

Director and Chairman emphasized on 'crop diversification' in view of the frequent natural disasters like drought, cyclone and flood being received by the state almost every year.

The technical session deliberations by CRRI scientists Drs. AK Nayak, U Dhua, PC Mohapatra, SK Pradhan and SD Mohapatara were followed by "Scientists-Farmers-Extension Officers" interaction on problems and issues concerning rice production. The major concerns raised were on supply of quality seeds in time, irrigation infrastructure, establishment of rubber sheller in each block and waiving of electricity charges in farming operations. The Director distributed ten 2-kg paddy seed mini kits of eight newly released CRRI varieties suitable for various rice ecologies to the Deputy Directors of Agriculture (DDAs)/their representatives of the state for demonstration. The workshop was coordinated by Dr. BN Sadangi, Head, Social Science Division and Dr. SK Mishra, Senior Scientist.



Guests on the Dais listening to the participants

CRRI-NABARD Interaction Meet

A CRRI-NABARD Interaction-cum-Exposure Meet was organized on 26 March 2015 in the institute in collaboration with NABARD Regional Office, Bhubaneswar, which was attended by four DGMs, over thirty District Development Managers-cum-AGMs (DDMs/AGMs) of NABARD from Odisha, all HODs and scientists of the institute. Shri SK Kale, CGM, NABARD, Bhubaneswar in his presidential address highlighted the activities and achievements of NABARD in augmenting



Shri SK Kale, CGM, NABARD, Bhubaneswar speaking on the occasion



NABARD officials visiting the Farming System Models of the Institute

ଅନୁଷ୍ଠାନର ସମସ୍ତ ସଭ୍ୟମାନଙ୍କର ସମ୍ମୁଖରେ ଏହି କାର୍ଯ୍ୟକ୍ରମର ବିବରଣୀ ପ୍ରଦାନ କରିବା ସହିତ ଉପସ୍ଥାନକାରୀଙ୍କୁ ଆବଶ୍ୟକୀୟ ସୂଚନା ଓ ପ୍ରଶ୍ନୋତ୍ତର ସମୟ ମଧ୍ୟ ମିଳିଥିଲା।

ଫଳରେ ଉପସ୍ଥାନକାରୀମାନଙ୍କର ମନୋରମତା ବୃଦ୍ଧି ପାଇଥିଲା। ଏହି କାର୍ଯ୍ୟକ୍ରମର ସମ୍ପର୍କରେ ଅଧିକ ସୂଚନା ପାଇଁ ଆମ ସ୍ୱାଗତ୍ୟକ୍ଷେତ୍ରକୁ ଯୋଗାଯୋଗ କରନ୍ତୁ।

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CR Dhan 307 (Maudamani): Developed from the cross Dandi/Naveen//Dandi is suitable for cultivation in irrigated areas of Odisha. It has maturity duration of 135 days, plant height of 110 cm, short bold grains and average grain yield capacity of 4.8 t/ha. This variety has moderate tolerance to leaf blast, brown spot, sheath rot, stem borer and leaf folder.

SK Pradhan and Nakula Barik
CRRRI, Cuttack



CR Dhan 408 (Chakaakhi): Developed from the cross CR 149-5010-228/T1242, is suitable for cultivation in shallow lowland areas of Odisha in *kharif* season. It has maturity duration of 165 days, plant height of 135 cm, long bold grain and has average grain yield capacity of 4.8 t/ha. This variety has moderate tolerance to leaf blast, neck blast, brown spot, bacterial leaf blight, sheath rot, stem borer, leaf folder and WBPH.

SK Pradhan, SSC Pattanaik, L Behera, S Lenka, BB Panda, Nakula Barik and A Ghosh,
CRRRI, Cuttack



CR Dhan 701: This hybrid developed from CRMS 31 A/CRL-22 R, is suitable for cultivation in irrigated and shallow lowland areas of Odisha in both *kharif* and *rabiseason*. It has maturity duration of 142 days, plant height of 120 cm, medium slender grain and has average grain yield capacity of 6.0 t/ha. This hybrid has moderate tolerance to brown spot, sheath blight, RTD and GLH.

RN Rao, SSC Pattnaik, GJN Rao, RL Verma, JL Katara,
ON Singh and T Mohapatra
CRRRI, Cuttack

Comparative transcriptome analysis of rice genotypes differing in tolerance to anaerobic germination using RNA-Seq

Unregulated flooding during germination in rice often leads to reduced seed viability, plant vigor and concomitant economic losses. Natural variation in genotypes of rice exists for tolerance to anaerobic germination. The present investigation was undertaken with an objective of understanding the differential responses of two rice varieties, Naveen (susceptible to anaerobic germination) and AC 41620 (tolerant to anaerobic germination) at the global transcription level post 48 h of anoxic stress during germination. RNA sequencing using the Illumina HiSeq2000 platform revealed a total of 108,575,418 raw reads from four samples which were preprocessed to generate 95,956,532 high quality reads ($Q > 25$) and aligned to *indica* reference genome. As a general observation, differentially regulated genes were more in case of tolerant genotype, AC 41620 (1130 DEGs), compared to susceptible genotype, Naveen (930 DEGs) (Fig 1. A). Comparison of transcriptome profiles revealed that 604 genes were uniquely up-regulated and 164 genes were uniquely down-regulated in tolerant genotype, AC 41620, while the corresponding numbers of genes in case of susceptible genotype, Naveen were 520 and 60, respectively (Fig 1. B). Several transcription factors were highly expressed in both genotypes under stress. Five most highly represented classes were AP2-EREBP, bHLH, MYB, WRKY and NAC (Fig 1. C). However, in case of AC41620, a few transcription factor families were also uniquely induced (Fig 1. D). Pathway analysis using MAPMAN revealed that genes involved in light reaction, calvin cycle, starch metabolism and anaerobic respiration were either over-represented or highly expressed in tolerant AC 41620 whereas expansins were found to be highly expressed in Naveen. Singular enrichment analysis of biological processes in AgriGO (<http://bioinfo.cau.edu.cn/agriGO/analysis.php>) suggests more elaborative activation of pathways related to stress, photosynthesis and carbohydrate metabolism in tolerant genotype, AC 41620, whereas in susceptible genotype, Naveen, signatures of DNA

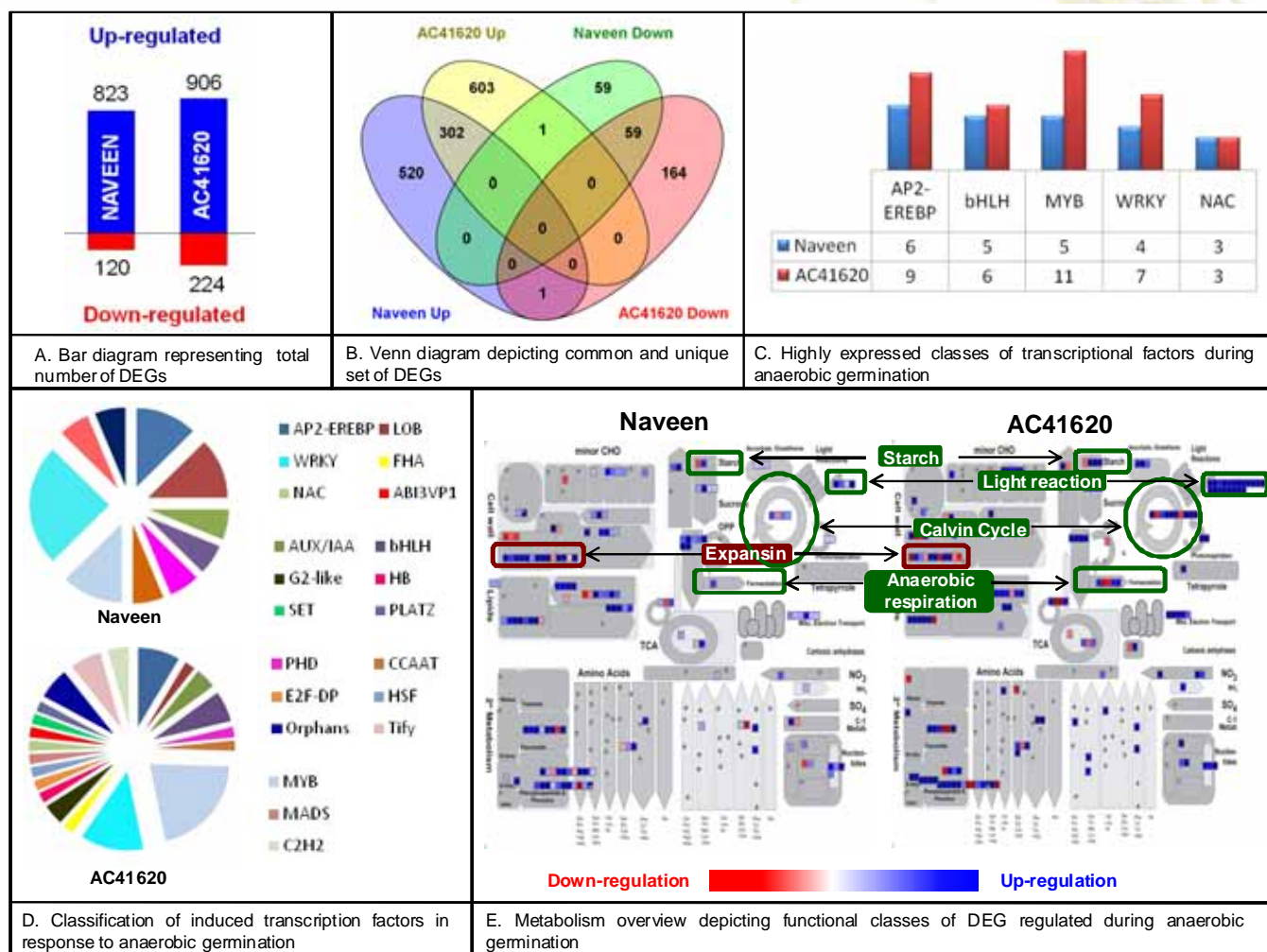


Fig 1. Differential gene expression of rice genotypes Naveen and AC41620 during aerobic germination

metabolism was evident. Pathways related to secondary metabolism seems to be active in both the genotypes (Fig 1. E). The DEGs and transcription factors identified in the present study will serve as a useful genomic resource for extending our understanding of molecular mechanism of anaerobic germination in rice.

J Vijayan, S Senapati, A Ray, S Ray, K Chattopadhyay, RK Sarkar and T Mohapatra
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Frequency and fertility restoration efficiency of *Rf3* and *Rf4* genes in rice

Increasing the yield of rice is necessary in order to provide food for expanding world population. The yield potential of hybrid rice is 15-20% more as compared to improved varieties. One of the important requirements for full exploitation of heterotic potentials in rice is the availability of diverse genotypes as parents possessing good combining ability. Identification of new parental lines and the categorization as restorer or maintainer are important for the development of new hybrids.

In this study, 570 rice varieties released for different ecologies in India were screened for the presence of fertility restorer genes (*Rf3* and *Rf4*) using linked markers. Categorization of varieties based on the allelic constitution at the two marker loci revealed that 13% contained dominant functional alleles of both *Rf3* and *Rf4* (*Rf3Rf3Rf4Rf4*), 6% varieties carried only *Rf3* dominant functional allele (*Rf3Rf3rf4rf4*), 50% had only *Rf4* dominant functional allele (*rf3rf3Rf4Rf4*) and 31% possessed recessive alleles of both the genes (*rf3rf3rf4rf4*). This result showed predominant occurrence of dominant allele of *Rf4* (63%) as compared to that of *Rf3* (19%). Based on the allelic status of the two restorer genes, 570 varieties were divided into four groups viz., Group-I (*rf3rf3rf4rf4*), Group-II (*Rf3Rf3Rf4Rf4*), Group-III (*Rf3Rf3rf4rf4*) and Group-IV (*rf3rf3Rf4Rf4*). Ten varieties from each group were randomly chosen and test crossed with two different CMS

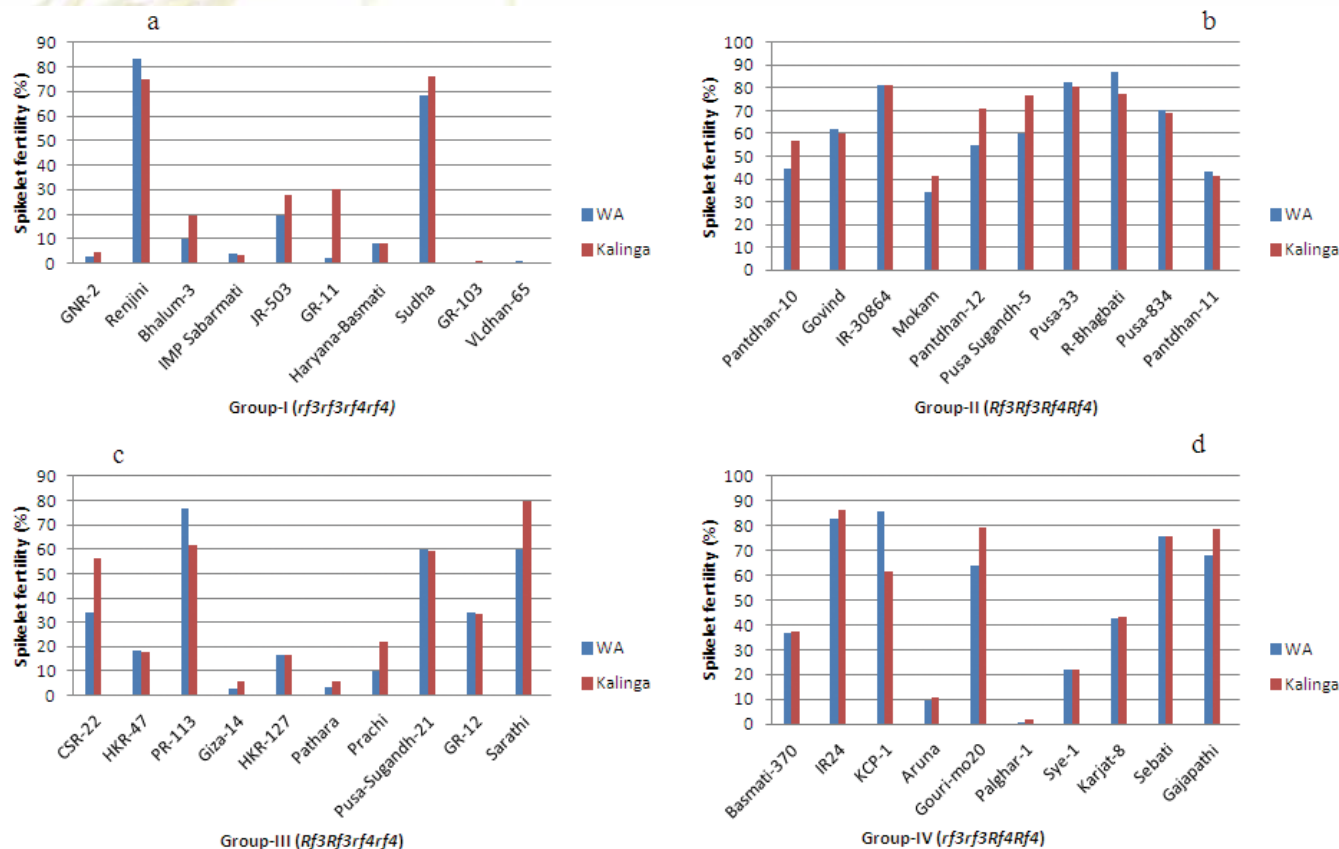


Fig 2 (a-d). Fertility restoration analysis of four groups constituted based on allelic combination at Rf3 and Rf4 loci. a): Group-I (*rf3rf3Rf4Rf4*), b): group-II (*Rf3Rf3Rf4Rf4*), c): group-III (*Rf3Rf3Rf4Rf4*) and d): group-IV (*rf3rf3Rf4Rf4*). Variety names and spikelet fertility percentage are depicted along the horizontal and vertical axis respectively.

lines, viz., CRMS31A (containing WA cytoplasm) and CRMS32A (containing Kalinga cytoplasm). All the resultant F_1 s along with parental lines were evaluated for spikelet fertility. Diverse fertility restoration patterns were observed among the four groups as shown in (Fig 2). Comparison of fertility restoration of WA and Kalinga CMS showed that most of the varieties in all four groups behaved more or less similar. However, some of the varieties differed in their ability to restore fertility of the two CMS lines (Fig 2). The presence of dominant alleles of both the restorer genes was more effective in fertility restoration. The efficacy of *Rf4* is relatively more than *Rf3*. In contrast, two varieties carrying recessive alleles of both of the restorer genes were also able to restore fertility indicating involvement of other fertility restorer gene(s) apart from *Rf3* and *Rf4*. The varieties viz. GNR-2, Improved Sabarmati, GR-103, VL Dhan-65 and Palghar-1 were found to be effective maintainers and IR-30864, Pusa-33, R-Bhagbati, IR24 and Sebati as effective restorers, which could be used for hybrid rice development employing CMS technology.

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Evaluation of introgression lines carrying drought and blast QTLs (*qDTY12.1+Pi2*)

Ten introgression lines (*qDTY12.1+Pi2*) in the background of rice variety Vandana along with parent were evaluated in drought stress and non-stress conditions under direct seeding in uplands. The same set was also screened for blast resistance in uniform blast nursery (UBN) under artificial epiphytotic condition. The drought stress trial experienced 20 days of stress period corresponding to flowering to grain filling stage. Four ILs viz., CRR747-16-3-B, CRR747-12-4-B, CRR747-12-3-B and CRR747-16-5-B significantly out yielded the recurrent parent Vandana under stress condition and there was no significant difference under non-stress condition (Table 1). These ILs showed 33.4 to 60.6 % yield advantage over recurrent parent Vandana under stress condition. The introgression lines have same flowering duration as that of recurrent parent Vandana but were slightly taller in stature. In the UBN the introgression lines did not show any

infection and scored as '0' for leaf blast disease (SES), whereas the parent Vandana was scored '4'. The ILs developed, will have an impact on the yield stability of Vandana in the drought and blast-prone areas of rainfed uplands and will serve as a breeding stock for the further improvement of upland rice in breeding programs.

Table 1: Performance of Vandana drought & blast QTLs (*qDTY12.1+Pi2*) introgression lines under stress & non-stress conditions

Entry	Days to 50% Flw.		Plant height (cm)		Grain yield (kg/ha)		Leaf blast score (SES)
	Stress	NS	Stress	NS	Stress	NS	
CRR747-3-6-B	60	64	89.3	99.4	1219	2517	0
CRR747-3-7-B	63	64	84.7	110.9	388	2750	0
CRR747-3-8-B	63	66	88.5	110.4	938	2333	0
CRR747-16-1-B	63	65	93.0	107.4	1200	2750	0
CRR747-16-2-B	62	64	87.5	106.7	919	1750	0
CRR747-16-3-B	63	65	91.3	110.4	1656	2667	0
CRR747-12-1-B	64	66	87.3	102.8	938	1767	0
CRR747-12-3-B	61	65	95.9	108.9	1375	2417	0
CRR747-12-4-B	59	64	93.3	109.2	1469	2650	0
CRR747-16-5-B	63	66	89.8	108.3	1388	2350	0
Vandana	64	65	85.0	97.7	1031	2517	4
5%LSD	1.3	2.6	4.8	6.6	255	610	

NS= Non- stress

NP Mandal and M Variar
CRURRS (CRR), Hazaribag

Characterization of salt-tolerant diazotrophs from rhizosphere of diverse rice ecology

Soil samples were collected from three diverse rice ecologies i.e. upland (BAU, Ranchi & CRURRS, Hazaribag), lowland (CRR, Cuttack) and shallow lowland (RRLRRS, Gerua). All together, 78 distinct rhizobacteria were isolated from rhizospheric soils of above regions. Among them, 38 salt-tolerant (15% NaCl) diazotrophic rhizobacteria were screened and tested for other PGP traits. Out of them, three isolates (CA54, GH47 and HR12) showed wide range of functional diversity (carbon-source utilization) and PGP traits. Finally, eleven salt-tolerant polyvalent PGPR were identified though 16S-rDNA sequencing. Out of eleven, two isolates (RM19 and HR62) identified as *Brevibacterium halotolerans*; eight isolates (CA54, GH47, CA66, CA68, GH21, HR40, HR58 and HR61) belonged to different species of genus *Bacillus* and one isolate (RM77) identified as *Pantoea agglomerans*. *In silico* restriction (with *HaeIII*) of 16S sequences of all identi-

Table 2. Frequency and cutting site of *HaeIII* in 16S-rDNA sequence of salt-tolerant isolates

Salt-tolerant isolates	Identity	NCBI* accession no.	Frequency of cutting (no.)	Cutting site position (bp)
CA54	<i>Bacillus stratosphericus</i>	KM261757	4	27, 486, 1083, 1105
CA68	<i>Bacillus</i> sp.	KM261761	5	95, 552, 586, 1151, 1173
GH21	<i>Bacillus aerophilus</i>	KM261759	2	94, 551
GH47	<i>Bacillus aerius</i>	-	5	266, 493, 725, 809, 960
HR40	<i>Brevibacterium halotolerans</i>	KM261762	4	442, 476, 1042, 1064
HR58	<i>Bacillus cereus</i>	KM261763	3	442, 1037, 1059
HR61	<i>Bacillus anthresis</i>	KM261764	4	101, 558, 1155, 1177
HR62	<i>Bacillus altitudinis</i>		2	92, 549
RM77	<i>Bacillus stratosphericus</i>	KM261765	8	101, 281, 349, 559, 593, 754, 1071, 1275
CA66	<i>Pantoea agglomerans</i>	KM261758	4	97, 554, 1152, 1174
RM19	<i>Brevibacterium halotolerans</i>	-	2	93, 550

* NCBI: National Center for Biotechnology Information, New York, USA

^ *HaeIII*: Restriction enzyme of *Haemophilus aegyptius*

fied isolates showed distinct diversity among them. The PGP-efficacy of salt-tolerant isolates (CA54, GH47 and HR12) was performed in salt-sensitive rice variety (Naveen) for growth promotion at both ambient salt (0 dS/m) and elevated salt (2 dS/m) conditions. All the strains significantly increased the shoot and root length, fresh and dry weight as compare to control (Table 2).

U Kumar and TK Dangar
CRRRI, Cuttack

Identification of causal organism of brown spots produced on rice leaves at CRRRI, Cuttack

There was incidence of brown spot after cyclone. Samples were collected during last fortnight of October 2013. The associated pathogen was isolated by host tissue transplant method. DNA was extracted, ITS region was amplified and sequencing was done. Pair-wise alignment between a query and database sequences was conducted using NCBI-BLAST. Phylogeny reconstruction by boot strap test was done in MEGA4 for identifying the organism.

The evolutionary history was inferred using the UPGMA method. The optimal tree with the sum of branch length = 10.14158900 is shown. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (500 replicates) are shown next to the branches. The tree is drawn to scale, with branch lengths in the same units as those of the evolutionary distances used to infer the phylogenetic tree. *Cochliobolus miyabeanus* was the pathogen associated with the samples collected during this study.

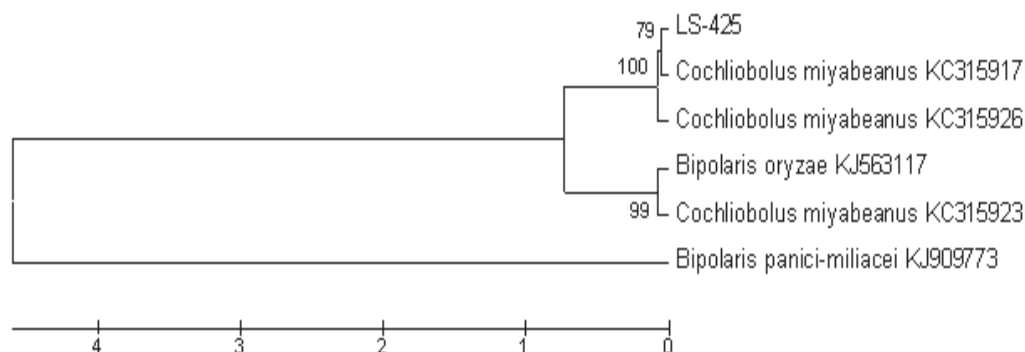
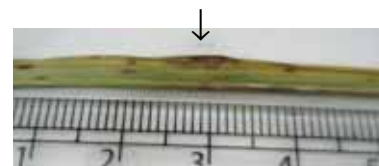


Fig 3. Evolutionary relationship of six taxa

Urmila Dhua and AK Mukherjee
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Synthesis and characterization of silver nanoparticles

Biosynthesis of silver nanoparticles (Ag-NPs) mediated by plant extracts has been undertaken. 1mM silver nitrate solution was mixed with different ratio of plant extract at different temperature and at different time. The reduction of silver was monitored by using the UV-Vis spectral analysis. The color of the mixture turned light brown in 48 h and became dark brown after 72 h indicative of the formation of Ag-NPs. Strong surface plasmon resonance of Ag-NPs was

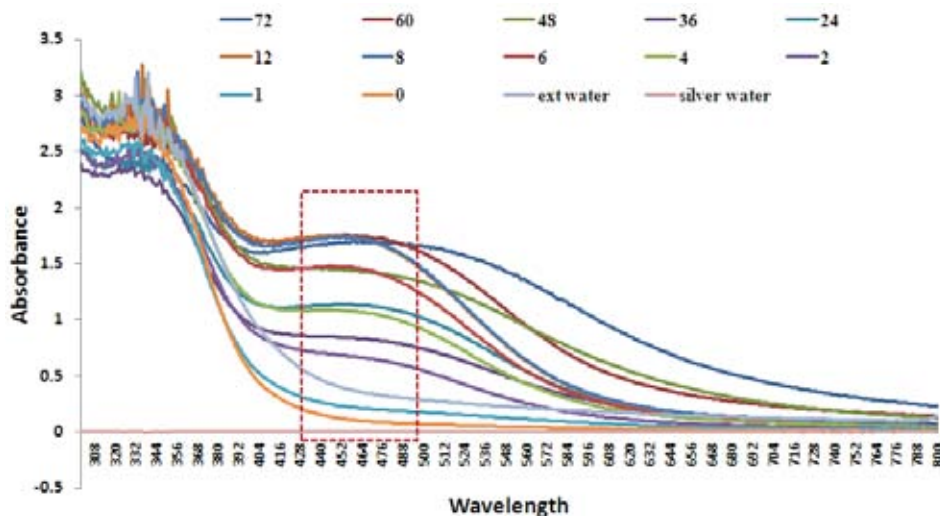


Fig 4. Ultraviolet-visible spectra of synthesized nanoparticles at different time intervals

centered at 420-480 nm (Fig 4). Particle sizes of synthesized Ag-NPs were ranged between 36-107 nm during different time intervals. The zeta potential was found to be between -14.16 to -29.45 mV. The negative value of zeta potential shows repulsion among the particles and thus increasing the stability of nanoparticles. IR spectra showed distinct peaks at 3432, 2924, 2853, 1638, 1165 and 1037 cm^{-1} . Presence of metabolites in plant extract may be acted as capping agent. This will improve the stability of synthesized nanoparticles. Role of these silver nanoparticles will be further tested for their pesticidal effects.

Totan Adak, AK Mukherjee, Berliner J and Somnath S Pokhara
CRRRI, Cuttack

Persistence of fipronil in soil under rice ecosystem

Fipronil (5-amino-3-cyano-1-(2, 6-dichloro-4-trifluoromethylphenyl)-4-trifluoromethyl sulfinyl pyrazole) is a broad spectrum insecticide for the management of the yellow stem borer and leaf folder in rice. Persistence of fipronil (Regent 0.3G) at recommended dose (RD) @ 75g a.i./ha and at double the recommended dose (DRD) @ 150 g a.i./ha was studied. For residue analysis, soil samples were collected at 0, 1, 3, 5, 7, 10, 15 and 30 days after application of the insecticide. Initial residue recovered was 0.065 $\mu\text{g/g}$ for the recommended dose and was 0.136 $\mu\text{g/g}$ for double the recommended dose. After 30 days of study, total fipronil residue recorded less than 0.005 $\mu\text{g/g}$ for recommended dose. Overall, total fipronil persisted in rice cultivated soil with 23 days half life for the recommended dose @ 75g a.i./ha. Whereas, half life of fipronil was 19 days at double the recommended dose @ 150 g a.i./ha.

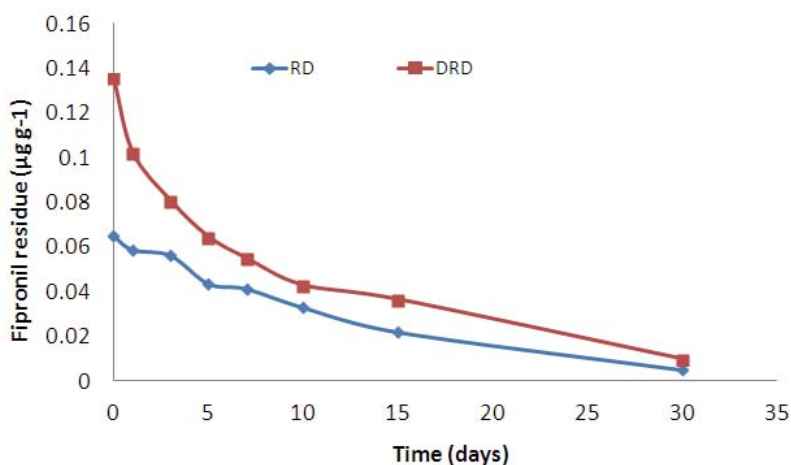


Fig 5. Persistence of fipronil in rice soil

Totan Adak, Berliner J, Somnath S
Pokhara and Mayabini Jena
CRRRI, Cuttack

Delineation of site specific nutrient management zones for paddy cultivated area around the Bhitarkanika mangrove ecosystem of India

The present study aims at dividing the study area which spreads around the Bhitarkanika sanctuary and includes nearly two hundred fifty five inhabited villages under the administrative jurisdiction of Rajnagar block in Kendrapada district of Odisha, into homogenous management zones based on soil fertility and other physicochemical properties. A grid soil sampling pattern was adopted and soil samples were collected. Soil pH, EC, Available K (AK), Available P (AP), Available N (AN), Soil organic carbon, DTPA extractable Fe, Zn, Cu and Mn were analyzed. First step in delineating MZs was to analyze the descriptive statistics of the above soil variables and distribution of these properties was tested for normality using the skewness and kurtosis significance test. Subsequently, correlation analysis was performed between all the soil properties. Then, semi-variance calculations and semi-variogram model fitting were performed using the ArcGIS 10. The fitted models were then used in an ordinary kriging procedure to estimate different properties

Table 3: Principal component analysis and loading coefficients for the first three principal components

	PC1	PC2	PC3
AP	0.823	0.057	0.026
EC	0.822	0.281	0.013
AK	0.8	0.019	0.029
pH	0.696	0.473	-0.046
Zn	0.549	-0.419	0.525
Mn	0.319	0.016	-0.493
SOC	-0.086	0.788	0.359
Fe	-0.566	0.422	-0.314
Cu	-0.316	0.011	0.624
AN	-0.392	0.224	0.258

EC: Electrical Conductivity; AK: Available Potassium; AP: Available Phosphorous; AN: Available Nitrogen; SOC: Soil Organic Carbon; Fe, Zn, Cu and Mn represent DTPA extractable Iron, Zinc, Copper and Manganese in soil, respectively.

at non-measured points as interpolated values for mapping. The cross-validation analysis was conducted for evaluating kriging interpolation bias and accuracy.

Further, principal component analysis (PCA), which is a dimension reduction technique, was performed. In the present study, PCs with Eigen values >1.0 were selected to develop the management zone classes. Finally, AN, AP, AK, Mn, Zn, Fe and Cu were selected and the fuzzy k-mean was used to divide the field into different unique management zones (Table 3). Based on the procedure described, three homogeneous MZs were produced finally (Fig 6).

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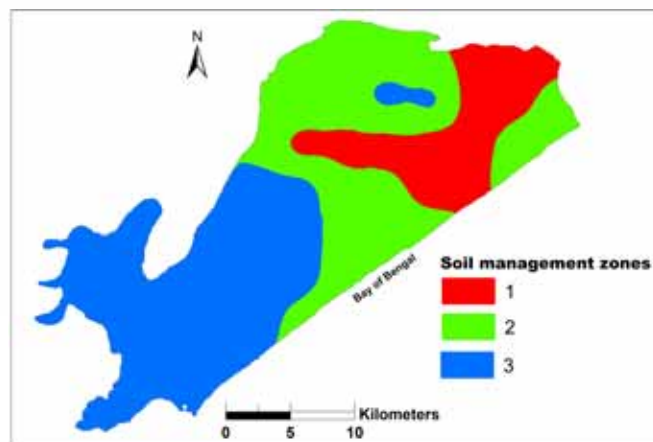


Fig 6. Soil management zones developed on the basis of fuzzy cluster algorithm

Optimum time of planting of *boro* rice in Assam

Field experiments were conducted at the research farm of RRLRRS, Gerua (Assam) during *boro* seasons of 2012-13 and 2013-14 to find out the optimum time of planting of *boro* rice in the north eastern region. Performance of two rice varieties, *viz.*, Chandrama and Naveen were tested under 5 different dates of transplanting (5th, 15th and 25th January, 5th and 15th February) during *boroseason*. Age of seedlings at the time of transplanting was 45 days. The crop transplanted on the 5th January yielded the lowest (5.02 and 4.53 t/ha during 2012-13 and 2013-14, respectively) which might be due to low temperature during early vegetative stage. Thereafter, gradual rise in temperature might have resulted into higher values of growth and yield attributing characters. Grain yield was the highest - 6.45 t/ha in 2012-13 and 6.26 t/ha in 2013-14 – in the crop transplanted on the 25th January. Thereafter, the varieties had non-significant yield differences up to 15th February. Chandrama recorded significantly higher grain yield (6.77 and 5.60 t/ha) over Naveen (5.08 and 5.10 t/ha) which was due to higher values for yield attributing characters especially more number of filled grains per panicle but Chandrama took 20 to 25 days more than Naveen to mature (Table 4). Thus, the optimum time of transplanting for both varieties was found to be the 25th January or the second fortnight of January. Naveen under all the dates of planting took approximately 150 days to mature and could be harvested by the last week of May. Thus, it can escape flash floods from May-end onwards. Chandrama took around 170-175 days to mature and had the risk of facing flash floods in crop planted on later two dates.

Table 4: Performance of rice varieties under different dates of planting during *boro* season

Treatment (Date of planting)	Effective tillers per hill (no.)		Panicle length (cm)		Filled grains per panicle (no.)		Straw yield (t/ha)		Grain yield (t/ha)	
	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14	2012-13	2013-14
5 th Jan	11.43	9.92	22.78	23.87	129.37	111.58	5.00	5.32	5.02	4.53
15 th Jan	10.97	10.33	23.13	23.94	138.97	122.53	5.80	6.30	5.80	5.28
25 th Jan	10.47	11.18	23.61	23.58	144.80	132.62	6.60	6.92	6.45	6.26
5 th Feb	10.50	10.73	23.22	25.18	139.95	125.83	6.40	6.35	6.23	5.46
15 th Feb	10.83	11.30	23.51	25.81	130.07	127.43	6.60	6.76	6.13	5.22
CD (p=0.05)	NS	0.49	NS	1.30	14.10	8.18	0.72	0.92	0.96	0.78
[Variety]										
Chandrama	10.65	10.80	22.91	24.23	150.89	128.24	6.80	7.10	6.77	5.60
Naveen	11.03	10.60	23.99	24.72	123.57	119.76	5.40	5.60	5.08	5.10
CD (p=0.05)	NS	0.58	0.88	0.47	10.90	8.11	0.52	0.65	0.68	0.32

T Singh, BS Satapathy and KB Pun
RRLRRS (CRRRI), Gerua

Participation in Symposia/Seminars/ Conferences/Training/Workshop/Meeting/ Visits

Mr. A Kumar attended Soil and Water Networking National workshop at IIT, Kharagpur from 4 to 7 January 2015, jointly organized by IIT Kharagpur and The University of Sydney.

Dr. Yogesh Kumar delivered a lecture on 'Way to increase cropping intensity in rainfed drought prone rice systems' in the training programme on Crop Management Module for Agro-climatic zones with special reference to rainfed area organized by Soil Conservation Training Centre, DVC, Hazaribag on 7 January 2015.

Dr. T Mohapatra, Director, CRRI attended the Curtain Raising Programme of DRR Golden Jubilee Celebrations at DRR, Hyderabad on 9 January 2015.

Dr. VK Singh participated in VII Annual Convention and National Seminar on Sustainable Rural Livelihood: Technological & Institutional Perspective, presented a research paper entitled '*Farmer-led innovation of Sugarcane Cultivation for rural prosperity in Koderma, Jharkhand*' at Division of Agricultural Extension Education, Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu Main Campus, Chatha Jammu from 8 to 10 January 2015.

Mr. Bhoopendra Singh attended Winter School on "Recent advances in Crop Management under protected Cultivation" at Centre for Protected Cultivation Technology, IARI, New Delhi from 26 Dec 2014 to 15 Jan 2015.

Dr. P Samal attended a meeting regarding preparation of policy report on *kharif* crops for the 2015-16 season at Krishi Bhavan, New Delhi on 16 January 2015.

Mr. Manish Kumar attended in National Conference on "Indigenous Innovation and Foreign Technology Transfer in Fertilizer Industry: Needs, Constraints and Desired Simplification" and poster presented on the topic of 'Effect of potash on potato production and productivity' organized by the Society of Fertilizers and Environment and Raman Centre for Applied and Interdisciplinary Sciences in collaboration with ICAR- CRJAF, Kolkata on 17 January 2015.

Dr. VK Singh participated and presented progress report of KVK, Koderma and highlighted the future plan of work for last quarter at BAU, Ranchi on 23 January 2015. Dr. VK Singh participated in meeting of KVKs of Jharkhand and other ICAR institutes at IINRG, Ranchi on 24 January 2015.

Drs Mukund Variar and Dipankar Maiti attended and delivered lead lectures on Blast of rice and AM-fungi for upland rice respectively in National Symposium on "Advances in Phytopathological Research in Globalized Era with Reference to Eastern Region" at Dept. of Botany, Ranchi University on 29 January 2015.

Dr. Yogesh Kumar delivered a lecture on 'Frontier Technology for profit maximization in rice' in '*Agriculture Varta*' organized by CSR unit, TATA Steel, Jamshedpur, Jharkhand on 29 January 2015.

Dr. Totan Adak Attended National Symposium on "Agrochemicals for Food and Environment Safety" and presented a paper on 'Effect of rice husk biochar and fly ash on fipronil sorption' at IARI, New Delhi from 28 to 30 January 2015.

Dr. Mukund Variar attended the SAC of KVK Nawada (8-9 January) and KVK, Hazaribag (9 February 2015) as ICAR representative.

Drs. KB Pun and T Singh attended Scientific Advisory Committee meeting of Krishi Vigyan Kendra, Assam Agricultural University, Nalbari on 30 January 2015.

Dr. SM Prasad attended and delivered a talk on "*Production technology of potato*" in a farmers training programme organized by Project Director, Watershed, Cuttack at village Mangarajpur, Tangi-Choudwar on 4 February 2015.

Dr. T Mohapatra, Director, CRRI attended the XII Agricultural Science Congress at NDRI, Karnal from 3 to 6 February 2015. Drs. B Mondal, Lipi Das, T singh and Smt. Sujata Sathy participated and presented a paper during the Agricultural Science Congress-2015 on 'Credit demand by small-scale rice farmer in Odisha: An assessment' and 'Sustainable livelihood security for small holder framers', respectively.

Dr. RK Mohanta attended HRD programme for scientists of Home Science, Animal Science and Fisheries in KVKs of Odisha at OUAT, Bhubaneswar from 6 to 8 February 2015.

Dr. MK Bag attended and presented a paper on "Management of rice sheath blight disease through strobilurins compound: a new generation bio-rational fungicide" in Agriculture and Technology sub-congress of 10th All India Peoples' Technology Congress at Rajabazar Science College, Calcutta University, from 6 to 7 February 2015.

Dr. VK Singh attended in SAC meeting of KVK (Holy Cross), Hazaribag on 9 February 2015.

Dr. M Sahid attended International Conference on "Natural Resource Management for Food Security and Rural Livelihoods" at New Delhi from 10 to 13 February 2015 and presented a paper entitled "Transformation of Zn in rice soil and its availability and uptake to rice crop under flooded and aerobic moisture regime".


Drs. Dipankar Maiti and CV Singh attended the Farm School organized by ATMA at Hazaribag as resource persons and delivered lectures to the Extension personnel on 'Rice IPM' (12 February 2015) and 'Rice production technology' (13 February 2015), respectively.

Dr. T Mohapatra, Director, CRRI attended an Interaction and Inspiration Programme of Odisha Bigyan Academy for +2 Science Lecturers and Students of Odisha and delivered a lecture on "Food Security" at Utkal University, Vanivihar, Bhubaneswar on 12 February 2015.

Dr. T Mohapatra, Director, CRRI attended a workshop in the training institute of Agriculture Department and delivered a lecture on "Women's Role and Responsibility in Managing Natural Resources" at Training Institute, Minor Irrigation & Water Use, Baramunda, Bhubaneswar on 13 February 2015.

Dr. Yogesh Kumar delivered a lecture on 'Cultivation of rice, pulses and oilseeds crops in Jharkhand' in the *Kisan Mela* organized by RK Mission Research Farm, Angada, Ranchi on 13 February 2015.

Dr. T Mohapatra, Director, CRRI attended the 4th International Global Social Science Conference-2015 and



Drs. BN Sadangi, SK Mishra and Lipi Das participated and presented papers in the Global Social Science Conference (GSSC-2015) on the theme “Management of Sustainable Livelihood Systems” at OUAT, Bhubaneswar from 14 to 17 February 2015.

Dr. T Mohapatra, Director, CRRI attended the Agricultural Genomics Symposium and delivered a lecture on “Our Experience in Rice Genomics: Structure to Function” at TNAU, Coimbatore on 16 February 2015.

Dr. Yogesh Kumar delivered a talk on ‘Traditional plant varieties in crop improvement’ at Krishi Vigyan Kendra (Koderma), Jainagar, Jharkhand on 18 February 2015.

Dr. T Mohapatra, Director, CRRI attended the 5th International Conference on Next Generation Genomics and Integrated Breeding for Crop Improvement and delivered a lecture on “Exploring Salinity Tolerance in Rice by Genome wide Approaches” at ICRISAT, Hyderabad from 19 to 20 February 2015.

Dr. SM Prasad attended Regional Agricultural Fair, 2015 from 19 to 21 February 2015 at CPRS, Patna and delivered a talk on “Rice varieties suitable for different ecologies of Eastern India and their production technologies”.

Dr. Yogesh Kumar delivered a lecture on ‘Improved varieties of rice suitable under DSR and cultivation of *rabi* pulses and oilseed crops under rice fallow area in Jharkhand’ in the ‘*Kisan Mela*’ organized by Dept. of Agriculture, Govt. of Jharkhand at block Office, Mandu, Hazaribag, Jharkhand on 20 February 2015.

Dr. T Mohapatra, Director, CRRI attended the 17th Indian Agricultural Scientists and Farmers’ Congress on “Agri-Innovation for Enhancing Production and Rural Employment” at Bioed Research Institute of Agriculture & Technology, Allahabad from 21 to 22 February 2015.

Dr. T Mohapatra, Director, CRRI attended the 1th Annual Conference of the Society of Statistics, Computer and Applications and delivered a lecture on “Genome wide Analysis using Bioinformatic Tools: Adding Value to Rice Genomic Resources” at Birla Institute of Management Technology, Bhubaneswar on 23 February 2015. Dr. P Samal attended and presented a paper on ‘Socioeconomic Aspect of Rice Cultivation in Eastern India’.

Dr. T Mohapatra Director, CRRI attended Institute Management Committee meeting of NRCPB, New Delhi on 23 February 2015.

Dr. KB Pun attended Institute Management Committee meeting of National Centre for Integrated Pest Management, New Delhi on 24 February 2015.

Drs. P Samal attended 17th Annual Conference of Society for Statistics and Computer Applications’ at Birla Institute of Management Technology, Bhubaneswar on 23 February 2015 and presented a paper on ‘Socioeconomic aspect of rice cultivation in Eastern India’.

Drs. Biswajit Mondal and NN Jambhulkar attended ‘17th Annual Conference of Society for Statistics and Computer Applications’ at Birla Institute of Management Technology, Bhubaneswar from 23 to 25 February 2015. Dr. Mondal presented a paper on ‘Measuring the impact of watershed development programmes: scopes and limitations’ and Dr. Jambhulkar presented a paper on ‘Minimum aberration fractional factorial plans for mixed-level experiments’.

Dr. VK Singh attended in ISEE National Seminar Extension Innovations and Methodologies for Market – Led Agricultural Growth and Development at RVSKVV, Gwalior from 26 to 28 February 2015.

Dr. SM Prasad attended RPSC meeting of AIR, Cuttack on 27 February 2015.

Dr. M Chourasia attended e-pest surveillance training at Salepur block office organized by DAO, Salepur for 50 farmers on 27 February 2015.

Dr. RK Mohanta attended a 3 day training programme organized at Block Office, Tangi-Choudwar for selected farmers/farm women and delivered lectures on “*Role of Goat Nutrition in Profitable Goat Farming*” on 27 and 28 February 2015.

Dr. Dipankar Maiti attended the workshop organized on 28 February 2015 as a part of National Science Day celebration by the Dept. of Botany, Vinoba Bhave University, Hazaribag and delivered key note address on the focal theme: Developing winning research project proposals.

Dr. Yogesh Kumar participated in project launching workshop on ‘Livelihood food security for Churchu block’ organized by SUPPORT and CINI at Hotel Canary Inn, Hazaribag, Jharkhand on 3 March 2015.

Dr. T Mohapatra, Director, CRRI attended and delivered a lecture in the First SRM Genetics Congress at Department of Genetic Engineering, SRM University, Kattankulattur, Chennai on 4 March 2015.

Dr SM Prasad attended video conferencing programme at Collectorate, Cuttack on 9 March 2015 on the National Mission of Agricultural Extension and Technology for states of East India (Bihar, Chhatisgarh, Jharkhand, Odisha and West Bengal).

Dr. T Mohapatra, Director, CRRI attended and delivered a lecture at NCIPM, New Delhi on 10 March 2015.

Mr. Bhoopendra Singh attended in BGREI meeting, at ATMA, Koderma, Jharkhand on 11 March 2015.

Dr. SM Prasad attended PUSA Krishi Vigyan Mela 2015 at IARI, New Delhi from 10 to 12 March 2015 along with eleven progressive farmers from different block of Cuttack district.

Drs. PC Rath and S Lenka attended and presented oral research papers on ‘Impact of climate change on insect pest of rice in India’ and ‘Field efficacy of new fungicide molecules against sheath blight disease in rice caused by *Rhizoctonia solani* Kuhn’, respectively, in 8th National Seminar on climate change impact and sustainable management strategies at Ravenshaw University, Cuttack from 14 to 16 March 2015.

Dr. S Lenka attended the meeting on preparation of Action Plan of BGREI for the year 2015-16 at Directorate of Agriculture and Food Production, Bhubaneswar on 17 March 2015 as a member DLMT for Koraput district of Odisha.

Dr. VK Singh attended two days workshop on ‘Attracting and retaining Youth in Agriculture (ARYA) project’, at NAARM, Hyderabad from 11 to 12 March 2015.

Dr. VK Singh deliver a talk on 19 March 2015 on ‘Leadership development in extension functionaries’ in a three days training programme for extension personnel organized by SAMETI, Jharkhand at KVK, Koderma from 18 to 20 March 2015.

Dr. U Kumar delivered a talk on “Beneficial microbes: A sustainable solution for food security” in National seminar at M.S. Swaminathan School of Agriculture (CUTM), Paralakhemundi, Odisha on 28 March 2015.

Awards/Recognition

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Dr. T Mohapatra, Director, CRRRI received the prestigious NAAS Recognition Award for the Biennium 2013-14 in the 12th Agricultural Science Congress at NDRI, Karnal.

Dr. T Mohapatra, Director, CRRRI received Lifetime Achievement Award, Indian Genetics Congress 2015 in recognition of outstanding contribution in the field of Plant Genetics at SRM University, Kattankulattur, Tamil Nadu.

Dr. T Mohapatra, Director, CRRRI received the Bioved Agri-Innovation Award on the occasion of the 17th Indian Agricultural Scientists & Farmers' Congress at Bioved Krishi Prodyogiki Gram, Moharab, Allahabad.

Dr. AK Nayak, Head and Principal Scientist, Crop Production, CRRRI has been elected a fellow of the National Academy of Agricultural Sciences (NAAS) - from 1st January 2015.

Dr. Pratap Bhattacharyya, Senior Scientist, Crop Production has been awarded "Dr. K.G. Tejwani Award" for Management of Natural Resources by 'Indian Association of Soil and Water Conservationist' for the Biennium 2012-13.

Dr. RK Mohanta received ANA- Mrs. Saroj Jakhmola Award for Best Ph.D. Thesis in Animal Nutrition for the biennium 2013-14 by Animal Nutrition Association, Izatnagar, Bareilly in the IX Biennial ANA Conference, 2015 organized at College of Veterinary Science, Guwahati, Assam on 22 January 2015.

Dr. VK Singh presented research paper on 'Assessment of Suitable Variety for Direct Seeded Rice (DSR) in Rainfed Condition of Jharkhand', which was adjudged as the best paper and received award in 17th Indian Agricultural Scientists and Farmers' Congress

ଡକ୍ଟର ଟି ମହାପାତ୍ର, ଡିରେକ୍ଟର, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୧୨^ଶ କୃଷି ବିଜ୍ଞାନ ସମ୍ମିଳନୀରେ ୨୦୧୩-୧୪ ବର୍ଷ ପାଇଁ NAAS ଗୌରବପୂର୍ଣ୍ଣ ପୁରସ୍କାର ପାଇଥିଲେ। ଏହି ପୁରସ୍କାର ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, କର୍ନାଲରେ ଉପସ୍ଥିତ ଥିଲେ।



Dr. T Mohapatra, Director, CRRRI receives Lifetime Achievement Award

ଡକ୍ଟର ଟି ମହାପାତ୍ର, ଡିରେକ୍ଟର, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୨୦୧୫ ମସିହାରେ ଶ୍ରୀ ମତ୍ତମ ଉନ୍ନୟନ ସମ୍ମିଳନୀରେ ଲାଇଫ ଟାଇମ୍ ଆଚିଭିଭେଣ୍ଟ ଆୱାର୍ଡ୍ ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଶ୍ରୀ ମତ୍ତମ ଉନ୍ନୟନ କେନ୍ଦ୍ର, କଟକରେ ଉପସ୍ଥିତ ଥିଲେ।

ଡକ୍ଟର ଟି ମହାପାତ୍ର, ଡିରେକ୍ଟର, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୧୭^ଶ ଭାରତୀୟ କୃଷି ବିଜ୍ଞାନୀ ଓ ଫାର୍ମରସ୍ ସମ୍ମିଳନୀରେ ୨୦୧୫ ମସିହାରେ ବାୟୋଭେଡ୍ ଆଗ୍ରି-ଇନୋଭେସନ୍ ଆୱାର୍ଡ୍ ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, ମୋହରାବ, ଆଲହାବାଦରେ ଉପସ୍ଥିତ ଥିଲେ।



Dr. Pratap Bhattacharyya receives "Dr. KG Tejwani Award"

ଡକ୍ଟର ଏ. କେ. ନାୟକ, କ୍ରମ ଉତ୍ପାଦନର ମୁଖ୍ୟ ବିଜ୍ଞାନୀ, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୨୦୧୫ ମସିହାରେ ଜାତୀୟ କୃଷି ବିଜ୍ଞାନୀ ସମ୍ମିଳନୀରେ ଉପସ୍ଥିତ ହୋଇ ଏହି ଆୱାର୍ଡ୍ ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, କଟକରେ ଉପସ୍ଥିତ ଥିଲେ।

ଡକ୍ଟର ପ୍ରତାପ ଭଟ୍ଟାଚାର୍ଯ୍ୟା, କ୍ରମ ଉତ୍ପାଦନର ସିନିୟର ବିଜ୍ଞାନୀ, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୨୦୧୨-୧୩ ବର୍ଷ ପାଇଁ 'ଡକ୍ଟର କେ. ଗୋପାଳ ଟେଜୱାନୀ ଆୱାର୍ଡ୍' ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, କଟକରେ ଉପସ୍ଥିତ ଥିଲେ।



Dr. RK Mohanta receives the ANA- Mrs. Saroj Jakhmola Award for Best Ph.D. thesis

ଡକ୍ଟର ରାମକୃଷ୍ଣ ମହାନ୍ତି, କ୍ରମ ଉତ୍ପାଦନର ସିନିୟର ବିଜ୍ଞାନୀ, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୨୦୧୩-୧୪ ବର୍ଷ ପାଇଁ ANA- ମିସ୍ ସରୋଜ ଜାକ୍ସମୋଲୀ ଆୱାର୍ଡ୍ ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, କଟକରେ ଉପସ୍ଥିତ ଥିଲେ।

ଡକ୍ଟର ଭୁବନେଶ୍ୱର ସିଂହ, କ୍ରମ ଉତ୍ପାଦନର ସିନିୟର ବିଜ୍ଞାନୀ, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୧୭^ଶ ଭାରତୀୟ କୃଷି ବିଜ୍ଞାନୀ ଓ ଫାର୍ମରସ୍ ସମ୍ମିଳନୀରେ ୨୦୧୫ ମସିହାରେ 'ସୁସ୍ୱାଦୁ ଚାଷିଆ ଚାଷି' ଆୱାର୍ଡ୍ ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, କଟକରେ ଉପସ୍ଥିତ ଥିଲେ।

ଡକ୍ଟର ଭୁବନେଶ୍ୱର ସିଂହ, କ୍ରମ ଉତ୍ପାଦନର ସିନିୟର ବିଜ୍ଞାନୀ, ଚିତ୍ରକୃଷି ଉନ୍ନୟନ କେନ୍ଦ୍ର (CRRRI) ୧୭^ଶ ଭାରତୀୟ କୃଷି ବିଜ୍ଞାନୀ ଓ ଫାର୍ମରସ୍ ସମ୍ମିଳନୀରେ ୨୦୧୫ ମସିହାରେ 'ସୁସ୍ୱାଦୁ ଚାଷିଆ ଚାଷି' ଆୱାର୍ଡ୍ ପାଇଥିଲେ। ଏହି ଆୱାର୍ଡ୍ ଗ୍ରହଣ କରିବା ପାଇଁ ସେ ଉତ୍କଳ ବିଶ୍ୱବିଦ୍ୟାଳୟ, କଟକରେ ଉପସ୍ଥିତ ଥିଲେ।



on “Agri-Innovation for Enhancing Production and Rural Employment” at Bioved Research Institute of Agriculture & Technology, Allahabad from 21 to 22 February 2015.

Dr. VK Singh, PC, Koderma awarded “Best KVK Scientist Award” 2014 in recognition of outstanding contributions in farm advisory services under Transfer of Technology and Participatory Research by Indian Society of Extension Education, IARI, New Delhi in the ISEE National Seminar at RVSKVV, Gwalior from 26 to 28 February 2015. Dr. VK Singh presented a oral paper entitled, “Weed Control in Direct Seeded Rice in Jharkhand”, which received the best paper presentation award.

Radio/TV Talk

Dr. Yogesh Kumar delivered a TV talk on “*Jharkhand main dhan ki fasal katne ke bad rabi dalhano ki baigyanik padhati se kheti*” in Krishi Darshan Programme, Doordarshan Ranchi, Jharkhand on 13 January 2015.

Dr. Yogesh Kumar delivered a TV talk on “*Jharkhand main chana avam masur fasal ka utpadan badhane ke tarike tatha lagne wali rogoin va kitoin ka nibaran*” in Krishi Darshan, Doordarshan Ranchi, Jharkhand on 13 January 2015.

Dr. RK Mohanta delivered a talk on “*Adhika Khira Utpadana Pain Dudhiyali Gaiku Santulita Gokhadya* (Balanced feeding for getting more milk from cows)” which was broadcasted by AIR, Cuttack on 9 February 2015.

Smt. S Sethy delivered a talk on “*Phala O Pani Pariba Mulyajukta drabya prastuti* (Value added products from fruits and vegetables)” which was broadcasted by AIR, Cuttack on 11 February 2015.

Institute Seminars/Lecturers

Dr. R Raja delivered a lecture on ‘Structural genomic characterization of wheat quality loci: Glu B and Ha’ on 24 January 2015.

Dr. R Srinivasan, Professor, NRCPB, IARI, New Delhi delivered a special lecture on ‘Relevance of transgenic crops’ on 9 February 2015.

Dr. J Ali, Sr. Scientist, IRRI, Phillipines delivered a lecture on ‘Green super rice’ on 25 February 2015.

Dr. SD Mohapatra delivered a lecture on ‘Rice Stem borer research: current status and future strategies’ on 27 February 2015.

Promotion

Dr. Ramesh Chandra, Senior Technical Assistant promoted to Assistant Chief Technical Officer w.e.f. 1 January 2009.

Mrs. Jali Das, LDC of RRLRRS, Gerua promoted to UDC w.e.f. 21 February 2015.

ଡକ୍ଟର. ଭି.କେ.ସିଂହ, କୋଡରମା ପ୍ରଦାନ କରିଛନ୍ତି “Best KVK Scientist Award” 2014 ଉପଲକ୍ଷେ ଉତ୍କଳ ସେବା ସମାଜର ଅନୁମୋଦିତ ଅବଦାନକୁ ଗୂଢ଼ମୂଲ୍ୟାଙ୍କନ କରିବା ପାଇଁ।

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ବିକାଶୀୟ ଉପାଦାନ

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ପ୍ରୋତ୍ସାହନ

ଡକ୍ଟର. ରାମେଶ ଚନ୍ଦ୍ର, ସିନିୟର ଟେକନିକାଲ ଆସିଷ୍ଟାଣ୍ଟ ପ୍ରୋତ୍ସାହନ ପାଇଁ ଆସିଷ୍ଟାଣ୍ଟ ଚିଫ୍ ଟେକନିକାଲ ଅଫିସର ଭାବେ ପଦୋତ୍ତରଣ କରାଯାଇଛି।

ଡକ୍ଟର. ରାମେଶ ଚନ୍ଦ୍ର, ସିନିୟର ଟେକନିକାଲ ଆସିଷ୍ଟାଣ୍ଟ ପ୍ରୋତ୍ସାହନ ପାଇଁ ଆସିଷ୍ଟାଣ୍ଟ ଚିଫ୍ ଟେକନିକାଲ ଅଫିସର ଭାବେ ପଦୋତ୍ତରଣ କରାଯାଇଛି।

