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Marker assisted selection for identification of recombinants for bacterial blight and blast resistance in segregating populations of Cottondora Sannalu 105-115

Manu Maya Magar, Ch V Durga Rani*, S Vanisree, Md Jamaloddin, G Swathi, M Sheshumadhav, G Anuradha, B Sri Chandana and EA Siddiq
Directorate of Rice Research, Rajendranagar, Hyderabad
Email : ranivenkata@yahoo.com

ABSTRACT

The present investigation has been initiated to combine bacterial blight (BB) and blast resistance with the high yield potential of a short duration rice variety, MTU1010 (Cottondora Sannalu) of India. B95-1 carrying BB resistance genes (xa13 and Xa21) and NLR145 carrying blast resistance genes (Pi54 and Pi1) were selected for making crosses. B95-1 was validated for the presence of target genes, xa13 and Xa21 by using primers viz., xa13 promotor (functional marker-FM) and pTA 248 (STS marker), while NLR145 was validated by using primers viz., Pi54 MAS (functional marker-FM) and RM 224 (gene linked marker-GLM). These primers were also used to study polymorphism between resistant (B95-1 & NLR145) and susceptible (MTU1010) parents for the target genes. Two F2 segregating populations viz., MTU1010 x B95-1 and MTU1010 x NLR145 were evaluated during dry season, 2012. Foreground selection was carried out and the plants carrying the target genes in homozygous condition were identified. Genotyping revealed that BB and Blast resistance genes exhibited Mendelian pattern of segregation in 1:2:1 ratio and exhibited goodness of fit. Phenotypic studies for BB and Blast progenies in two F3 populations resulted in identification of resistant plants.

Key words: *rice, bacterial blight, blast, marker assisted selection*

Molecular characterization of short grain aromatic rice landraces of Odisha for detection of aroma 116-120

Pritesh S Roy, Sudipta Jena, Ashwasit Maharana, GJN Rao and SSC Patnaik*
Central Rice Research Institute, Cuttack - 753006, Odisha
Email : sasank.crri@gmail.com

ABSTRACT

Sensory method along with four molecular markers (ESP, EAP, INSP and IFAP) were used for evaluation of aroma in indigenous short grain aromatic rice genotypes collected from different regions of Odisha (India). Sensory method of aroma evaluation from kernel sample of these genotypes could detect mild, moderate and strong aroma in 8, 36 and 26 genotypes, respectively. The molecular level aroma detection could identify homozygous fragrance in 59 genotypes, whereas 11 genotypes were found to be with heterozygous nature for this locus indicating requirement of more efforts towards understanding their genetic base of aroma. Integration of sensory method and molecular level evaluation of aroma could help in rapid identification of aromatic genotypes within a large population.

Key words: *rice, aroma, sensory, landrace, Odisha*

Genetic diversity analysis of direct seeded rice genotypes under drought situation 121-124

Shafina Haque, SK Pradhan and ON Singh
Central Rice Research Institute, Cuttack - 753006, Odisha
****Email :** onsingh01@yahoo.com*

ABSTRACT

Genetic divergence is an efficient tool for the selection of parents used in hybridization programme. In the present study, Seventy six rice genotypes, landraces and popular varieties consisting of both indigenous and exotic collection were studied for yield and yield related traits. Based on D^2 analysis, the genotypes were grouped into eight clusters. Maximum number of genotypes (35 genotypes) were grouped in cluster I. The maximum inter cluster distance was observed between cluster VI and VII (35.02) followed by between cluster III and VII (34.68) and between cluster I and VIII possessing wider genetic diversity among the genotypes between these groups. The hybrids developed from the selected members of these clusters would produce highly variable population in the segregating generations. The maximum intra cluster distance was observed in cluster III (6.46) followed by cluster IV (6.32). Hence, selection within these clusters may be exercised based on the highest areas for the desirable traits, which would be made use of in improvement through intervarietal hybridization. Among the twelve traits studied, kernel length contributed maximum divergence (34.32%) followed by plot yield (21.02%). Hence, the traits viz., sterility, plot yield, kernel length, kernel breadth, 1000 grain weight contributed 71.52 per cent towards total divergence. Therefore, these characters should be given importance during hybridization and selection in the segregating population.

Key words: *Rice, genetic diversity, D^2 analysis, clustering*

Storability of polymer coated CORH 3 hybrid rice seeds 125-130

S Ambika*, M Bhaskaran, V Manonmani and Vanangamudi K
Tamil Nadu Agricultural University, Coimbatore -641003, Tamil Nadu, India.
****Email :** ambikasingaram@gmail.com*

ABSTRACT

Maintenance of seed vigour and viability during storage is a matter of prime concern in agriculture. Owing to the sub-tropical climate prevailing in major parts of the country, seeds of most crop species show rapid deterioration and hybrid rice is no exception. Freshly harvested seed of hybrid rice CORH 3 were dried to safe level moisture (<13%), graded to uniform size and coated with different polymers viz., Genius coat 171, Genius coat 172, Arcus, Myconate and Quick roots. The polymer coated seeds were stored in polyethylene bag of 700 gauge thickness and kept under ambient condition for nine months along with untreated control seeds. The seeds coated with Quick roots polymer recorded higher germination of 79 per cent at ninth month of storage compared to untreated control seeds (71 per cent). The electrical conductivity (0.129 dSm^{-1}) was low in the seeds coated with Quick roots with nil pathogen infection and insect incidence upto nine months of storage

Key words: *polymer, seed coating, hybrid rice, storage, seeds*

BS Satapathy*, KB Pun, T Singh and SK Rautaray[1]
[1]Regional Rain Fed Lowland Rice Research Station, Gerua-781102, Assam
[2]Directorate of Water Management, Chandrasekharapur, Bhubaneswar-751023, Odisha
Email : satapathybs65@gmail.com

ABSTRACT

The experiment was conducted during 2011 and 2012 to study the efficacy of liquid seaweed sap of Kappaphycus alvarezii and Gracilaria edulis on growth and yield performance of summer rice in a lowland field at Gerua, Assam.The treatments consisted of Kappaphycus (K) sap and Gracilaria(G) sap, each in four different doses viz., 2.5%, 5%, 10% and 15% in combination with recommended doses of fertilizer (RDF); and were compared with RDF in combination with water spray, and, also with the 7.5% K sap+50% RDF. A total of 10 treatments were evaluated and the results indicated that rice grain yield was increased by 13.8% and 10.3% in the treatments 5% K sap+ RDF and 5%G sap+ RDF, respectively, as compared to RDF + water spray. The increase in yield was attributed to increase in the number of panicles per unit area, number of filled grains panicle^{-1} and test weight. Highest net return (` 29751ha^{-1}) and benefit: cost ratio(1.75) was obtained under 5%K sap+RDF with 20% increase in net return as compared to RDF + water spray. Application of 5% K or G sap in combination with RDF increased grain and straw yield, net income and benefit:cost ratio of summer rice.

Key words: *summer rice, liquid seaweed sap, yield, economics, lowland*

TR Mohanty[1]*, SK Maity[2] and PK Roul[3]
[1] Regional Research Technology Transfer Stations, Judia Farm, Keonjhar-758002, Odisha
[2] Visva-Bharati University, Sriniketan, West Bengal - 731 236
[3] Directorate of Research, OUAT, Bhubaneswar - 751003, Odisha
Email : tusharranjan70@gmail.com

ABSTRACT

Studies were conducted during wet seasons, 2009 and 2010 to assess the growth and productivity of wet season rice under three crop establishment techniques viz. system of rice intensification (SRI), sowing of sprouted seeds by a drum seeder (DS) and conventional transplanting (CT) under three nutrient management practices viz. recommended dose of fertilizer (RDF) (80:40:40 N: P_2O_5: K_2O kg ha^{-1}), integrated nutrient management (INM) i.e. 50% R.D.F. + 50% R.D.F. through organic sources (based on nitrogen requirement) and organic management (OM) i.e. 100% of R.D.F. through organic sources (based on nitrogen requirement). The system of rice intensification increased grain yield (6.65 t ha^{-1}) by 18.0 and 25.8% over CT and DS, respectively; whereas, the latter two treatments remained at par. INM registered the highest grain yield of 6.43 t ha^{-1} which was higher by 11.9 and 19.2% over RDF and OM, respectively. SRI grown under INM recorded the highest productivity of 7.30 t ha^{-1}. SRI fetched the highest gross return (` 77925 ha$^{-1}$), net return (` 43033 ha^{-1}) and return ` $^{-1}$ (2.28). The crop with INM practices realized the highest gross return (` 75586 ha^{-1}) and net return of (` 40570 ha$^{-1}$); but the net return was at par with RDF (` 40251 ha^{-1}). The return ` $^{-1}$ (2.45) was the highest with R.D.F. followed by INM (2.16). Maximum N, P and K uptake was observed with SRI method of establishment and integrated nutrient management practices.

Key words: *crop establishment, SRI, drum seeding, conventional transplanting, nutrient management*

Performance of four row self propelled rice transplanter and weed management practices on productivity of lowland rice 143-149

C Sangeetha*
Vanavarayar Institute of Agriculture, Pollachi - 642103,Tamilnadu, India.
****Email : chandrusan2007@gmail.com***

ABSTRACT

Field experiments were conducted at Tamil Nadu Agricultural University, Coimbatore during dry season 2011-12 and 2012-13 in clayey loam soil to evaluate the different crop establishment methods and weed management practices in rice. The treatments consisted of three establishment methods in horizontal strips and six weed management practices in vertical strips. The results revealed that machine planting (30 cm x 20 cm) with conoweeding four times at 10 days interval starting from 10 days after transplanting (DAT) registered more tiller production contributing to higher grain yield and found to be economical by giving higher net return and this was followed by application of pretilachlor (0.75 kg a.i. ha^{-1} pre-emergence) + bispyribac sodium (20 g a.i. ha^{-1} early post-emergence) + conoweeding at 40 DAT.

Key words: *machine planting, hill survivality, tiller production, grain yield, straw yield*

Effect of fly ash on the feeding activity of brown planthopper and defence chemicals in rice plant 150-154

P Chandramani*
Agricultural College and Research Institute, Madurai - 625 104
****Email : chandramani21@yahoo.co.in***

ABSTRACT

Pot culture experiment and laboratory experiments were carried out to study the feeding activity of brown plant hopper through honey dew test and certain biochemical constituents in the rice plant due to the application of fly ash. Among the various treatments, quantity of honey dew excreted in terms of area was significantly less in lignite fly ash (LFA) at 10 t ha^{-1} (9.6 mm^2) followed by LFA 12.5 t ha^{-1} (10mm^2) as against the maximum of 51.6 mm^2 in the untreated check. Honey dew excreted in the treatments bituminous fly ash (BFA) at 12.5 t ha^{-1} and 10 t ha^{-1} were 11.0 and 11.6mm^2, respectively and these two treatments were on par with each other. The biochemical constituents of plants imposed with fly ash revealed that total phenol content, silicon and tannin content varied significantly among the treatments. Total phenol content was significantly high in LFA at 10 t ha^{-1} (6.03 mg g^{-1}) and LFA at 12.5 t ha^{-1} (5.9 mg g^{-1}) followed by BFA 12.5 t ha^{-1} (5.4 mg g^{-1}), against the minimum of untreated check (2.06 mg g^{-1}). Silicon content was significantly high in LFA 10 t ha^{-1} (2.6 %) and BFA 12.5t ha^{-1} (2.5 %) as against the minimum of 1.0% in the untreated check. Tannin content was significantly high in LFA 7.5 t ha $^{-1}$(9.1 mg g^{-1}) and 12.5 t ha^{-1} (8.46 mg g^{-1}) as against the minimum of untreated check (2.43 mg g^{-1}). Similarly BFA and LFA at 1 t ha^{-1} and 2.5 t ha^{-1} were significantly on par with each other and their phenol, silicon and tannin content were comparatively lower than the high doses.

Key words: *BPH, honey dew, fly ash, biochemical constituents*

Socio-economic analysis of awareness and perception of climate change by the rice farmers in vulnerable regions of Odisha 155-161

Arun Pandit*, BB Panda, KS Rao, SK Bandyopadhyay[1], S Mohanty, A Das and P Swain

Central Rice Research Institute, Cuttack - 753 006, Odisha

[1]Indian Agricultural Research Institute, Pusa Campus, New Delhi-110012

Email : arunpandit74@yahoo.co.in

ABSTRACT

Public risk perception indicates the way people respond to the hazards including climate catastrophes. Public opinion largely shapes the policy formulations by the governments. The present study was conducted in Ganjam district of Odisha to gauze the awareness and perception of farmers regarding climate change which is already manifesting itself in the region. The study indicated that reasonably good percentage (65.17%) of farmers heard the term 'climate change'. However, they hardly understand the proper meaning of climate change. Around 41% of the farmers didn't have any idea about what causes climate change. However, farmers had unanimous feeling that the climate is changing. They perceived that intensities of day and night temperature, rainfall, humidity, cold and heat waves and frequency of cyclones has changed over the years. Majority of the farmers experienced that the cropping season and sowing time had been delayed because of late onset of monsoon. Farmers may be encouraged to rear livestock as a measure of occupation diversification to lessen the risk in times of climatic adversity. It is required to organize awareness camps for educating the farmers and general mass about the seriousness of threat level of climate change and the mitigation/adaptation options. Extension functionaries should impress upon the farmers to have more social participation.

Key words: *socio-economics, climate change, perception, rice farmer*

SHORT COMMUNICATION

Gene action and combining ability studies in rice 162-164

Savita Bhatti, DP Pandey* and Dhirendra Singh

Rice and Wheat Research Centre, CSKHPKV, Malan (HP)-176 047

Email : pandeydp04@yahoo.co.in

ABSTRACT

Investigation was carried out to determine gene action and combining ability studies in rice. The material consisted of F1 population of 30 crosses developed by crossing 10 genotypes with three testers. TDominance genetic variance were highly significant as compared to additive gene effects for total tillers plant^{-1}, effective tillers plant^{-1}, spikelets panicle^{-1}, grains panicle^{-1}, grain fertility, biological yield plant^{-1}, harvest index, grain yield plant^{-1}, 1000-grain weight and grain length and L:B ratio. The average degree of dominance was observed more than one for all the traits studied except plant height, panicle length, days to 50% flowering and days to maturity. The cross HPR 2639 x HPR 2143 is a good specific combination for grain yield plant^{-1}, panicle length, spikelets panicle^{-1}, grains panicle^{-1}, biological yield plant^{-1}, days to 50% flowering and plant height.

Key words: *rice, gene action, general combining ability, specific combining ability, line x tester analysis*

Amit Kumar Dash, GJN Rao and RN Rao*
Central Rice Research Institute, Cuttack-753006, Odisha
****Email : rnrao14@yahoo.com***

ABSTRACT

The present study was carried out to evaluate the response of F1 hybrids of maintainer x maintainer crosses of rice anthers for high frequency callus induction in N6 medium and shoot and green plant regeneration in MS medium. The effect of genotype was significant ($p<0.001$) for callus induction, shoot and green plant regeneration. Out of 4 inter-varietal crosses evaluated, the cross CRMS31B x CRMS24B was highly responsive for callus induction (37.83 %) as well as calli responsive for shoot regeneration (41.09 %) and green plant regeneration (15.00 %) whereas the cross CRMS32B x CRMS28B was found to be poor in callus induction (18.36 %), callus responsive for shoot regeneration (20.59 %) and also in green plant regeneration (11.58 %). The results suggest that genotypes play a critical role in the anther culture response in indica rice.

Key words: *indica rice, anther culture, callus induction, maintainer line*

Subhrasini Lenka and JML Gulati
Orissa University of Agriculture and Technology, Bhubaneswar, Odisha-751003
****Email : jml.gulati@gmail.com***

ABSTRACT

A field investigation on response of rice varieties to different establishment methods under system of aerobic rice production was carried out at Orissa University of Agriculture and Technology, Bhubaneswar during wet season of 2012. Among the varieties, aerobic rice Pyari, proved superior with higher yield of grain and straw, and net return compared to other two varieties. With regards to methods of establishment, the yield of grain and straw and net returns were higher under aerobic transplanting with crop geometry of 20 cm x 20 cm. It also recorded higher values of yield attributing characters, leaf area index, nutrient uptake and field water use efficiency.

Key words: *aerobic rice, spot seeding method, aerobic transplanting*

Jadhav KT*, Jadhav UT, Suryawanshi VP, Alase UN, Awasarmal Vishal
Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra - 431 402
Email : kirantjadhav76@gmail.com

ABSTRACT

A field experiment was conducted at Marathwada Krishi Vidyapeeth, Parbhani, during wet season 2011. The experiment was laid out with eight treatment combinations involving tillage operation, weed and nutrient management. Rice grain and straw yield were significantly more under conventional tillage practice than conservation tillage owing to higher values of growth and yield

attributes of rice under conventional tillage. However, conservation tillage showed significantly higher values of available N, P_2O_5, K_2O, Fe and BD than conventional tillage. Amongst management practices recommended dose of fertilizer (RDF @ 80:50:50 M{L Lg ha^{-1})+ $FeSO_4$ 10 kg + hoeing at 30 days after sowing (DAS)+ hand weeding (HW) at 30 DAS and 45 DAS recorded significantly more values of growth attributes, yield attributing characters, grain yield (2.48 t ha^{-1}), lowest mean weed dry matter (42.53 g) at harvest and no. of weeds (26.81) at harvest over rest of management practices, however, it was at par with 80% RDF + $FeSO_4$ 8 kg + green manuring and incorporation at 35 DAS + 1 HW at 45 DAS . Amongst management practices significantly higher available N, P_2O_5, K_2O, Fe and BD were recorded at harvest under RDF + $FeSO_4$ 10 kg + green manuring and incorporation at 35 DAS + 1 HW at 45 DAS.

Key words: *conservation tillage, green manures, intercropping, weed, upland rice*

Screening of rice germplasm lines against rice root-knot nematode *Meloidogyne graminicola* 177-178

J Berliner*, Somnath S Pokhare, Chakradhar Mishra, Mayabini Jena and ON Singh
Central Rice research Institute, Cuttack-753006, Orissa, India
Email : j_ber@rediffmail.com

ABSTRACT

The rice root-knot nematodes infest rice plants and cause considerable yield loss to the tune of 17-30 % to rice cultivation. In order to identify resistant source against them,414 rice cultivars were tested by artificially inoculating fifteen-day-old pot-grown seedlings with 100 second stage juveniles. Only two entries from breeding lines, 127-28-1-1-1 &183-6-1-1-3 were found resistant with score 2. Two lines from NBPGR collection and 4 aerobic cultivars were tolerant to root-knot nematode leaving all other in susceptible and highly susceptible category.

Key words: *Meloidogyne graminicola, screening, resistance, aerobic varieties*

Determination of producer's surplus and consumer's surplus in organic rice 179-181

D Nagaraj and B Chinnappa*
College of Agriculture, Navile, Savalanga Road, Shimoga - 577 204, Karnataka
****Email : chinnappaprof@rediffmail.com***

ABSTRACT

A study was undertaken with an objective of empirical assessment of consumer's surplus and producer's surplus in organic rice. For this purpose. a sample of 30 consumers and 30 producers was chosen purposively from Bangalore city and Shivamogga taluk respectively. Since organic rice consuming population could not be found in organic rice producing area (Shimoga), it was decided to choose the 30 consumers of organic rice in Bangalore city. The study revealed that most of the consumers of organic rice were well educated having health consciousness. The other factors affecting consumption of organic rice include, absence of chemical residues, sweet aroma, taste, media advertisement, etc. The consumer surplus was estimated to be ` 9.42 kg$^{-1}$ of organic rice indicating that the consumers are willing to pay an extra price of ` 9.42 kg^{-1} over and above the market price. The producers, obtained ` 14.19 kg^{-1} of organic rice over and above the prevailing market price thus earning better profits in organic rice cultivation.

Key words: *organic rice, producer's surplus, consumer's surplus*