145	4.250	LS
11.	Gurjari	1998	Asha X Kranti	115-120	5.500	LB
12.	GR-7	2000	GR-3 X Bas. 370	115-120	4.526	M S
13.	Dandi	2001	PNL-2 X IET-8320	130-135	4.750	M S
14.	GR-8	2001	Selection(Vyara-55)	75-80	1.750	SB
15.	GR-9	2002	Sathi-34-36 X CR-544	90-100	2.400	M S
16.	GR-104	2002	GR-101 X Bas.370	135-140	4.500	LS
17.	GR-12	2004	GR-4 x IR-64	120-125	5.500	M S
18.	Ashoka 200F (BVD 109)	2006	Kalinga-III x IR 64	85-90	1.800	LS
19.	AAUDR 1	2006	Sathi34-36xDadri Kolam	85-95	2.500	M S
20.	NAUR 1*	2008	GR-4 x IET 1705	120-125	5.900	LS
21.	GAR 13*	2009	GR-11 x IET-14726	125-135	6.000	M S

* Yet to be notified

AICRIP NEWS

Crop Research Station, Ghaghraghat

The Crop Research Station, Ghaghraghat formerly known as Agriculture Flood Research Station was established in 1958 and was shifted to Narendra Dev University of Agriculture and Technology (NDUAT) in 1976-77. The centre is located at left bank of Ghaghara River in Bahraich district (UP), India. Geographically, it lies between 81.2°E longitude and 27.5°N latitude and at an elevation of 112m above sea level. The centre has farm area of about 40 hectare. The soil is predominantly sandy loam with pH 7.5 to 8.5. This station is specifically known for innate condition of three rice environments *viz.,* deep water, where water depth is more than 1 meter and with flash flood it may go up to 3 meter, semi deepwater where water depth goes up to 1 meter and intermittent flood where crop is submerged for a period of 5 to 15 days due to heavy rainfall and consequent rise in the river water level.

Significant Achievements

The varieties, Jalmagna and Jalnidhi for deepwater, Chakia-59 and Jalpriya for semi deep water, Madhukar and Barh-Avarodhi for flood prone ecosystem have been developed from this research station. Rice-lentil and rice-linseed cropping sequence was found to be the most promising under rainfed low land situation. Short duration maize 'tipakhia' was introduced along with very deep water rice. Pre-emergence application of amilofos @ 0.4 kg ai/ha supplemented with one hand weeding at 40 days after sowing was found to be most effective to control weeds in direct seeded rice under rainfed low land situation. Integrated use of 50% recommended dose of fertilizer through press mud +50% of recommended fertilizer dose of NPK through inorganic fertilizer produced





the higher yield of rice and improved the soil fertility. Yield losses up to 30% have been reported due to stem borer under deep water situation. Stem borer damage increased with rising water level and duration of the crop. Among the diseases, blast is the major disease causing up to 25% yield loss.

Scientists involved in AICRIP project

Dr. Nitendra Prakash (Rice breeder), Dr. Shiv Shankar Prasad (Entomologist) and Sri Sant bux Singh (Agronomist) are involved in rice research.

Rice Research Station, Kanpur

Rice research work was initiated at Kanpur, Uttar Pradesh during 1924. Later on, in 1932, the head quarter was shifted from Kanpur to Nagina which released a number of varieties through pure line selection. Most popular among them are N22, N 100, T 3, T 9 and T100.During 1958, a new rice research station was established at Masodha, Faizabad. In 1971-72, a unit of rice research was started at Kanpur to tackle problems of saline and alkaline ecosystem and also post harvest technology especially rice milling under Chandra Shekhar Azad University of Agriculture and Technology. Subsequently, this centre also started working as voluntary centre of AICRIP. Kanpur became a funded AICRIP centre wef 2004.

Significant Achievements

C S Azad University of Agriculture and Technology, Kanpur developed Usar -1(a cross of Jaya/ Getu) variety in 1985 with the yield potential of 45 - 50 q /ha that matured in 140- 145 days. It was suitable for saline-alkaline conditions. Ashwini was released in 1987 from this centre for rainfed and early transplanting conditions of central plain and Bundelkhand regions of U.P, with an yield potential of 40-45 q /ha that matured in 96 -105 days. A technology was developed for enhancing productivity of sodic soil with the use of salt tolerant variety along with gypsum amendment @100% (21 tons/ha) coupled with green manure @ 10 ton/ha and ZnSO4 application @ 60 kg /ha with 50% GR (10.5tons/ha).

Scientists involved in AICRIP project

Dr. Vijay Kumar Yadav (Rice breeder), Mr. Devendra Singh (Soil scientist) and Mr. Hari Ram (Agronomist) are involved in rice research.





Department of Rice, Tamil Nadu Agricultural University, Coimbatore - Completing 100 years of rice research

The Department of Rice previously known as "Paddy Breeding Station" is a constituent of the Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore. This station conducts multidisciplinary research for rice improvement. In 1912 during the British colonial period, a Government Economic Botanist (GEB) was posted at Coimbatore to initiate research on this most vital crop of the country. Thus Paddy Breeding Station came into existence at this place as the oldest rice research station in the modern India. Geographically this research station is located at an elevation of 426.72 m, between 11° N latitude and 77° E longitude. The station has a cultivable land area of 12.96 ha uniformly laced with clayey soil with a pH of 7.8. The average rainfall is 670 mm per year. This centre is internationally renowned with its record in rice history, headed by British Scientists like F.R. Parnell, R.O. Iliffe and also by the famous Indian Paddy Specialist, Padmashri. Dr. K. Ramaiah. During the initial period, strenuous efforts were made to collect and conserve the biodiversity of the crop through establishment of local genebank. Primarily, Coimbatore was the National centre for rice germplasm collection in India which possessed 2000 accessions during 1911- 1914. These accessions differed widely in duration, grain quality, rice texture, flavour, fineness etc., and morphological characters such as stem colour, seed coat etc.

Significant Achievements

The first variety of this station, GEB 24 (Kichili samba) released during 1921, played unique and significant role in the subsequent development of rice not only in this country but also at the global level. This variety became very popular with large coverage and attained worldwide distinction and since then has been used in several National and International breeding programmes as progenitor for their varieties. Several other varieties from this station transformed the rice cultivation in the state. Noteworthy among them are blast resistant CO4 and CO25, inter-specific cross derivative CO31, semi-dwarf varieties CO37 and CO38, high yielding long duration variety CO40, salt tolerant CO43 and CO47, etc.



The recently released, CO(R) 48 and CO(R) 49 are fine grain rice varieties that would cater to the current market demands. The Central Variety Release Committee approved CO(R) 50 is the "super rice" variety with new plant type characters and high yield. The contribution of this department includes 23 purelines, 27 hybrid derivatives, one spontaneous mutant (GEB 24), one introduction (Bhavani) and three hybrids which have remarkably improved the rice cultivating horizon of the state.

Scientists involved in AICRIP project

Dr. K. Mohana Sundaram, Professor and Head, Dr. S. Robin, Dr. S. Manonmani, Dr. S. Rajeswari, Dr. R. Pushpam (Rice Breeders) Dr. R. Rabindran (Pathologist), Dr. S.Suresh (Entomologist), Dr. S. Radhamani, (Agronomist) and Dr. V. Ravichandran, Asst. Professor (Physiologist) are involved in rice research. Dr. K. Thiagarajan, present Director of the Centre for Plant Breeding and Genetics has served this station for more than ten years.

Varieties / Hybrids released from Coimbatore Station

Variety / hybrid	Year of release	Duration in days	Average Yield t/ha	Special attributes
GEB24	1921	150	3.5	Fine grain, good quality rice
CO 1	1923	155	3.2	Medium fine, suitable for samba season
CO 2	1923	152	3.8	Adaptable to late planting
CO 3	1923	161	3.6	Drought tolerant, suitable for samba season
CO 4	1926	187	3.0	Resistant to blast
CO 5	1926	164	3.5	Suitable for late planting
CO 6	1926	176	3.7	Fine grain, good tillering variety
CO 7	1926	158	3.5	Translucent, white, fine grain
CO 8	1931	180	3.2	Fine grain
CO 9	1932	115	3.0	Red grain, suitable for Kar, Kuruvai season

Variety / hybrid	Year of release	Duration in days	Average Yield t/ha	Special attributes
CO 10	1932	120	3.0	Fine grain, suitable for Kar, Kuruvai season
CO 11	1933	185	3.0	Fine, white grain, suitable for samba season
CO 12	1933	185	3.0	Suitable for second season
CO 13	1940	110	3.0	Early, Suitable for all seasons
CO 14	1940	170	3.0	Non lodging
CO 15	1940	190	3.5	Blast Resistant
CO 16	1940	185	3.0	Blast Resistant, Non lodging
CO 17	1941	165	2.5	Suitable for semi dry condition
CO 18	1941	125	2.7	Suitable for Sornavari and Kar season
CO 19	1941	180	3.5	Fine grain
CO 20	1941	125	3.0	Medium, white grain
CO 21	1942	100	2.4	Bold, white grain , suitable for Kar, kuruvai season
CO 22	1942	120	2.4	suitable to winter season
CO 23	1944	135	3.5	Fertilizer responsive
CO 25	1949	175	3.5	Resistant to blast
CO 26	1949	200	3.0	Resistant to blast
CO 27	1952	160	3.0	Consumer preference
CO 28	1952	160	2.0	Fine grain, suitable for Samba season
CO 29	1960	110	3.0	Blast resistant, suitable for Navarai season
CO 30	1960	165	2.8	Blast resistant
CO 31	1963	145	2.4	Drought resistant
CO 32	1964	135	3.8	Quality rice
CO 33	1970	105	5.7	Short, round grain, non lodging
CO 34	1970	115	7.0	Heavy yielder, wider adaptability
CO 35	1970	110	.5.2	Early, high yielding
CO 36	1973	130	7.5	Photo-thermosensitive
Bhavani	1973	130	6.1	Direct introduction, long slender quality rice
CO 37	1974	115	6.5	Resistant to sheath blight, wider adaptability
CO 38	1975	150	6.0	Blast resistant
CO 39	1975	90-95	4.0	Short duration
CO 40	1977	165-175	7.2	Heavy yielder, tolerant to blast
CO 41	1979	100-105	4.5	Fine rice, low nitrogen responsive
CO 42	1979	135-140	6.0	Tolerant to BPH
CO 43	1982	135	5.2	Fine grain, tolerant to alkalinity and salinity
CO 44	1983	135	4.9	Suited for late sown conditions
CO 45	1990	135	5.8	Resistant to blast, BLB and RTV
CORH 1	1994	115	6.0	First hybrid rice in India, medium slender rice moderately resistant to BPH , GLH and RTV
CO 46	1997	125-130	6.0	BPH resistant

Variety / hybrid	Year of release	Duration in days	Average Yield t/ha	Special attributes
CORH2	1998	135	6.1	Medium slender white rice non lodging tolerant to alkalinity & salinity
CO 47	1999	110-115	5.8	Medium slender white rice resistance to blast.
CORH 3	2006	115	7.2	First non-aromatic good grain quality rice hybrid. Moderately resistant to hoppers and RTD and resistant to blast.
CO (R) 48	2007	135	6.1	Moderately resistant to blast. Suitable for thaladi season
CO (R) 49	2008	135	6.2	Fine quality, medium slender white rice. Suitable for thaladi season.
CO (R) 50	2009	135-140	6.4	First 'super rice' variety possessing new plant type attributes and suitable for thaladi season.

RESEARCH NOTES

Molecular detection of *Rice tungro bacilliform and spherical virus* from infected plants and viruliferous insects

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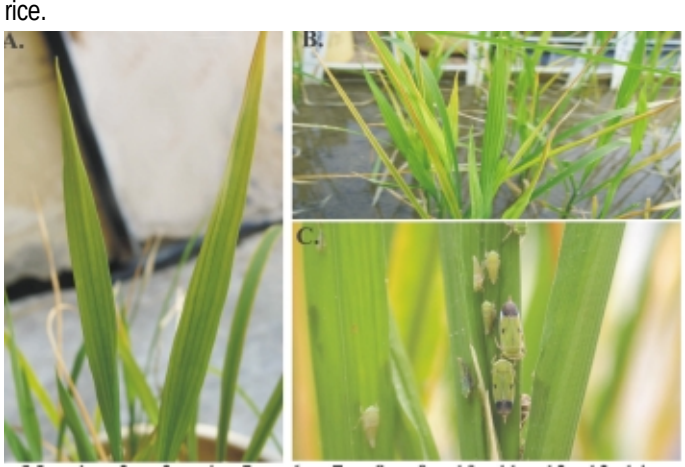
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Rice tungro virus (RTV) disease occurs sporadically but causes significant losses in grain yield. During the last four decades, tungro was increasingly noticed in several rice growing states in India. The disease is caused by a complex of two viruses; *Rice tungro bacilliform virus* (RTBV), a DNA virus, and *Rice tungro spherical virus* (RTSV), an RNA virus. The circular double-stranded DNA genome of RTBV is ~8 Kb in length which codes for four open reading frames (ORFs) on a single strand whereas RTSV has a polyadenylated single-stranded RNA genome of about 10 kb. The viral complex is transmitted between plants by the vector, green leafhoppers (GLH), *Nephotettix virescens* and *N. nigropictus.*

Symptom development of rice tungro disease is not temporally coupled with the virus titer; the symptoms appear much later as compared to the peak of the viral accumulation. In addition, the tungro virus disease symptoms are often confused with other conditions *viz.* physiological or nutritional disorders and direct damage by pests. Therefore, early detection of the disease is essential for the effective management. Further, the detection of rice tungro virus in viruliferous population of GLH is crucial to reduce economic losses. Biological indexing and serological enzyme linked immunosorbent assay (ELISA) methods are widely used for diagnosis. Nevertheless, molecular techniques have revolutionized plant virus detection and identification. Early molecular hybridization technologies were rapidly supplanted by more powerful nucleic acid amplification methods based on the polymerase chain reaction (PCR).

In the present study, tungro infected samples were collected from Cuttack, Puducherry, Coimbatore, Kanyakumari, Patancheru and Rajendranagar, Hyderabad and maintained in DRR glasshouse. The symptoms caused by this virus in rice varied exhibiting yellowing of the leaf tips, yellow to orange discolouration of leaves, interveinal chlorosis, stunting and reduced tillering (Fig. 1A& B). Green leaf hopper samples were collected from the infected rice plants (Fig.1C). PCR primers were designed from the flanking regions of ORF-IV of RTBV. Total DNA of suspected samples (plants and insects) was successfully used for detection of RTBV in rice. PCR analysis of suspected DNA samples showed an amplicon of 1.7 Kb corresponding to the ORF-IV region of RTBV genome (Fig.1D). All the virus isolates collected from different locations produced the expected PCR band size while no corresponding band was observed in healthy and blank samples. Similarly, RT-PCR and dot blot hybridization techniques were developed to detect the RTSV from tungro infected samples. In addition to that, one more primer pair has been developed to detect the RTSV from infected leaf samples and insects using RT-PCR. The primers were designed based on the CP3 gene of RTSV to amplify the ~850 bps region of viral genome (Fig.1E**)**. Further, PCR and RT-PCR products were cloned in pDrive cling vector and sequenced. The results showed perfect homology with the corresponding RTBV and RTSV genes, confirming the PCR based diagnosis of tungro disease of rice.



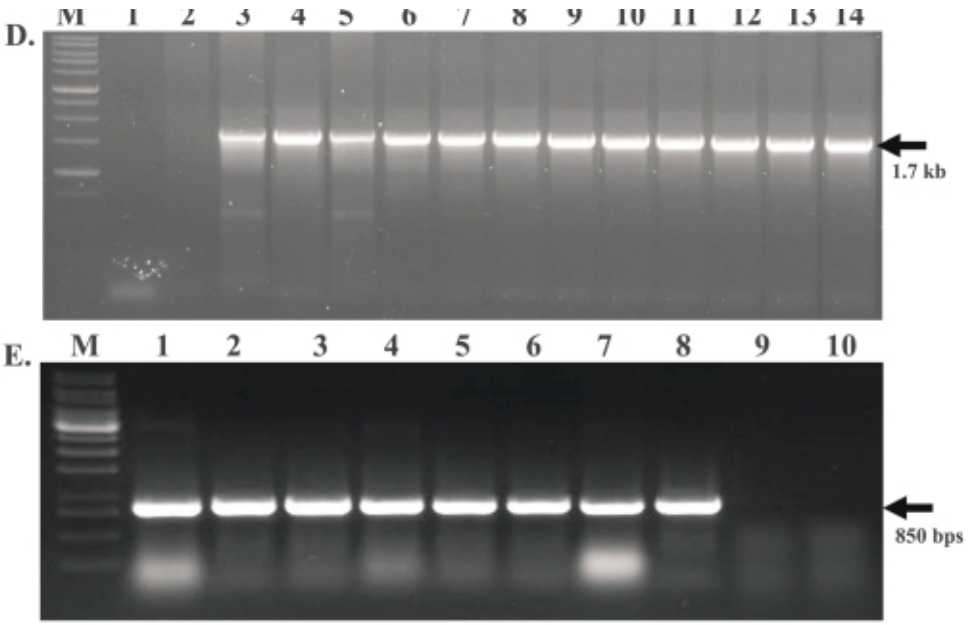


Fig.1. PCR based diagnosis of RTBV from infected samples; M-1kb DNA ladder, 1-blank, 2-healthy, 3 to 8-tungro infected plant material collected from Cuttack, Puducherry, Coimbatore, Kanyakumari, Patancheru and Rajendranagar (Hyderabad) respectively, 9 to 14- virulifeorus insect samples **(D)**. RT-PCR based detection of RTSV from infected samples; M-1kb DNA ladder, 1 to 6- tungro infected plant material collected Cuttack, Puducherry, Coimbatore, Kanyakumari, Patancheru and Rajendranagar (Hyderabad) respectively, 7&8- virulifeorus insect samples, 9-healthy, 10-blank(**E**).

Brown Planthopper - an emerging threat to rice cultivation in Manipur

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Brown planthopper (*Nilaparvata lugens* Stål.) is one of the most destructive pests of rice throughout Asia. It causes severe yield reduction by directly sucking the plant sap and acting as a vector of viral diseases such as rice grassy stunt and ragged stunt. In the North Eastern State of India, Manipur, the incidence of BPH & WBPH was not reported earlier. During monitoring of AICRIP trials in October, 2009 in Manipur, we observed severe crop damage (hopper burn) in Hosciea village of Thoubal district, located between Imphal and Wangbal. As reported by farmers, similar kind of hopper burn was observed at other places also. After critical observation we could find that the damage was due to both BPH and WBPH (Fig.1) and invariably the population of BPH was more. The BPH population observed in Manipur might have migrated from neighboring country, Myanmar. The chemical control measures are not effective due to very high and frequent rainfall. In such climatic conditions the host plant resistance is very important strategy to control hopper damage. In the screening block of blast at Wangbal, we observed that most of the varieties have died due to severe infestation of BPH & WBPH, while Punshi which was


Fig.1



Fig.2

used as susceptible check for blast was found to be resistant to hoppers (Fig. 2). We requested the seeds of popular varieties grown in Manipur to screen for BPH reaction. Among the old and newly released varieties, seed of 7 varieties was obtained and screened against BPH in DRR glasshouse. Of the 7 varieties screened, 5 were resistant and 2 were susceptible (Table1). Further screening and identification of gene for BPH resistance in the varieties grown in Manipur will help in redeployment of other genes along with the existing ones in breeding programme to develop stable resistant varieties.

Table1: Reaction of rice varieties grown in Manipur to BPH

Variety	Parentage	Year of release	BPH damage score 0-9 scale	Reaction
Punshi	Phoren/IR661-1-140-3	1981	1.2	R
RC Maniphou 4	Kalinga 2/Palman	1992	2.3	R
RC Maniphou 5	Kalinga 2/Palman	1992	2.0	R
Leimaphou	Moiranagphou/Lowagin	1999	8.2	S
Eriemaphou	Taothabi/IR1125-21-2-1	2000	6.6	S
RC Maniphou 6	CH988/IR24	2000	2.7	R
RC Maniphou 7	Mutant of Punshi	2000	1.8	R

R: Resistant, S: Susceptible

BPH resistant cultures for coastal saline areas

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Brown planthopper (BPH) is re-emerging as a key pest threatening rice production in tropical Asia. The salt stress in association with the incidence of BPH is becoming the major threat for rice production in coastal/inland saline areas in India. CSR3 was identified resistant to salinity as well as BPH and blast. We developed lines RP 4631-146-9-1-1-1-3, RP4631-146-20-4-1-1-1 and RP4631-46-6-5-1-1-1 from the cross CSR 3 /Kasturi and RP4353-MSC28-13-3-1-1-3 from the cross IET 9993/N52 which were evaluated in AICRIP trails in coastal saline areas in the country for yield and salinity tolerance. Subsequently they were also screened for blast and BPH resistance in DRR glasshouse and at hot spot locations. In coastal saline conditions, RP 4631-146-9-1-1-1-3, RP4631-146-20-4-1-1-1, RP4631-46-6-5-1-1-1 and RP4353-MSC 28-13-3-1-1-3 yielded 3.9, 4.1, 4.4 and 4.1t/ha, respectively with long slender grains and desirable cooking quality. In the repeated screening in glasshouse as well as in field at 17 locations, all the 4 cultures were resistant to blast and BPH (Table1). The culture RP4631-46-6-5-1-1-1 has been released as DRR Dhan 39 in 2009 for cultivation in coastal saline areas of Orissa, Kerala and Gujarat. The other cultures are under evaluation.

Table1: Reaction of newly developed cultures against BPH

Culture	IET No.	BPH Damage score			Mean	Reaction
		2009	2008	2007		
RP 4631-146-9-1-1-1-3	19483	2.7	2.9	3.0	2.9	R
RP4631-146-20-4-1-1-1	19486	3.1	2.1	4.0	3.0	R
RP4631-46-6-5-1-1-1	19487	1.8	2.6	4.2	2.8	R
RP4353-MSC 28-13-3-1-1-3	19482	2.1	3.6	2.3	2.7	R
PTB33 (Resistant check)		1.2	1.0	1.4	1.2	R
TN 1 (Susceptible check)		9.0	9.0	9.0	9.0	S

R: Resistant, S: Susceptible

MO 21(Pratheeksha) – A short duration rice variety for Kuttanad

R. Devika, S. Leenakumary, N. Rema Bai, M. Surendran, Annie Koruth and Abraham Varughese

Rice Research Station, Moncompu, Alleppey.

One culture KAU M 108-262-1 (SD 36) (IET 18660) was released by the State Seed subcommittee as MO 21(Pratheeksha) on 15th January, 2010 for irrigated areas of Kuttanad region. This is from the cross between IET 4786 and MO 8 (Aruna). It is semi-dwarf (98 cm ht), short duration (100-110 days), medium tillering, photo- insensitive variety with long bold red kernelled grains. It is moderately resistant to BPH, gall midge, sheath blight and sheath rot. It has got a high hulling (81.0%), milling (78.0%) and head rice recovery (70.0%). It matures 25 days earlier than Uma (MO 16). Of 221 rice cultures/varieties screened at 6 locations for Fe & Zn accumulation in grain (brown rice) SD 36 was found promising, recording comparatively higher Fe (40mg/kg) and Zn (43 mg/kg) content. Being a high yielding variety of short duration it is recommended for cultivation in Kuttanad where double cropping is practiced.



Naga Wonder Rice

P.K.Singh[1], P.L.Singh[1] , K. Rabi[2], and S.P.S.Rathore[3]

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There are a number of local varieties in Nagaland, of which Nagaland wonder rice *i.e.*, *Oryza sativa* cv Melhite Kenye lha is one of the most



important variety. This paddy variety was identified on 1st October, 1998 by Melhite Kenye, a Pastor in Town Baptist Church, Chumukedima, Dimapur district, and was named after him. The Pastor experimented by cultivating 100 plants at the premises of Town Baptist Church. In 2003, one of the plants has grown to a height of 8.5 feet with 240 tillers and 340 grains in each panicle. The total grain produced weighed at 1 kg and 182 grams. This was entered into the Guinness Book of World Records and subsequently declared as the tallest rice crop in the world discovered in a remote village in Nagaland.

INSTITUTIONAL ACTIVITIES

Training program on Hybrid Rice Production Technology

Developing new generation of hybrid workers…

An eight day training program was organized by DRR on Hybrid rice production technology during 18th to 25th February, 2010. The training program was sponsored by Directorate of Extension (DOE), Government of India, New Delhi. There were 20 participants from state department of Agriculture representing 12 different states across the Country. Dr. B.C. Viraktamath was the Course Director and Drs. Mangal Sain, A.S. Hariprasad, and Sheik Meera were the co-ordinators of this training program. The training programme consisted of theory (on various aspects of hybrid rice production) and practicals *viz.,* visit to the hybrid rice experimental plots, seed production areas, grain quality studies, and identification of insect pests, diseases, weeds.



Workshop on RKMP Content Development Strategies

A peep into the subject matter…

A two day workshop on Content Development Strategies was organized during 5th - 6th February, 2010 at DRR. Dr. Sarat Chandrababu, Director, Centre for Development and Advance Computing was the Chief Guest and Dr. MS Rao, Chief Executive Officer, Cereal Systems Initiative for South Asia (CSISA) was the guest of honour. Project Director Dr. BC Viraktamath presided over the inaugural session. The workshop was attended by around 60 participants including the CoPI teams from partner institutes. Dr. S. Meera, PI of the project outlined the broad guidelines of content development. During the deliberations, it was suggested that the content development of RKMP should focus on Information and Knowledge needs of all groups and this need assessment should be a continuous process. Local ITKs and inventory of stakeholders needs should be in place and existing communication systems are a part of this inventory. A tag line for RKMP i.e., *Annagynanam* was proposed by Dr. Sontakki, NAARM, Hyderabad.





Institutional Biosafety Committee (IBSC) Meeting

Recently, Institutional Biosafety Committee of DRR has been reconstituted with the approval of DBT/RCGM. The new IBSC committee includes, i) Dr. B.C. Viraktamath, Project Director, DRR (Chairman), ii) Prof. P.B. Kirti, Professor, Dept. of Plant Sciences, Univ. of Hyderabad (DBT Nominee), iii) Dr. M. Sujatha, Principal Scientist (Biotechnology), Directorate of Oilseeds Research, Hyderabad (Outside Expert), iv) Dr. A. Debnath, Medical Officer, NAARM (Member), v) Dr. N. Shobha Rani, Principal Scientist & Head, DRR (Member), vi) Dr. G. Katti, Principal Scientist (Entomology), DRR (Member), vii) Dr. G.S. Laha, Senior Scientist (Pathology), DRR (Member), viii) Dr. R. M. Sundaram, Senior Scientist (Biotechnology), DRR (Member) and ix) Dr. S.M. Balachandran, Principal Scientist (Biotechnology), DRR (Member Secretary).

The 11th IBSC meeting with the new committee members was held on 10th February 2010. In his remarks, Dr. B.C. Viraktamath emphasized that lessons had to be learnt from the experience with respect to Bt Brinjal and these should be avoided while developing and commercializing Bt rice and added that IBSC members had a great responsibility on their shoulders in terms of GM crop research conducted at DRR. Three new proposals for evaluation of transgenic rice lines at DRR was discussed in the meeting and approved by the IBSC. Prof. P.B. Kirti, suggested that DRR should initiate work on development of marker-free transgenic rice due to the sensitivity associated with the use antibiotic resistance genes in food crops. Dr. M. Sujatha, suggested to carry out protein analysis of Cry1Ac and Cry1Aabc against target insect pests. Dr. Debnath insisted that regular medical tests should be conducted on research personnel working with GM rice at DRR.



Participation in Meetings, Seminars & Workshops

Dr. S R Voleti, Head & PS, Plant Physiology, DRR delivered a key note address on "Biocompatible novel formation of silicon imidazole complexes



from silicic acid and their possible mechanism in combating disease and pest in rice" and chaired a session in the **Indo- US workshop on silicon in Agriculture** at Bangalore, during 25th -27th February,2010. His studies on silicilic acid assimilation and subsequent deposition to silica within the rice plant led to the discovery of silica-imidazole complexes in non polar solvents ranging from ornate forms to tubules and flakes as clearly seen by SEM. The most significant aspect of the study was that silicic acid –guest complexation need not be restricted to polyamines. Preliminary field trials of some of these amino acid carrier complexes in relation to biotic stress tolerance, particularly against yellow stem borer and abiotic stress tolerance in some rice genotypes and hybrids confirms the significant role played by silica.

Dr. N. Sarla, Principal Scientist (Biotechnology), Dr. J.S. Bentur, Principal Scientist (Entomology), Dr. C.N. Neeraja, Principal Scientist (Biotechnology) and Dr. R.M. Sundaram, Senior Scientist (Biotechnology), DRR delivered lectures in the **National symposium on Genomics and Crop Improvement - Relevance and Reservations** organized at Acharya N.G. Ranga Agricultural University (ANGRAU), Hyderabad in collaboration with Indian Council of Agricultural Research and Department of Biotechnology during 25th to 27th, February, 2010. Symposium was organized to review the potential of genomic tools in overcoming the problems that defy conventional breeding approaches and to address the apprehensions of a section of the society on the biosafety of genetically manipulated crops.The symposium consisted of three technical session's viz., i) Molecular Mapping and Breeding, ii) Transgenics and iii) Genomic analysis and Functional Genomics devoted to (a) raising the genetic ceiling to yield (b) defending the yield against biotic/abiotic stresses and (c) improvement of grain quality. The symposium was attended by more than 200 participants, which included eminent Indian plant sciences researchers, faculty from various Universities and over 100 youngsters including students. Dr. P. Nataraj kumar, Senior Research Fellow, DRR got the best poster award for his poster "Identification, molecular mapping of a novel, dominant bacterial blight resistance gene, Xa33 from *O. nivara* and marker-assisted introgression of the gene into Samba Mahsuri".

- Dr. B.C. Viraktamath, Project Director had a meeting with Dr. K. Thiyagarajan, Director and Dr. M. Maheshwaran, Professor (Biotechnology) of CPBG, TNAU, Coimbatore on Functional Genomics of BPH and Hybrid Rice Development on 7th and 8th January, 2010.
- Dr. R. Mahender Kumar, Principal Scientist (Agronomy) delivered a talk on "Principles and practices of SRI cultivation" at a State Level Orientation Trainers Training Programme on SRI at Imphal, Manipur on 15th January, 2010.
- Dr. B.C. Viraktamath, Project Director attended meeting of Directors of ICAR institutes under Crop Science Division with Secretary-DARE and DG, ICAR at ICAR Headquarters, New Delhi on 19th -20th January, 2010.
- Dr. J.S. Bentur, Principal Scientist (Entomology) delivered a talk on 'gall-midge rice interaction' at Agriculture College and Research Institute, Madurai on 22nd January, 2010.
- Dr. B.C. Viraktamath, Project Director attended meeting of Review Committee on Genetic Manipulation (RCGM) at DBT, New Delhi on 25th January, 2010.
- Dr. B.C. Viraktamath, Project Director participated in a meeting on "Issue of Pinhead damage of rice" under the chairmanship of Dr. Gurbachan Singh, Agriculture Commissioner at Krishi Bhawan, New Delhi on 4th February, 2010.
- Dr. B.C. Viraktamath, Project Director and Dr. L.V. Subba Rao, PS (Plant Breeding) attended a meeting on Agricultural Bio-diversity under the chairmanship of Dr. P.L. Gautam, Chairman, National Bio-diversity Authority, at ANGRAU, Hyderabad on 6th February, 2010.
- Dr. B.C. Viraktamath, Project Director participated in ICAR Director's conference at NASC, New Delhi during 15th-16th February 2010 and Vice-Chancellors conference on 17th February, 2010.
- Dr. B.C. Viraktamath, Project Director attended inaugural session of National Symposium on 'Climate Change and Rainfed Agriculture' at CRIDA, Hyderabad on 18th February, 2010.
- Dr. N. Somasekhar, Senior Scientist, Nematology participated in National conference on "Innovations in Nematological research – challenges and road map ahead" at TNAU, Coimbatore during 23rd to 25th February, 2010.
- Dr. B. C. Viraktamath, Project Director, Dr. A. S. Hari Prasad, Senior Scientist, Hybrid Rice, Dr. M. Mohan, Senior Scientist , Entomology participated in one day workshop on Technology management and commercialization in Agriculture at NAARM, Hyderabad on 4th March 2010.
- Dr. J. S. Bentur, PS, Entomology and Mr. V.S.A.C.Sama, SRF, Biotechnology participated in the National Seminar on "Paradigm shifts in research on crop resistance to pests" at Annamalai University during 4th - 5th March, 2010 and delivered oral presentation.
- DR SR.Voleti and (Mrs) B.Sailaja participated in " Agricultural Drought Monitoring and Vulnerability Assessment" at CRIDA, Hyderabad during 10th -11th March, 2010.
- Dr. Shaik N.Meera, PI of RKMP project participated in Content Development Workshop of ZARS, Mandya on 9th March, 2010.
- Dr. S. M. Balachandran, Principal Scientist, Biotechnology, Dr. A. S. Hariprasad, Senior Scientist, Hybrid Rice and Dr. M. Mohan, Senior Scientist, Entomology participated in the meeting cum workshop of the South Zone 'Zonal Technology Management & Business Planning and Development (ZTM & BPD) at CIFT, Cochin during 12th -13th March, 2010.
- Dr. B. C. Viraktamath, Project Director, Dr. S. M. Balachandran, Principal Scientist and Dr. R. M. Sundaram, Senior Scientist participated in the 'Golden Rice Review' meeting at Directorate of Maize Research, IARI, New Delhi on 16th March, 2010.
- Dr. Shaik N.Meera and Dr. P. Muthuraman participated in Content Development Workshop of CRRI, Cuttack on 16th March, 2010.

Awards and Recognition

Dr. Ch. Surender Raju, Senior Plant Breeder at AICRIP centre, Rajendranagar has been awarded the **"Best Scientist award"** by the Government of Andhra Pradesh in January 2010 in recognition of his meritorious service at Rudrur, Warangal, Jagtial and Rajendranagar centers for the last two decades. He was involved in development and release of high yielding, gall midge resistant and fine grained varieties like JGL-3844 (Jagtial Samba), WGL 32100 (Warangal Sannalu), WGL 14 (Warangal Samba) and RDR 763 (Indur Samba). Recently, a short grain aromatic culture (RNR 2465) was proposed for release in the State for its high yield and excellent cooking quality.



Mr. C. Sadanandam from DRR, stood first in Caroms and won the Winners Cup in South Zone Sports Meet held at CIFT, Cochin during 22nd to 27th February, 2010.



Promotion/Deputation

- Dr. D. Venkateswarlu was promoted to T7-8 w.e.f. 3rd February 2005
- Mr. A.N. Murthy, AFAO was deputed to NIRD, Hyderabad as Assistant Advisor & pay and Accounts Officer for a period of two years (2010 to 2012). He was relieved on 18th January, 2010.

Distinguished Visitors

Graduate and post-graduate students (9) and faculty (4) from Cornell University, USA visited DRR laboratories, glasshouses and interacted with scientists on 13th January, 2010.



128 scientists from 89th FOCARS batch, NAARM visited DRR on 3rd February 2010.

Six project officials of Agricultural Technology Management Agency (ATMA), Nagaland visited DRR on 1st March 2010.



Mr. Eli Vered, crop specialist and expert in irrigation system, from NETAFIM - Israel visited the collaborative experimental field trial on "Evaluation of drip irrigation in rice" on 2nd March, 2010 at DRR and interacted with scientists from different disciplines involved in the project.



IRRI's celebrates Golden Jubilee Year

The International Rice Research Institute (IRRI) has embarked on its 50th anniversary celebrations, to acknowledge how rice science has helped in addressing food and nutritional security and to emphasize the ongoing need for rice science to address the challenges of poverty and climate change. In fifty years, IRRI's high-yielding rice varieties and other technologies, plus extensive training, have contributed to the doubling of average world rice yields. This has averted famine and prevented millions of hectares of natural and fragile ecosystems being converted to farmland. Her Royal Highness Princess Maha Chakri Sirindhorn of Thailand formally launched IRRI's 50th anniversary at IRRI's headquarters in the Philippines on 17th November 2009, which will include 12 months of special activities to draw the world's attention to rice. At this juncture, IRRI's director general, Dr. Robert Zeigler acknowledged the contribution of member Countries in this endeavor. Commemorating this 6th International Rice Genetics Symposium was held in Manila, Philippines during 16 – 19 Novemberr, 2009. Other major events planned for the anniversary celebrations includes, 50th annual meeting of IRRI's Board of Trustees during 12-17 April 2010, and 3rd International Rice Congress at Hanoi, Vietnam during 9-12 November 2010.

RICE RECIPE

Idiyappam (String hoppers)

This South Indian version of noodles is a healthy and wholesome breakfast dish from the Land of Coconut Trees, Kerala. It is also a staple dish in Srilanka and Malaysia. The soft and thin idiyappams are made out of rice flour. Rice flour is made at home by soaking raw rice in water for few hours, drying and grinding it into fine powder. This flour is dry roasted and made into a smooth thick paste by adding hot water to which a little salt and a spoon of oil is added. This paste is kneaded with hand to make sure that there are no lumps. The paste put into the idiyappam stalt (mould) is sqeezed in circular motion to form thin strands. The idiyappam thus formed is garnished with grated coconut and steamed for about 10 minutes. These idiyappams are served with potato stew, coconut chutney, sambar or with thick coconut milk and sugar.



Forthcoming Publications from DRR

1. Hybrid Rice in India
2. Weed Management in Rice
3. Soil Related Problems and Management in Rice
4. Rice Almanac - India

GLOBAL RICE NEWS

Digital Rice Information Gateway

New initiative by IRRI…

On rice trade matters, Dr. Samarendu Mohanty, IRRI economist outlined an initiative to develop a digital rice information gateway. This gateway aims to provide a real-time crop monitoring and forecasting platform by combining modern techniques such as satellite based remote sensing with weather and crop modeling, and econometric modeling. The system will be capable of generating short- to medium-term projections of production, consumption, trade, and prices under different domestic and trade policy regimes and macro conditions. In addition, policy simulations and assessments of the impacts of technology interventions can also be conducted using the framework.

Through this project, IRRI provides real-time information on rice area and production that will lead to a smooth functioning of the global rice market. Moreover, the regular updating of medium-term supply, demand, and price projections will assist government agencies, agribusiness, and others in their respective medium-term planning. As this initiative will ensure the timely availability of policy briefs, policymakers should be able to make more informed decisions. Finally, it will also contribute to the capacity-building of national agricultural research and extension system partners for rice market outlook studies and policy analysis. Dr. Mohanty informed that their target is to make the complete system operational by mid-2011.

Source: http://beta.irri.org/news/images/stories/ricetoday/9-1/Rice_facts.pdf

Forthcoming Events

- 45th Annual Rice Workshop will be held at Anand Agricultural University, Anand, Gujarat - 3rd to 6th April 2010
- Institute Research Council (IRC) Meetings - First week of May, 2010
- RAC & IMC meetings - May 2010
- IPM training programme for executives of agro-industries - May/June 2010

DIRECTOR'S MESSAGE



I am happy to note that timely planting and good crop growth during this *rabi* season is going to compensate some of yield losses suffered due to severe drought during *kharif* season. As the AICRIP Annual Workshop is advanced by one week, every one of us is busy with the data compilation, analysis and report writing during this quarter. I welcome all our co-operators for the 45th Annual Workshop and hope the deliberations during the group meetings will provide a roadmap for strengthening rice research network. I am happy to see the contributions from AICRIP centers about their achievements in this issue. We look forward for more contributions in the form of research notes in future issues. I expect that all of you will be proactive to make this newsletter a vehicle to disseminate new developments in rice research.

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