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भाकृअनुप
ICAR

DRR

DRR

Directorate of Rice Research
NEWSLETTER

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From Director's Desk...

Monsoon plays a pivotal role in the success of Indian agriculture. After experiencing a deficit and delayed rainfall in 2012, monsoon is expected to be normal during 2013 in most parts of India strengthening the prospects of larger area coverage under different kharif crops. The southwest monsoon, critical for India's agricultural production, arrived in Kerala on June 1, 2013. However, a smooth advancement and even distribution of rainfall in the coming weeks is crucial to boost the sowing of kharif rice crop. According to a prediction by India Meteorological Department, southwest monsoon seasonal rainfall for the country as a whole is most likely to be 96-104% of Long Period Average (LPA). With the government's continued focus on expanding Green Revolution technology in the rice growing regions of eastern India through promotion of hybrid rice cultivation, intensification techniques and other modern production techniques, a production of 102.0 million tons is forecasted during 2013-14 (Global Agricultural Information Network dated 15th February, 2013).

Coming to our institutional activities, a huge AICRIP activity is undertaken at DRR during this quarter of the year in addition to our ongoing research work. Majority of the scientists involved in AICRIP remained busy in finalising the trials and sending the seeds of various trials to different cooperating centres. In addition, sowing activities were started at our DRR and ICRISAT campus farms.

A number of important events took place during this period. Most importantly, the 48th Annual Rice Group Meeting (ARGM) was successfully organized at Sher-e-Kashmir University of Agricultural Sciences & Technology (SKUAST), Srinagar during April 14-16, 2013. About 450 rice researchers across India representing ICAR institutions, State Agricultural Universities and Private companies and scientists from IRRI participated in the meeting. Variety Identification Committee under the Chairmanship of Dr. S. K. Datta, Deputy Director General (Crop Sciences), ICAR on 14th April, 2013 identified 15 varieties and 7 hybrids for different regions.

The second meeting of the Research Advisory Committee (constituted in 2012) was held at DRR from 2-3 May, 2013 under the chairmanship of Prof. E. A. Siddiq. Institute Research Council Meeting (IRC) was organized from May 6-9, 2013. All the scientific staffs of DRR participated in the meeting and presented the salient research findings carried out in their respective research projects. Six new projects were approved by the IRC. Dr. Achim Dobermann, DDG (Research), IRRI, Philippines and Hon Secretary, ICAR, Shri Arvind Kaushal visited the institute during this quarter.

I hope that the contents of the newsletter would be quite informative and useful for all those interested in rice. I earnestly solicit your valuable suggestions for further improvement and also invite articles from you.

(B.C. Viraktamath)

IN THIS ISSUE

General Article

AICRIP Management Information System

B. Sailaja, Shaik N. Meera and B. C. Viraktamath, DRR, Hyderabad-500 030

All India Coordinated Rice Improvement Programme (AICRIP) is the largest research network devoted to a single crop comprising 47 funded and 100 voluntary centres across India. The main objective of the AICRIP is to organise and conduct multidisciplinary, multi location evaluation of varietal, crop production and protection technologies across diverse ecosystems to increase and stabilise rice production. Every year, a very large number of trials are organised and conducted by breeders, agronomists, pathologists, entomologists, soil scientists and physiologists at AICRIP centres. In order to improve efficiency and to have real time data, AICRIP Management Information system (MIS) was developed and hosted at the URL **http://www.aicrip-intranet.in** to receive the real time data from AICRIP centres in uniform formats.

USER	National	Principal Investigator	Center In Charge	Co-operator
PRIVILEGE	Data from All Centers All Disciplines	Data from All Centers specific Descipline	Data from Specific Center All Disciplines	Data from Specific Center Specific Descipline

Entering into AICRIP Intranet

Cooperators and centers database | User privileges (login name password)

↓

Planning and indenting trials

New Trials - **DRR** | Indenting trials - **Centers**

↓

Technical Program and Seed Dispatch - DRR

Objectives and designs of each trial | Trial wise seed dispatch details

↓

Seed confirmation and Crop conditiion - Centers

Trial wise seed received confirmation | Sowing, Planting dates and monthly crop condition with remarks

↓

Submission of data - Centers

On line data submission for different experimental designs (ex: RBD, Split etc.) in different disciplines

↓

Analysis and Reports - DRR

Analyse data from different experimental designs and generate final reports (location wise, parameter wise and as per the requirement)

Data pertaining to different activities like planning trials in each discipline, allotting trials to different locations, seed/material dispatch, seed received confirmation, monthly crop condition with sowing dates, trial information, incidence of pests and diseases, statistical designs for conducting trial were designed with simple user friendly interfaces using C sharp of Visual Studio (Flowchart).

Centralised database was designed using Microsoft Structured Query language (SQL) and maintained at DRR, Hyderabad. As this system has to manage multi-location and multidiscipline data with different roles of users, user privileges were designed based on the need and role of access to the data to specific user. Four levels of users were created such as National Coordinator/ Project Director and Administrator, Principal Investigators of AICRIP, Center In charges and Co-operators.

Statistical analysis and reports module were also integrated with AICRIP MIS to analyse multilocational data from different experimental designs (RBD, Split Plot, Screening pests and diseases) and choose best performing technology tested over different locations.

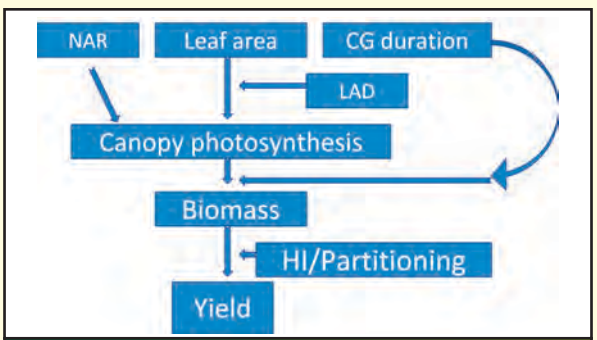
This package will reduce the work load and time taken for analyzing huge AICRIP data from AICRIP centers. Data will be directly added to the centralized database in the prescribed format and year wise data will be maintained on the server. This will be useful for assessing the performance of genotypes to different stresses across several years. At present we are generating reports for the trials conducted in individual disciplines. We can extend this by introducing performance of technologies across trials, disciplines and centers. This will be of great use for recommending the technologies to different regions. Further, this software can be easily customized and used for managing coordinated data of any other crops.

Research Highlights

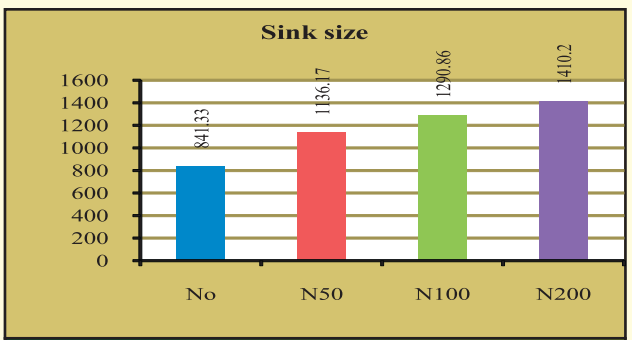
Increasing yield potential in irrigated rice - manipulating source and sinks.

P. Raghuveer Rao, S. Ravichandran, R. Mahender Kumar,
D. Subrahmanyam, A. S. Ram Prasad and S. R. Voleti, DRR, Hyderabad-500 030, India.

A study was conducted on rice source sink relationship in high yielding varieties (early, medium and late) and hybrids, by manipulating source and sink sizes. Studies conducted over last three years, revealed that source and sink size increased with increasing nitrogen levels from 0-200 kg ha^{-1}. Among the varieties, source size and sink capacity was highest in hybrids as compared to high yielding varieties (HYV). Leaf area index (LAI) of 6-7 was found to be optimum for attaining a yield of 8-9 tons ha^{-1} where as the growth analysis data revealed that crop growth rate (CGR) increased with increase in Nitrogen levels and hybrids had better CGR than HYVs. Physiological parameters measured by Licor-6400 revealed that photosynthetic rate, stomatal conductance and transpiration rate increased with increase in nitrogen levels. Photosynthetic rate and transpiration rate were high in hybrids as compared to high yielding varieties and among hybrids PHB-71 had the highest photosynthetic rate and transpiration rate. Among high yielding varieties, Akshayadhan had high photosynthetic rate. Varadhan had high water use efficiency when measured by Licor 6400 in terms of A/T and IWEU ratios. A/Ci ratio i.e., Corboxylation efficiency or activity of RUBP carboxylase was found to be higher in hybrids as compared to high yielding varieties. Correlation analysis was carried out for yield and yield influencing attributes. Significant correlation was observed for yield with TDM and spikelets per panicle. It was found that yield levels can be improved in irrigated ecology by improving the bio-mass (Total Dry Matter) and sink size (spikelets per panicle) in HYVs and hybrids. Based on the study, it was found that source was limiting in early duration HYVs and sink was limiting in late duration HYVs. In Hybrids, there is an optimum source and sink relationship for achieving yield of 8-9 tons ha^{-1}.



Possible factors contributing for rice yield



Effect of N levels on sink size

Management of Brown Planthopper (BPH) – a success story

Ch. Padmavathi[$], D. Krishnaveni[$], B. Sreedevi[$], J. S. Bentur[$], P. Rajinikant*, V. Sunil[$] and K. Chiranjeevi[$]
[$] DRR, Hyderabad-500 030 and *ARS, Kampasagar, Nalgonda district

Since two years, BPH has become a major threat for rice cultivation in and around Nalgonda district of Andhra Pradesh. In 2011 *Kharif* season, few farmers have burnt their fields due to heavy incidence of BPH. In view of this, during kharif 2012, IPM trials were conducted in two farmer's fields in Chillapuram (Mr. Saida Naik) and Thungapadu (Mr. Chenna Reddy) villages of Miryalguda mandal in Nalgonda district. Regular visits were made to these farmers' fields and IPM practices were suggested starting from nursery up to harvest. The IPM practices adopted includeed formation of alley ways in the main field while transplanting, application of optimum dose of fertilizers, weed management, disease management, intermittent drainage of water and need based application of insecticides without repetition of same chemical. Thorough coverage of crop with emphasis on targeting the base of the plants was advised during spraying. These operations led to the successful management of BPH in these IPM fields while all the surrounding rice fields were infested with BPH resulting in hopper burn in few of the fields.

Mr. Saida Naik, a distressed farmer burning his BPH infested rice field during *kharif* 2011

During 2012 *kharif* season, BPH incidence and hopper burn was observed in Duggepally, Chillapuram, Yadgarpally, Thungapadu, Adavidevulapally, Narammagudem, Laxmipuram villages of Miryalguda, Nidamanuru and Tripuraram mandals of Nalgonda district. The major variety grown in these villages was BPT 5204. Indiscriminate use of insecticides including synthetic pyrethroids and combination products was the main reason for this heavy incidence. Farmers were taking up 8 to 10 sprays in a season and most of the times repeating the same insecticide. Yields of 6.84 t/ ha from IPM field and 5.53 t/ ha from non- IPM field were recorded. Regular field inspection followed by intermittent drainage of water and in case of severe incidence, judicious application of insecticticides taking care of not repeating the same chemicals will help in curtailing the BPH population build-up.

Mr Saida Naik looking at his IPM field during *kharif* 2012,Chillapuram village

Hopper burn field - Chillapuram village

Rice based Skin care / Health care products

M. Mohibbe Azam, DRR, Hyderabad-500 030, AP

Rice bran is one of the valuable by-products of the rice processing industry. It is a potential source of edible and health products. Rice bran is a good source of antioxidants including vitamin E and oryzanol, high quality oil and protein. Oil (RBO) contains various antioxidants including γ-oryzanol. These antioxidants fight with free radicals and slow down the effect of aging. Oil also contains another class of compounds- pro-anthocynidines which is responsible for the suppleness of skin. The oil has skin tightening property. It is easily absorbed into the skin. Oryzanol can intercept ultraviolet rays and has skin whitening property.

Keeping in mind the enormous potentials of various fractions of rice, two products from rice bran oil and rice starch were developed. First product is a skin moisturizer suitable for normal and oily skin. Its regular application makes skin smoother, soft and supple. The product has rice bran oil in the range 5-15% and 1-5% brown rice. Its other key ingredients are water and glycerol. Due to brown rice, the product also contains Oryzanol, vitamins and other antioxidants like tocopherols, tocotrienols, phytosterols. The product has been named as "Rice Riche Moisturizing lotion".

Feedback from volunteers were collected. All the users (100%) reported that the product does not cause any irritation, redness, rashes or any negative effect and felt that there was no itching, burning or soreness. At the same time the users felt that the skin becomes supple and hydrated after application. More than 90 % users reported that they are satisfied or extremely satisfied with the performance of the product. Majority of the respondents (62 %) considered this product better/ much better than the available products in the market while 38% of the users rated this product on par with market product.

Second product is an oily gel meant for releiving minor aches and pains of muscles and joints associated with simple

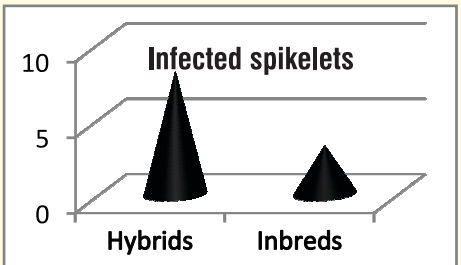
Strains, bruises and sprain. The product has been named as Rice Riche Pain Releiving gel. It contains rice bran oil (20-40%) and other analgesic ingredients (camphor, menthol, methyl salicylate and eucalyptus oil). Due to rice bran oil, active ingredients of the formulation get absorbed very well and provides quick relief. All the users (100 %) reported that

they are satisfied or extremely satisfied with the performance of the product. Majority of the respondents (71.5%) felt that this product is better/ much better than the available products in the market. While, 28.5% users reported that the product is at par with the available products.

False smut susceptibility of rice hybrids and inbred cultivars under field conditions

J. S. Lore[1], P. P. S. Pannu[2], J. Jain[1] R. Kaur[1] and G. S. Mangat[1] *Punjab Agricultural University, Ludhiana -141 004.*

False smut caused by *Ustilaginoidea virens* (Cooke.) Takah., is an emerging disease of rice and causes significant yield losses under favorable weather conditions on susceptible cultivars particularly on hybrid rice. The losses due to false smut have been reported up to 44% in recent studies. Twenty five hybrids and ten inbred cultivars were transplanted in randomized block design with three replications. Different disease parameters such as number of smut ball per panicle, per cent infected spikelet, visual score (0-9) and per cent sterility were recorded. Days to 50% flowering and weather data were also recorded. Per cent sterility was positively correlated with all the disease parameters. The disease parameters decreased with increase in days to 50% flowering. In general, the short duration hybrids/inbreds flowered during 90-100 days showed high disease score, higher number of smut balls and higher infected spikelet (%) per panicle. Agro-meteorological factors such as temperature, relative humidity and rain fall were positively correlated with all the disease parameters. Out of twenty five hybrids tested, fourteen namely NPH369, FPH109, SVH026, NPH909, Rashmi,Laxmi117, 27P31, MRP5901, Shabnam, BS-129-G, KSL210014, Tara, BS158 and FPH-36 showed maximum mean disease score (7.0-8.3), higher number of smut balls, per cent infected spikelets and sterility. Three hybrids i.e. BS-444-G, Sudha and Luxmi 108 showed lower value for all the disease parameters. Among the ten inbred cultivars four *viz*., PR 114, PR113, PR111 and PR115 showed lower diseaseparameters. However, cultivars like NP549, NP950, NP742 and PR116 showed comparatively higher value of the disease parameters. The genotypes were categorized into 5 groups based on different disease parameters. The first group consisting of two hybrids viz., NPH 369 and NPH 909 showing highest values of different disease parameters with mean disease score of 8 while the fifth and last group consisting of inbreds like PR 113 and PR 114 showed lowest scores of different disease parameters with mean disease score of 0.83. The data indicated that average per cent infected spikelet/panicle was higher (8.1%) in hybrids as compared to inbred cultivars (3.2%).



Per cent infected spikelet/paniclon rice hybrids verses inbreds

Identification of heat tolerant genotypes under NICRA project at DRR, Hyd.

S. R. Voleti, C. N. Neeraja and NICRA Team

The work was carried out during Kharif, 2011 and Rabi, 2011-12, with approximately 800 germplasm lines (belonging to 11 categories) with and without nitrogen application. Data were collected for 4 morphological, 7 physiological, 16 yield parameters and nitrogen content in grain and straw and 9 parameters under hydroponics. A total of 120 lines were short listed based on their physiological performance at field level. In Kharif 2012, the selected lines were once again grown with and without nitrogen and also another set exposed to elevated temperature (>5^{0}C ambient) in an artificial heat tunnel. Based on few selected parameters, five best entries which exhibited superior performance are presented in Table 1. In addition, expression profiles of nitrate reductase (NR), phenlyl alanine ammonia lyase (PAL) and ammonium transporter (AT) in root and shoot tissues were also characterized which were differentially expressed and varied to different folds in their expression pattern (Table 2). **These entries are now being proposed for registration**

Table-1: Physiological and yield attributes of selected entries (Pooled data)

Selected Parameters	Genotypes					Genotype (L.S.D <0.05)	Treatment (L.S.D <0.05)
	SOMALY2-023-3-5-1-2-1	IR-55178	GQ-25	SG26-120	IR82310-B-B-67-2		
Leaf Temp (^{0}C)	27.77	25.78	25.06	23.84	23.21	4.51	2.85
Leaf Thickness (μm)	0.13	0.135	0.13	0.145	0.14	0.04	0.03
SPAD	32.64	30.05	33.40	33.49	32.35	5.04	3.19
Rolling time (sec)	45.88	70.62	60.75	58	55.62	45.42	28.73
Plant Height(cm)	104.83	75.92	93.67	94.08	86.33	28.69	18.15
EBT/Plant	5.42	12.25	6.92	7.17	7.67	5.50	3.48
Pan. Number	6.85	6.35	5.25	5.2	6.2	3.458	2.19
Pan. Weight (gm)/Plant	10.21	4.76	8	8.43	10.17	4.06	2.56
Filled grain wt (gm) /Plant	9.43	3.88	6.98	7.41	8.52	4.11	2.60
Total grain wt(gm) /Plant	9.75	4.36	7.46	7.9	9.4	4.09	2.59
TDM(gm) /Plant	20.68	12.23	17.97	18.91	20.77	3.87	2.45
HI (%)	46.85	30.93	39.66	40.97	39.61	22.17	14.02
Nitrogen in Grain (%)	1.03	1.22	1.29	1.29	1.29	0.25	0.16
Nitrogen in straw (%)	0.35	0.42	0.41	0.36	0.45	0.12	0.08

Table-2: Differential expression of NR, PAL and AT in shoot and root seedling tissues of rice grown in hydroponics

		Folds over without N		
Genotype	Tissue	NR	PAL	AT
SOMALY2-023-3-5-1-2-1	Shoot	0.10 DR	**5.30 UR**	0.10 DR
	Root	0.03 DR	**2.00 UR**	0.10 DR
IR55178	Shoot	0.01 DR	1.34 **UR**	0.28 DR
	Root	0.05 DR	7.4 0 **UR**	0.47 DR
GQ-25	Shoot	1.20 **UR**	2.7 0 **UR**	6.30 **UR**
	Root	0.49 DR	6.40 **UR**	0.65 DR

DR= Down regulation: UR = Up regulation.

AICRIP News

Rice Research Station, Kaul CCS Haryana Agricultural University

Rice Research Station, Kaul was established in February, 1972 with the objective of developing improved high yielding varieties of rice and its production technology. Haryana is one of the leading rice producing states and contributes considerable quantity of rice to the central pool. The State is well known for production and export of high quality scented and superfine quality non-scented rice. The station has well-equipped laboratories, screen houses, agro-met observatory, seed processing unit and a well laid out 33.6 ha farm for research and seed production. Five scientists *viz*. Dr. Ram Singh (Senior Plant Pathologist), Dr. Khushi Ram (Senior Rice Breeder), Dr. Lakhi Ram (Senior Entomologist), Dr. Mangat Ram (Senior agronomist) and Dr. B. S. Mehla (Senior Plant Breeder) are involved in AICRIP research activities of the centre. Besides, RRS, Kaul is also a voluntary centre for Soil Science and its coordinated trials are being conducted by Dr. Dalel Singh, Sr. Scientist cum Regional Director.

Major Achievements

- **Varieties released**

Variety	Year of release	Grain yield (q/ha)		
		Average	Potential	Remarks
A) Non-scented medium duration (136-150 days) varieties for normal planting				
HKR 127	2009	70	100	Semi-dwarf, long slender grain, moderately resistant to false smut
HKR 126	1992	67	100	Semi-dwarf, long slender grain, tolerant to water stress
HKR 120	1987	62	90	Semi-dwarf, long slender grain, moderately resistant to bacterial blight
Haryana Shankar Dhan-1 (hybrid)	2006	75	100	Semi-dwarf, Erect leaves, compact plant type with long slender partially awned grains
B) Non-scented mid-early duration (120-135 days) varieties for normal and late planting				
HKR 47	2005	65	90	Semi-dwarf, Long slender grain, moderately resistant to false smut
HKR 46	2000	63	90	Semi-dwarf, long slender grain
C) Scented Tall (140-155 days)				
Taraori Basmati	1992	25	35	Extra long rice, aromatic, photo-sensitive, elongates twice after cooking
D) Scented semi-dwarf (140-155 days)				
Haryana Basmati No.1	1991	40	55	Semi-dwarf, long slender grain, aromatic, photo-insensitive, resistant to blast

- Recently a non-scented early variety HKR 48 has been recommended for release while a scented variety Haryana Basmati 2 and a non-scented medium duration variety HKR 128 have been identified for testing at farmers' field in the state by University Variety Release Committee.
- Developed seed production and cultivation package for irrigated transplanted and direct seeded rice
- Two CMS lines *viz*. HCMS 1-2A and HCMS 2-1A have been developed and maintained for utilization in hybrid rice programme
- Developed integrated pest management practices against major insect-pests and diseases like blast, bakanae, sheath blight, bacterial blight, false smut, stem borer, leaf folder and WBPH
- Organized Dhan Mela every year in addition to Field Days/Kisan Divas
- Breeder seed of rice varieties is produced to meet out the requirement of seed agencies
- Taraori Basmati has been registered for its quality traits while HKR 95-128, HKR 95-131 and HKR 95-138 found resistant to bacterial blight in multi environmental tests have been maintained as genetic stocks by NBPGR, New Delhi

Panorama of institutional Activities

48th Annual Rice group Meeting held at SKUAST-K, Srinagar

The 48th Annual Rice Group Meeting (ARGM) was organized at Sher-e-Kashmir University of Agricultural Sciences & Technology (SKUAST), Srinagar during April 14-16, 2013. About 450 rice researchers across India representing ICAR institutions, State Agricultural Universities and Private companies and scientists from IRRI participated in the meeting. The inaugural meeting was graced by Jenab Ghulam Hassan Mir, Hon'ble Minister of Agriculture, J&K and Jenab Nazir Ahmad Khan Gurezi, Hon'ble Minister of State for Animal and Sheep Husbandry (Independent charge) PHE, I & FC Horticulture, Agriculture and Floriculture, J&K, Dr. Tej Pratap, Vice Chancellor, SKUAST-K, Dr. Swapan K. Datta, DDG (CS), Dr. R. P. Dua, ADG (FFC), Dr. B. C. Viraktamath, Project Director, DRR, Dr. Shafiq A. Wani, Director of Research, SKUAST-K and Dr. G. Katti Convener of the 48th ARGM. The meeting was chaired by Dr. S. K. Datta, DDG (CS).

Dr. B. C. Viraktamath presented the research highlights and briefed about the last year's rice production situation in the country. The Guest of Honor, Jenab Gurezi while appreciating the efforts made SKUAST for developing varieties to suit to the farmers' needs, urged that there is a need for characterization of locally adapted germplasm for important traits. Dr. R. P. Dua emphasized on bridging the gaps in rice production through existing technologies and through scientific innovation. Dr. S. K. Datta while addressing the delegates mentioned that rice research in India has come a long way during last 70 years from Bengal famine to the self sufficiency. He mentioned that last year, the rice exports were to the tune of 7.3 million tons including 3.2 million tons of Basmati. Dr. Tej Pratap, Vice Chancellor, SKUAST, Srinagar emphasized on long term research plan keeping in mind the changing scenario of mountain agriculture. On this occasion, 13 publications, 10 from DRR, one each from SKUAST, Srinagar, ANGRAU, Hyderabad and TNAU, Coimbatore were released. This was followed by presentation of AICRIP awards-2012 for overall performance as well as discipline wise. These were AP Rice Research Institute, Maruteru (Overall Best AICRIP centre), RARS, Masodha, NDUAT (Plant Breeding), PAU Ludhiana (Agronomy and Entomology), RRS, Rajendranagar, ANGRAU (Plant Pathology), CSAUT, Kanpur (Soil Science) and GBPUA&T, Pantnagar (Plant Physiology). Jenab Ghulam Hassan Mir, Hon'ble Minister of Agriculture, J&K, expressed concern for the new trend of decreasing rice producers and increasing rice consumers and emphasized that rice farming should be made remunerative. The inaugural session ended with vote of thanks by Dr. Katti.

This was followed by discipline wise presentation of progress report. A special session was organized on "pre-breeding in rice to improve yield, resistance and quality. The session was chaired by Dr. M. P. Pandey, Vice Chancellor, BAU, Ranchi and Co-chaired by Dr T. Mohapatra, Director, CRRI, Cuttack. The presentations were made by Dr. Kuldeep Singh, Sr. Molecular Geneticist from PAU, Ludhiana, Dr. Ramesh Sonti, Chief Scientist, CCMB, Hyderabad, Dr. K. K. Jena, Senior Scientist, PBGB, IRRI and Dr. T. Ram, Principal Scientist, DRR, Hyderabad. Variety Identification Committee met under the Chairmanship of Dr. S. K. Datta, Deputy Director General (Crop Sciences), ICAR on 14th April, 2013 and identified 15 cultures and 7 hybrids for different regions. Three cultures and one hybrid were recommended for re-submission with additional data. On 16th April, a special session on IRRI-India collaboration was organized under the chairmanship of Dr. Swapan K. Datta, DDG (CS), ICAR and Dr. Achim Dobermann, DDG (R), IRRI. Eleven presentations were made in this session by Dr. J.K. Ladha, IRRI representative for India and Nepal, Dr. Ruraidh Sackville Hamilton, head, IRRI gene bank, Dr.T. Mohapatra, Director, CRRI, Dr. Eero Nissila, Head, PBGB division, IRRI, Dr. David Johnson, head CESD, IRRI, Dr. K. Velayutham, TANU, Dr. Alfred Schmidley, IRRI, Dr. Nese Sreenivasalu, head of Grain Quality and Nutrition Centre, IRRI, Dr. Samarendu Mohanty, Head, Social sciences division of IRRI, Dr. Noel Magor, Head, Training center at IRRI and Dr. Shaik N. Meera, Senior Scientist, DRR. The plenary session was chaired by Dr. B. C. Viraktamath, Director, DRR and co-chaired by Dr T. Mohapatra, Director, CRRI in which respective Principal Investigators presented the proceedings and recommendations of the concurrent session. The retiring scientists were felicitated for their significant contribution and service rendered to AICRIP

Research Advisory Committee Meeting held

The second meeting of the new Research Advisory Committee (constituted in 2012) was held at DRR from 2-3 May, 2013 under the chairmanship of Prof. E. A. Siddiq, Former DDG (CS), ICAR. The members were Dr. Ramesh V. Sonti, Chief Scientist, CCMB, Hyderabad; Dr. Madan Mohan, Professor, Biotechnology, Delhi University; Dr. R. P. Singh, Former Project Director, Project

Directorate on Cropping System Research, Modipuram; Dr. R. K. Samanta, Ex-Vice Chancellor, BCKVV, (WB), Dr. S. N. Sinha, Ex-

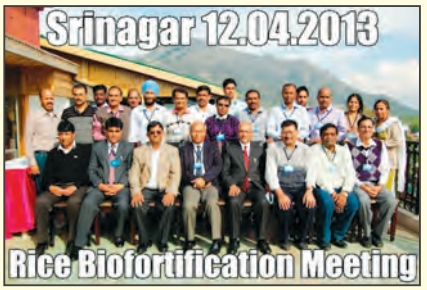
Head, IARI Regional Station, Karnal; Dr. T. Mahapatra, Director, Central Rice Research Institute, Cuttack and Dr. Gururaj Katti, Member Secretary, RAC, DRR. At the outset, Dr. N. Shobha Rani, Project Director I/C welcomed the chairman and all the members and presented an overview of DRR research activities and accomplishments covering crop improvement, crop production, crop protection and social sciences division. Dr. G. Katti presented the proceedings of RAC-2012 and action taken report. This was followed by detailed presentation of research accomplishments of each discipline by respective PI/Head. A special lecture on Indian Agriculture scenario was presented by Dr. R. P. Singh, member RAC

Institute Research Council Meeting organized

Institute Research Council Meeting (IRC) was organized from May 6-9, 2013 under the chairmanship of Dr. B. C. Viraktamath, Project Director, DRR. All the scientific staffs of DRR participated in the meeting. At the outset, Dr. V. Jhansi Lakshmi, Principal Scientist, Entomology and secretary, IRC welcomed the Chairman and all other members of IRC. The chairman in his introductory remarks emphasized the importance of the meeting. This was followed by presentation of the work done during 2012-13 by individual scientists of each discipline. Each presentation was thoroughly discussed by the members. As many as 6 new projects were approved by the chairman. The chairman in his concluding remarks mentioned about excellent work done during the last year. He also urged to put new and innovative ideas in research and suggested to incorporate the suggestions given in Divisional IRC meeting by the external experts and also by the Research Advisory Committee (RAC). This was followed by the presentation of Research Framework Document (RFD) by Dr. M. B. B. Prasad Babu, Sr. Scientist, Soil Science and EFC draft by Dr. K. V. Rao, Principal Scientist and Head, Soil Science. The meeting ended with vote of thanks by Dr. B. Sreedevi, Principal Scientist, Agronomy and Joint Sceretary, IRC

Review Meeting on Bio-fortification Organized

One-day meet on Review of Rice Bio-fortification program was organized by ICRISAT-HarvestPlus (HP) team in association with ICAR, DRR and DBT on 12 April 2013 at SKUAST, Srinagar. Dr. S.K. Datta, DDG (CS) underscored the mission of bio-fortification for the development and release of nutritionally enriched food crops for the needy with the support from DBT project and international dimensions provided by HarvestPlus. He mentioned about ICAR's Bio-fortification Platform and the recent concept of 'Nutri-Farms' and complementation of both programs. The progress of two phases of the DBT Bio-fortification project was outlined by Dr. K.S. Charak, Advisor, DBT. Detailed presentations were made by eight centers: DRR-Hyderabad, IGKV-Raipur, CRRI-Cuttack, RRS-Chinsurah, TNAU-Coimbatore, UAS-Bengaluru, MSSRF-Chennai and University of Calcutta. The deliberations were concluded with general discussion on rice bio-fortification coordinated trials 2013, germplasm exchange among centers and proficiency test across XRF and ICP laboratories



Deputy Director General, IRRI visits DRR

Dr. Achim Dobermann, DDG (Research), IRRI, Philippines visited DRR on 19th April, 2013. He had detailed discussions with Dr. B. C. Viraktamth, Project Director, DRR on ongoing research activities at DRR and also interacted with all the heads of the sections. He stressed on strengthening of collaboration with DRR.

Lecture on Green Super Rice

Dr. Jauhar Ali, Plant Breeder and Coordinator of **Green Super Rice (GSR) Project**, International Rice Research Institute, Philippines delivered a talk on the GSR Project on 22nd April 2013 in Seminar Hall-I, DRR

Secretary ICAR visits DRR

Shri Arvind Kaushal, Additional Secretary, DARE and Hon Secretary, ICAR visited DRR on 29th June, 2013 accompanied by Dr. S. L. Goswami, Director, NAARM. He went through rice museum and interacted with the DRR scientists and showed keen interest in activities of DRR and appreciated the progress made by the institute.

Technical Bulletin released

During 5th Genome Saviour Community Recognition awards ceremony held at NASC complex organized by PPV&FR Authority on 22nd May, 2013, Honourable Minister of state for Agriculture and Food Processing Industries, Shri Tariq Anwarji released the publication "DUS Characterization of Rice Varieties" brought out by DRR

MOU signed

To popularize the DRRH 2 hybrid and to increase the hybrid seed production, Directorate of Rice Research has signed MoUs with two private seed companies *viz*., Namdhari Seeds Pvt. Ltd, Bengaluru and Siri Seeds (India) Pvt. Ltd, Hyderabad, on 19.6.2013

Separate MoUs were signed between Directorate of Rice Research, Hyderabad and M/S Krishidhan Seeds Pvt Ltd. on 26.6. 2013 to popularize DRR hybrids viz. DRRH2 and DRRH3

Staff Activities

Awards

During the 48th Annual Rice Group Meeting at Srinagar, best performing AICRIP centres were felicitated for their outstanding performance during 2012. Andhra Pradesh Rice Research Institute, Maruteru (ANGRAU), Andhra Pradesh was adjudged as Overall Best AICRIP Centre for 2012. In addition, different AICRIP centres were awarded for outstanding performance in individual disciplines.

Discipline	Award winning centre
Plant Breeding	Crop Research Station, Masodha, NDUAT, U.P.
Agronomy	PAU, Ludhiana, Punjab
Entomology	PAU, Ludhiana, Punjab
Plant Pathology	ARS, Rajendranagar, ANGRAU, Hyderabad, AP
Soil Science	CSAUT, Kanpur, Uttar Pradesh
Plant Physiology	GBPUA&T, Pantnagar, Uttarakhand

Deputation

Dr. Shaik N. Meera, Senior Scientist, Agricultural Extension, DRR was deputed to International Rice Research Institute (IRRI) Philippines as Visiting Research Fellow for six months (7 October 2012 to 5 April 2013). During his deputation he worked on further development of the Rice Knowledge Bank (RKB) by designing and managing the coordination of integrated access to rice production knowledge with understanding in the IRRI RKB, CSISA Cereal Knowledge Bank and South Asia country knowledge banks.

DRR Scientist felicitated

Dr. R.M. Sundaram was felicitated by Agri-Biotech Foundation (Formerly known as AP Netherlands Biotechnology Programme) for his outstanding contributions in rice molecular breeding. He gave a lecture at the Foundation and was presented a memento by Dr. Pakki Reddy, Director, ABF

Retirements

Dr. Mangal Sain, Principal Scientist and Head, Division of Social Sciences, Directorate of Rice Research, Hyderabad retired from active service upon superannuation on 31st May, 2013. He made significant contribution in the fields of Agricultural Entomology and transfer of technologies. All DRR staffs wish him and his family a very happy and healthy retired life.

Dr. D. Venkateswarlu, Technical Officer, Hindi (T-7/8), Directorate of Rice Research, Hyderabad retired from active service upon superannuation on 30th June, 2013. He has contributed immensely for the promotion of official language in each and every level at DRR. All DRR staffs wish him and his family a very happy and healthy retired life.

Pests of rice

Rice Tungro Virus Disease of rice

D. Krishnaveni, DRR, Hyderabad-500 030

Rice is a natural host for more than 25 viruses and about 15 viruses may seriously affect rice yield. Rice tungro disease virus (RTD) is one of the major destructive diseases that cause huge damage to the rice crop. '*Tungro*' is a Philippino word meaning degenerated growth. During the last five decades tungro is increasingly noticed in several rice growing states of India.

Symptoms of tungro

Tungro affected plants are stunted in growth with reduced tillering. Young leaves are pale green to yellow, while older leaves are reddish orange in colour. Infected leaves often dry up quickly, if plants are infected during early stages, results in delayed flowering and panicles may fail to emerge.

Causal agent: Tungro is a disease caused by a complex virus comprising of two unrelated virus particles *viz*., *Rice tungro spherical virus* (RTSV) is a plant picornavirus with a single stranded positive sense RNA genome and *Rice tungro bacilliform virus* (RTBV) is a pararetrovirus, with a double-stranded and circular DNA genome.

Vectors and transmission: Green leafhopper species, *Nephotetix virescens*, (Distant) and *N. nigropictus* (Stal.) and zigzag leaf hoppers, *Recilia dorsalis* (Motsch) have been reported to be vectors to transmit the virus. As these insects fly and feed on other plants, the virus particles from the stylets get introduced into healthy plants, where 7 minutes of feeding time is enough for transmission. Tungro symptoms can be seen after 10-14 days.

Survival and Perpetuation: Tungro is mostly a crop adaptive, non-persistent virus that lives in rice plants. In mono-cropped areas, it may survive in stubble and multiply in ratoons. In double or triple cropped areas the virus may survive through transmission from one rice crop to another crop. Stubbles, self sown, voluntary plants and ratoons play a great role in the inter-seasonal carry-over of tungro inoculums.

Diagnostics: The tungro virus disease symptoms are often confused with other conditions *viz.,* physiological or nutritional disorders, and direct damage by pests or other viral diseases. Early detection of the disease is essential for the effective management. At DRR, PCR based and RT-PCR based techniques have been developed for the precise diagnosis of RTBV and RTSV particles.

Management of the disease

The management of rice tungro disease should be considered in an integrated manner. This involves deployment of resistant or tolerant varieties, elimination of primary sources of inoculum, vector management, seed bed management and cultural practices.

Host plant resistance: Vikramarya, Radha, and IET 9994 (Nidhi)

Cultural methods:

- Rouging and burning of infected plants Destruction of alternate hosts and grasses on the bunds.
- Crop rotation preferably with pulses or oil seeds

Chemical control:

- Application of granular insecticides like carbofuran @ 10 kg per acre in the nursery (5 days before pulling the nursery).
- Application of carbofuran 3G 10-12 kg/ac or spraying of imidacloprid 200SL@40 ml or chloripyriphos 20 EC @ 500 ml in 200 lit. of water in the main field. Repeat the spray after 7-10 days depending upon the intensity of the green leafhopper populations (more than 10 per hill)

Rice Recipe: Kabuli rice

Dr. Amtul Waris, Principal Scientist, DRR, Hyderabad-500 030

Kabuli Rice is a Rajasthani recipe, mainly from Jodhpur.

Ingredients

2 cups basmati rice, 1 medium size onion chopped, 1/4 small potato diced, 1/4 small carrot diced, 1/2 cup cauliflower florets, 1/4 cup green beans, 1/2 cup peas, 1 cup yogurt, 1 Bread Slice - cut in cubes and deep fried, 1/2 teaspoon turmeric powder, 1 teaspoon red chilli powder, 2 teaspoons garam masala, 1 tablespoon ginger garlic paste, 1 tablespoon of mix dry fruits (raisins, cashewnuts), bay leaf, salt as per taste, Oil.

Instructions

- Wash and cook rice, spread and keep it aside.

- Sauté, peas, potatoes, carrots, cauliflower and keep it aside.
- Heat oil, add bay leaf, add ginger garlic paste, sauté onion for few minutes, when onion starts changing color add the vegetables
- Add the dry spices and stir well.
- Lastly add yogurt stir it nicely then cover the lid and let it simmer for few minutes.
- In a serving dish, spread a layer of rice, on top spread the vegetable gravy, and then rice. Repeat this twice. Or just mix it all together. Decorate with bread pieces and serve it hot with curry, raita or garlic chutney.

Rice news around the globe

- A group of scientists from De Montfort University, Leicester, UK have identified an aromatic rice from Bangladesh with very low arsenic content and higher concentrations of essential nutrients, selenium and zinc which could have major health benefits (Shaban et al., 2013, Biomedical Spectroscopy and Imaging, Vol 1, No. 4 / 2012 DOI: 10.3233/BSI-120028)
- A recent publication from University Teknology MARA showed that heated 'Ricebag' (rice put in woollen fabric) can be used to treat soft tissue injuries (Source: http://www.sciencedaily.com /releases/2013/04/130417091648.htm)
- Researchers from Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, BGI-Shenzhen, and University of Arizona have sequenced the complete genome of wild rice *Oryza brachyantha* which can provide new insights to understand the function and evolution of Oryza genomes (Chen et al., 2013, Nature Communications, 2013; 4: 1595 DOI: 10.1038/ncomms2596)
- A recent publication from Michigan Technological University has revealed that extracts of calli from rice stem cells can knock out two kinds of human cancer cells as well or better than the potent anti-cancer drug Taxol (Deshpande et al., Phytotherapy Research, 2012; 26 (7): 1075 DOI: 10.1002/ptr.3699)
- The dominant broad spectrum blast resistance gene, designated Pi49, was mapped on chromosome 11 with genetic distance of 1.01 and 1.89 cM from SSR markers K10 and K134, respectively in Mowanggu, a local japonica cultivar (Sun et al., 2013, Euphytica, 192:45–54)

BOOK POST

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