



DRR



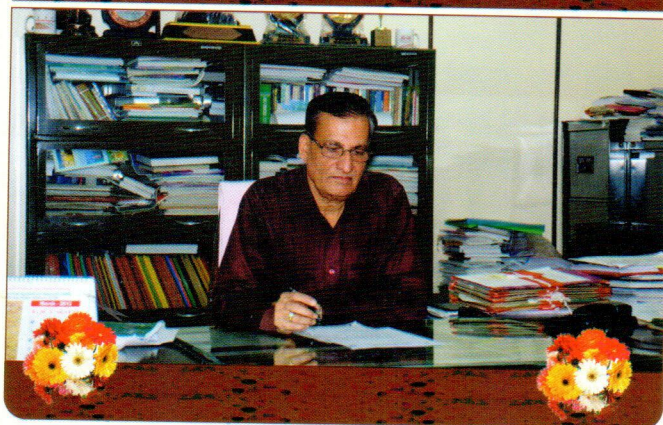
Directorate of Rice Research NEWSLETTER

Volume : 11, Number : 4

RICE IS LIFE

October - December 2013

From Director's Desk...



During 2013, the monsoon started early and was well distributed across the major rice growing regions of India. However, there was some moisture stress during late September when the crop entered into reproductive phase especially in eastern and north eastern part of India. Again during October, heavy torrential rains and tropical cyclones in the northern and north eastern states posed a major problem to rice production. Since October, three consecutive cyclones (Phiallin, Helen and Lehar) caused significant damage to the maturing rice crop in the coastal belts of Andhra Pradesh and Odisha. The consequent heavy rains in the eastern states of India resulted in the lodging of the crop. Harvesting operations in the rain affected areas was significantly delayed as the mechanical harvesters are unable to operate in wet soil conditions. Although official estimates are not available, market sources report a crop loss of around 3 million tons in the cyclone and heavy rain affected areas. According to a report by USDA (November 2013 forecast), India's rice production during 2013-14 is likely to be 103 million tons, little less than earlier prediction, primarily due to recent cyclones in the eastern coast and heavy rains in other parts late in the season. However, planting of rabi rice is expected to be higher than that of last year because of improved soil moisture conditions and augmented water levels in irrigation reservoirs.

Many important events took place at DRR during this quarter of the year. Different AICRIP activities were at their peak during this period. As a part of the AICRIP program, 10 different teams

consisting of scientists from different disciplines of DRR and other cooperating centres monitored the AICRIP trials at various centres across the country.

DRR organized 2nd DRR-industry meet to promote the commercialization of technologies. Farmers' day was organized in a very big way where more than 600 farmers took part. Vigilance week was celebrated with greater enthusiasm and a special lecture was delivered by noted social scientist, Prof. G. Harogopal. As many as 9 technical staff members were promoted to the next higher grades. International Conference on Bacterial Blight of Rice was organized jointly by CCMB and DRR. A 'Special IPM Day' and 'Mutant Day' were organized with great enthusiasm. One day workshop on Ag Balance-A method to measure sustainability in agriculture was organized at DRR jointly by BASF and DRR. One day awareness program on Plant Variety Protection and Registration of Plant Varieties was organized in which more than 100 officials participated. A free medical camp was organized for the benefit of DRR staffs and their family members.

I believe that the contents of the newsletter would be quite informative and useful for all those interested in rice research. I sincerely solicit your valuable suggestions for the improvement and also invite articles from you. I also sincerely thank the team of scientists viz., Drs. Amtul Waris, B. Jhansi Rani, P. Raghuveer Rao and G. S. V. Prasad led by Dr. G. S. Laha for their splendid effort in bringing out all the issues of DRR Newsletter during the year 2013.

B.C. Viraktamath

(B.C. Viraktamath)

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General Article

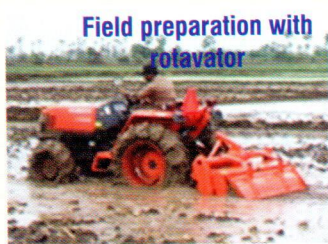
Mechanized System of Rice Intensification (MSRI)

P. Raghu Rami Reddy, S. Dayakar, R. Jagadeeshwar, S. Vanisree,
Ch. Surender Raju and Ch. Damodar Raju Rice Section, ARI, Rajendranagar, Hyderabad.500030.

Rice cultivation is labour intensive and water consuming which are making it less profitable. SRI is a good water saving technology but not very popular due to labour intensive transplanting and inter-culture operations. To overcome this, SRI has been modified to suit mechanized way of rice intensification keeping other conditions like maintaining moisture at field capacity, incorporation of weeds with mechanical inter-culture operation constant. The techniques of mechanized system of rice intensification (MSRI) are as follows.

1. Land preparation

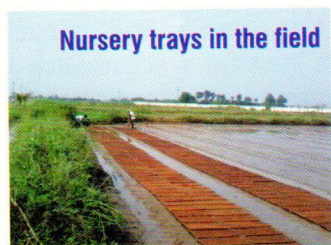
After summer ploughing, proper leveling of the field is necessary to save irrigation water. To achieve proper leveling, use of laser guided land leveler is preferred over manually operated leveling blade. After leveling, puddling should be done with low horse power (35 HP) 4 wheel drive tractors with rotavator. First rota-tilling should be done in 1st speed of load gear and then second operation can be done with higher speeds of load gear. The puddling with rotavator will help in distracting surface soil structure and settlement. It creates better semi impervious layer which reduces percolation loss.



Field preparation with rotavator

2. Nursery preparation

In mechanized transplanting, tray or mat nursery is necessary.



Nursery trays in the field

Trays (58 x 28 cm) should be filled with finely pulverized soil (3: 1 Soil : FYM/vermi-compost). Seed rate of 8-10 kg for fine, 10-12 kg for medium and 12-15 kg for coarse varieties is sufficient for one acre. Before sowing, the seeds must be subjected to germination test. Well filled healthy seeds should be used for

sowing which can be done using common salt solution (1.2 kg salt for 10 lit of water). Selected seeds are then soaked in water for 24 hrs and kept under tight gunny bag for another 24 hrs for good germination. To attain uniform density of seeds in the trays, the automatic tray filling machines can be used. The quantity of seeds per tray with automatic machine may vary from 80 gm (very fine) to 180 gm (very coarse). After spreading of seeds on the soil of trays, a layer of rich FYM or vermi-compost soil mixture is used to cover the seed layer. Approximately 75-85 trays are required to transplant one acre. After filling the trays with seeds,



A well maintained trays for machine transplanting

irrigation must be gentle with rose cans without disturbing seed masses. The trays must be kept on well leveled raised beds and all around trays, irrigation and drainage channels must be prepared. The trays should be covered with paddy straw or old gunny bags or shade nets to protect them from direct sunlight. Sprinkle water with cans daily three times and remove the straw/ gunny bags/ shade nets after 7 days and thereafter give regular irrigations. If necessary apply 0.5 to 1 g nitrogen one or two times per tray. Seedlings of 15 cm height with 3 leaves are good for transplanting with machine.

3. Transplantation

The main field should be well puddled in advance and soil should be allowed to settle. A thin layer of water (1-2cm) to be maintained before machine enters the field, for smooth rolling of wheels and better scouring of finger after dibbling. Trays are loaded both on the board and transplanting unit tray. Since the row to row distance is fixed, hill to hill spacing can be adjusted based on farmers choice. Marker unit must invariably be used to get parallel rows for mechanical weeding. The transplanter must be operated in steady pace without jerking for clog free transplantation. Speed must be selected based on soil and field conditions and maintained throughout the operation.



Machine Transplanting

4. After care

After successful transplanting, field must be carefully maintained, excess water, if any, must be drained out and saturated field condition be maintained for 3-4 days. Once crop is established, irrigation should be managed well to maintain the soil always at field capacity. To reduce and incorporate weed mass in the fields, 2-3 mechanical weeding are required from 20th day of transplanting onwards at 10 days interval. Once the crop is 50 days old, normal irrigation (5 cm standing water) can be followed.

Advantages of MSRI

- Minimizes the dependency on labour
- Timely attendance of field operations (Transplanting, weeding)
- Reduction in cost of cultivation
- Harvesting is early by 5-7 days
- Increased crop yield and efficient utilization of scarce inputs like water and labour

Limitations of MSRI

- Perfect leveling is necessary and the technology is not suitable for low lying as well as saline soils.

Research Highlights

Low Glycemic Index (GI) Rice: A Boon to Diabetic Patients

V. Ravindra Babu, T. Longvah & B.C. Viraktamath

Directorate of Rice Research, Hyderabad-500 030; National Institute of Nutrition, Hyderabad-500 007

The glycemic index or GI, is a measure that rates foods that contain carbohydrates on a scale of 1 to 100 and foods closer to 100 are considered as high glycemic food and vice-versa. In case of rice, varieties with GI value of around 50 are considered as low GI rice. Brown rice has slightly lower GI compared to white rice. The GI is most often used as a guide to help diabetics to stabilize their blood sugar levels. The food with high GI (>65) e.g. white rice, quickly gets digested and gets converted into sugar or blood glucose. This results in increasing the blood sugar level. The parboiled rice has lower GI (around 40). As per the information available, high amylose content (AC) may result into low GI in rice. However, studies

conducted at DRR in collaboration with National Institute of Nutrition showed that there is no correlation between low GI and high amylose content. Out of 10 rice varieties and one hybrid with high AC tested for GI, only one variety i.e. Lalat showed low GI (53.17) while for others, GI ranged between 62.85 to 82.36 (Table 1). In addition to Lalat, another land race from Tamil Nadu viz., Mulgiri rice variety was also found to have low GI. The variety Lalat is a popular variety grown in the state of Odisha while 'Mulgiri Rice' is already commercialized by a private company as low GI rice suitable for diabetic patients. GI of these varieties was analyzed by *in vivo* methods.

Table-1: GI values of some of high amylose rice varieties

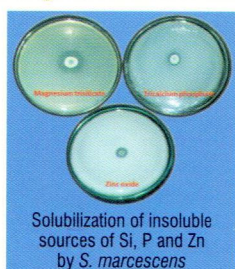
Genotype	Amylose content	Available Carbohydrate (gm/100g)	Amylose/Amylopectin (gm/100g)	GI values
Lalat	27.90	75.84	16.38	53.17
Tellahamsa	27.65	75.13	16.85	77.48
Triguna	26.57	76.13	17.44	82.02
Savitri	26.35	76.52	17.73	68.85
Jaya	26.69	78.53	16.72	75.58
PR-113	26.82	78.97	17.16	77.54
NDR-97	26.52	80.45	17.02	78.02
Sasyasree	26.48	82.36	16.23	76.36
Varalu	26.64	79.50	16.24	78.41
Salivahana	26.46	77.77	17.57	79.18
DRRH-3(Hybrid)	24.69	78.38	17.39	78.27
Min.	24.69	75.13	16.23	53.17
Max.	27.90	82.36	17.73	82.02
Avg.	26.62	78.15	16.98	74.99

Plant Growth Promoting Rhizobacteria for Water Stress Tolerance in Rice

P. C. Latha, B. Sreedevi, K. Surekha, S. R. Voleti, C. Chandrakala, K. V. Prasad Babu and T. Ranjith Paul

Directorate of Rice Research, Hyderabad-500 030

A plant growth promoting bacterium with multiple beneficial traits has been isolated from the rhizosphere of rice grown at DRR farm which has the ability to promote seed germination and vigour under water stress. The bacterium produces indole acetic acid ($2.89 \mu\text{g IAA}/\mu\text{g protein}$), a plant growth hormone, and ACC (1-Aminocyclopropane-1-Carboxylate) deaminase ($2.29 \mu\text{mol } \alpha\text{-keto butyrate}/\mu\text{g protein/h}$) activity which reduce the



production of stress ethylene in rice plants. The isolate also exhibits solubilization of unavailable forms of phosphorous, zinc and silica. Seed bacterization of rice variety Swarna with the rhizobacterial isolate was found to increase the germination percentage under 15% and 20% PEG 6000 induced water stress when compared to un-inoculated control



Enhancement of Root mass by *S. marcescens*

(Table 2) under *in vitro* conditions. A comparison of the root traits which play an important role in water stress tolerance using WinRHIZO image analysis system established that the rhizobacteria also enhanced the root length, root volume and root diameter of inoculated seedlings. The isolate has been identified as a non

pigmented strain of *Serratia marcescens*, a gram-negative bacillus of Enterobacteriaceae through sequencing of nearly full length 16S rDNA using universal bacterial primers, and is currently being evaluated for yield and nutrient uptake enhancement in pot culture.

Table 2: Effect of inoculation on germination and root characteristics of rice seedlings

Treatments	Germination %	Root length (cm)	Root diameter (mm)	Root volume (cm ³)
<i>S. marcescens</i> inoculation				
15% PEG	90	7.0	0.42	0.021
20% PEG	85	8.3	0.39	0.018
Un-inoculated Control				
15% PEG	50	4.2	0.41	0.016
20% PEG	70	5.1	0.34	0.014

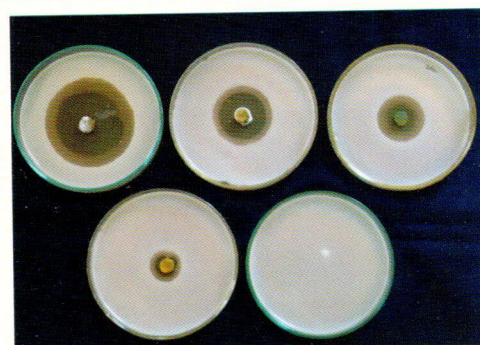
(Values are average of 3 replications containing 10 seedlings)

In Vitro Study on the Toxin Production by False Smut Pathogen, *Ustilagoidea virens*

D. Ladhakshmi, G.S. Laha, D. Krishnaveni, M. Srinivas Prasad and V. Prakasam, Directorate of Rice Research, Hyderabad-500 030

False smut caused by *Ustilagoidea virens*, is one of the important grain diseases of rice. The fungus infects the young ovary of the individual kernels and causes a yield loss up to 50 per cent. Apart from the direct yield loss, the pathogen causes quality loss by producing a toxin, known as Ustiloxin. Ustiloxins are unique tetrapeptides containing a 13-membered ring and ustiloxins A-F were isolated from the water extracts of false smut balls (Koiso et al., 1994). The toxins cause mycotoxicosis and inhibit the polymerization of brain tubulin at micromolar concentrations. An attempt was made to know toxin production by different isolates of *U. virens* under *in vitro* condition using *Candida albicans* as test organism. A mycelial disc (9 mm diameter) from actively growing culture was placed on yeast extract potato dextrose agar media (YEPDA) and incubated for two days at 28°C. One day old culture of *Candida albicans* (grown on YEPDA) was dissolved with 1 ml of

sterile water and mixed with 200 ml of soft YEPDA (containing 1.2% agar) and poured as layer on the incubated plates. The plates were incubated at 28°C for additional two



Toxin production by *U. virens*

days and observation was recorded as diameter of inhibition zone around *U. virens* colony. There was wide variation in the extent of toxin production by different isolates of the pathogen as evidenced by the inhibition zones produced (Table 3).

Table 3 : Toxin production by the isolates of *U. virens*

Isolate collected from	Mean Inhibition zone (mm)	Isolate collected from	Mean Inhibition zone (mm)
Andhra Pradesh	4.25	Manipur	5.35
Haryana (Kaul)	5.35	Maharastra	4.25
Haryana (Karnal)	3.00	Punjab	4.35
Haryana (Uchani)	3.90	Orissa	0.45
Himachal Pradesh	1.90	Tamil Nadu	3.75
Karnataka	3.10	Utrakhand	0.70
Kerala	1.25	West Bengal	5.75

Rice Disease Survey

Outbreak of Neck Blast in the Plains of Uttarakhand

V. P. Bhadana¹, A. P. Padmakumari¹, K. Surekha¹, B. S. Mehla², G. Mahajan³ and G. S. Laha¹
1-DRR, Hyderabad-30; 2-RRS, Kaul-136021 and 3-PAU, Ludhiana-141004

Blast disease of rice caused by *Pyricularia grisea* may occur as leaf blast, node blast and neck or panicle blast. The neck blast makes more significant yield and quality losses. Our past survey data reveal that the incidences of neck blast has increased significantly in last 5-6 years. This may be due to changes in varietal profile, cultivation practices or apparent changes in climatic condition. We surveyed rice crops in and around villages like Garhi Hussain, Bhawanipur, Narainpur, Ganguwala and other adjoining villages near Kashipur in Udham Singh Nagar district of Uttarakhand during first week of October, 2013 and observed wide spread occurrence of neck blast. The variety HKR 47 was worst affected and in some fields, there was 100% neck blast incidence. Some farmers told that they have sprayed Beam (tricyclazole) 3 times; but it has not worked. Few farmers have harvested the crop even before the crop was fully mature fearing the disease may appear. The

expected yield loss in severely infected fields was more than 50%. We interacted with the farmers and suggested the measures to be taken. These included growing of blast resistant varieties like IR 64, early planting (if possible) and use of alternative fungicides like isoprothiolane, kasugamycin, iprobenphos or Nativo 75 WG (trifloxystrobin 25% + tebuconazole 50%).



Severe neck blast on rice variety HKR 47

Outbreak of Bacterial Blight of Rice in Guntur District of Andhra Pradesh

A. Yugander, R. M. Sundaram, M. S. Prasad and G. S. Laha; DRR, Hyderabad 500 030, AP

Bacterial blight (BB) of rice caused by *Xanthomonas oryzae* pv. *oryzae* is one of the most destructive diseases of rice especially during monsoon season in India. There was a severe outbreak of BB in many parts of Guntur district of Andhra Pradesh (Eenadu, Oct 14, 2013, Guntur District Spl.) on Samba Mahsuri (BPT 5204) rice variety. We surveyed the BB incidence in several villages in seven mandals (Piduguralla, Nakairikallu, Sattenapalli, Narasaraopeta, Karampudi, Macherla, Bellamkonda) in Guntur district. The disease



Severe BB incidence on BPT 5204

incidence varied from 30-70% in different mandals (Table 4). In some areas, on the surface of the young lesions, yellowish, opaque and turbid drops of bacterial ooze were observed during early morning. There was excessive rainfall (800-1200 mm) during August to

September, 2013 coupled with high wind velocity which probably resulted in the outbreak of the disease in this region. It is expected that the yield loss due to BB will be 30-50% on Samba Mahsuri crop. However, BB resistant rice variety 'Improved Samba Mahsuri' developed jointly by DRR and CCMB which few farmers cultivated in this district was totally free. Therefore, it is suggested that the farmers can cultivate this variety in this region which is similar to Samba Mahsuri in all respects and have an added advantage of in-built BB resistance.

Table 4: BB incidence in different Mandals/Taluqs of Guntur district of AP

Mandal/Taluqs	Disease incidence (%)
Nekairikallu	50-70%
Karpudi	35-40%
Piduguralla	30-50%
Sattenapalli	45-60%
Narasaraopeta	40-60%
Macherla	30-50%
Bellamkonda	40-50%

Severe Outbreak of False Smut in Nalgonda District of Andhra Pradesh

D. Ladhakshmi, D. Krishnaveni, M. S. Prasad, G.S. Laha and B.C. Viraktamath; DRR, Hyderabad-30

Roving survey was conducted in the first week of December 2013 in Nalgonda district of Andhra Pradesh to assess the incidence

of false smut (FS). Eleven villages (Chityal, Veliminedu, Cherughat, Vemulapallee, Tummadam, Mukundapuram, Narasihula gudam,

Kampasagr, Thripuraram, Chrlapalle and Miryalguda) were surveyed in 8 mandals (Chityal, Narket Palle, Vemulapallee, Nidamanur, Nuthakal, Thripuraram, Nalgonda and Miryalaguda) at maturity stage. The most predominant variety in the



Severe incidence of FS on BPT 5204

region was BPT5204 followed by MTU1010 and NLR 34449. Heavy incidences of FS were recorded in Chityal, Thripuraram, Tummadam and Kampasagar. Among the varieties, BPT 5204 recorded severe incidence of FS both in terms of infected panicles/hill (50-100%) and number of smut balls/ panicle (up to 44 smut balls/panicle). High rainfall during the last week October 2013 (10-70 mm/day) and high humidity (94-98 %) due to cyclone 'Philian' which coincided with the flowering period might be the cause for heavy incidence of false smut.

AICRIP News

Agricultural Research Station, Lonavala (MPKV)

Agricultural Research Station, Lonavla was established in the year 1958 primarily for the resistance evaluation against rice blast disease. Testing of rice varieties against blast disease was initiated in 1949 at Pune and Mahabaleshwar under glasshouse conditions. Meanwhile, blast disease spread over in almost all paddy growing areas of Maharashtra during 1958. Due to the epidemic out break of the disease in the state, ICAR New Delhi



Evaluation of rice blast under UBN condition

sponsored a scheme at Lonavla, Maharashtra in the year 1958 by appointing a Rice Pathologist, as In charge of Station. The center has been identified as 'Hot spot' for blast disease of rice. Initially, this research station was a part of Agricultural Research Station,

Karjat till 1976. Later on, it was declared as an independent centre in 1976 and was transferred under the control of Mahatma Phule Krishi Vidyapeeth, Rahuri. The centre has a total area of 2.67 ha with a cultivable area of 1.58 ha. Presently the centre is headed by Dr. A. P. Gaikwad, Rice Pathologist and is assisted by one JRF, one Agricultural Assistant and 3 administrative staffs. The main mandates of the centre are

1. Evaluation of rice genotypes and breeding material for Leaf and neck blast resistance.
2. Resistance evaluation of rice germplasm for leaf scald disease under field conditions
3. Management of leaf blast, leaf scald, false smut and Udbatta diseases

Research Accomplishment

A. Identification of resistant rice varieties

Blast disease

Since the establishment of this centre more than thirty thousand rice entries have been evaluated against blast disease in

the field and glasshouse conditions. The centre has identified a number of blast resistant rice cultivars for commercial cultivation in the state viz., **Phule Samrudhi, Indrayani, Bhogawati, Phule Maval, Phule Radha, Vijaya, Pankaj, Ratnagiri 68-1, Karjat 14-7, Karjat 35-1, Karjat - 1, Ratnagiri -1, Ratnagiri -2, Panvel-2, Pavana, Kundalika, Darana, RB-4-14, Ratnagiri-711, Prbhavati, Ratnagiri - 73, Sindewahi 75, Sakoli-6, Patani-6, Karnataka, Basmati 370, Krishnasal and Chinnur.**



Rice cultivars promising against blast

Leaf scald disease

Evaluation against leaf scald under field conditions revealed that the released varieties viz., T-22, T-3, Basmati-370, IR 6007, BR-88, Ambemohar-157, Karjat-1 and Pavana were resistant to leaf scald.

Multiple Disease Resistant Rice Varieties

Tetep was found to be resistant to leaf and neck blast, sheath rot, leaf scald and brown spot; KJT 5-1-10-22-38-13 and RAU 631-9-10 were resistant to leaf and neck blasts and brown spot; HKR-05-22, Swarnadhan, NLR 20104, RAU 631-9-10, CR 2675-10-2-1-1 and CB-06-555 were resistant to leaf and neck blast while, TRC2008-4 was resistant to sheath rot and brown spot.

B. Integrated Disease Management in rice

A module for integrated management of rice diseases viz., blast, sheath rot, leaf scald, brown spot and seed discolouration has been designed and recommended as below:

- Soil application of rice husk ash at sowing on raised beds @ 1 kg/m².
- Seed treatment with benomyl @ 3 g/kg followed by *Pseudomonas fluorescens* @ 5 g/kg seed.
- Soil application of rice straw @ 2 t/ha at transplanting.
- Three sprays of fungicides viz., propiconazole or carbendazim @ 10 ml/g per 10 L water at 15 days interval, starting first spray at disease appearance.

C. Recommendations

Blast : Seed dressing with carbendazim @ 4 g/kg followed by 3 sprayings of copper oxychloride or mancozeb, (0.2%) and/ or carbendazim, benlate, hinosan (0.1%) are recommended to control blast.

Leaf scald : Difolatan, copper oxychloride (0.2 %) and carbendazim (0.1%) are recommended to control leaf scald disease.

Udbatta : Seed dressing with thiram or vitavax @ 2.5 g. per kg seed

is recommended to control false smut and udbatta disease.

D. Other Activities

Conducting several state trials, monitoring virulences in *Pyricularia grisea*, conducting several fungicidal trials, studies on epidemiology of rice diseases, varietal demonstration, demonstration of other technologies like Char Sutri method of paddy plantation, several extension activities like transfer of technologies under farmers-scientist club, production and supply of breeder seeds of rice varieties developed by the university.

Other AICRIP News

Field Day on rice variety Krishna organized

ARI, ANGRAU, Hyderabad organized a field day on Rice variety, Krishna (RNR 2458) under ICAR Front Line Demonstrations at Chennaram village, Nelakondapally Mandal, Khammam district on 19-11-2013. The meeting was chaired by Dr. D. Vishnu Vardhan



Reddy, ADR, ANGRAU. Scientists from ARI participated in the meeting. About 90 farmers participated in the program. The Scientist explained that the variety was specifically bred for late planting situation and having blast resistance with good

cooking quality. Some of the farmers who cultivated the variety expressed utmost satisfaction and anticipating grain yield of 6.5-7 t/ha.

ARI, ANGRAU organized Field day at Mahabubnagar

A field day on RNR 15048 (MTU 1010 x JGL 3855) was organized at Gopannapet village, Atmakur mandal of Mahabubnagar district on 23-11-2013. It is a short duration variety (125 days) with cold tolerance and



having resistance to leaf blast and neck blast. The variety has yield potential equivalent to MTU 1010 and has a short slender, super fine grain with good cooking quality. The meeting was attended by Hon'ble Vice Chancellor, Dr. A. Padma Raju. Various scientific staffs and large number of progressive farmers participated in the meeting. Seeds of RNR 15048 was also distributed to the selected farmers of Mahabubnagar district for cultivation.

ZARS, Mandya celebrates Platinum Jubilee and organizes Kisan Mela

Zonal Agricultural Research Station (ZARS), VC Farm (UAS, Bangalore) celebrated Platinum Jubilee and organized Kisan Mela-2013 during 22-23 November, 2013. The meeting was attended by Dr K. Narayanagowda, Vice Chancellor; Dr. B. C. Viraktamath, Director, Directorate of Rice Research, Hyderabad, Dr. M. A. Shanka, Director of Research; Sri. Krishnabyregowda, Hon'ble Minister of State for Agriculture, Dr. M. H. Ambarish, Hon'ble Minister for Housing, GoK; Kumari Ramya Divyaspandana, Hon'ble Member of Parliament, Mandya Lokasabha Constituency and others. Dr. B. C. Viraktamath was



felicitated during the inaugural function for his contribution to hybrid rice research. Dr. Viraktamath also visited FLDs on new rice hybrid KRH-4 grown under SRI method of cultivation in Matadadoddi, Maddur Taluk, Mandya district.

Panorama of Institutional Activities

DRR - Industry Meet.

As a part of ICAR initiative, DRR organized 2nd DRR-Industry meet on 19th October, 2013 with the objective of forging partnership with the private sector. Around 50 companies participated in the meet. Various DRR



technologies were showcased along with the innovations that could be commercialized through public-private partnerships. The field visit was followed by a meeting with all the industry representatives. Dr. N. Shobha Rani, Head, CIS and Chairman, ITMU welcomed the chief guest Dr. N. H. Rao, Joint Director, NAARM, Dr. R. D. Singh, Senior Vice President, Coromandal International Ltd and other dignitaries. Dr. B. C. Viraktamath, Project Director, DRR highlighted the significance of the meeting that coincided with "Agro-innovative India's foundation day" of ICAR for commercializing ICAR technologies.

Farmers' day organized

Directorate of Rice Research organized Farmers' day on 20th October, 2013 at its Rajendranagar campus. More than 600



farmers attended the Farmers day. The technologies developed by DRR were displayed and explained to the farmers. Besides this, stalls were organized where live samples of pests and diseases, weeds, soil

testing kit and seeds of different rice varieties were displayed. A computer display was also made to show the information that the farmers can get through Rice Knowledge Management Portal (RKMP) which has been developed by DRR. In addition, there were stalls from ANGRAU, PDP, DOR, DSR, M/S Bayer and other private companies. This was followed by a meeting which was presided by Dr. B. C. Viraktamath, Project Director, DRR. Dr. A. Padma Raju, Vice Chancellor, ANGRAU was the chief guest and Shri J. Dharma Naik, Additional Director of Agriculture, Government of AP was the guest of honour. The meeting was also attended by Dr. B. Venkateswarlu, Director, CRIDA, Hyderabad. The entire meeting was coordinated by Dr. N. Shobha Rani, Head, CIS. Project Director welcomed all the participants and briefed about the adoptable technologies. All the farmers were given a booklet containing salient points in rice cultivation (in local language) and a leaf colour chart. At the end, a question answer session was organized in which pressing issues of the farmers with respect to rice cultivation were addressed. Few selected progressive farmers were felicitated in the meeting. The meeting ended with vote of thanks from the convenor of the program, Dr. R. Mahendra Kumar.

Vigilance week observed

DRR observed vigilance week from October 28-November 2, 2013. The observance of Vigilance Awareness

Week commenced with the pledge on 28th October, 2013 at 11.00 A.M. The English version of the oath was read by Dr. N. Shobha Rani, In-charge Director and the Hindi version was read by Dr. N. Sarla, National Professor, DRR. All the DRR staff took the oath. This year theme of observing Vigilance Awareness Week was "Promoting Good Governance-Positive Contribution of Vigilance".



Lecture on Good governance organized

Prof. G. Harogopal, former Dean, School of Social Sciences,

University of Hyderabad delivered a lecture on "Providing good governance: positive contribution of vigilance" on 2nd November, 2013 during the vigilance week.



Impact of cyclone 'PHAILIN' on rice crop

The Cyclone Phailin lashed on the coastal districts of Odisha and Andhra Pradesh during 10-12 October, 2013 causing severe damage to standing rice crop and human life. A team of scientists



from DRR viz., Dr. V. Ravindrababu, D. Subrahmanyam, M. S. Prasad and B. Gangaiah along with the staffs from ARS, Ragolu and State Department of Agriculture surveyed the affected areas in

Srikakulam district of AP. There were heavy winds (100-150 kmph) and intense rain fall (107-190 mm) on the day the cyclone crossed the coast line near Gopalpur, Odisha on 12th October. There was heavy damage to the rice crop due to water stagnation in the low lying areas (3-6 days) and crop lodging due to heavy winds. The state department of agriculture had estimated that rice crop was damaged approximately in 4100 ha due to inundation and in 1400 ha due to lodging of crop. In some of the villages near the sea coast, the saline sea water intruded into the rice fields which resulted in yellowing of the leaves and burning of the leaf tips. The team also made some suggestions for the immediate actions to be taken to save the crop as much as possible.

DRR organizes training for tribal farm women

An off campus training on dissemination of improved rice production technologies was organized by DRR for tribal farm women

under the Tribal Sub-Plan activities at Korra Tanda Village of Nalgonda District of AP on 29th August, 2013. The objective of the training program was to disseminate improved rice production technologies to tribal farm women.



IRRI Scientists visit DRR

Dr. Eero Nessila, Head, Inat Breeding, Genetics and Biotechnology Division, IRRI, Philippines, visited DRR on 26/11/2013. He had a detailed discussion with Project Director, Dr. B. C. Viraktamath and



scientists of Crop Improvement section regarding the ongoing projects. He also visited DRR rice museum.

Dr. K. K. Jena, Principal Scientist and team leader of GRiSP's (Global Rice Science Partnership) biotic stress breeding program, PBGB Division, IRRI, Philippines visited DRR on 5 December, 2013 and had a detailed discussion on component 8 (biotic stresses) and component 11 (increasing yield potential) of GRiSP with Dr. B. C. Viraktamath, Project Director, DRR. The meeting was also attended by scientists of Crop Improvement and Crop Protection Division, DRR.



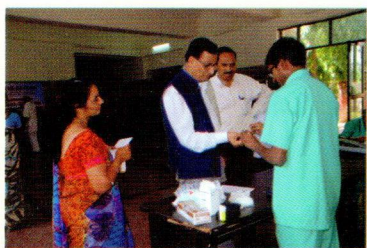
Dr. Noel Magor (Head, Training Centre, IRRI) visited DRR along with Drs. Frank Mussunig, Salahuddin and Poornima Shankar on 13 December 2013. They discussed about theme 6 activities undertaken under IRRI-India workplan with Dr. B. C. Viraktamath, Project Director. The meeting was attended by Drs. K. V. Rao, P. Muthuraman and Shaik N. Meera.

Cyclone 'Helen' and 'Lehar' hits coast of Andhra Pradesh

Cyclone Helen lashed on the coast of Andhra Pradesh on 22 November, 2013. Though its intensity was not very high, it resulted in heavy rains and caused extensive damage to the maturing rice crop in the coastal districts of Andhra Pradesh. Even before coastal Andhra Pradesh fully recovered from the effects of Cyclone Helen, another cyclone called Lehar hit between Machilipatnam and Kalingapatnam near Kakinada on 28th November, 2013. However, the cyclone was weak and did not cause much damage to crops and human life.

DRR organizes free medical camp

A free medical camp was organized at DRR on 6th December, 2013 by the DRR Staff Recreation club. Three CGHS and ICAR recognized hospitals situated at Hyderabad viz., Deccan Hospitals, Somajiguda, Olive Hospitals, Mehdiapatnam and Dr. Agarwal's eye Hospital, Panjagutta took part in the camp. About 150 DRR staffs and their family members got the benefit from the free medical camp.



International symposium on bacterial blight of rice organized

Fourth International Conference on bacterial blight of rice was jointly organized by Centre for Cellular and Molecular Biology, Hyderabad (CSIR), Directorate of Rice Research, Hyderabad (ICAR) and Society for Advancement of Rice Research, Hyderabad from December 2-4, 2013. The inaugural meeting was attended by Prof. Swapan K. Datta, DDG (Crops), ICAR, Prof. Mohan Rao, Director CCMB, Prof. E. A. Siddiq, Honorary Professor, ANGRAU, Dr. B. C. Viraktamath, Director, DRR, Dr. T. Mahapatra, Director, CRRI, Prof. Adam Bogdanove, Professor, Cornell University and Dr. Ramesh V. Sonti, Chief Scientist, CCMB. Inaugural lectures were delivered by Prof. Jan Leach from Colorado State University and Prof. Adam Bogdanove from Cornell University. Many leading scientists from different parts of World participated in the meeting and discussed the latest advancements made.



Field day attended

A field day was organized by Sri Venkateswara Bharatiya Gramina Karshak Seva Samiti (NGO) at Gandepally village in East Godavari District on 21.11.2013 and large number of DRR scientists participated in the meeting. During the meeting, DRR scientists interacted with the farmers and suggested for non-lodging paddy varieties, good management practices, pests control, mechanization in paddy and extension services available for the farmers.

DRR organizes IPM day

An IPM day was organized by DRR in collaboration with KVK, Kampasagar, ANGRAU on 25th November 2013, to create awareness about the management of pests (weeds, insects & diseases) from nursery to harvest. Around 50 farmers and 25 scientists from DRR, KVK and state government officials attended the meeting. The IPM practicing farmers shared their experiences and operations taken for the management of different pests. "IPM card" was distributed to farmers along with leaf colour chart.



Mutant day organized



A mutant day was organized at village Kakonoor (Kesampeta mandal) where about 10,500 M₂ lines of popular rice variety Samba Mahsuri are being grown in farmer's fields (a CCMB-DRR

project: PLOMICS). The main objective of the meeting was to involve scientific staffs from different disciplines of Directorate of Rice Research in selecting novel mutants. Dr. N. Shobha Rani (Project Director I/c) inaugurated the meeting and about 30 scientific staffs participated in the meeting and selected many unique mutants.

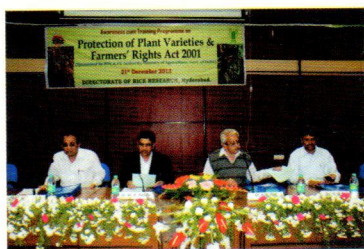
One day workshop on sustainability in Agriculture organized

One day workshop on Ag Balance-A method to measure sustainability in agriculture was organized at DRR jointly by BASF and DRR on 9 December, 2013. The meeting was inaugurated by Dr. N. Shobha Rani, Project Director (I/c). All DRR scientific staffs and different BASF officials viz., Mr. Ashok Koshy, Mr. M. K. Reddy, Dr. Martijn Gijmans, and Mr. Jagmeet Bal participated in the meeting.



Training program of plant variety protection organized

One day Awareness cum Training Programme on Plant Variety Protection and Registration of Plant Varieties was held at DRR on 21st December, 2013 for the benefit of the Agricultural Officers/ Assistant Professors from SAUs/ NGOs.



MOU signed



To popularize rice hybrid DRRH 2 and to increase its seed production, Directorate of Rice Research has signed an MoU with M/S R. J. Biotech Pvt. Ltd., Aurangabad on 12th December, 2013.

Staff Activities

Awards

Dr. Sheshu Madhav, Sr. Scientist, Biotechnology, DRR was selected as best young scientist (above 30 yrs category) during International Conference on "Plant Biotechnology, Molecular Medicine and Human Health (ICPMH-2013) organized by Department of Genetics, University of Delhi, from 18-20 October, 2013. He presented a paper on "Application of molecular markers for development of broad spectrum blast resistance and improvement of quality traits in rice"

Dr. Shaik N.Meera Sr. Scientist, Ag. Extension received Young Extension Professional Award of International Society of

Extension Education (INSEE) for the year 2013 for his outstanding contribution in the field of Extension Research. He received the award from Dr. S. Ayyappan, Director General ICAR and Secretary DARE during the International Conference on 'Extension Educational Strategies for Sustainable Agricultural Development- A Global Perspective' held on 5-8 December 2013 at Bengaluru. Director and staffs of DRR congratulate him for his achievement.



Foreign visits

Drs. B. C. Viraktamath, V. Rabindrababu, R. M. Sundaram and G. Padmavathi attended the Rice Genetics 7 symposium which was held at Hotel Dusit Thani, Manila, Philippines from 5-7 Nov. 2013

Dr. V. Rabindrababu also participated the planning meeting on High Zinc Rice: current advances in Singapore from November, 11-12, 2013. The meeting was organized by IRRI, Philippines under Harvest Plus Network Program

Dr A.S. Hari Prasad, PS, DRR participated in the Asian Seed Congress 2013 held at Kobe, Japan during November 18-22, 2013

Dr. B. Nirmala attended a workshop on "Food value chain Analysis: Tools and Applications" in Bangkok from December 4-8, 2013.

Re-Joining of Dr. S. K. Mangrauthia, Scientist, Plant Biotechnology

Dr. Satendra K. Mangrauthia, Scientist, plant Biotechnologist joined back to DRR on 16 December, 2013 after 1 year deputation as IUSSTF at Purdue University, USA.

List of staffs promoted to new grade

The following staff members of DRR were promoted to the next higher grade through career advancement scheme.

Name of the staffs	Promotions	
	From	To
Dr. D. Venkateswarlu*	T7/8	T9
Mr. Y. Kondala Rao**	T7/8	T9
Mr. S. Amudhan	T5	T6
Mr. P.M. Chirutkar	T5	T6
Mr. B. P. Anjaneyulu	T4	T5
Mr. T. Jagannatha Rao	T4	T5
Mr. Y. Roseswar Rao	T3	T4
Mr. K. Shravan Kumar	T3	T4
Mr. B. Venkaiah	T2	T3

* Retired on 30/6/2013; ** Retired on 31/7/2012

Monitoring of AICRIP trials

As a part of program, the AICRIP trials at different cooperating centres were monitored by various teams. The details of the scientific personnel and the centres visited are presented below.

Team Members including Nodal Scientists	Period of visit	AICRIP centres visited
Drs. T. Ram, M. S. Prasad, Brajendra, Mohd. Naiyar Ali and Saurabh Dixit	Sept 29- Oct 2 & Oct 23-28, 2013	CRURRS, Hazaribagh; BAU, Ranchi; CSSRI Centre, Lucknow; NDUAT, Kumarganj; CRS, Faizabad; CSAUAT, Kanpur
Drs. V. Ravindra Babu, D. Subramanyam, Ajay Srivastava, J. P. Aditya and Z. A. Bhatt	Sept 30 - Oct 6, 2013	VPKS, Almora; RWRC, Malan; CSKHPKV, Palampur; ARS, MAjhera; SKUAST - J, Chatha
Drs. N. Shobha Rani, K. Surekha, A. P. Padma Kumari, G. S. Laha, V. P. Bhadana, B. S. Mehla and G. Mahajan	Oct 1- 10, 2013	IARI, New Delhi ; RRS, Kapurthala; ARS, Rauni; PAU, Ludhiana; RRS, Kaul; ARS, Uchaini; CSSRI, Karnal; GBPUAT, Pantnagar; RRS, Nagina; SVPUAT, Meerut; ARS, Kota
Drs. S. M. Balachandran, V. Jhansi Lakshmi, N. P. Chauhan and R. L. Kunkerkar	Oct 14 - 21, 2013	MRRS, Nawagam; RR RS, Vyra; NAU, Navsari; ARS, Lonavla; RARS, Karjat; KLRS, Panvel; ARS, Sakoli; ZARS, Sindewahi
Drs. L. V. Subba Rao, B. Gangaiah, P. Raghuvveer Rao, D. K. Sidde Gowda, P. Surendran and S. Manonmani	Sept 28 - Oct 3 & Nov 4 - 11, 2013	RARS, Pattambi, RRS, Vyttil a, RRS, Moncompu; ZARS, Brahmavar; ARS, Sirsi; ARS, Gangavathi; ARS, Mugad; RRS, Mudigere; ARS, Ponnampet; HREC, Gudalur; TNAU, Coimbatore
Drs. K. V. Rao, N. Shobha Rani, G. Katti, G. S. V. Prasad and P. V. Satyanarayana	Oct 22 - 29 & Nov 20- 21	APPRI, Marut eru; ARI, Rajendranagar; ARS, Warangal; ZARS, Mandya; RRS, Tirur; TNRRI, Aduthurai; PKKV, Puducherry; PJNCOA&RS, Karaikal
Drs. A.S. Hari Prasad, B. Sreedevi, Mayabini Jena, Nitendra Prakash and Vindeswari Prasad	Nov 6 - 14, 2013	CRRI, Cuttack; RRS, Chinsurah; ARS, Patna; RAU, Pusa; CRS, Faizabad; and CRS, Ghaghraghat
Drs. G. Padmavathi, D. Krishnaveni, Narendra Pandey and P. Perraju	Oct 3 - 11, 2013	IGKV, Raipur; JNKVV, Jabalpur; JNKVV, College of Agriculture, Rewa; SGCA&RS, Jagadapur; RRTTS, Chiplima; ARS, Jeypore; Col. of Ag, Bilaspur
Drs. S. R. Voleti, V. P. Bhadana and Ch. Padmavathi	Oct 14 - 22, 2013	RARS, Titabar; SARS, Arundhatinagar; ICAR Centre, Lembuchera; ICAR Res. Cpmplex, Barapani; Dist and Local Res Stn and Labs, Upper Shillong; RRS, Wangbal; ICAR Centre, Lamphalpet; CAU, Iroisemba; CRRI regional centre, Gerua
Drs. R. Mahendra Kumar, M. Sheshu Madav, Chita Shankar and S. K. Pradhan	Oct 21 - 26, 2013	RRS, Chinsurah; CRRI, Cuttack; OUAT, Bhubaneswar; RRS, Kalimpong

Weeds of Rice: *Cyperus difformis* (umbrella Nutsedge/small Flower Umbrella Sedge)

B. Sreedevi, DRR, Hyderabad-30

Cyperus difformis, commonly known as umbrella nutsedge or small flower umbrella sedge is a member of cyperaceae. It is a major sedge weed of paddy fields in 46 different countries and one of the world's worst 76 weeds. It is a C3, densely tufted annual sedge of very short lifecycle of 1 month and infrequently perennial. It was first discovered in 1934 in Southeastern Virginia.

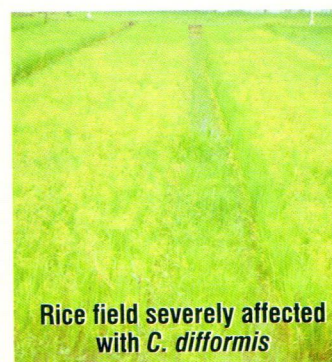
It is a terrestrial herb with triangular solid stem, fibrous brown or white root system, simple leaves arranged alternately. The leaf blade is flaccid, linear, abruptly acuminate, smooth and usually shorter than the flowering stem. Leaf margin is entire, apex is acute and parallel venation is seen. Leaf base is clasping and leaf sheath is triangular or round in cross section. Inflorescence is complex like an umbrella. Flowers are bisexual and present as terminal umbel which is sessile, yellow without petals. Fruit is a nut and normally propagated by seed. In tropical conditions it flowers



Cyperus difformis

and seeds throughout the year. It is heavy seed producer producing around 50,000 seeds/plant /cycle of 1 month.

This weed grows well in rich fertile soils as well as poor sandy and clay soils. It is well adapted to moist lowland soils or flooded areas. Being very short life cycled and fast growing, this weed competes heavily for nutrients and water in the initial stages of rice crop. It forms a thick population before maximum vegetative stage of paddy crop, making it a dominant weed resulting in major yield loss ultimately. Cultural control methods like deep flooding is required as shallow or intermittent flooding is less effective. Chemical control by using post emergence herbicides like 2, 4-D, chlorimuronethyl+metsulfuron methyl, ethoxysulfuron etc are effective in controlling this weed. Biotypes of *C. difformis* have been found resistant to the herbicide bensulfuron in rice in USA and Australia.



Rice field severely affected with *C. difformis*

Rice Recipe: Tiranga Pulao

Amtul Waris, DRR, Hyderabad-30

An easy to prepare nutritious pulao, an all time Republic Day and Independence Day special, to booster our National pride.

Ingredients

Basmati rice- 2 cups, soaked in water for half an hour, Vegetable oil/ghee-2 to 3 tbsp, Onion-1 medium finely sliced, Cinnamon-2 sticks, Cloves-4, Green cardamoms-2, Salt to taste, tomato puree-2 tbsp, spinach-1/2 a bundle boiled and pureed and Chat masala-1 tbsp.

Method

- Heat the oil in a pan; add onions, cinnamon sticks, cloves and green cardamoms. Sauté until the onions are golden brown.
- Add drained rice and stir carefully coating the rice grains with the oil.
- Add four cups of water and salt. Stir well and bring it to boil,

cook rice till done.

- In a pan take 1 tbsp ghee and add chopped onion, stir till golden in colour, add tomato puree and red chilli, turmeric and chat masala and add 1/3 of cooked rice in it to make tomato masala rice.



Tiranga pulao

- In another pan take 1 tbsp of ghee and add green chilli and spinach puree, cook till little thick, add little salt and pepper powder and mix well, add another 1/3 of rice in it to make spinach rice.
- Arrange it in three different layers and Tiranga pulao is ready to serve.

Rice News around the Globe

A group of Scientists from IRRI and Japan have discovered a gene called SPIKE (SPIKELET NUMBER) from an Indonesian Tropical Japonica land race which can increase rice yield by 13 to 16 %. Map based cloning revealed that SPIKE was identical to NARROW LEAF 1 (NAL 1) which has been reported to control vein pattern (Source : Fujita *et al.*, www.pnas.org/cgi/doi/10.1073/pnas.1310790110).

BOOK POST

Published by : Dr. B.C. Viraktamath, Project Director
Editorial Committee : Dr. G. S. Laha, Dr. Amtul Waris, Dr. B. Jhansi Rani,
Dr. P. Raghuvveer Rao and Dr. G. S. V Prasad
Address : Directorate of Rice Research, Rajendranagar,
Hyderabad – 500 030, AP, India
Phone : +91-40-24591216, 24591254
Fax : +91-40-24591217
e-mail : pdrice@drricar.org
Website : <http://www.drricar.org>