



ICAR-Indian Institute of Rice Research

NEWSLETTER

Volume : 13 , Number : 3

RICE IS LIFE

July - September 2015

From Director's Desk....



Warm greetings to all

I am pleased to share with you our newsletter for the third quarter of 2015. The kharif season in which over 85% of the country's rice is produced falls during this period, which also coincides with the southwest monsoonal rains that provide about 80 percent of the country's annual precipitation. The South West monsoon which influences the production prospects for kharif rice was reported to be 14% lower during the current monsoon season from June to September, 2015 compared to the Long Period Average (LPA) rainfall. As per 1st Advance official estimates for 2015-16, area coverage under kharif rice is lower by 12.96 lakh hectare than its area coverage of 396.51 lakh hectare during the same period of 2014-15. However, according to the Ministry of Agriculture, due to multiple governmental interventions like contingency plans, timely advisories and regular monitoring of seed and fertilizer availability, estimated production of kharif rice is 90.61 million tonnes which is higher by 2.59 million tonnes in comparison to the 1st Advance Estimates for the previous year.

ICAR-IIRR, which is observing its Golden Jubilee this year, celebrated the 68th Independence Day on 15th August with great enthusiasm. A sport meet involving all the ICAR Institutes at Rajendranagar was also organized to commemorate the occasion. The Honourable Union Minister for Labour, Shri. Bandaru Dattatreya graced the one day "Innovative Farmers Meet" organized on 29th August 2015 at IIRR and distributed awards to farmers from different parts of the country for their

innovations related to rice cultivation. Hindi Pakhwada celebrated from 14 - 29th September witnessed enthusiastic participation by all the staff of ICAR-IIRR.

Dr. Shaik N.Meera, Dr. Divya Balakrishnan and Dr L.V Subba Rao brought laurels to the Institute by receiving respectively the prestigious "Lal Bahadur Shastri Outstanding Young Scientist Award 2014", the "Jawaharlal Nehru Award for PG Outstanding Doctoral Research in Agricultural and Allied Sciences 2014" and "Seedsmen Annual Awards-2015". In addition, Dr. Brajendra, Senior Scientist (Soil Science), IIRR has the rare honour of being nominated by the Food and Agricultural Organization of the United Nations as one of the top global soil experts to the panel of Intergovernmental Technical Panel on Soils.

An important mandate of the Institute is to disseminate salient technologies and to function as a knowledge platform on all aspects of rice production. In this endeavour, a short course on "Quality Improvement, Bio-fortification and Product Development in Rice for Nutritional and Financial Security of Rice Farmers" was organized during September 1-10, 2015. Scientists also organized outreach programs in the tribal mandals of Chintapalli of Visakhapatnam and Seethampeta of Srikakulam district of Andhra Pradesh, Chinna Solipet Village of Rangareddy district and Yellammatanda of Telangana.

I hope that the contents of the newsletter would be informative and useful to the rice fraternity and I take this opportunity to invite your participation in the International Rice Symposium 2015 with theme of Rice Science for Global Food and Nutritional Security which will be held at Hyderabad from November 18 - 20, 2015.

(V. Ravindra Babu)

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AICRIP Centre Profiles

Hybrid Rice Evaluation Centre, Gudalur, Tamil Nadu – 643 212

History

The Hybrid Rice Evaluation Centre, Gudalur in Nilgiri Dist. was established during July 1996. The main objectives are to identify and utilize TGMS lines for development of Two line Hybrid Rice suitable for Tamil Nadu. A scheme entitled “Development of Two line Hybrid Rice” was implemented with the financial support by the TNADP during 1995-96. The research activities were initiated at HREC, Gudalur from 1996 to intensify the research activities on two line hybrid rice under the technical and administrative control of the Director, Centre for Plant Breeding and Genetics, and later Director of Research, TNAU, Coimbatore. The experiments were conducted in different lease lands from 1996 to June 2009. During July 2009, a separate land (2.65 acres) was purchased in Devala village, Nelliyalam panchayat, Gudalur taluk. The experiments are being conducted in the newly purchased land.

The station is located at Gudalur in Ooty – Mysore National Highway, Nilgiri District, Tamil Nadu, India. This centre is situated at an elevation of 1300 m MSL and between 11.5 N latitude and 76.5 E longitude. The average rainfall is more than 2000 mm per year.

Mandate: The mandate is to develop TGMS lines in rice, to perpetuate the promising TGMS lines in rice, to develop

two line hybrids in rice, to coordinate the rice research and development activities with various rice research stations of TNAU and IIRR, Hyderabad and to screen the rice genotypes for blast resistance.

Research Activities

In this centre evaluation and seed multiplication of Thermo Sensitive Genic Male Sterile (TGMS) lines are being carried out. The TGMS lines needs cool climate for seed setting ie., day temperature should be < 24 C and night temperature should be > 18 C. This type of climate prevailed only in Gudalur of Nilgiri District in Tamil Nadu. Apart from this evaluation of AICRIP rice genotypes for hilly ecosystem and screening of rice genotypes (DRR and TNAU materials) against blast and brown spot are being carried out regularly. Popularised CO R 50 for cultivation in hill eco system which gives 30-40 % higher yield over the local variety Bharathy.

Contact Address

The Professor and Head, Hybrid Rice Evaluation Centre, TNAU, No. 18, New Municipal Complex, Near State Bank of India, Ooty – Mysore Main Road, Gudalur – 643 212, Nilgiri District, Tamil Nadu. Phone Number : 04262 – 264945, EMail: arsgudalur@tnau.ac.in; drres@tnau.ac.in



TGMS Screening nurseries



Blast Screening Nurseries

Hill Agricultural Research and Extension Centre

CSKHPKV Dhaulakuan Sirmour Himachal Pradesh

History

Hill Agricultural Research and Extension Centre (HAREC) earlier called as Regional Research Station was established by State Department of Agriculture in 1954 and transferred to CSKHPKV, Palampur in 1978 to fulfil the research needs of sub-mountain and sub-tropical areas of the state and designated as Regional Research Station. Krishi Vigyan Kendra was established at this centre in 1983 for effective transfer of technology demonstration. In November 2002, after reorganization of research and extension systems of the university, it was named as Hill Agricultural Research and Extension centre, Dhaulakuan. It is located at Dhaulakuan in Sirmour district 25 km from Nahan and 17 km from Paonta Sahib. The centre is located on Nahan-Paonta Sahib road (National Highway 72) at an altitude of 469 msl and 30.4 N of longitude and 77.5 E of latitude. Nearest railway station and airport are at Dehradun and Chandigarh respectively.

Infrastructure

This station has a total area of 35.53 ha out of which 8.88 ha is given to KVK. Area under experiments is 8.85 ha, seed production is 10.68 ha, fodder is 1.9 ha, miscellaneous area is 5.22 ha. The infrastructure includes laboratories of Plant Breeding, Plant Pathology, Agronomy, Entomology, Soil science, Plant Physiology and Animal Nutrition, library, glasshouse, growth chambers, B grade materiological observatory, auditorium, seed grader, guest house and farmers' hostel. Limited residential facilities are also available at the centre. It has an experimental area of 26 ha divided into two parts.

The centre has a sanctioned strength of 15 scientists with 10 technical, 8 administrative, 3 drivers and 47 supporting staff. There is one small dairy unit of murrah buffaloes at the centre as a demonstration unit.

Mandate

Basic and strategic research on important hill crops including indigenous germplasm conservation, Research on high value crops utilizing niche potential of mountains, Development of integrated farming system modelas using the latest technology and traditional wisdom of farming community, Transfer of Technology through demonstration and training.

Major thrust areas

Development/identification of suitable varieties of cereals, pulses, oilseeds, vegetables and forages, Rainwater harvesting using polylined tanks, Organic farming, IPM

with emphasis on biopesticides, Quality seed /planting production, Livestock improvement and balanced nutrition

Salient achievements

Varietal development: Till date the centre has developed about 50 varieties of 22 crops for different agroclimatic conditions of the command area.

Genetic Resources: Valuable crop germplasm is maintained by the breeders.

Seed Production: Every year 150-200 ruinatls of breeder and TL seed of 25-30 improved varieties of various crops and vegetables is produced.

Vermicomposting: Vermicompost was prepared by conservation of raw dung, obnoxious weeds like Lantana, Ageratum, Parthenium and Eupatorium by using earthworm (Eudrilus euginae) and is demonstrated and used in large scale in HP.

Water Management: Low cost water storage and utilization systems (LDPE film lined tanks and conveyance systems) have been developed and demonstrated for limited irrigation and growing off-season crops.

Crop Protection: Cost effective and efficient insect trap has been developed for trapping beetles affecting crops.

Staff Position Dr Dhanbir Singh (ADR), Dhirenda Singh (Plant Breeder)



Monitoring of AICRIP trials

IIRR is entrusted with the responsibility of collective planning, implementation and co-ordination and multidisciplinary rice research activities being carried out at more than 100 research centres spread over 27 states and two union territories. Monitoring of All India Coordinated Rice Improvement Programme (AICRIP) trials, breeder seed production, frontline demonstrations in farmer's fields and the research activities of the centres is very crucial to ensure desired results and proper implementation of the Co-ordinated programme. This year during the reporting period (July-September 2015), two multidisciplinary teams from IIRR along with a nodal scientist from the respective regions have completed the monitoring of rice trials as per the details given below.



Blast Nurseries in Almora

S. No.	IIRR team and Nodal Scientist	AICRIP Centres monitored	Period of Visit	Remarks
1	LV Subba Rao, V Jhansi Lkshmi and MBB Prasad Badu	Khudwani, Larnoo, Shalimar, Chatha, Rajouri, Malan, Palampur, Dhia Khurd (BSP), Dhaula Kuan	10-20 September	Monitored Hill region trials. In general crop stand was good in the AICRIP centres. Moderate incidence of leaf and neck blast and large number of grasshoppers at Khudwani, severe incidence of hispa in Entomology trials, moderate to severe incidence of leaf blast at Malan, severe incidence of leaf and neck blast at Rajouri, severe incidence of foot rot disease at Larnoo were observed.
2	V P Bhadana, V Jhansi Lkshmi, B Sreedevi and Indradev Pandey	Almora, Bhageswar, Majhera, Pantnagar	26 September - 2 October	Monitored hill region trials. The rainfall received was below normal in Bhageswar and Majhera. The crop stand was good at Pantnagar. At Majhera, the crop stand was not good due to lack of water. At Almora severe incidence of leaf and neck blast, at Majhera severe incidence of brown spot, at Pantnagar large number of stem borer moths, moderate incidence of BLB and sheath blight were observed.

Society for Advancement of Rice Research is Online from April 2015

Website concept & content by : Dr . P. Revathi, Dr . V. P. Bhadana & Dr .V. Ravindra Babu

Research Highlights

Agamimi - A japonica rice variety rich in Zinc micronutrient

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Rice is the major staple food for more than half of the world's population contributing 60%-70% of daily calorie intake. However, rice seed contains inherently low concentration of micronutrients especially iron and Zinc. People consume mostly polished rice and as polishing leads to loss of Zn, only 20 % of the daily requirement of zinc is met. Consequently Zinc deficiency has become more prevalent among people, whose diets are largely rice based. As per the guidelines of world Health Organization (WHO, 2007), about 20% of the world's population is at risk of zinc deficiency. Apart from pregnant and lactating women, the infants and young children are more vulnerable to Zn deficiency. The symptoms include growth retardation, dermatitis, diarrhoea, hair loss and poor immunity. Biofortification is more promising and economic approach to develop nutritious rice with increased Zn content.

The first step in breeding for Zn rich rice cultivars is characterization of germplasm for seed zinc content besides grain yield. In this context a traditional japonica rice cultivar of Egypt called Agamimi was evaluated for Zn content and yield traits in Initial Variety trial (IVT)-Biofortification under AICRIP multilocation testing program conducted in 17 locations spread over 12 states during 2014. It is an intermediate (120 cm), mid early duration (130 days) variety possessing short bold grains. This japonica rice cultivar was found to possess coastal saline tolerance (ECe 7.0 and pH 7.65) in the trial conducted at Machilipatnam, a coastal saline location of ANGRAU, Hyderabad. It has recorded yield (3275 kg/ha) on par with coastal saline yield check Indra (3325 kg/ha).



Fig. 1: Agamimi

Across locations it recorded overall mean Zinc content of 25.49 ppm in polished rice (10%) which is much higher than the threshold value of 16 ppm. It outperformed the micronutrient checks such as Kalanamak and Chittimutyalu containing 18.29 ppm and 21.49 ppm Zinc respectively. But the iron content was found to be low (2.65 ppm) which is below threshold value (10 ppm). It recorded mean yield of 2815 kg ha⁻¹ lower than that of yield check, Samba mahsuri (4197 kg/ha) (IIRR Progress report, 2014, Vol.1). It displayed good cooking and eating quality parameters i.e., desirable amylose content (22.9 %), intermediate alkali spreading value (4) and soft gel consistency (63 mm). Regarding physical quality traits, it exhibited high head rice recovery (69.6%) and high milling outturn (71.5%).

The entry showed broad spectrum resistance to different diseases in the field. It displayed resistance to leaf blast (Susceptible index: 2.3) whereas moderate resistance to sheath rot (SI: 4.4) and RTD (SI: 5) (IIRR Screening nurseries, 2014). Agamimi could be used as a potential donor for Zn improvement in the adapted varieties with high grain yield potential in view of the high nutritive value it possesses. Rightly Govt. of India has also launched a mega project addressing the issue of developing nutritionally rich rice varieties.



Fig. 2a: Paddy



Fig. 2b: Brown rice
Zn: 30.6 ppm



Fig. 2c: Polished rice
Zn: 25.49 ppm

Rice germplasm lines resistant to rice brown planthopper

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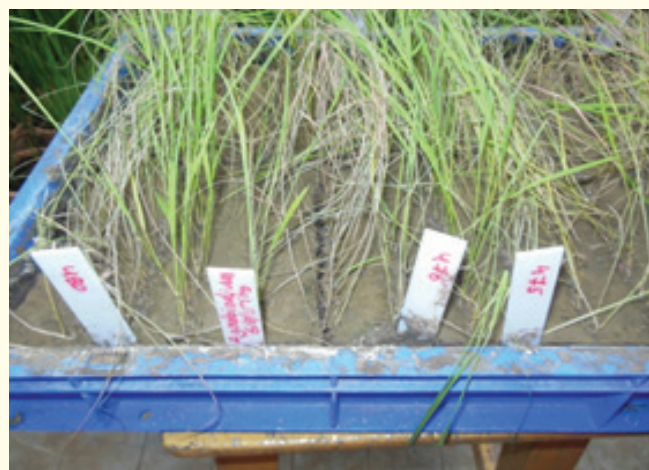
Rice brown planthopper (BPH), *Nilaparvata lugens* is the most important insect pest of rice in India. The nymphs and adults of this planthopper stay at the base of the rice plant and suck the phloem sap. This results in the yellowing, drying and ultimately death of the rice plant. This damage is called hopperburn and in severe cases of infestation, the plants in the field die in circular patches and 100% yield loss occurs. In addition to direct damage, BPH transmits the viral diseases like grassy stunt and ragged stunt. Host plant resistance is one of the important management options available to effectively control the brown planthopper. The necessity to identify suitable new donors resistant to BPH from different sources of diverse origin is of utmost importance in order to combat the pest and develop material resistant to different biotypes. Because of the development of biotypes that could damage the cultivars possessing a narrow genetic base, it has become imperative for a crop to have broad genetic background to retard or prevent such a catastrophe. Identification of new resistance genes is one of the most reliable strategies by rotating varieties having different major genes conferring BPH resistance. One thousand rice germplasm lines collected from various parts of India were mass screened for their reaction to BPH in the IIRR greenhouse under artificial infestation conditions through standard seedbox screening test on 0-9 scale. Of the 1000 germplasm lines screened, one is highly resistant, 19 are resistant and 40 are moderately resistant to BPH. These germplasm lines are collected from the remote areas which are not explored earlier and are evaluated for the first time for their reaction to planthoppers. The lines which are found resistant to the brown planthopper can serve as the new resistant donors and can be used in the breeding programme for BPH resistance. Further investigations to ascertain novelty of resistant genes in the germplasm lines

and mechanisms of resistance to BPH are required in order to use them in breeding programme.

Reaction of germplasm lines to rice brown planthopper, BPH

S. No.	Germplasm IC Number	Damage Score	Reaction
1	IC 216750	0.77	HR
2	IC 216788	1.2	R
3	IC 216737	1.3	R
4	IC 75961	1.36	R
5	IC 75990	1.42	R
6	IC 76013	1.54	R
7	IC 76000A	1.79	R
8	IC 217507	1.95	R
9	IC 76010	1.99	R
10	IC 76033	2.04	R
11	IC 217509	2.10	R
12	IC 215054	2.20	R
13	IC 217460	2.45	R
14	IC 217492	2.45	R
15	IC 217441	2.55	R
16	IC 216538	2.8	R
17	IC 216944	2.8	R
18	IC 216735	3.0	R
19	IC 218062	3.0	R
20	PTB 33	1.7	R
21	TN 1	9	S

HR: Highly Resistant, R: Resistant, S: Susceptible



Web based Expert System for rice varieties, pests and diseases

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Expert systems are computer programs that are different from conventional computer programs as they solve problems by mimicking human reasoning processes, relying on logic, belief, rules of thumb opinion and experience. Generally farmers face problems like choosing suitable varieties, knowledge on pesticides/fungicides application, pest and disease problems, yield losses etc. Agricultural experts are always not available to farmers when they need. Real time problem solving is essential to give confidence to farmers and increase the productivity of rice.

Web-based applications have a much easier path to successful cross-platform compatibility than downloadable software applications. An attempt was therefore made to develop an expert system for rice varieties, pests and diseases to aid in the decision making at farm level. This system was first developed as standalone system and refined further as web based expert system using Microsoft SQL as back end and ASP.Net as front end. Step wise information has been provided for developing interface to identify pest/disease symptoms starting from field appearance to damage and finally for recommending control measures.

The home page of Rice Expert System (Fig 1) consists of series of questions and answers to diagnose the problem, to browse directly major pests/diseases/varieties, to access information on better crop protection measures, commonly used pesticides for rice and frequently asked questions.



Fig. 1: Home Page – expert system user interface

If user already knows the problem, then user can directly access the details by choosing insect pests, diseases and varieties links. If user clicks on the pest/disease name then the detailed information regarding the pest/disease will be displayed (Fig 2).

If the problem is unknown then user has to select the animated image button from the home page to diagnose the problem.

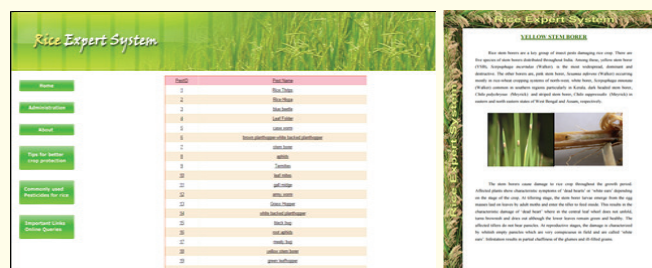


Fig. 2: List of Rice Pests/Diseases

An interface was developed with questionnaire supported by popup menus, list boxes in the drop down menus and option groups. Each option was aided by appropriate visual colour photographs to help the user for accurately selecting his choice and seek solution. Questionnaire menu of the expert system begins by collecting information about the place followed by ecosystem based on the input provided by the user while selecting through drop down menus. At the second level it collects information on weather followed by crop details as variety duration, crop stage etc. At the third level, questions seek to gather information on the various symptoms in the field that were encountered by the user. Then a series of questions were designed to access the right answer from the knowledge base with regard to either disease or insect pest problems (Fig 3).

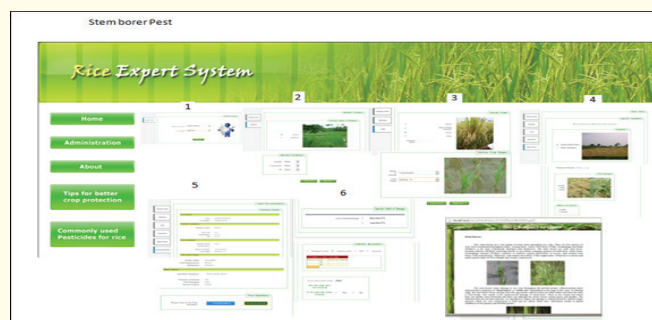


Fig. 3: Flow questions to diagnose insect pest stem borer

Web based expert system is a dynamic system to diagnose pest and disease problems at field level without experts advice and updates database of new problems of rice crop. The alpha version of the system was successfully hosted on public domain and can be upgraded for various ecosystems.

This facility is therefore expected to aid and enhance the performance of progressive farmers and agricultural extension personnel and reduce the time required to tackle biotic stresses without waiting for an expert advice. Further this system can be integrated with mobile phones to reach each and every farmer of the country.

Socio-religious Significance of Rice

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Rice plays an important role in the lives of the people of our country. It is not just a form of sustenance that nourishes the body; it is also an inseparable aspect of everyday life. In Hinduism, rice holds great spiritual and ritual significance as it is a staple of the Indian diet. Because of its basic life-sustaining qualities, rice is revered as a potent symbol of auspiciousness, prosperity and fertility and therefore is used extensively in Hindu rites and rituals. Rice particularly plays a significant role in some Hindu *samskaras* -- rite-of-passage ceremonies that signify transition periods in an individual's life and personality development -- as well as in harvest festivals.

Wedding Rituals

During a Hindu wedding, rice is often sprinkled over the newlywed couple to bless them with a prosperous married life. Because rice is thought to ward off demons, it is poured into the wedding fire by the bride and bridegroom. It is also offered by the couple to their patron household deity after the completion of the marriage ceremony and sprinkled around the house by the new bride to secure blessings on their joint home. In certain parts of India the couple will stand on a pile of rice during the marriage ceremony.

First Feeding Ceremony - Annaprasana

Rice plays a central role in the Hindu ceremony of Annaprasana, a ritualized first feeding, as it is the first solid food placed in a baby's mouth. The ceremony is conducted in the baby's sixth or seventh month of life, depending on local customs and the health of the child, and is arranged by a priest. Simple boiled rice or a sweet rice pudding called *kheer* is prepared by the mother or grandmother of the child under the chanting of appropriate Vedic mantras. Annaprasana literally means "feeding rice" in Sanskrit. It is also known as *Bhaatkulai* in the Garhwal hills, *Mukhe Bhaat* in Bengal or *Choroonu* in Kerala. Annaprasana is primarily a Hindu ceremony (though Parsis also have a similar ritual) that symbolises the beginning of the weaning period in your baby's life. The baby is gradually introduced to solid foods following this ceremony.

Education Initiation Ceremony - Vidyarambham

The Vidyarambham ceremony initiates Hindu children into the world of education by exposing them to their first letters. During the ceremony, a child is assisted to form letters in a plate covered with dry rice grains. The letters are generally a mantra of prosperity that is again written with gold on the child's tongue. Rice is utilized in this ceremony as it represents fortune and blessings for the prosperous development of the child.

Celebration of Rice - Harvest Festivals

Thai Pongal is a mid-January festival celebrated among the Tamils of southern India to mark the end of the harvest season. The day's celebrations include an early morning ceremony of boiling rice with milk and sugar in clay pots. The boiling of the milk is considered an auspicious sign. The freshly cooked rice dish, called *pongol*, is offered to the sun god *Surya* to express gratitude for the successful harvest and the lengthening days, and to secure blessings of prosperity. Pongal in the state of Tamil Nadu is celebrated during the same time as '*Bhogali Bihu*' in the North Eastern State of Assam, *Lohri* in Punjab, '*Bhogi*' and '*Makar Sankranti*' in Andhra Pradesh and '*Makar Sankranti*' in the rest of the country, including Karnataka, Maharashtra, Uttar Pradesh, Bihar and Bengal. Assam's '*Bihu*' involves the early morning worship of *Agni*, the god of fire followed by a nightlong feast with family and friends.

Bengal's '*Makar Sankranti*' entails the preparation of traditional rice-sweets called '*Pittha*' and the holy fair - *Ganga Sagar Mela* at the *Ganga Sagar* beach. In Punjab, it's '*Lohri*' - gathering around the sacred bonfire, feasting with family and friends, and exchanging greetings and pleasantries. And in Andhra Pradesh it is celebrated as '*Bhogi*', when each household puts on display its collection of dolls.

Bihu or Bohag Bihu is the most important festival of the people of Assam. It is a festival that transcends all religious and class barriers bringing people together in a free and uninhabited manner. The Bihu festival signifies a celebration



of farming, especially paddy. Rongali Bihu marks the beginning of sowing of seeds, the Kati Bihu marks the completion of sowing and transplantation of the saplings and finally Magh Bihu marks the advent of the harvest period. Bohag Bihu, is celebrated in mid-April, the Magh Bihu, held in mid-January, and the Kati Bihu is celebrated in mid-October. The three are connected with the spring, winter and autumn seasons respectively.

Hariyali Kora Navkhani

This festival is celebrated in the month of September and October in the state of Chattisgarh. Hariyali and Kora are celebrated in the month of September, meaning greenery and plentiful, whereas Navkhani is celebrated in October. The word 'Navkhani' means eating the new crop and offering the new harvest to the forefathers.

Gokul Ashtami

The birth of Lord Krishna is celebrated on Gokul Ashtami or Janmashtami.. Gopal Kala-a preparation made of flattened rice and curds is prepared on this day. Another fun-filled ritual performed on this day is dahi-handi - clay pots filled with curd, puffed rice and milk are strung high up above the streets and groups of enthusiastic young men (and even women) form human pyramids to reach these and break them open.

The festival of Chhath is celebrated in Bihar with traditional fervor. This festival is exclusive to the state of Bihar as no other state celebrates this festival of thanksgiving to the Sun God. It is the bounty of the harvest, which is deemed a fit offering to the Sun god. Newly pounded rice is soaked and made into a paste. Dry fruits, nuts and slivers of coconut are used as flavoring and the cooked lump is then rolled in the palms, into hardened laddoos.

Implementation of Integrated Breeding Platform (IBP) tools - Breeding Management System (BMS) for modern crop breeding

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The Integrated Breeding Platform (IBP) is a web-based one-stop shop for information, analytical tools and related services to design and carry out integrated breeding projects. The Generation Challenge Programme (GCP) of the Consultative Group on International Agricultural Research (CGIAR) is leading the development of an Integrated Breeding Platform (IBP, www.integratedbreeding.net) that will offer crop information, data management and analysis tools and other services, to enable researchers in developing-country agricultural research institutes carry out molecular breeding projects in an efficient and cost effective manner. Many National Programmes, particularly in developing countries, are not using basic data management and analytical tools for crop improvement. This can lead to sub-optimal breeding

decisions. The Integrated Breeding Platform provides a unique, comprehensive and easy to use suite of tools, for the capture, management and analysis of data for crop breeding. Improved data management will result in increased efficiency in targeted breeding programmes, allowing them to use modern breeding approaches (e.g., genomic-based or predictive breeding), and thus reduce the time and resources required to develop and bring new crop varieties into farmers fields. The BMS is a suite of interconnected software specifically designed to help breeders manage their day-to-day activities through all phases of their breeding programmes. From straight forward phenotyping to complex genotyping, it provides all the tools that are needed to conduct modern breeding in one comprehensive package BMS.

Comparative Advantage of India in Rice Exports

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India is the leading exporter of rice in the world. It has exported 3.7 million tons of basmati rice worth Rs.27,597 crores and 8.27 million tons of non-basmati rice worth Rs.20,428 crores during 2014-15. There has been a tremendous increase in export of both basmati and non-basmati rice from India during the period 1995-96 to 2014-15. The total quantity of total rice exports have increased by about 144 per cent during the last two decades. The major destinations for export of Basmati rice have been observed as Saudi Arabia, Iran, Iraq, UAE and

Kuwait. Bangladesh, Srilanka, Nepal and Senegal were the major export destinations for non-basmati rice. The value of export competitiveness ratio is greater than unity (14.84 in 2005 and 15.36 in 2012) and the revealed symmetric comparative advantage (RSCA) is positive during the period. The export competitiveness ratio and revealed symmetric comparative advantage indicate that India has a high comparative advantage for export of rice and has enormous scope for sustaining its top position in the world rice trade and also to increase its exports.

Rice News

New Nutrient Rich Rice Varieties Identified

High Zinc line (IET 23832)

IET 23832 ((RP 5886-HP 3-IR80463-B39-3), developed from the cross IR 73707-45-3-2-3/ IR 77080-B-34-3 is a mid early duration culture (~130 days) with long slender grains. It recorded an average of 18.18 ppm Zinc content in polished grains which is higher than the checks viz., Kalanamak (16.43 ppm) and Chittimuthyalu (16.71 ppm). Qualitywise, IET 23832 recorded 55.6% HRR which is fairly high for a long slender grain culture, intermediate ASV (3.5), amylose content (21.11%) and Gel Consistency (54 mm).

It is identified for the states of Karnataka, Tamil Nadu and Andhra Pradesh as high zinc culture with high yield potential

High protein line (IET 24780)

IET 24780(CR 2829-PLN-37) developed from the cross ARC 10075/ Naveen is a high protein line of mid early duration (~125 days). It is semi dwarf, compact plant type and has good initial growth and tillering ability. It recorded yield superiority over all the checks in the states of Odisha, Madhya Pradesh and Uttar Pradesh. It has more than 10.0% protein content in polished grains which is higher than its high yielding parent (Naveen) and other checks and qualifying checks in the trial. Possessing medium slender grains, IET 24780 recorded high HRR (69.7%), AC (25.1%), GC (37 mm).

It is identified for the states of Odisha, Madhya Pradesh and Uttar Pradesh as high protein culture with high yield potential

Big data on 3,000 rice genomes available on the AWS Cloud



Sample seeds from among the 127,000 rice varieties and accessions stored in the International Rice Genebank at the International Rice Research Institute.

The 3,000 Rice Genomes Project (3K RGP) is a collaborative, international research program that has sequenced 3,024 rice varieties from 89 countries. This massive dataset is a powerful resource for understanding natural genetic variation in rice as well as for large-scale discovery of new genes associated with economically important traits. It will help accelerate the pace of developing improved rice varieties around the globe to feed a growing population, estimated to reach more than 9.6 billion by 2050, with half of humanity relying on rice for sustenance and livelihood.

The International Rice Genebank of the T.T. Chang Genetic Resources Center at the International Rice Research Institute (IRRI) in the Philippines contains more than 127,000 rice varieties and accessions from all over the world. These accessions hold a virtually untapped reservoir of genes/traits that can be used to make rice cultivation more sustainable, with a smaller environmental footprint. Traits targeted for improvement include higher nutritional quality; tolerance of pests, diseases, and environmental stresses, such as flood and drought; and reduced greenhouse gas emissions.

Three research institutions—the Chinese Academy of Agricultural Sciences (CAAS), the Beijing Genomics Institute (BGI) Shenzhen, and IRRI—collaborated to sequence the genomes of 3,024 rice varieties and lines housed in the IRRI (82%) and the CAAS (18%) genebanks. The sequencing and initial analysis was funded by grants from the Bill & Melinda Gates Foundation and the Chinese Ministry of Science and Technology. This dataset contains millions of genomic sequences from a diverse set of rice varieties that, when combined with phenotyping observations, gene expression, and other information, provides an important step in establishing gene-trait associations, building predictive models, and applying these models to breeding.

Panorama of Institutional Activities

Independence day celebrated at IIRR

68th Independence day was celebrated on 15th August at IIRR. Dr V Ravindra Babu, Director, IIRR hoisted the national flag and highlighted 50 years achievements of IIRR. On this occasion, games and sports competitions were organized for all the staff members of IIRR. In addition to these competitions, separate sports meet was conducted for various ICAR Institutes viz., IIOR, IIMR, NBPGR, PDP, NAARM situated in Rajendranagar area of Hyderabad. The sports events include Table Tennis, Shuttle, Kabaddi, Volleyball. The Directors of the various ICAR Institutes also participated in the celebrations and prized were distributed to the winners of different competitions.



Innovative Rice Farmers' Meet- organized

Indian Institute of Rice Research – ICAR organized an Innovative Farmers meet on 29th August 2015 in the premises of IIRR. Honourable Union Minister for Labour, Shri. Bandaru Dattatreya was the Chief Guest of this function. Shri. V. Shobanadreeswara Rao, former Minister of Agriculture, Govt of Andhra Pradesh, Dr. I.S. Solanki, ADG (FFC) and Sh. Dusharla Satyanarayana, Founder, Jala



Sadhana Samithi were Guests of honour. The Chief Guest felicitated thirty innovative farmers representing all over India for their innovations related to rice cultivation. The rice innovations were in to the broader areas of machineries, development of new cultivars, conservation of native varieties, innovative pest, disease and weed management, water management techniques, storage devices, organic rice cultivation, soil fertility management, upscaling of indigenous technical knowledge in rice cultivation etc. Innovative farmers made presentation on their innovations followed by interaction with the subject matter specialists for further upscaling and validation. On this occasion a book on “Rice Innovation – 2015” was released along with a “Mobile app on Rice Innovation”. More than 200 farmers from all over India participated in this function and witnessed the farmers’ innovations in rice cultivation.

Hindi pakhwada celebrated

Hindi pakhwada was celebrated from 14-29 September, 2015 at IIRR. The celebration started by formal inauguration by the Director Dr Raviindra Babu on 14th September continued for a fortnight. In the 15 day long celebrations, various competitions/ activities pertaining to Hindi language like quiz, memory contest, extempore speech, and elocution were conducted. In these competitions all Scientific,



technical, administrative, supporting and project Staff have participated. The valedictory function was organized on 29th September chaired by Dr V Ravindra Babu, Director IIRR, Shri Jaishankar Tiwari Assistant Director, Rajbhasha, Central Hindi Training institute, Hyderabad, was the chief guest. The winners of various competitions were felicitated on this occasion. The chief guest Shri Jaishankar Tiwari remarked that Hindi has certain attractions and the more the people use the language the more they get attracted towards it. Dr. Ravindra Babu, Director, emphasized on the constitutional obligations of use of Hindi in the office. Dr. Brajendra., Chairman, committee on Official Language was the overall in-charge of the celebrations.



ICAR Sponsored short course on quality improvement

A short course on "Quality Improvement, Bio-fortification and Product Development in Rice for Nutritional and Financial Security of Rice Farmers" was organized during

September 1-10, 2015. 18 participants comprising of one professor/principal Scientist, two Associate professors and 15 Assistant professors ICAR and State Agricultural Universities from different parts of the country participated in the course. Of these, there were 03- women participants.



Out Reach Programmes Tribal Sub-plan meeting conducted

The implementation of Tribal Sub plan under National Seed Project and Mega Seed Project was taken up during kharif 2015 in Nalgonda, Khammam, Ranga Reddy and Mahaboobnagar districts of Telangana and Srikakulam and Vishakhapatnam districts of Andhra Pradesh. The farmers in the tribal villages were selected for imparting training on Farmers' Participatory Seed Production. Tribal farmers were informed about the purpose of programme. In addition to the technical support during the crop season, it is proposed to supply some inputs based on the requirements of farmers in different villages of selected districts, inputs like seeds, sprayers, drum seeder, weeders, tarpaulins etc. Seeds of Improved Samba Mahsuri & DRR Dhan 44 from IIRR were supplied to the tribal farmers in Telangana state while local varieties were provided to the tribal farmers of Chintapalli of



Vishakhapatnam and Seethampet of Srikakulam districts of Andhra Pradesh.



Farmer-Scientist interaction organized in Rangareddy district, Telangana

Popularisation of cost effective and labour saving rice production technologies was undertaken in Chinna Solipet Village of Rangareddy district on 13/08/2015. A farmer-scientist interaction was organized to create awareness about the use of herbicide for weed control, drum seeder under water saving technology and cono weeder for labour saving and drudgery reduction. Drs. Amtul Waris, B.Sreedevi and B.Nirmala have organized the farmer scientist interaction. Mr.Papi reddy of Dow Agrosiences company has demonstrated the correct application of herbicide and precautions to be taken in the use of herbicide.



IIRR varieties DRR Dhan 42, 43 and 44 popularized among tribal farmers

New varieties of ICAR-IIRR viz., DRR Dhan 42, 43 and 44 developed by Dr.T.Ram were popularized among the tribal farmers of Yellammatanda of Telangana. Mini-kits were distributed to the tribal farmers and technical inputs on package of practices were provided. Leaflets in local language about these new varieties were made and distributed by Drs. B.Sri Devi, Amtul Waris and Dr.B.Nirmala on 13-7-2015.



Distinguished Visitors

Dr GS Sandhu, DDG Crop Sciences visited IIRR on 11-9-2015



Staff Activities

Awards and Recognitions



Dr Brajendra Senior Scientist (Soil Science) nominated to FAO panel on soils

It is a rare Honour to IIRR, Hyderabad that the Food and Agricultural Organization (FAO) of the United Nations has nominated Dr Brajendra, Senior Scientist (Soil Science) IIRR as one of the 27 top global soil experts to the panel of Intergovernmental Technical Panel on Soils (ITPS). The main function of the Intergovernmental Technical Panel on Soils is to provide scientific and technical

advice on global soil issues, primarily to the GSP, UNFAO, and in relation to specific requests submitted by global or regional institutions. His salient scientific achievements and brief bio data have been put up on the GSP, UNFAO website. It is to be known that UN has declared the year 2015 as the Year of soils.

Dr. Shaik N.Meera bagged Lal Bahadur Shastri Outstanding Young Scientist Award 2014

Dr. Shaik N.Meera, Senior Scientist bagged prestigious 'Lal Bahadur Shastri Outstanding Young Scientist Award 2014' of ICAR. The award was presented during the 87th Foundation Day Celebrations and Award Ceremony of ICAR held at Patna. Dr. Meera has made outstanding contributions in Indian rice sector with innovative extension methods and practical Digital approaches benefitting rice farmers and extension agencies. He received an award amount of ₹ 1.00 lakh in cash and a citation and a challenge project for three years with budgetary provision of ₹ 30.00 lakh and ₹ 5.00 lakh for foreign training. Dr. Meera is currently working on Mobile applications for Indian Rice farmers in several local languages. If this project is successful, Indian farmers can get reliable and time critical information directly from the research stations that may revolutionise rice farming in the country.



Dr. Divya Balakrishnan bagged ICAR Jawaharlal Nehru Award for PG Outstanding Doctoral Research in Agricultural and Allied Sciences 2014

Dr Divya Balakrishnan carried out marker assisted backcross breeding for transferring blast resistance genes viz., Pi1, Pi2 Pi33 and Pi54 to popular but susceptible rice varieties viz., ADT43, BPT5204 and Improved White Ponni and she received ICAR Jawaharlal Nehru Award for PG Outstanding Doctoral Research in Agricultural and Allied Sciences 2014. Award consist of ₹ 50,000/-in cash plus a citation and silver medal (gold polished) each to be awarded annually for the outstanding original research work in agriculture and allied sciences. Her research

leads to development of four gene pyramided lines with background genome recovery up to 95 percent and were significantly similar to recurrent parent in morphological, yield and grain quality traits. Dr Divya obtained her Ph.D. from Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore.



Dr L.V Subba Rao honoured with Seedsman Annual Awards-2015

Seedsman Association felicitated Dr L.V Subba Rao on 9th September, 2015 with Seedsman Annual Awards-2015 for the service rendered to the seed sector at FTAPCCI, Red Hills, Hyderabad.



Deputations Abroad

Dr Brajendra, attended fourth Intergovernmental Technical Panel on Soils (ITPS) meeting at FAO, Italy, Rome

Dr Brajendra, was invited by UNFAO from Asia to participate as an official member in the ITPS meeting to be held at Rome, Italy, from 14 to 18th September, 2015 for developing Voluntary guidelines for sustainable soil management. In the meetings held at the Malasian room of FAO, Rome, Italy, he was also made Chairman (one out of five) for the GSP third pillar of action for developing global Research platforms for Promoting targeted soil research

and development focusing on identified gaps and priorities and synergies with related productive, environmental and social development actions.


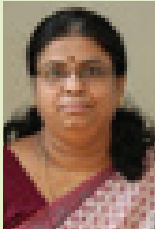



Drs. Shaik N.Meera and VP Bhadana, Senior Scientists were deputed to Dhaka, Bangladesh

Drs. Shaik N.Meera and VP Bhadana, Senior Scientists were deputed to Dhaka, Bangladesh during 6-10 September 2015 to participate in the Green Super Rice workshops They participated in GSR Training Course on

Promotions


The following staff were promoted to the next higher grade


S. No	Name	Promoted		
		From	To	w.e.f.
1	 Dr B Sailaja	RGP 7000	RGP 8000	31-12-2009
			Senior Scientist	17-05-2010
		RGP 8000	RGP 9000	31-12-2012
2	 Dr PC Latha	Scientist	Scientist (Senior Scale)	22-8-2004
3	 Dr B Nirmala	RGP 6000	RGP 7000	8-1-2012

Crop Management Skills during 06-07 September 2015 and GSR Monitoring and Evaluation Workshop for South Asia during 8-10 September 2015. These workshops were helpful in getting the first hand information from farmers and extension agencies about the extension strategies adopted for promoting GSR varieties so that same could be adapted in Indian context. Further, GSR monitoring and evaluation workshop help us in developing M&E strategies for rice extension in general and GSR in particular.



S. No	Name	Promoted		
		From	To	w.e.f.
4	 Dr. P Senguttuvel	RGP 6000	RGP 7000	26-6-2012
5	 Dr P Revathi	RGP 6000	RGP 7000	26-6-2012
6	 Dr Satendra K Mangrauthia	RGP 6000	RGP 7000	26-6-2012

S. No	Name	Promoted		
		From	To	w.e.f.
7	Dr Kota Suneetha 	RGP 6000	RGP 7000	10-02-2013

S. No	Name	Promoted		
		From	To	w.e.f.
8	Dr KB Kempa Raju 	RGP 6000	RGP 7000	10-02-2013

Forthcoming events

- International Rice Symposium 2015 from 18-20 November 2015.
- Industry meet on 5-12-2015
- IIRR Foundation day on 15-12-2015
- Short training course on “Modern Integrated Crop Breeding Tools- Breeding Management System (BMS)” from 18-27 January, 2015. Contact: Email ids: pdrice@dr.org, revathi.ponnusamy@gmail.com

BOOK POST

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