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भाकृअनुप
ICAR

DRR

# Directorate of Rice Research
## NEWSLETTER

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## From Director's Desk...

Monsoon plays a pivotal role in the entire socio-economic fabric of India, influencing all walks of life especially crop production. Timely arrival of the South-West Monsoon and its reasonably well distribution across the country encouraged the farmers to bring more area under rice, especially in Uttar Pradesh and West Bengal. For the country as a whole, the rainfall for the season (June-September, 2013) was 106 % of its long period average (LPA). According to a report by Ministry of Agriculture, GOI, area under Kharif rice in India stands at around 37.7 million hectares (as of October 4, 2013) which is about 2% up compared to last year same time. The general consensus among the rice trade, Agriculture Ministry officials and exporters is that the rice production this kharif would touch a new high, exceeding the record 92.78 million tonnes in 2011. Hon'ble Agriculture Minister, Shri Sharad Pawar ji and his deputy Shri Tariq Anwar ji have expressed confidence that the bounteous monsoon this year would help the country produce record food grains, including rice. The London-based International Grains Council (IGC), in its latest estimate, has forecasted India's rice output at 107 million tonnes, up 2.5 per cent from last year.

AICRIP is the backbone of DRR and many activities took place during this quarter of the year in addition to our regular research activities. These included planting of different AICRIP trials, preparation of different data record books and sending them to the cooperators, regular contact with the cooperators across the country regarding conduct of the trials and general crop condition and monitoring of the trials by different teams constituted for this specific purpose.

Some important events took place at DRR. A meeting on strengthening the collaboration between IRRI and India was organized at DRR when Dr. K. K. Jena, Team Leader, GRiSP's Biotic Stress Program visited DRR. Padmashree Dr. M. V. Rao visited DRR and had a detailed discussion with Project Director and other scientists regarding the rice research programs. Padmabhushan Dr. R. S. Paroda, Chairman, TAAS and Former DG, ICAR delivered first Dr. M. V. Rao lecture on "Addressing the emerging concern of Indian Agriculture" at DRR auditorium which was organized by the Indian Society of Oilseeds Research, DOR.

DRR bagged three prestigious ICAR awards *viz.,* Hari Om Ashram award, Lal Bahadur Shastri award and Young Scientist Leadership Award for outstanding contribution in rice science. Independence day was celebrated with great enthusiasm. Hindi week was organized from 14-21 September where large number of DRR staff members took part. A parthenium awareness week was organized and the highlight was a special lecture on parthenium by Dr. N. T. Yaduraju, Former Director, NRC, Weed Science. Three training programs were organized by DRR on SRI, Quality aspects of rice and IPM.

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

**(B.C. Viraktamath)**

## IN THIS ISSUE

General Article

# Panicle mite, *Steneotarsonemus spinki* Smiley (Acari: Tarsonemidae): A potential pest of rice

Ch. Padmavathi, M. Sampathkumar and Gururaj Katti, DRR, Hyderabad-30

Panicle mite, also known as Sheath mite or tarsonemid mite is not visible to naked eye as it is microscopic in nature. This mite was first reported in India as early as in 1930's as a "tiny moving arthropod" (Ramaiah, 1931; Agric. Livestock (India) 1, 414–416). This was followed by a report as pest of rice in 1975 (Rao and Das, 1977; Int. Rice Res. Newsl. 2, 8). Later its incidence was noticed in farmer's fields in Uttar Pradesh, Andhra Pradesh, Odisha and Jharkhand. Recently, it has become a potential pest in Andhra Pradesh, particularly in Telangana region during *Kharif* season and coastal Andhra during *Rabi* season.

***Identification:*** Female mites are ovoid in shape, hyaline to straw coloured and are approximately 250 μm in length. Male mite has elongated rear legs containing a pair of elongated spines. Males are highly active and can be seen moving on the surface of leaf.

***Life history:*** *S. spinki* is facultatively parthenogenetic in nature wherein virgin females produce male offspring. But the mother female can mate with its male off spring and then produce eggs from which both female and male mites develop (Xu *et al.* 2001; syst. Appl. Acarol. 6: 45 - 49). A mated female produces on an average 55 eggs. The oviposition period is 5 days. The eggs hatch in 2-4 days and there is an active larval stage, lasting about 1 day and a quiescent stage lasting 2 days. The life cycle is completed in 6 days. However, the duration of different stages and the total duration of the life cycle is highly temperature dependant. Under ideal climatic conditions, mites can have 48-55 generations per year. High temperature and low rainfall are ideal for the development of panicle mites in the field.


Eggs


Panicle mite adult

***Damage symptoms:*** Damage can be seen from one month after transplanting. At vegetative stage, feeding takes place behind the leaf sheath by perforating the epidermal cells. The feeding lesion can be detected by brown discoloration of leaf sheath. After panicle formation, symptoms include "sterile grain syndrome" described as loose and brownish flag leaf sheath, a twisted panicle neck, impaired grain development resulting in empty or partially filled grains associated with diseased brown spots, and an erect panicle. It injects toxic saliva into the grain while feeding resulting in discoloration. It can cause damage indirectly also, by acting as carrier of fungal and bacterial pathogens, and associated with diseases such as bacterial panicle blight, blast, leaf scald, pecky rice (caused by *Fusarium* spp.), sheath blight, sheath rot, and stackburn disease.


Infested panicle

***Yield losses:*** Crop losses ranging from 5 – 90% have been attributed to panicle mites in a number of Countries. Japonica varieties in India are reported to be more susceptible to *S. spinki* than Indica varieties with a 20% yield loss. Damage is more in short duration varieties compared to medium and long duration ones.

***Off season survival:*** Panicle mites in different stages survive on rice stubbles or ratoon plants in India. A weed, *Schoenoplectus arficulatus* (Cyperaceae) has been observed as an alternate host of panicle mite.

***Management options:***

1. Destruction of rice stubbles and removal of weed species that can act as a source of infestation.
2. Use of clean and certified seed
3. Clean machinery and other equipment to avoid the dissemination of the mite from an infested area to an uninfested area
4. Leaving the fields fallow for at least two weeks between crop cycles in mite endemic areas
5. Crop rotation or avoiding second rice crop under severe mite infestation,
6. Application of systemic miticides like dicofol @ 500 g a.i. /ha, ethion @ 500g a.i. /ha, spiromesifen @ 72 g a.i. /ha and profenofos @ 500 g a.i. /ha.

***Suggested future line of work:*** Being a potential pest, there is an urgent need of research work into bio-ecology details of this pest. Other areas on which systematic studies are needed include:

1) The exact mechanism by which this mite feeding causes sterility.
2) Dispersal of *S. spinki* on or in harvested rice seed and
3) Mechanism of association of panicle mite with various fungal and bacterial pathogens

During 2012 Kharif season, we visited Duggepally, Chillapuram, Yadgarpally, Thungapadu, Adavidevulapally, Narammagudem, Laxmipuram villages of Miryalguda, Nidamanuru and Tripuraram mandals of Nalgonda district. In all the villages, BPT 5204 was grown. All the farmers' fields were infested with panicle mite and most of them applied atleast 2 sprays of profenofos.

# Nutritional Profiling of Poular Rice Varieties of India

V. Ravindra Babu, T. Longvah,*, K. Surekha, and B.C. Viraktamath
DRR, Hyderabad-30; * NIN, Hyderabad-07



Rice plays a pivotal role in Indian economy being the staple food for two thirds of the population. With 44.62 million hectares under rice, India ranks first in area, second in production with 31% of calories to Indian diet supplied through rice. Next to yield, grain and nutritional quality has become the primary consideration in rice breeding programmes. Rice bio-fortification programme aims at biological and genetic enrichment of food stuffs with vital nutrients (vitamins, minerals and proteins). This is also the only feasible way of reaching the malnourished population in rural India. High nutrient dense rice not only can benefit the consumer but also produce more vigorous seedlings in the next generation. Since staple foods are eaten in large quantities everyday by malnourished poor, adding of even small quantities of micronutrients makes a big difference. Zinc deficiency is one of the common causes for malnutrition and 25% of the world's population is at risk of zinc deficiency (Maret and Sandstead 2006). In Asia and Africa, it is estimated that 500-600 million people are at risk for low zinc and iron intake (HarvestPlus, 2010). Males aged between 15-74 need about 12-15 mg of zinc daily while females aged between 12-74 need about 68 mg of zinc and 10-15 mg of iron daily (Sandstead, 1985). In this context, breeders are now focusing on breeding for nutritional enhancement to overcome the problem of malnutrition. Efforts are made at Directorate of Rice Research (DRR) to evaluate land races, basmati, non-basmati and high yielding rice cultivars collected from different parts of the country to study the iron and zinc content in the grains. Varieties with relatively high iron and zinc in grains were identified and used in the breeding programme as donors and some fixed lines with high iron (>10 ppm) and zinc (>20 ppm) in the 10% polished rice were identified and are at testing stage in AICRIP system. The data on iron and zinc in brown, 5% and 10% polished rice of selected popular varieties, estimated on Varian Techtron AAS are furnished in Table-1.

**Table-1 : Iron and Zinc estimates of varieties and landraces from different states of India**

| S.No. | Name of the Variety | Grain Type | Fe (ppm) | | | Zn (ppm) | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0% | 5% | 10% | 0% | 5% | 10% |
| 1 | MSE -9 | LB | 34.4 | 12.4 | 10.8 | 21.7 | 16.6 | 15.6 |
| 2 | Kalanamak | SB | 34.0 | 12.1 | 10.9 | 24.6 | 21.9 | 19.2 |
| 3 | Karjat -4 | MS | 25.6 | 18.6 | 14.0 | 30.0 | 27.9 | 20.3 |
| 4 | Shashi | LS | 9.5 | 6.5 | 5.2 | 24.3 | 20.7 | 18.4 |
| 5 | Chittimutyalu | SB | 24.9 | 14.0 | 9.8 | 30.5 | 25.7 | 24.4 |
| 6 | Poornima | SS | 13.9 | 8.0 | 5.8 | 31.3 | 25.8 | 23.0 |
| 7 | ADT - 43 | MS | 14.3 | 12 | 7.7 | 30.9 | 26.6 | 20.9 |
| 8 | Ranbir Basmati | LS | 14.2 | 10.4 | 7.8 | 30.9 | 26.3 | 24.4 |
| 9 | Type - 3 | LS | 15.3 | 9.7 | 7.1 | 30.3 | 28.3 | 26.5 |
| 10 | Udayagiri | SB | 30.1 | 9.5 | 9.0 | 30.1 | 19.5 | 11.3 |
| 11 | Ratna | LS | 10 | 6.4 | 3.6 | 32.7 | 25.2 | 22.0 |
| 12 | Jyothi | LB | 19.8 | 14.9 | 4.0 | 31.3 | 22.4 | 20.6 |
| 13 | Kesari | MS | 8.1 | 7.4 | 5.2 | 31.5 | 19.9 | 19.3 |
| 14 | Metta Triveni | SB | 26.1 | 7.0 | 7.0 | 31.5 | 27.2 | 22.7 |
| 15 | DL - 183 | MS | 12.8 | 5.4 | 4.4 | 30.5 | 22.1 | 20.3 |
| 16 | Varsha | SB | 37.5 | 11.2 | 8.1 | 32.9 | 25.7 | 22.6 |
| 17 | Vikas | LS | 10.5 | 7.6 | 4.6 | 28.5 | 21.2 | 19.8 |
| 18 | Kranti | SB | 10.0 | 6.9 | 5.3 | 31.4 | 23.6 | 22.2 |
| 19 | Pant sugandhan - 17 | LS | 15.9 | 6.8 | 3.5 | 32.5 | 25.2 | 23.0 |
| 20 | Jalamanga | SB | 17.8 | 7.0 | 5.3 | 21.0 | 17.5 | 16.3 |

In general, basmati, deep water and some land races were found to have high iron and zinc content in rice grains (both brown and polished rice).
Note: 0%-brown rice:; 5%-polished rice; 10%-polished rice

# Flea Beetle Damage on Rice in Srikakulam District of Andhra Pradesh

V. Visalakshmi, K. V. Ramana Murthy, J. Dayal Prasad Babu and Chitra Shankar*, Agricultural Research Station, Ragolu, Srikakulam, ANGRAU; *DRR, Hyderabad-30

The flea beetle ***Chaetocnema concinnipennis*** (Baly) was found to cause noticeable damage on rice seedlings during the last two - three years in some districts of Andhra Pradesh. The term 'flea beetle' is applied to a group of small beetles that have enlarged hind legs and jump when disturbed. They are very small black beetles measuring about 0.2 mm in length and 0.1 mm in width. *C. concinnipennis* was recorded for the first time in India in July-August, 1969 at Cuttack, where it caused severe damage to rice, especially in the newly transplanted seedlings. Although *Chaetocnema* spp. were reported to be abundant in upland rice, in West Africa, the feeding damage that they cause was considered minimal and they are considered to be minor pests. But they are potential vectors of Rice Yellow Mottle Virus. Larvae develop on the roots of grasses in fallow upland areas and are not rice pests. The adult beetles feed on leaf surface causing white longitudinal lesions (inset) which can be easily confused with the damage caused by rice hispa. Heavily infested plants appeared scorched, with withered leaf-tips.

*C. concinnipennis* damage was observed from last year in around 15 villages belonging to Tekkali, Nandigama and Meliaputti mandals of Srikakulam district around 50-60 km radius of the Odisha border. The incidence in high intensity was observed in 2013 also in the same pockets. The pest infestation started in the dry nurseries, during dry spells, in the month of June and continued up to July. In the nurseries, adults were observed feeding and produced narrow white longitudinal lesions on both sides of the leaves, which later dried up. During the peak period the leaf damage was up to 80%. The damage was also observed on many weeds ranging from 16-64 % (Table 2). The pest started disappearing with receipt of rainfall from third week of July. *C. concinnipennis* also appeared in L.N. Peta mandal of Srikakulam district in transplanted fields at 10-20 DAT stage in BPT 5204 (Samba Mashuri) and MTU 1001 (Vijetha). The pest showed varietal preference where moderate to severe damage was observed in BPT 5204 with 20-40 beetles per hill and 50-80% leaf damage. In the variety MTU 1001, the incidence was relatively low with mean leaf damage of 26.5% and 13 beetles/hill.

**Table 2:** Mean leaf damage by fleabeetles in rice and alternate hosts

| S.No. | Crop/weed | Mean leaf damage (%) |
|---|---|---|
| 1 | Rice nursery (nursery) | 64 |
| 2 | *Cyprus rotundus* (nursery) | 61 |
| 3 | *Echinochloa colonum*(nursery) | 43 |
| 4 | *E. crusgalli* (nursery) | 32 |
| 5 | *Mimosa pudica* (nursery) | 25 |
| 6 | *Imperata* spp. (nursery) | 16 |
| 7 | Transplanted fields (BPT 5204) | 71.4 |
| 8 | *Cynodon dactylon* (transplanted field bunds) | 12.3 |
| 9 | Transplanted fields (MTU 1001) | 26.5% |

# Rice Farming Systems in Backward Regions: Socio-economic Assessment and Sustainable Livelihood Analysis

N. Meera Shaik, Arun Kumar S., Amtul Waris, Muthuraman P, Chiranjeevi K. and Rajendar Reddy, V*; DRR, Hyderabad-30 and *YFA-KVK, Madanapuram

Evolving a methodology for livelihood mapping at micro level in the vulnerability context helps in preparation of suitable strategies and policy interventions. It is also important to assess different factors associated with and influencing the livelihood options of the weaker and vulnerable sections of the farming community like the scheduled castes/ scheduled tribes (SC/ST) Farmers. The present study investigated the livelihoods of SC/ST target population in Kothakota, Wanaparthy and Pebbaire mandals (blocks) of Mahaboobnagar district which is identified as one of the backward regions by the Government of India. The study found that the sustainable livelihoods was at the medium level which can be attributed due to high social capital and social networks even though the human, physical, natural and financial capitals were not encouraging.

An *Ex-post facto* research design was followed to carry out the survey since the variables chosen for the study had already occurred. The survey was conducted in three mandals of Mahboobnagar district of Andhra Pradesh state of India. The selection of respondents was purposive in nature. From 12 hamlets, 147 poor SC/ST farmers were selected. Multiple linear regression analysis was carried out with sustainable rural livelihoods and

personal, socio economic and psychological factors. The factors like land holding, migration pattern and economic motivation were found significant at 1 percent level of probability where as employment generation and technology utilization was significant at 5 percent level of probability. The identified factors of livelihood like landholding, migration pattern, economic motivation, employment generation, technology utilization has to be given attention while formulating suitable strategies that can directly impact the livelihoods of similar farming community and vulnerability contexts.


As per the findings of the study, it is suggested that a cafeteria of technologies targeting smaller landholdings need to be undertaken that will reduce the migration behavior in this region. This may make livelihoods sustainable. Similarly, there is a need to take up interventions focusing on employment generation amongst the rural youth (eg. developing mass multiplication facilities for bio-control agents such as *Trichoderma* and *Trichogramma*). The low technology utilization can be overcome by addressing the issues such as lack of resource abundance, drought tolerant varieties/ adaptation measures, depleted ground water resources, poor institutional credit support and poor extension contact. The technology utilization pattern needs to be changed over a period of 2-3 years with a series of technological interventions.

# AICRIP News: Agricultural Research Station, Ponnampet

Ponnampet centre (University of Agriculture Sciences, Bangalore) of AICRIP was established in 1965. It is located in Kodagu District of Karnataka state. The total area of the station is 23.88 ha. The soil ranges from sandy loam to red loam with a pH range of 5.5-6.5. The station is situated at 867 m above MSL with Latitude of 12.29$^0$ N and Longitude of 75.56$^0$ E. The station is in hill zone (Central Western Ghats) and receives an average annual rainfall of 2200 mm. The location of the research station represents rain fed mid and low land ecosystem of rice cultivation and the station mainly covers Coorg district where rice is grown in an area of about 35,000 hectares. Presently, two scientists are working in the AICRIP Centre *viz.,* Dr. Devaraja, Junior Rice Pathologist and I/c of AICRIP; Mr. B Manjunatha, Junior Rice Breeder. The station has been recognized as an international center for screening rice varieties for blast tolerance.

## Research Accomplishments

### Crop improvement

The AICRP center under University of Agricultural Sciences, Bangalore, is working on rice breeding with a mandate for development of blast resistant / tolerant and high yielding paddy varieties. A total of 375 rice accessions are maintained at the centre over the years which include about 15 aromatic short grain accessions, 5 Basmati accessions, 6 medicinal rice accessions, 55 short, 99 medium, and 52 long duration white rice accessions, 123 red kernel rice accessions along with 20 improved varieties released for Coorg district. The centre is also conserving 267 traditional rice varieties of the Central Western Ghats. The centre has identified and released varieties like **IET-7191, KHP-2, KHP-5, Tunga (IET-13901), KHP-9, KHP-10 (red kernel rice), Hemavathi (DWR-4107), Sharavathi (IR-57773), BKBM-23, PUBM-8 and KHP-11** for the zone.

**Leaf and Neck Blad Resistent Paddy Variety: KPR 1**

### Crop Protection

Since the station has been recognized as an international center for screening rice varieties for blast tolerance, several thousands of rice genotypes were effectively screened against blast adopting Uniform Blast screening Nursery (UBN). AICRIP Plant Pathology trials *viz*. National Screening Nursery-1, National Screening Nursery-2, National Screening Nursery for Hills, National Hybrid Screening Nursery, Donor Screening Nursery, monitoring

**Uniform Blast Screening Nursery (UBN) at ARS, Ponampet**

Vice Chancellor & Project Director, DRR visit to Blas Screening Nurseries

field virulences of *Pyricularia grisea*, Germplasm Screening Nursery, International Rice Blast Screening Nursery and disease management trials from DRR are being conducted every year. Blast is a major problem in the region and the centre has identified tricyclozole 75 WP and carbendazim (12%) + mancozeb (63%) as effective fungicides against the disease. The newly identified leaf blast and neck blast resistant, high yielding paddy varieties KPR-1 and KPR-2 are gaining popularity among farmers. Intan, a local popular variety but susceptible for blast has been improved by way of selection and further purification is in progress. Molecular characterization for the presence of blast resistant genes was carried out at DRR for the rice genotypes that were phenotypically found resistant to blast at ARS, Ponnampet.

# Panorama of Institutional Activities

## Padmashree Dr. M. V. Rao visits DRR

Padmashree Dr. M. V. Rao, Former Special DG, ICAR visited DRR on 4th July, 2013 and had a detailed discussion with Project Director, Dr. B. C. Viraktamath, sectional heads and Principal investigators regarding recent developments in rice research. Dr. N. Shobha Rani presented the salient achievements of DRR in recent past. He appreciated the achievements made by DRR and stressed the importance of field based experiments. He also pointed out the technologies generated at DRR should reach to the farmers. The meeting ended with vote of thanks by Dr. J. S. Bentur

## Meeting on IRRI-India Collaboration Organized

A meeting on strengthening the collaboration between IRRI and India was organized at DRR on 19th July, 2013. 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 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. Again on 24th July, Dr. Nese Srinivasulu visited DRR to discuss about IRRI-India collaborative project-18 (on *slower digestive rice varieties*) under GRiSP product line titled "*High quality rice and innovative rice based food products*" with the scientists involved in quality and nutrition of Crop Improvement Division.

## Independence Day Celebrated

Independence day was celebrated with great enthusiasm on 15th August, 2013 both at DRR and ICRISAT campus. All the DRR staffs participated in the function. At DRR, the national flag was hoisted by Dr. K. V. Rao, Project Director I/C and at ICRISAT farm campus, by Dr. V. Rabindrababu, Principal Scientist, Plant Breeding. Project

Director (I/c) in his message narrated the salient DRR achievements and thanked all the DRR staff for the good work done during the last year. He also emphasized that the entire DRR community should strive for further excellence of the institute and for increasing the rice productivity and production.

## DRR Observes '*Parthenium* Awareness Week'

Directorate of Rice Research observed Partheniоum Awareness week from 16-22 August, 2013. Dr. N. Shobha Rani (Project Director I/C) briefed all the staffs regarding importance of this dangerous weed. All the staffs of DRR including farm labours removed all the Parhenium plants from DRR campus (on 17th August) and from DRR fields at Rajendranagar (on 19th August). A token gift was given to the staffs for this collective activity. The event ended with vote of thanks by Dr. R. Mahendra Kumar, PS and Head, Agronomy .

## Lecture on Parthenium

Dr. N. T. Yaduraju, Ex-Project Director, National Research Centre for Weed Science (NRCWS), Jabalpur and Principal Scientist, ICT4D, KSI, ICRISAT delivered a lecture on "Parthenium story-Have we learnt the lesion" at DRR Seminar Hall-1 on 16th August, 2013. He presented in details the biology and management of this notorious weed on the eve of "Parthenium Week".

## Padmashri Dr. M. V. Rao lecture held at DRR

Padmabhushan Dr. R. S. Paroda, Chairman, TAAS and Former Director General, Indian Council of Agricultural Research delivered first Dr. M. V. Rao lecture on "Addressing the emerging concern of Indian Agriculture" on August, 24, 2013 at DRR auditorium. The event was organized by the Indian Society of Oilseeds Research, Directorate of Oilseeds Research, Hyderabad.


## Hindi week Celebrated

Hindi Week was celebrated with great enthusiasm from 14-21 September, 2013. All the scientists, technical and administrative personnel of the directorate participated in different competitions like hindi quiz (16th September), extempore (17th September) and memory test (19th September). Ms. Sujataji who is a Hindi teacher in the Central School, NPA Rajendranagar, was the chief guest at the closing ceremony. Twenty seven scientists, technical officers and administrative personnels were given prizes by Chief guest and Project Director (I/C) Dr. N Shobha Rani on 21st September. Both Dr. Shobha Rani and Chief Guest emphasized the importance of hindi as official language. Dr. R. Mahendra Kumar released hindi version of the leaf colour chart. The entire program was conducted by Drs. Brajendra, Ch. Padmavathi, N Sarla, N. Somsekhar, Shri Amudhan and Shri Chirutkar.


## Trainings organized at DRR

A DOE sponsored model Training Course on "Innovative System of Rice Intensification" was organized at DRR from 20-27 August, 2013. The main objective of the training was to spread the knowledge of SRI and popularize the technology among the farmers. The training was attended by 25 participants from different parts of India.


A 6-day training program on "Quality and nutritional aspects of rice" was organized at DRR from 2-7 September, 2013. The main purpose of the training was to impart knowledge on quality and nutritional aspects of rice. Twenty eight participants (11 from private companies, 15 from AICRIP centres and 2

research scholars) participated in the training program.

A 6 day refresher course on "Rice IPM" was organized at DRR from 23-28 September, 2013. The training was organized for the newly joined scientists at different AICRIP centres across the country in the discipline of Plant Protection. The main purpose of the training was to impart practical knowledge in different Plant Pathological and Entomological experiments against different pests.


## IRRI Scientists visit DRR

Dr. Endang Septiningsih, Dr. Carol Casal and Dr.M.S.Ramesha visited DRR on September 10. They met scientists of Crop Improvement division to discuss about the status and research aspects of anerobic germination and direct seeded rice at DRR.

## Indian Rice Check Programme Planning Meeting Organized

Under Global Rice Science Partnership (GRiSP Theme 6) and RKMP outreach program, DRR is planning to initiate a pilot project on innovative concept known as Rice Check in Andhra Pradesh in collaboration with Andhra Pradesh Rice Research Institute (APPRI, Maruteru, ANGRAU). The Planning meetings were conducted during 17-20 September 2013 in West Godavari District of Andhra Pradesh. Dr. John Lacy, Consultant IRRI participated in the meetings along with selected scientists from DRR and ANGRAU .

## RKMP- Private Sector Workshop

One day workshop was organized at DRR on 24th September, 2013 to encourage private sector involvement in Rice Knowledge Management Portal (www.rkmp.co.in). A total of 50 private sector rice stakeholders participated in this workshop. The main objective of this workshop is to create awareness about RKMP, provide the hands-on experience for various features of the RKMP and to get the private sector perspective and involving them for information/ data contribution.

## Inauguration of Heat tunnel facility at DRR farm

Temperature gradient facility for conducting high temperature studies in relation to impact of climate change on rice cultivation was inaugurated on 23rd September, 2013 by Dr. Y. P. Abrol, FNASc, Head, Plant Physiology (Rtd.), IARI in presence of Dr. B. Venkateshwarlu, Director, CRIDA, Dr. N. Shobha Rani (Project Director I/c, DRR) and Dr. S. R. Voleti, PI, NICRA, DRR.

## One Day Workshop on Climate Change Organized at DRR

One day workshop/brain storming was held at DRR in relation to N-use efficiency on 23rd September, 2013 in rice in Project Director's committee room. The meeting was attended by Dr. Y. P. Abrol, Head, Plant Physiology (Rtd.), IARI, Dr. B. Venkateshwarlu, Director, CRIDA, Dr. M. Maheswari, Head, Crop Sciences, CRIDA, Dr. Altaf Ahmed, Dr. Raghuram, Dr. Jagadish Rane, Dr. Padmini Swain, Dr. Sangeeta Mohanty, Dr. S. R. Voleti and Other DRR NICRA Staffs along with RAs and SRFs.

## Staff Activities

### Awards

Prestigious Hari Om Trust Award was conferred to Dr. B. C. Viraktamath, Project Director, DRR and his team members (Drs. M. S. Ramesha, R. M. Sundaram and A. S. Hari Prasad) by Indian Council of Agricultural Research for their outstanding contribution towards the development and popularization of hybrid rice in India. All the DRR staffs congratulate the entire team for their achievement.

Dr. M. Seshu Madhav, Senior Scientist, Plant Biotechnology has been conferred with prestigious Lal Bahadur Shastri Young Scientist Award by ICAR for his outstanding contributions relating to blast disease and molecular aspects of quality characters of rice.

Dr. Shaik N.Meera received prestigious 'Young Scientist Leadership Award' during the Agriculture Leadership Summit-2013 organized by 'Agriculture Today' at New Delhi on 19th September 2013. The award was presented to him by Dr. B. L. Joshi, Governor of UP, Prof. M. S. Swaminathan, Shri. Prakash Singh Badal, Hon'ble Chief Minister, Punjab and Shri. Tariq Anwer, Hon'ble Minister of State for Agriculture, GOI. Dr. B. C. Viraktamath, Project Director DRR was present in the function.

## Visits Abroad

Dr. T. Ram (PS, Plant Breeding) and Dr. P. Revathi (Scientist, Plant Breeding) participated in the second year of training on Integrated Breeding Multi Year Course (IB_MYC) which was held in The Mediterranean Agronomic Institute of Zaragosa, Zaragosa, Spain from July1-12 2013. This was sponsored by GCP (The Generation Challenge Programme (GCP), Consultative Group on International Agricultural Research (CGIAR), CIMMYT, Mexico.

Dr. M. Sheshu Madhav was invited to participate in International workshop on "Directions on Blast studies in Asia, Africa and Japan for Blast research network for stable rice production " organized by JIRCAS at Tsukuba from Sep 24-28, 2013. He presented the paper on **"An overview of research activities of host plant resistance to rice blast at DRR".**

## Promotions

Dr. S. Ravichandran, Senior Scientist, Statistics DRR joined NAARM, Hyderabad as a principal Scientist (Direct recruitment). He was relieved from DRR on 24th July, 2013. DRR staffs wish him all success in his future endeavour.

## Retirements

Dr. J. S. Bentur, Principal Scientist and Head, Entomology and PMEC retired from active service upon superannuation on 31st July, 2013. He made a significant contribution in the field of general and molecular entomology with special reference to gall midge. All DRR staffs wish him and his family a very happy and healthy retired life.



Shri G. Thirupataiah, Technical Assistant (T-2/3), Driver, retired from active service on superannuation on 31st July, 2013. He is a silent worker and served his duties very sincerely. All DRR staffs wish him and his family members a very happy and healthy retired life .

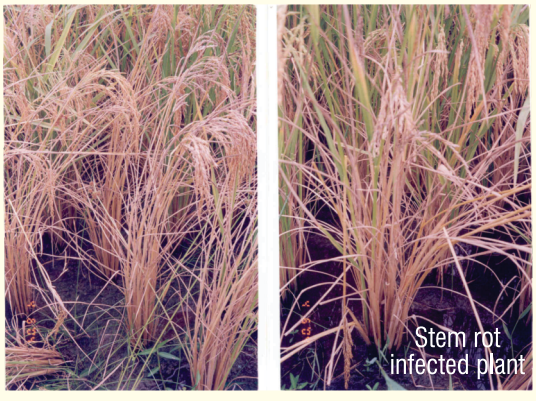
# Pests of Rice: Stem Rot of Rice

S. Krishnam Raju and V. Bhuvaneshwari;
APRRI, Maruteru - 534 122

**Introduction:** Although, India is having the maximum area under rice cultivation but several biotic and abiotic factors are mainly responsible for low production and productivity of rice. Stem rot caused by *Sclerotium oryzae* Catt. is one of the important fungal diseases of rice. Once considered as a minor disease, it has now become one of the important diseases inflicting heavy losses in most of Asian countries. In Andhra Pradesh, the stem rot incidence has been increasing from 2005 onwards and it is spreading widely in Godavari Delta where rice-rice cropping system is mostly followed. The disease is more pronounced wherever a single variety is grown in large area over years together.

**Economic Importance**: The losses due to the disease are difficult to assess. It causes decay of the leaf sheath and culm, which contributes to lodging, besides causing loss in yield and lowering of milling quality due to the light and chalky character of the grain. Based on the available information in literature, the disease causes 18-56 per cent yield losses.

**Symptoms:** The first symptom of the disease is the appearance of small, black, irregular lesions on the outer leaf sheath near the water line. As the disease advances, the discolouration spreads up and down from the water line. The lesion advances and penetrates the inner leaf sheath. Here it causes the leaf sheath to partially or entirely rot, and the infection penetrates the culm. Brownish black lesions may develop in one or two internodes causing the stem to collapse and lodge. When the affected plants are cut open and examined, the interior of the culm may be filled with grey fungal mycelium. Numerous sclerotia may be found either loose inside the culm or embedded in the host tissue. The affected plants produce ears with lighter grains. Masses of sclerotial bodies can also be seen on the drying older basal leaves. In the main field, the affected plants collapse due to weakening of the stem base. Attack on the stems increases in intensity as the plants approach maturity, and reaches its peak at harvest time. Early infected plants yield poorly. There are some reports that infected plants produce excessive numbers of tillers from the base of the stems. However, this is not very common.


Stem rot infected plant


Rotting of culm

**Pathogen:** The teleomorph of this fungus is called ***Magnaporthe salvinii,*** the sclerotial anamorph ***Sclerotium oryzae*** and the conidial anamorph ***Nakataea sigmoidea.***

**Favourable conditions**: The disease is favoured by high N fertilizers, high relative humidity, high temperature and water logging conditions. The disease is more in early planted crop because of high temperature and relative humidity prevailing during the susceptible stage of the crop. The disease is prevalent in states like Haryana, Bihar, Uttaranchal and Andhra Pradesh.

**Management:** Rice farmers largely depend on plant protection chemicals only despite availability other management practices like summer ploughing, stubble burning, removal of crop residue, proper weed control, avoiding excess nitrogen application and removal of stagnated water. Keeping this in view a package has been developed at APRRI & RARS, Maruteru for stem rot management in rice.


Mycelial growth in the culm

## In areas where the disease is not present or noticed

1. Since the disease can spread through the seed as an admixture, seed must be procured from disease free fields.
2. Seed must be treated with carbendazim 50WP (3 g/kg as dry seed treatment or 1 g/kg as wet seed treatment) or carbendazim 25% + mancozeb 50% (Sprint) 75WP (4 g/kg as dry seed treatment or 2 g/kg as wet seed treatment).

## In areas or fields where the disease is noticed


*S. oryzae* culture

1. Harvest the crop close to the ground as far as possible and burn the stubbles after harvest by spreading the crop residue over the field.
2. Summer ploughing greatly reduces the viability of sclerotial bodies present in the field after harvest.
3. Allow only a thin film of water during tillering to flag leaf stage and there should not be any inundation or deep water in the field except for short periods at PI stage or ear head emergence stages.
4. The water should not be allowed to flow from diseased field to neighbouring healthy fields.
5. The field must be drained completely and allowed to dry till hairline cracks before next irrigation, every time.
6. As the fungus enters the plant through wounds made by insects, proper integrated pest management practices should be adopted.

7. As the disease may spread at any stage from maximum tillering onwards, the crop must be protected by spraying with hexaconazole 5EC @ 2.0 ml or validamycin 3L @ 2.5ml or propiconazole 25 EC @ 1.0ml or benomyl 50 WP @ 1 g or carbendazim 50 WP @ 1 g or tebuconazole 25 EC @ 2.0ml per litre of water at 10-15 day interval till maturity.

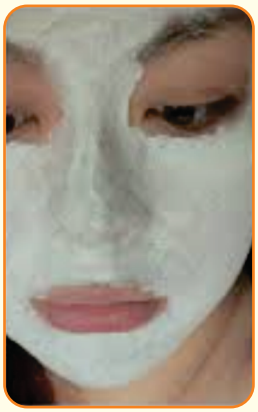
# Rice Face Mask:
# For fairer skin and a smoother complexion with fewer wrinkles.

**Amtul Waris, DRR, Hyderabad-30**

Rice Protein is an old Japanese secret for smooth, soft skin. It has been extremely useful in preventing the appearance of ageing, keeping the cellular metabolism vital and energizing the skin. Rice proteins reinforce the barrier function of skin, promoting collagen synthesis and increasing skin suppleness and firmness. They ensure smooth skin charged with new vitality and protected against the dryness and appearance of aging.

## Action

- Protects the skin Collagen network
- Improves properties of photo aged skin
- Reduces skin roughness
- It has excellent moisture retention



## Procedure to make the rice face mask

- Grind a handful of raw rice into a fine powder. You can use a grinder to do this.
- Add some milk to the rice powder – enough to make it into a paste.
- Apply this paste over the face and neck. Leave for 20-30 minutes.
- Wash the mask off with some warm water.

**Frequency and results:** Do this consistently at least once a week and you should see your skin lighten after a month.Rice paste will not only lead to fairer skin, but also a smoother complexion with fewer wrinkles.

# Rice News around the globe

A group of scientists from USA and China have shown that pure Si nanoparticles (SiNPs) derived directly from rice husks exhibited high performance as Li-ion battery anodes with high reversible capacity and long cycle life (Nian Liu et al., 2013; Nature Scientific Report; 3 : 1919 | DOI: 10.1038/srep01919)

A team of scientists from National Institute of Agrobiological Sciences (NIAS), Japan and International Center for Tropical Agriculture (CIAT), has discovered the *DEEPER ROOTING 1* (*DRO1*) gene that makes the roots of rice plants grow downward instead of outward and plants with *DRO1* can continue to grow and produce grain even under extreme water stress (Uga et al., 2013; Nature Genetics 45: 1097-1102).

A group of scientists from Cornell University, USA reported that a new process for blowing up grains of rice produces a super-nutritious form of puffed rice, with three times more protein and a rich endowment of other nutrients that make it ideal for breakfast cereals, snack foods and nutrient bars (Paraman et al. 2012; *Agricultural and Food Chemistry*, 2012; 60 (44): 11188-11194)

Broad spectrum blast resistant gene Pi56(t) which encodes NBS-LRR protein was mapped on chromosome 9 in the resistant cultivar Sanhuangzhan No 2 (SHZ-2) (Yan Liu et al., 2013; Theoretical and Applied Genetics; April 2013, Volume 126, Issue 4, pp 985-998)

*qSB-11*$^{LE}$, the QTL that confers partial resistance to rice sheath blight was fine mapped in chromosome 11 in rice variety Lemont and was localized to the region defined by two cleaved-amplified polymorphic sequence markers, Z22-27C and Z23-33C covering 78.871 kb, based on the rice reference genome (Zuo et al., Theoretical and Applied Genetics; 2013, 126 (5):1257-1272.

## World Food Prize

Three distinguished scientists **-Marc Van Montagu** of Belgium, and **Mary-Dell Chilton** and **Robert T. Fraley** of the United States received the 2013 World Food Prize. In announcing the names of the 2013 Laureates, Ambassador Kenneth M. Quinn, President of the World Food Prize, emphasized the impact and potential of their work. They were recognized for their independent, individual breakthrough achievements in founding, developing, and applying modern agricultural biotechnology. "Their research is making it possible for farmers to grow crops with improved yields, resistance to insects and disease, and the ability to tolerate extreme variations in climate." In a written statement, Dr. M.S. Swaminathan, the renowned Indian scientist and Chairman of the World Food Prize Laureate Selection Committee, said the award is especially fitting this year.

## Forthcoming Events

1. The 7th International Rice Genetics Symposium (RG7) will be held from 5 to 8 November 2013 at Dusit Thani Hotel in Manila, Philippines. Organized by the International Rice Research Institute (IRRI).
2. The fourth International Conference on Bacterial Blight (ICBB) is being jointly organized in Hyderabad during December 2-4, 2013 by Centre for Cellular and Molecular Biology (CCMB), Directorate of Rice Research (DRR) and the Society for Advancement of Rice Research. The meeting will be held in the CSIR-CCMB.
3. The 11th International Symposium on *Rice Functional Genomics (ISRFG11): Sustaining food and nutritional security* is being held during November 20 – 23, 2013 at hotel "The Grand", New Delhi, India jointly organized by National Institute of Plant Genome Research and University of Delhi South Campus.

**BOOK POST**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