IIRR

Indian Institute of Rice Research

NEWSLETTER

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From the Director's Desk

I am pleased to present the current issue of the newsletter, which chronicles the institute and its contributions, since its inception as All India Coordinated Rice Improvement Project in 1965, through its elevation as Directorate of Rice Research in 1975 and upto the subsequent upgradation to Indian Institute of Rice Research (IIRR) in 2015.

This quarter is a period of intense activity for IIRR scientists on account of data compilation, analysis and report writing for the Annual Rice Group Meeting of AICRIP which will be held during 11-15th April, 2015. I convey my sincere thanks to our co-operators for successful conduct of AICRIP trials and I take this opportunity to invite all to the Golden Jubilee Annual Workshop.

Golden Jubilee Celebrations of the institute were launched on January 9, 2015 with the curtain raiser function in the presence of Dr. Swapan Kumar Datta DDG (CS), Dr. J.S. Sandhu, Agricultural Commissioner, Govt of India, Dr. S.N. Puri, Ex-Vice Chancellor CAU, Imphal, Manipur, Directors of Local ICAR Institutes, and Vice Chancellors of State Agricultural Universities. Other important events organized at the institute during this period include 66th Republic Day celebrations, 2nd Pre Rice Group Meeting for Hill Region on 20th February 2015 and "Open Day' on February 28, 2015.

Dr. J.S. Sandhu, DDG (Crop Sciences), ICAR visited the institute on March 8th, 2015, reviewed the activities of IIRR and preparations related to Golden Jubilee Celebrations and interacted with scientists and addressed the administrative staff on various issues.

Three training programmes on Quality and Nutritional Aspects of rice, Widening the Genetic base in Rice and Workshop on Registration of Plant Varieties and Farmers' Rights were organized at IIRR. The scientists also organized field days and various programmes in Khammam, Nalgonda and Mahbubnagar districts to increase the awareness of farmers in managing problem soils and judicious use of herbicides.

During the reporting period, MOA was signed with Metahelix Life Sciences Limited, Bangalore for Improved Samba Mahsuri. I also take great pleasure to inform that IIRR scientists have been the recipients of Innovative Agricultural Scientist 2015 award (Dr. V. Ravindra Babu, Project Director, (Acting)) and Dr. PN Behl Award of IARI for excellence in Crop Sciences (Dr. R. M. Sundaram, Senior Scientist, Biotechnology).

Cumulative rainfall for the country in the previous year was below normal with a 12.3% and 33% decrease during south-west and north-east monsoon seasons. Hence, the second advance estimates of rice production for the year 2014-15 is 103.04 million ton, down from 103.65 mt in the year 2013-14. Ministry of Agriculture has also reported a decrease in the area under *rabi* rice from 42.56 lakh hectare in 2014 to 38.27 lakh hectare in the present rabi season. The current rabi season was also besieged by unseasonal rains leading to crop damage across several states. I expect that the imminent Annual Rice Group Meetings in April which will be conducted for an extended period of 5 days will help to lay the roadmap for rice research for the forthcoming years, keeping in view the current and future challenges in rice production.

(V. Ravindra Babu)

IN THIS ISSUE

IIRR – A profile

Genesis

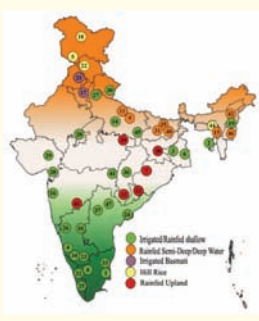
All India Coordinated Rice Improvement Project (AICRIP) was established in 1965 by the Indian Council of Agricultural Research (ICAR) to organize and co-ordinate national level multi-location testing of elite breeding lines and other crop management technologies across all rice growing ecologies of the country. This has greatly contributed to rapid exchange of genetic material and information among the rice researchers at home and abroad. In order to meet the objective of the technology development and evaluation, the AICRIP was elevated as the Directorate of Rice Research (DRR) in August 1975 with the added mandate of pursuing research on irrigated rice for strengthening and stabilizing rice production in the country. The Directorate has evolved into an efficient and successful program of partnership in rice research bringing together more than 300 rice researchers from 47 funded and over 100 voluntary research centers affiliated to State Agricultural Universities, State Department of agriculture and other Research Institutes of ICAR across the country. In the 12th plan, Indian Council of Agricultural Research (ICAR) has upgraded the DRR to Indian Institute of Rice Research (IIRR).

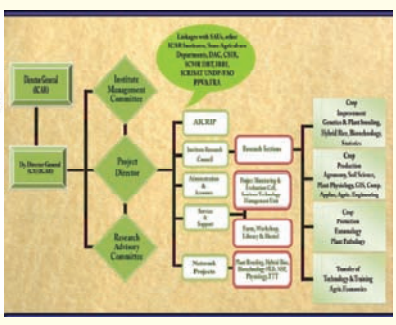
Since 1968, more than 1011 rice varieties including 68 hybrids have been released through multilocation testing for various agro- ecological systems prevalent across the country. 46% of these varieties are meant for irrigated areas, 18% for rainfed shallow lands, 12% for rainfed uplands, 4% for irrigated areas in hills, 4% for deep and semi-deep water, 4% irrigated saline/alkaline soils, 6% for scented rice and rest for the other rice ecologies. More than 60 varieties have been developed by the Institute of which 40 are central releases and the rest are released in different states. Globally 19 varieties released through AICRIP are being cultivated in 25 other rice growing countries.

The Mandate

- To organize, coordinate and monitor multi-location testing at national level to identify appropriate varietal and management technologies for all the rice ecosystems.
- To conduct basic, strategic, applied and anticipatory research in the major thrust areas of irrigated rice aimed at enhancement of production, productivity and profitability while preserving environmental quality.
- To initiate, organize, coordinate and monitor research networks relating to problems of national and regional importance.
- To serve as major centre for exchange of research material and information.
- To accelerate the pace of technology transfer through development and adoption of innovative extension training models, self learning modules, organizing formal training courses, frontline demonstrations, exhibitions, farmers' day etc.
- To develop linkages with national, international and private organizations for collaborative research programmes.
- To provide consultancy services and undertake contractual research.

IIRR is an important constituent institute of ICAR under direct supervision of the Deputy Director General for Crop Sciences. For fulfilling its mandate effectively, IIRR is organized into four sections (Crop Improvement, Crop Production, Crop Protection and Transfer of Technology) and ten units (Plant Breeding, Hybrid Rice, Biotechnology, Agronomy, Soil Science, Plant Physiology, Agricultural Engineering, Entomology, Plant Pathology and Transfer of Technology) along with centralized service wings and administration. The research programs of IIRR are supported by centralized facilities of farm, administration, accounts and library. 54 Scientists (sanctioned number of posts 71) at the headquarters organize lead research in frontier areas of irrigated rice, besides the co-ordination of multilocation testing and transfer of technology through formal training programmes and on farm frontline demonstrations. The scientists are assisted by 40 Technical, 28 Administrative and 15 supporting staff. AICRIP activities are integrated into the mandate with senior most scientists of each discipline acting as the PIs of the programme. There are 47 funded and more than 105 voluntary centers involved in rice research activities. Research and institutional activities are planned and guided by Research Advisory Committee and Institute Management Committee while the progress is critically evaluated once in five years by the Quinquennial Review Committee. The detailed organizational setup of the Institute is provided in its organogram.





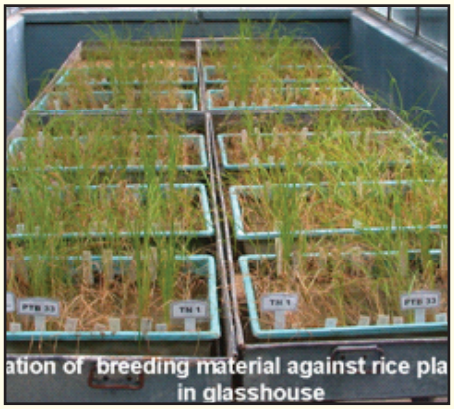
Infrastructure

For organizing mandated work, the Institute is equipped with state of the art facilities such as fully equipped laboratories for all the sections, centrally air cooled greenhouses for screening germplasm for resistance against pests and diseases, net-houses, growth chambers, screening nursery beds, containment transgenic poly-houses and heat tunnel. Field facilities include well laid out experimental farms at Rajendranagar (20 ha) and Ramachandrapuram (40 ha) with a wild rice garden and pollination chambers along with adequate farm machinery, godowns and limited cold storage facilities.

A centrally air conditioned auditorium with 350 seating capacity, seminar halls, guest house, hostel facilities and a canteen are available for imparting training and to disseminate information using latest multi-media and ICT tools. The Central library of the institute is fully digitized with over 4,654 books, 6,500 bound volumes and subscribes to 55 Indian and 13 foreign journals. The significant achievements of the Institute are exhibited in the form of posters, graphs and other visuals for the benefit of visitors through a state of the art museum.

The Staff

Cadre	Sanctioned	Filled	Vacant
Scientific	71	54	17
Technical	53	40	13
Administrative	32	28	4
Supporting	17	15	2
Total	173	137	36



Research Projects at IIRR

During the year 2014-15, 50 institute research projects are being implemented at IIRR on various aspects of crop improvement, crop production, crop protection, farm mechanization and transfer of technology. These research projects are supported through IIRR core funding. In addition, forty six externally funded projects are being operated which are supported by various agencies like DBT, DST, IRRI, NFBSFARA, ICAR and private companies.

Research achievements

Varietal Improvement

Several distinct technological innovations have been made in terms of new varieties and technologies developed by the AICRIP since the release of the first rice variety Jaya in 1968. Since then more than 1037 varieties including 69 hybrids have been released till 2013. Among these 119 varieties and 44 hybrids were released through (CSCS & NRV) while the SVRC released 847 varieties and 27 hybrids. Of these, 477 are for irrigated areas, 130 for rainfed uplands, 187 for rainfed low lands, 41 for semi deep and 18 for deep water situation, 51 for high altitudes, 41 for saline and alkaline areas, 6 for aerobic, 19 for boro and 67 aromatic long and short grain varieties were released. IIRR itself has developed 50 varieties and some of them are released more than once. Pest resistant varieties (Phalguna, Sonasali, Vikas, Ajaya); multiple pest resistant varieties (Suraksha, Vikramarya, Triguna), high yielding basmati varieties, salt tolerant varieties, have been developed and released.

Varieties and hybrids developed and released by IIRR

Variety	Year	Ecology	Variety	Year	Ecology
Jaya	1968	IRM	Lakshmi	1991	RSL
Cauvery	1970	RUP	Ajaya	1992	IRM
Sona	1973	IRE	RP 732	1992	HILLS
Vikram	1974	IRM	Amrut	1993	RUP
Akashi	1975	RUP	TPS 3	1993	RSL
Kanchan	1976	RUP	IET 7564	1994	RUP
Prakash	1977	IRM	RP 2421	1994	HILLS
Phalguna	1977	IRM	Yezin 3	1995	RUP
Rasi	1977	IRE	DRRH 1	1996	IRM
Swarnadhan	1979	RSL	Nidhi	1996	IRE
Pranava	1979	RSL	Triguna	1997	IRE
Sasyasree	1979	IRE	Krishna Hamsa	1997	IRE
CO 42	1979	RUP	IET 8113		IRM
CSR 5	1979	SA	IET 8116	1998	IRM
Kunti	1982	IRM	Vasumati	2001	IRSC
Manasarovar	1983	RSL	Shanti	2001	IRE
Vikas	1983	IRE	Mugadh Sugandha	2002	IRSC
SLR 51214	1984	IRE	Dhanrasi	2002	RSL
Seshu	1985	IRE	Sweta	2002	RSL
Srinivas	1985	IRE	Bhogavati	2004	IRSC
PR 108	1986	IRM	Sugandhamati	2005	IRSC
Sonasali	1986	IRM	Shwe Mayanmar	2005	RUP
Vikramarya	1986	IRM	Jarava	2006	RUP
Prasanna	1986	RUP	DRRH 2	2006	IRE
Mandya Vijaya	1986	RSL	Madhuri	2007	RSL
IET 7191	1987	RSL	Improved SambaMahsuri	2007	RUP
IET 7575	1988	IRM	Varadhan	2008	IRE
Suraksha	1988	IRM	Akshayadhan	2008	IRM
Tulasi	1988	IRM	Sampada	2008	IRM
Nagarjuna	1988	RSL	DRR dhan 38	2009	IRM
Salivahana	1988	RSL	DRRH 3	2009	IRM
Vibhava	1989	IRM	DRR Dhan 39	2009	SA
Ravi	1989	RUP	DRR dhan 40	2013	IRM
Aditya	1989	RUP	DRR dhan 41	2014	aerobic
Kasturi	1989	IRSC	DRR dhan 42	2014	RUP
ADT 40	1989	RSL	DRR dhan 43	2014	IRE
			DRR dhan 44	2014	IRE

IRE –Irrigated Early IRM- Irrigated Medium RSL – Rainfed Shallow lowland RUP-Rainfed Upland IRSC-Irrigated Scented, SA-Saline Alkaline

- Molecular marker technology is deployed in development of" Improved Samba Mahsuri" variety resistant to BLB with 3 genes *xa*5, *xa*13, X*a*21.
- First medium slender hybrid "DRRH3" which is similar to Samba Mahsuri with 25-30% higher yield was developed.
- IIRR has been recognized as one of the best DUS centers for maintaining a large reference collection of 629 varieties and for promotion of registration of rice varieties at the Foundation Day Programme of PPV&FRA, New Delhi on 11.11.2010.
- On IIRR initiative, 71 extant, notified varieties of rice were IPR enabled with PPV&FRA granting registration certificates.
- A DNA based rapid and reliable assay for assessment of purity of seed-lots of rice hybrids and CMS lines was developed which is cost effective and time saving.
- Molecular markers for the major fertility restorer genes Rf3 and Rf4 heve been developed and used in hybrid rice programme and for targeted improvement of elite restorer and maintainer lines for disease resistance.
- Identified superior alleles of blast resistance genes *Pi54*, *Pita* and *Pib* from germplasm collections which widened the spectrum of resistance and helped to establish suitable gene deployment strategies.

- Novel resistant genes *Xa33* (for BB), *Gm3* & *Gm8* (for gall midge) are fine mapped:.
- Functional markers have been developed for major blast resistance gene *Pi54* and the major QTL controlling grain length, *Gs3, for aroma* (BADEX 7-5).
- Several candidate genes associated with yield, quality and nutrition have been identified and the outcome of transgenic research is visible with 3Bt transgenic rice events with Cry1A showing resistance to stem borer and 3 independent events with DREB1A gene in Samba Mahsuri background shortlisted for Bio-Safety Research Level (BRL-1) testing.
- Direct seeding of rice (DSR) is considered as one of the potential alternatives to transplanted rice to overcome problems regarding water and labour.

- Adoption of SRI at proper locations with suitable genotypes has a scope for area increase, enormous saving on seed and 36% saving on water, additional yield of 1.0 to 1.5 t/ha which will add 4-6 million tonnes to our food basket.
- Modification of leaf colour chart (LCC) by IIRR under SSNM and distribution of 2-3 lakhs of LCC to farming community has significantly reduced N application and recorded 5-16% higher yields over RDF.
- Suitable package for aerobic rice system which reduced the water requirement by 30-40% over continuous flooding was developed and several suitable rice-based cropping systems (RBCS) and organic farming for sustaining rice productivity were recommended.

- Seed priming by soaking paddy seed in water and shade drying for 2 1/2 to 3 hours, and repeating the cycle for 5-6 times before sowing improve germination, seedling vigor and establishment in direct sown rice.
- Application of Sulphur 30-45 kg/ha to *kharif* rice in deficient soils for rice-blackgram; Application of Sulphur 30 kg/ha to *kharif* rice and 30 kg/ha to *rabi* sunflower in rice-sunflower cropping systems is recommended for higher productivity, rice equivalent yields and economic returns.

- Regular supply of Zinc sulphate @ 50 kg/ha once in 3 seasons for normal soils and 100 kg initially for sodic soils is recommended for sustaining rice production in intensively cultivated rice soils.

- An efficient 8 row drum seeder has been designed and developed. the drum seeder technique not only saves on cost of labour but also enhances yield.

- Organic farming systems requires 4-8 crop cycles to stabilize productivity and improvement of physical, fertility and biological properties of soil.

- Several new herbicides were identified promising for different ecosystems:

  a. transplanted rice - penoxsulam application either pre or post emergence @ 0.0200 kg a.i./ha is promising. Single application of the combination herbicide (Bensulfuron methyl + pretilachlor) or two sequential applications of Glyphosate followed by combination product (bensulfuron-methy + pretilachlor) was also effective.

  b. Direct seeded and transplanted rice - Penoxsulam + cyhalofop-butyl @ 120 g/ha for broad spectrum weed control.

  c. Direct seeded rice under puddled condition - penoxsulam or carfentrazone-ethyl @ 25 g/ha were effective.

  d. Dry direct seeded rice - Metamifop was found effective.

  e. In aerobic rice, mechanical weeding using push weeder three times or Sequential application of Pendimethalin @ 1 kg a.i./ha at 3-4 DAS fb Bispyribacsodium 35 g a.i./ha at 2-4 leaf stage of weeds or Chlorimuron + Metsulfuronmethyl 40 g at 25-30 DAS) are promising with higher Weed Control Efficiency

- Through intensive screening of a large number of germplasm accessions against major insect pests, several new sources of resistance have been identified. A number of donors like Velluthacheera, Banglei, Aganni, ADR 52, Pandi, Chennellu etc. with proven multiple resistance to gall midge, BPH and WBPH have been identified. Utilizing these donors, multiple resistant varieties were developed.

- Studies on variation in insect pest population have identified seven distinct gall midge populations in the country while no variation in BPH population was noted.

- Several insecticides, both granules and spray formulations have been identified after systematic evaluation against insect pests. Effective insecticides identified are granular formulations of carbofuran, phorate, diazinon, mephospholan, quinalphos, MIPC, chlorantriniprole and spray formulations of phosalone, chlorpyriphos, monocrotophos, carbosulfan, carbaryl, ethofenprox, cartap hydrochloride, fipronil, imidacloprid, buprofezin, pymetrozyne, combination product *viz*., ethiprole+imidacloprid, dinotefuran, sulfoxaflor, chlorantriniprole, flubendiamide, indoxacarb etc.

- Pheromone mediated monitoring (8 traps with 5 mg impregnated lures per hectare) as well as mass trapping (20 traps per hectare) of yellow stem borer was developed as a practical, cost effective and environmental friendly option for the farmers.

- Planting of one row of Pusa Basmati 1 (PB1), an aromatic cultivar highly susceptible to yellow stem borer, for every 9 rows of any main crop reduced stem borer damage considerably giving additional income from PB1 crop.

- Integrated Pest management modules suitable for different ecosystems were developed and evaluated.

- Utilizing some of the resistant donors, several disease resistant varieties have been developed like Swarnadhan, Rasi, Sasyasree, Kasturi, VLK Dhan 39, Himalaya, Sujatha, Co43 for blast, Nidhi, Vikramarya for rice tungro virus.
- A national facility of AICRIP MIS was developed and successfully hosted at the URL http://www.aicrip-intranet.in and links are available with IIRR.
- New products 1) **Rice Riche Pain Relieving Gel**, a topical composition for fast relief of aches and pains of muscles and joints associated with simple strains, bruises and sprains, 2) **Rice Riche Moisturizing Lotion** to improve the skin's visual appearance (smooth, soft and supple skin), 3) **Rice Riche Cream** for Dry and Cracked heel suitable for very dry and dehydrated skin 4) **Rice based face scrub** which keeps skin smooth, soft and moist are developed.

Technology Transfer

- Transfer of rice production technology is being successfully carried out through Transfer of Technology and Training (TTT) centre of IIRR by organizing as many as 242 training programmes during the last 25 years catering to the needs of senior extension functionaries of the state departments of Agriculture, State Agricultural Universities and Agro-input Agencies with diverse sources of financial support. Broad areas of training/workshops organized by IIRR are rice production technology, rice based cropping systems, integrated nutrient management in rice, integrated pest management in rice, hybrid rice production technology, hybrid rice seed production technology, selective mechanization in rice cultivation, system of rice intensification, quality control in basmati rice, marker assisted selection.

Frontline demonstrations

- The extension principle of "Seeing is believing" is very well implemented by IIRR through organization of FLDs on newly released varieties/technologies as a very useful strategy for their popularization, and thereby helping to enhance the production and productivity of rice in the country. IIRR coordinates the Rice frontline demonstration which is organized every year all over the country demonstrating suitable elite cultivars and appropriate crop management technologies in farmers' fields in association with SAU's and state department of agriculture.
- Since 1990 to 2000, about 16404 FLDs of 1 acre each have been conducted benefitting 33100 rice farmers. From 2001-02 to 2013-14, about 12150 FLDs of 1 hectare each have been conducted benefitting 30200 rice farmers.

Frontline Demonstration of Technologies

Rice Knowledge Management Portal

Rice Knowledge Management Portal (www.rkmp.co.in) is the largest repository of knowledge on any single crop (rice) across the globe. It aims to strengthen researchers, extension workers, policy makers, farmers; partnership and networks through better flow of rice knowledge and information contributing to overall rice development. With 16000 pages of knowledge, 18 platforms, more than 50 videos, 6000 minutes of audio, "user specific" platforms like Service domain, Data repository, Diagnostic tools, E-Learning platforms etc, this is one-stop solution for the rice related information. With an ambitious plan of reaching out to one million rice farmers, RKMP team is striving to develop a series of android based mobile applications coupled with participatory rice check programme.

AICRIP Centre Profiles

Agricultural Research Station, Nellore, A.P.

The Agricultural Research Station, Nellore (79° 59' E, of 14°27' N, 20 m above MSL at 3 km East of Nellore town on Nellore-Muthukur road) was originally established as Government Paddy Farm during 1937 at Buchireddipalem 15 km away from Nellore in the composite Madras state on leased lands to improve the local Molagolukulu paddy varieties under cultivation and later designated as Rice Research Station. The Research Station was shifted to Nellore on permanent lands during 1961. This station is functioning as a sub-center of the National Agricultural Research Project (NARP) from 21-8-1985 in southern zone with zonal head quarters at Tirupati of Andhra Pradesh. Nellore is the lead center for Rice Research for southern Zone of AP.

The average rainfall is 1040.7 mm. The gross area is 12.5 ha which is irrigated by four tube wells and canals. The soils are sandy clay loams, neutral to saline (7.5 to 8.3 pH) in reaction, slightly ill drained. Four overlapping seasons *viz*., early *kharif* (April to August), *kharif (*August -February), e*arly rabi* (October to March) and l*ate rabi* (January to May) exist in rice cultivation.

MANDATE: ARS, Nellore is entrusted with Rice Research as the main function and to serve as verification center for pulses. The main objective is development of high yielding fine grain quality rice varieties suitable for southern zone of Andhra Pradesh with blast, BLB and BPH resistance.

Research Contributions

Research findings on Blast

- Blast resistant varieties *viz*., Kotha Molagolukulu-72, 74 Swarnamukhi, Simhapuri, Tikkana, Sriranga, Sravani, Swathi, Penna, Somasila, Vedagiri, Apoorva, Parthiva and Nellore Mashuri were developed.
- The cultures *viz*., NLR 33235, NLR 32972, NLR 33636, NLR 26706, NLR 33639, NLR 33650, NLR 33638 and NLR 33640 were found to have horizontal resistance to blast disease with slow blasting characters.
- The blast races IC – 9, IE-18, IM-1, IB-62, IB-31 and IA-5 were identified in Nellore.
- Night temperatures ranging from 18 to 20°C and morning RH of 90% is highly favourable for blast disease from December to March.

Scientific Staff

Dr. C.P.D. Rajan, Principal Scientist Plant Pathology & Head, Dr. Y. Suryanarayana Principal Scientist (Rice), Dr. P. Ramesh babu Principal Scientist, Smt. Ch. Sreelakshmi Scientist, Smt. M.

The following 25 rice varieties were developed and released from this research station.

S. No	Variety (Paddy)	Year of release	Special Characters
1.	BCP 1	1948	Traditional long duration Molagolukulu rice
2.	BCP 2	1948	-do-
3.	BCP 3	1950	-do-
4.	BCP 4	1950	-do-
5.	BCP 5	1951	-do-
6.	BCP 6	1965	-do-
7.	Bulk H9	1965	-do-
8.	Kotha Molagolukulu-72	1977	First cross derivative with blast resistance
9.	Kotha Molagolukulu-74	1977	Long duration molagolukulu rice cultures
10.	Pinakini (NLR9672-96)	1987	-do-
11.	Tikkana (NLR27999)	1988	-do-
12.	Simhapuri (NLR28600)	1991	-do-
13.	Sreeranga (NLR28523)	1991	-do-
14.	Swarnamukhi (NLR145)	1991	Medium duration rice with blast resistance
15.	Bharani (NLR30491)	1996	Short duration rice with RTV resistance
16.	Sravani (NLR33359)	1996	Short duration rice with Blast resistance
17.	Swathi (NLR33057)	1996	Medium duration rice with Blast resistance
18.	Penna (NLR33365)	1996	Long duration rice with Blast resistance
19.	Somasila (NLR33358)	1999	Short duration rice with Blast resistance
20.	Vedagiri (NLR33641)	1999	Long duration rice with Blast resistance
21.	Apoorva (NLR33654)	2002	Medium duration rice with Blast resistance
22.	Parthiva (NLR33892)	2006	Long duration rice with Blast resistance
23.	Nellore Mahsuri (NLR34449)	2009	Fine grain Short duration (125 days) rice with Blast resistance
24.	Nellore Sona (NLR3041)	2012	Fine grain medium duration (145 days) rice with blast tolerance
25.	Swetha (NLR40024)	2012	Short duration rice variety suitable for early *kharif* with blast and lodging tolerance.

Sreevalli Devi Scientist (Plant breeding), Dr. P. Raja Sekhar Principal Scientist, Ms. P. N. Harathi Scientist, Ms. I. Paramasiva Scientist (Entomology), Dr. U. Vineetha Scientist (Agronomy).

Rice Research Unit (RRU), Bapatla, A.P.

History

The Rice Research Unit (RRU) Bapatla (15 54' N and 80 28' E - + 5.49 m above MSL) was established during the year 1961 at Tenali and shifted to Agricultural College farm campus, Bapatla (Guntur district, Andhra Pradesh) during 1973 with a mandate of development of improved rice varieties suitable for cultivation in black soils of Nagarjuna Sagar Project area and Krishna western delta.

Infrastructure: Total area is 14 hectares which is cultivated in *kharif* season only under canal irrigation. 4 ha area is under the research experiments and remaining area is under seed production. The soils are predominantly black clay type and the annual rainfall ranges from 646.7mm (2014) to 1546 mm (2013). The general cropping pattern is Single cropping/Rice-Pulse/Rice-Green manure.

Research Accomplishments

The varieties developed and released from this station are very popular and hot favourites of the farmers in the state and also adjacent states occupying large areas. Samba Mahsuri occupies over ten lakh hectares of area in undivided A.P. (> 25% of paddy growing area) and also popular at national and international level. Sona Mahsuri (BPT 3291) is very popular in North coastal region of AP, in Karnataka, Orissa and Chattisgarh states. The seed developed at this station is of great demand.

- Pre-release cultures *viz*., BPT 2507, BPT 2505, BPT 2605, BPT 2604, BPT 2660, BPT 2590, BPT 2644, BPT 2663 and BPT 2618, BPT 2753, BPT 2764, BPT 2760, BPT 2765 etc. are in advanced stages of testing with a duration of 140-150 days.

Scientific Staff

Dr. P.V. Ramkumar Principal Scientist, plant Breeding, Dr. B. Krishna Veni, Scientist plant Breeding, Miss B. Vijaya Lakshmi, Scientist plant Breeding, Sri K. Shyamsundar Scientist Agronomy, Dr. C.V. Rama Rao, Senior Scientist Entomology & Head

Varieties released from RRU Bapatla

Variety	Year of Release	Duration (Days)	Grain type and other useful characters
Samba Mahsuri (BPT 5204) (GEB24/TN1/Mahsuri)	1986	145	Medium slender, excellent cooking quality for Irrigated low lands
Sona Mahsuri (BPT 3291) (Sona/Mahsuri)	1982	135-140	Fine grain, moderately resistant to blast.
Dhanya Lakshmi (BPT 1235) (Sabarmathi/W12708)	1982	125	Long slender for *rabi* season and IRE
Surya (BPT 4358) (Sona Mahsuri/ARC 6650)	1999	145	Fine grain resistant to BPH,
Bapatla Sannalu (BPT 1768) (BPT 3301/Mahsuri Mutant)	2002	155-160	Medium slender, for single cropped areas, Semi-deep water ecosystem
Bhavapuri Sannalu (BPT 2270) (BPT 5204/CR MR1523)	2010	160-165	Fine grain, tolerant to BPH, suitable to single cropped wetlands of Andhra Pradesh.
Varieties under minikits			
BPT 2295 (BPT 1768/ NLR 33641)		150	Medium slender grain, tolerant to blast and BPH.
BPT 2411 bpt5204/surya BPT 4358		140-145	Medium slender grain. tolerant to blast and BPH.

Sona Mahsuri (BPT 3291)

Agricultural Research Station, Ragolu, A.P.

Agricultural Research Station, Ragolu (at 83.84^{0}E Longitude, 18.24^0 N latitude and 27 m MSL) located at 3 km away from Srikakulam town was established in the year 1956 by Department of Agriculture, Government of Andhra Pradesh as seed multiplication farm of rice and pulses and was transferred to Acharya N.G. Ranga Agricultural University from 1st July,1966. Research on rice and rice fallow pulses intensified at this centre with formulation of National Agricultural Research Projects (NARP) by ICAR as lead centre from October, 1981. Due to emergence of new virulent biotype 4 of rice gall midge during the year 1986, the post of Entomologist was shifted from ARS, Warangal during the year 1988 to intensify research on rice gall midge. Testing and verification functions of oilseeds are also taken up by Agricultural Research Station, Ragolu. The farm is spread over 12.30 hectares, with cultivable area of 10.03 ha. The soils are red loamy poor in organic matter slightly acidic or neutral with a pH of 6-5-7.8. Average rainfall received is 1371.9 mm. Rice /rice and rice/rice fallow pulses are grown during *kharif* and *rabi* seasons and the source of irrigation is by canals. The mandate of the research station is development of rice varieties suitable for North Coastal Andhra ecosystems with tolerance to pest and diseases.

ARS Ragolu

Significant achievements:

So far, this research station has released ten (10) varieties The variety RGL 11226 completed its mini kit testing with good performance and ready for release.

Varieties released	Year of Release	Duration (Days)	Grain type	Ecosystem
Gutti krishnakatukalu (RGL-1), MTU5/MTU10	1967	165	LS	early and late planted
Nagavalli (RGL-52) RGL1/IR8	1982	160	MS	RSL
Vamshi (RGL-1746) (BAM 3/TN1)	1986	105	LS	IRM
Mahendra (RGL-1750) (BAM 3/TN1)	1986	120	LS	RSL
Pushkala(RGL-2624) (IR 28/Tellahamsa)	1986	75	LS	IRE
Srikakulam sannalu (RGL-2537) (CR104/T147)	1997	130	MS	RSL
Vasundhara (RGL-2538) (Phalguna/IET 6858)	1997	130	LS	RSL
Sreekurma (RGL-2332) (BPT 5204/IR 64)	2006	150	MS	RSL
Sreesatya (RGL- 1880) RGL1231/Phalguna/IR 36)	2009	89	MS	IRE
Vamsadhara (RGL- 11414) RGL 4166/MTU 7029).	2010	130	MS	RSL

LS: Long slender, MS: Mmedium slender, RSL: Rainfed shallow land, IRE: Irrigated early, IRM: Irrigated medium

- Identified new gall midge biotype 4 in North Coastal Zone
- Five released varieties *viz*., RGL-2537, RGL-2538, RGL-2332, RGL- 1880, RGL- 11414 and RGL11414 were found resistant to gall midge Bio type-4.

RGL 2538

RGL 11414

Scientific Staff

Dr. A. Upendra Rao, Senior Scientist and Head (Agronomy), Dr. V. Visalakshmi, Senior Scientist (Entomology), Dr. K. Madhu Kumar, Scientist (Plant Breeding).

Agricultural Research Station, Machilipatnam, A.P.

Agricultural research station Machilipatnam is a voluntary centre identified for the conduct of trials on soil salinity by the Indian Institute of Rice Research. It was established in the year1964 with the objective of development of medium duration salt tolerant / resistant rice varieties suitable to coastal regions with pests and disease tolerance. Agricultural Research Station, Machilipatnam is situated at an altitude of 14 meters above mean sea level, 16^0.2' N latitude and 81^0.15' E longitude and 8 KM away from Bay of Bengal in Machilipatnam (Krishna district of Andhra Pradesh).

Total acerage of the station is 23.5 ACRES and 4 ACRES is occupied by office roads and buildings. The soils are black clay and are saline sodic with 7.35 pH, 14.2 EC (dS m-1), 17.57% ESP. The annual rainfall is 1000 mm and rice crop is cultivated in a single season *i.e.* in late *kharif* or early *rabi* transplanted in the month of September due to the late arrival of water in the canals. In addition to the research activities, breeder seed production and foundation seed production of MTU 1061 and BPT 5204 are being taken up.

Varieties Released: Two Saline tolerant varieties of rice *viz*., MCM – 1 and MCM -2 were released from this research station but at present they are not under cultivation.

Entries promoted to AICRIP trials: MCM 107 (BPT 5204 x MTU 4870), MCM 108 (BPT 5204 x MTU 4870), MCM 109 (MTU 2716 x BPT 5204)

Cultures under Pipe Line : The first ever salinity tolerant cultures **MCM 100 & MCM 101** developed by the university at this research station have completed three years of testing under minikits across the coastal belt of Andhra Pradesh in the saline patches. Proposals for the release are under submission.

Cultures under pipeline	Duration (Days)	Grain type and other useful characters
MCM 100 (MTU 1042 x MTU 1061)	145 – 150	fine grain type with yield potential of 6.0 t / ha, suitable for *kharif* season, tolerant to salinity, BPH, non lodging, dormancy for 3 weeks
MCM 101 (MTU 4870 x MTU 2716)	130 – 135	fine grain type with yield potential of 5.5 t / ha, suitable for *rabi* season, tolerant to salinity, BPH, non lodging, dormancy for 3 weeks

Scientific Staff

Dr. T. Anuradha, Principal Scientist (Plant Breeding) & Head and Dr. K. Nagendra Rao, Scientist (Plant Breeding)

Research Articles

Potential Sources of Resistance to Planthoppers Identified in Greenhouse and Field Screening

G. Padmavathi[1], P.V. Satyanarayana[2], K.Vasantha Bhanu[2], V. Jhansi Lakshmi [1],V.P. Bhadana[1], M. Tahseen[1] G.S.V. Prasad[1] and V. Ravindra Babu[1]
[1]Indian Institute of Rice Research, Hyderabad-30, [2]Andhra Pradesh Rice Research Institute, Maruteru, AP

Planthoppers (BPH and WBPH) are sucking pests of rice causing 100% yield loss. There is a need to identify novel resistant sources for developing varieties with durable resistance. 1000 recombinant inbred lines (F_9) developed by crossing 3 susceptible cultivars Samba mahsuri, NDR 359 and TN1 with three resistant donors Ptb 33, Sinnasivappu (resistant to BPH) and MO1 (resistant to WBPH) were screened continuously for 4 seasons in two consecutive years (2012-13) in greenhouse at IIRR and in the field at APRRI, Maruteru to identify resistant lines.

At Maruteru, these RILs were screened in field under heavy insect pressure with standard checks. Of these, 60 lines were moderately resistant. Thirty RILs derived from 4 crosses TN1/PTB 33, TN1/Sinnasivappu, SambaMahsuri/MO1 and NDR 359/MO1 consistently recorded resistant reaction during both the years and could set seed.

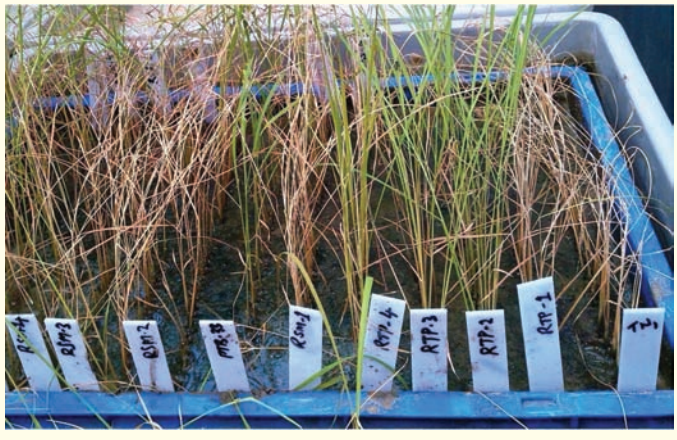
These 30 resistant RILs were screened for their resistance to BPH and WBPH separately in greenhouse at IIRR, Hyderabad. Two RILs (TN1/Ptb 33) *viz*., RP 5448-RIL-501 and RP 5448-RIL-311 were resistant to both the hoppers, RP 5448 -RIL- 526 was resistant to BPH and RP 5448 -RIL-112 was resistant to WBPH. RP 5449-RIL-320 (TN1/Sinnasivappu) was resistant to both hoppers (Table 1).

The RILs (RP 5448-RIL-501, RP 5448-RIL- 311 and RP 5449-RIL-320) after field as well greenhouse screening could be utilized as elite genetic stock for combined hopper resistance. While two RILs *ie.,* RP 5448 -RIL- 526 (BPH resistant) and RP 5448 -RIL-112 (WBPH resistant) could be used as new resistant sources.

Table 1: Reaction of RILs in the field and greenhouse to planthoppers

Cross/Designationn	Damage Score			
	Field		Greenhouse	
	PH 2012	PH 2013	BPH 2013	WBPH 2013
TN1/PTB33				
RP5448-RIL-501	3.0	3.9	2.85	3.0
RP5448-RIL-311	3.1	3.2	3.0	3.0
RP5448-RIL-526	3.0	3.8	4.0	9
RP5448-RIL-112	3.0	4.0	9	3
RP5449-RIL-320 (TN1/ Sinna sivappu)	3.0	4.5	2.9	3.2
TN1	9	9	9	9
Ptb33	3	3	3	-
MO1	3	3	-	2.9
MTU 1001	3	3	-	-

Field screening (BPH + WBPH) at APRRI, Maruteru



Greenhouse screening (BPH) at IIRR, Hyderabad

Evaluation of blast and bacterial blight resistant MAS lines in multi environment

Srinivas Prasad. M, Ratna Madhavi. K, Rambabu.R, Vijay Kumar.S, Aruna.J, Abhilash Kumar V, Laha G.S., Prasad GSV, Sundaram R M, Seshu Madhav.M, Ram T and Ravindrababu V.
Indian Institute of Rice Research, Rajendranagar, Hyderabad-30.

Rice blast disease, caused by the pathogen *Maganoporthe oryzae* is one of the most devastating and destructive diseases causing severe yield losses.

Incorporation of blast resistance genes in the background of Samba Mahsuri and IR64: The blast resistance genes *Pi-1*, *Pi-2* and *Pi-54* from donors C101LAC, C101A51 and Tetep respectively were introgressed into the most popular and susceptible variety Samba Mahsuri through marker aided backcross method of breeding (MABC). The introgressed lines (ILs) were phenotyped with blast isolate (SP-28) (Figure 1) and genotyped with gene linked markers like RM224 for *Pi-1*, RM527 and MSM-1 for *Pi-2* and RM206 for *Pi-54*.

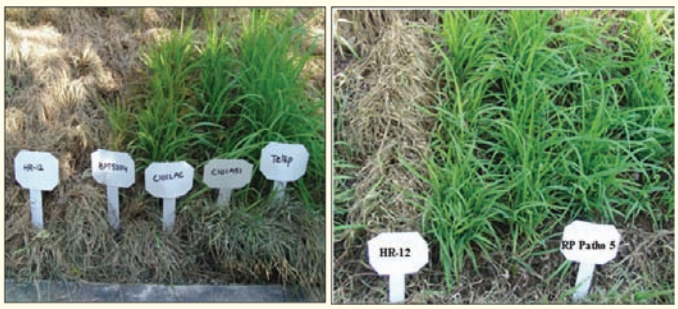


Figure 1. Phenotypic evaluation of 'R' gene introgressed lines along with parents

Three (ILs) lines with *Pi-1+Pi-2+Pi-54* genes (RP Patho-5), two lines with *Pi-1+Pi-2* genes (RP Patho-4), five lines with *Pi-1+Pi-54* genes (RP Patho-11), five lines with *Pi-1*gene (RP Patho-1), four lines with *Pi-54* gene (RP Patho-3) and three lines with *Pi-2* gene (RP Patho-2) in the background of Samba Mahsuri were identified as good lines showing resistance against blast across the locations in AICRIP. Some of them had also shown tolerance to other diseases. Similarly one line (ILs) with *Pi-2* (RP Bio Patho-3) and three lines with *Pi-54* (RP Bio Patho-4) in the background of IR64 *(Pi-25(t))* exhibited resistance to blast across the locations.

Incorporation of blast resistance into Improved Samba Mahsuri (Xa21+ xa13 + xa5)

The blast resistance genes *Pi-2* and *Pi-54* were introgressed into the improved Samba Mahsuri possessing BLB resistance and susceptibe to blast through MABC. Two lines with *Pi-2+Pi-54* and *Xa21 + xa13* genes (RP-BioPatho-5), four lines with *Pi-54+Xa21* genes (RP-BioPatho-2) and one line with *Pi-2+xa13* genes (RP-BioPatho-1) were identified as good lines with superior agronomic performance, grain and cooking quality traits compared to recurrent parent with an added advantage of blast resistance. These lines were nominated in AVT1-NIL under AICRIP and some of them were promoted to AVT2- NIL trial.

Efforts are being made to nominate some of these elite blast and BLB resistant Samba Mahsuri lines in the AICRIP trials and also to identify unique lines of potential academic, scientific and commercial value for registration with NBPGR, New Delhi as they will be a valuable source for the improvement of rice varieties.

Table.1: Reaction of the MAS lines to rice diseases in multi-location test

Pathology code/ Cross	Line No (RP Nos)	Genes	Reaction to	
			blast	Other diseases
RP Patho-1 (Sm*^{2} /C101LAC)	RP 5862-Patho-1-2-15, Patho-1-6-5, Patho-1-12-3, Patho-1-12-9 and Patho-1-1-4	*(Pi-1)*	R	BS, RTV
RP Patho-2 (Sm*^{2} /C101A51)	RP 5867-Patho-2-1-1, Patho-2-1-2 and Patho-2-1-4	*(Pi-2)*	R	NB, Shb, ShR BS
RP Patho- 3 (Sm*^{2} /Tetep)	RP 5863-Patho-3-56-11, Patho-3-73-6, Patho-3-73-12 and Patho-3-73-8	*(Pi-54)*	R	BS
RP Patho-4 (Sm*^{2} C101LAC// Sm*^{2} /C101A51)	RP 5868-Patho-4-5-6 and Patho-4-16-7	*(Pi-1+Pi-2)*	R	Shb, ShR NB BS
RP Patho-5 (Sm*^{2} /C101LAC// Sm*^{2} /C101A51///Sm*^{2} /Tetep)	RP 5869-Patho-5-16, Patho-5-23 and Patho-5-30	*(Pi-1+ Pi-2+Pi-54)*	R	Shb, ShR, NB BS
RP Patho-11 (Sm*^{2}/C101LAC// Sm*^{2}/Tetep)	RP 5870-Patho-11-15, Patho-11-17, Patho-11-19, Patho-11-20 and Patho-11-21	*(Pi-1+Pi-54)*	R	Shb, BS
RP-BioPatho-1 (ISM*/C101A51)	RP 5871-Bio Patho-1-8-6	*(Pi-2+xa13)*	R	BLB
RP-BioPatho-2 (ISM*/Tetep)	RP5864-Patho-2-18-5, Patho-2-16-4Bio-Patho-2-5-9 and Bio Patho-2-9-7	*(Pi-54 + Xa21)*	R	Shb, ShR BLB
RP Bio Patho-3 (IR64*/C101A51)	RP 5873-Bio Patho-3-12-8	*(Pi-2)*	R	NB BS
RP Bio Patho-4 (IR64*/Tetep)	RP 5874-Bio Patho-4-4-11, Bio Patho-4-9-8 and Bio Patho-4-4-2	*(Pi-54)*	R	NB, Shb ShR
RP-BioPatho-5 (ISM*/C101A51// ISM*/Tetep)	RP 5872-Bio Patho-5-156 and Bio Patho-5-212	*(Pi-54 + Xa21+Pi-2+xa13)*	R	Shb, ShR BLB

Note: "*" - The reaction of the lines in AICRIP to blast disease; Sm: Samba Mashuri, ISM: Improved Samba Mahsuri

BS-brown spot RTV-rice tungro virus NB- neck blast Shb- sheath blight BLB-bacterial leaf blight ShR- sheath rot R -resistant S- Susceptible

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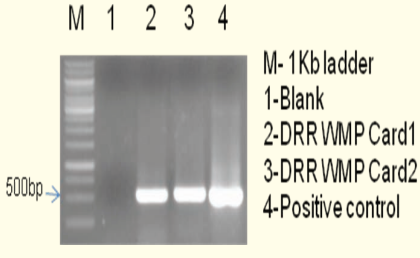
Indian Institute of Rice Research

Development of Rapid Diagnostic Kit for Identification of Rice Tungro Disease

Satendra K Mangrauthia, P. Malathi, D. Krishnaveni, S.M. Balachandran, Brajendra and V. Ravindra Babu
Indian Institute of Rice Research, Rajendranagar, Hyderabad-30

Rice tungro virus (RTV) disease is caused by infection of two different viruses, R*ice tungro spherical virus* (RTSV) and *Rice tungro bacilliform virus* (RTBV). Both RTSV and RTBV are transmitted in a semi-persistent manner by green leaf hopper. Early and accurate detection of the disease is the only way for the effective management. The disease symptoms are characterized by inter-veinal chlorosis, yellow to orange discoloration of leaves, twisting of leaf tips, stunting, reduced tillering and sterility. However, identification of disease in the field based on these symptoms is difficult as symptoms of tungro disease are often confused with other problems such as zinc deficiency, cold injury, and other biotic stresses and symptoms are greatly influenced by cultivar, stage of plant growth during infection, temperature and relative humidity. In addition, vast experience is required to identify the disease based on symptoms. Therefore, a reliable kit that can diagnose the presence of tungro virus in the field will be highly useful to the farmers and agricultural scientists for detection of the disease. A simple, reliable, quick and low-cost diagnostic kit for the tungro virus identification was developed. The kit is based on nucleic acid identification of virus which ensures 100% confidence in identifying the correct pathogen. The kit contains a card which needs to be used for spotting the suspected plant sample in field/lab. This card can be stored for long time (2-6 months) at room temperature. Farmers can send the spotted card through post or any means to a laboratory, where a piece of card can be put along with a mix developed by IIRR in a PCR machine using defined profile. A simple gel documentation will be able to confirm the presence of virus in suspected samples. The whole procedure can be completed within 2h 30 min and requires minimum skill to perform the analysis.

Rice Tungro Virus Diagnostic Kit



Lane M- 1 Kb DNA ladder
Lane 1- Healthy sample
Lane 2 and 3- RTV Infected leaf samples
Lane 4- Positive control

Panorama of Institute activities

Curtain raiser function on launch of IIRR Golden Jubilee Celebrations

On the occasion of completion of 50 years of excellent service to the rice farming community and other stakeholders, IIRR decided to celebrate 2015 as Golden Jubilee Year and planned to organize several programs during the year including Golden Jubilee Annual Rice Workers Group Meeting in April 2015 and Golden Jubilee International Symposium during November 2015. In this context, a curtain raiser function was organized on January 9, 2015 for launching of the Golden Jubilee Celebrations. Dr. V. Ravindra Babu, Project Director (A), IIRR highlighted the achievements and the Chief Guest, Dr. Swapan Kumar Datta, DDG (CS) complemented the efforts and contributions of IIRR. The eminent scientists, Dr. S.N. Puri, Dr. J.S. Sandhu, Prof. A. Padmaraju, Prof. A. Praveen Rao, Dr. T. Mohapatra, and Dr. J.K. Ladha, were guests of honour. The directors of the local ICAR institutes also graced the occasion. On the eve of his superannuation from the ICAR service, Dr. S.K. Datta was felicitated overwhelmingly. Five innovative and progressive farmers from Telangana were also felicitated.

Republic day celebrations at IIRR

66th Republic Day was celebrated at IIRR, Dr. V. Ravindra Babu, Project Director (Acting) hoisted the national flag and highlighted 50 years achievements and prizes were distributed to the winners of different events.

2nd Pre-Rice Group Meeting for Hill Region

The 2nd Pre-Rice Group Meeting for Hill Region, 2015 was organized at IIRR on 20th February, 2015. Fifteen scientists from 8 states participated in the meeting and Dr. D.V. Seshu former global coordinator of International Network for Genetic Evaluation of Rice, Philippines and founder Scientist member of AICRIP inaugurated the meeting and chaired the technical session. Dr. V. Ravindra Babu, Project Director (Acting), IIRR highlighted importance of hill ecology.

Open Day Celebrations

The Institute has celebrated "Open Day' on February 28, 2015 and facilitated the visit of 600 young high school students from 12 schools and made them aware of different aspects of rice crop, research facilities available, conducted various competitions *viz*., elocution, poster presentation, quiz and distributed prizes to the winners.

Swachh Bharat Abhiyan

Swachh Bharat Abhiyan activities are being regularly carried out by IIRR every week on Wednesday from 3-4 PM with the active participation of all the staff and the waste plant material collected is used to prepare vermicompost by keeping it in trenches to utilize it for manuring IIRR garden.

Hindi Karyashala organised

A one day Hindi Karyashala was organised on 31-1-15 at the Institute in which the Chief Guest Shri Jai Shankar Tiwari apprised the officials about use and applications of Hindi language. The winners of extempore competition were felicitated by the Project Director.

A two months long Hindi Pragya and Praveen classes were conducted for the staff of IIRR which commenced in the month of February and concluded on 31st March, 2015. A total of 20 staff members attended the same.

MOA signed

IIRR has signed an MOA with Meta Helix life Sciences limited, Bangalore on 8-1-2015 for Improved Samba Mahsuri (RP Bio 226) resistant to BLB for its large scale seed production and popularization among farmers.

Training Programmes conducted

Quality and Nutritional Aspects

A short course training programme for 10 days was conducted during 3–12th, January, 2015 on Quality and Nutritional Aspects of Rice and others crops *viz*., pearl millet, maize, and sorghum under CRP on Biofortification, for the benefit of scientists, technical personnel and research scholars and 27 trainees attended the course.

Widening the Genetic base in Rice through Pre-Breeding

A short training course on "Widening the Genetic base in Rice through Pre-Breeding for Developing Next Generation Varieties and Hybrids" was organized for 10 days during 19-28th, January 2015 which covered various aspects of pre-breeding in which 24 participants were trained.

Registration of Plant Varieties and Farmers Rights (PPVFRA)

One day Awareness Workshop on "Registration of Plant Varieties and Farmers' Rights (PPVFRA)'' was organized at IIRR, on 18th March, 2015 to create awareness about the functions of PPV&FRA, farmers' Rights, Community recognition awards, registration of farmers varieties etc.

Outreach Programmes

NSP- Tribal Sub Plan

Seven Knapsack sprayers of 16 litres capacity and folders on 'Rythu sthayilo vari vittanotpattiki avasaramaina melakuvalu mariyu yaajamaanya padhatulu were distributed to tribal farmers of Repallewada tanda of Khammam district on 13th February 2015.

Field day on FLD

Frontline demonstration on problem soil management through INM was conducted in *kharif* 2014 in 10 selected fields in Singaram village, Gundala mandal of Nalgonda district and field day was organized on December 10, 2014.

Awareness campaign for judicious use of herbicides

An awareness campaign for judicious use of herbicides was organized in Raavichedu village of Mahbubnagar District of Telangana on 23rd January 2015 about the correct method of use of herbicides by knapsack sprayer and penoxsulam herbicide for one time application was distributed.

Village adoption under IIRR-TSP activities

Bench mark survey was conducted in January 2015 for selection of villages for adoption under IIRR-TSP activities for 2015-16 and a cluster of villages *viz*., Harshaguda, Gangaram and Sirigiripuram (Maheshwaram Mandal, Ranga, Reddy District) were selected.

Village adoption under Swacch Bharath activities

Survey was conducted in March 2015 and Harshaguda village, Maheshwaram Mandal, Ranga Reddy District was selected for adoption under Swatchh Bharath activities of IIRR for 2015-16 based on the information given by the local Kisan club.

Distinguished visitors

Dr. Swapan Kumar Datta DDG(CS), Dr. JS Sandhu, Agricultural Commissioner, Govt. of India, Dr. S.N. Puri, Ex-Vice Chancellor CAU, Imphal, Manipur, Directors of Local ICAR Institutes, Vice Chancellors of State Agricultural Universities and many dignitaries attended Curtain Raiser Programme-Golden Jubilee Celebrations of IIRR held on 9th January 2015.

Dr. Jauhar Ali, Plant Breeder (GSR), IRRI visited IIRR and interacted with scientists associated with "Green Super Rice" Project on 17th February 2015.

Dr. DV Seshu former global coordinator of International network for genetic evaluation of rice, Philippines and founder Scientist member of AICRIP, visited IIRR and inaugurated 2nd pre rice group meeting for hill region 2015 on 20th February.

Dr. JS Sandhu, DDG Crop Sciences, ICAR visited IIRR on March 8th 2015 to review the activities of IIRR and Golden Jubilee Celebrations. He visited IIRR field experiments, Inaugurated renovated Jaya Hostel and new library facility, and later had in-depth discussions with Project Director regarding the Golden Jubilee celebrations and other issues related to functioning of IIRR. He addressed the administrative and Scientific staff on various issues.

Staff activities

Awards/Recognitions

Innovative Agricultural Scientist award

Dr. Vemuri Ravindra Babu, Project Director (A), IIRR was conferred with Innovative Agricultural Scientist 2015 award for his outstanding contribution in rice breeding by development of varieties suitable for saline water irrigation. This award was presented in the biotech fest, an agricultural innovative festival in January 2015 by SKSD Mahila Kalasala (Degree and PG), SVK Education Society, Tanuku, West Godavari district, AP.

NAAS Fellowship

Dr. BC Viraktamath, Former Project Director, IIRR has been elected as the Fellow of National Academy of Agricultural Sciences with effect from 1st January 2015.

Dr. PN Behl Award

Dr. RM Sundaram, Senior Scientist, Biotechnology received Dr. PN Behl Award of IARI for excellence in Crop Sciences from Dr. VL Chopra in a solemn function at Division of Genetics, IARI on 20th Feb. 2015.

Best Poster Awards

Drs Satendra K Mangrauthia, P. Malathi, D. Krishnaveni, and S.M. Balachandran won the best poster award for the Poster entitled "Development of RNAi-Mediated Resistance to Rice Tungro Virus in Genetically Engineered Oryza sativa" in 18th ADNAT Convention Symposium on Genetic Engineering of Agricultural Crops and Livestock: Current Status and Social, Ethical and Regulatory Issues held from 23rd to 25th February 2015 at Central University, Hyderabad.

M. Mohan, M. Sampathkumar, Chitra Shanker, S. Shanas and K. Karthikeyan won the best poster award for the poster on "Bio-ecology of White Stem borer, *Scirpophaga fusciflua* Hampson (Pyralidae: Lepidoptera); An Emerging Pest of Rice & its susceptibility to *Bt* toxins and strains" presented in the National meeting on new/safe molecules and bio control technologies for IPM in crops at NBAIR, Bangaluru on 23rd Feb. 2015.

Visits abroad

Dr. MM Azam, Principal Scientist, Plant Breeding participated in regional workshop on "Water-Energy-Food Nexus" held in Kathmandu during February 10-12, 2015 organised by Fulbright Commission and US Embassy in Nepal.

New Additions to the team IIRR

Dr. Divya P. Syamala Scientist (Biotechnology) on transfer from SBI joined Crop Improvement Section, IIRR w.e.f 14 -1- 2015.

Mr. A. Vijaya Kumar, Junior Accounts Officer Finance and Accounts Section joined IIRR w.e.f 2-2-2015.

Retirements

Mr. S. Narsing Rao, AAO, Retired from Council's service on attaining the Age of Superannuation on 31-3-2015. IIRR staff wishes him and his family members a happy and peaceful retired life.

Tips to use brown rice in daily meal plan

- Cook it with at least one meal a day. If you can, try to eat it at lunch and dinner. High fibre content of brown rice aids the digestive health by helping to keep one regular.
- Cook the rice with different spices to change up the taste. If we eat plain brown rice twice a day, it won't take long for us to be tired of it, and we may give up eating it. Try adding spices such as ginger, turmeric, coriander, onion and chilli to the rice to give it a different taste at every meal
- Brown rice is significantly lower in carbohydrates than white rice, bread or potatoes. Eating the brown rice slowly, with plenty of chewing, is important to help break the rice down and make it even easier to digest. Slow eating also slows down the meal and convinces our body that we are getting full. This will help to discourage overeating.
- Make brown rice a significant part of one's diet for one to two weeks. Weigh one-self daily and keep track of the weight loss, remembering that one might not see progress for the first few days.
- How to lose weight eating brown rice

Step 1

- Eat 1/3 to 1/2 cup of cooked brown rice at breakfast. Brown rice could be substituted for white rice to make our daily breakfast dishes of dosa, idly and utthapam.

Step 2

- Integrate brown rice into lunch or dinner. Keep cooked brown rice or prepared brown-rice pulao in the refrigerator so that one can quickly heat it up and add it to meals.

Step 3

- Adding brown rice can transform soups into fibre-rich meals that curb our hunger for hours.

Step 4

- Make healthy one dish meals with brown rice. Cook brown rice with seasonal vegetables mushrooms, whole lentils and chicken. Top with slivered almonds or crushed walnuts for an additional fibre boost.

Step 5

- Make a healthy, satisfying brown-rice salad by combining 1 cup brown rice, 2 tsp. salt, 2 tsp. sugar, 1/4 cup vinegar, 1 tbsp. olive oil, 1 cup basil leaves, 1 cup of diced tomatoes, cucumber and freshly ground black pepper.

Step 6

- Snack on brown rice cakes, cookies, fritters which contain high amounts of fibre and are low in calories and fat.




Forthcoming events

- 50th annual rice group meeting (5 day event) 11-15, April 2015
- Farmers first for integrated rice farming / India rice check for sustainable rice farming, Institute Research Council meeting May, 2015
- Innovative rice farmers meet June, 2015
- Short course training programme on Transformative approaches in gender mainstreaming, gender budgeting and empowerment in Agriculture June 8-17th 2015

Directors of IIRR

S.No.	Name	Tenure
1	Dr. M.S. Pawar, Project Coordinator	April 1965 - March 1966
2	Dr. S.V.S. Shastry, Project Coordinator	April 1966 - January 1975
3	Dr. D.V. Seshu, Project Director (A)	February 1975 - August 1975
4	Dr. R. Seetharaman, Project Director	August 1975 - September 1985
5	Dr. J.E. Shinde, Project Director (A)	September 1985 - February 1987
6	Dr. B. Venkateshwarlu, Project Director (A)	February 1987 - November 1987
7	Dr. E.A. Siddiq, Project Director	November 1987- June 1994
8	Dr. K.G. Pillai, Project Director (A)	June 1994 - November 1995
9	Dr. K. Krishnaiah, Project Director	December 1995 - February 2000
10	Dr. B. Mishra, Project Director	July 2000 - August 2005
11	Dr. S.V. Subbaiah, Project Director (A)	August 2005 to June 2006
12	Dr. B.C. Viraktamath, Project Director	June 2006 to May 2014
13	Dr. V. Ravindra Babu, Project Director (A)	September 2014 to till date

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Editorial Committee : Dr. V. Jhansi Lakshmi, Dr. P.C. Latha, Dr. P. Revathi, Dr. Arun Kumar, Mr. D. Sanjeeva Rao, Mr. U. Chaitanya

Address : Indian Institute of Rice Research, Rajendranagar, Hyderabad – 500 030, Telangana, India

Phone : +91-40-24591216, 24591254

Fax : +91-40-24591217

e-mail : pdrice@drricar.org

Website : http://www.drricar.org