SUMMARY
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Blast caused by *Pyricularia grisea* Cooke, Sacc. is the most important fungal disease of rice and occurs in all rice growing regions. It is widespread and serious disease which accounts for heavy loss every year. The yield loss recorded up to 18 to 43% in a susceptible variety at Central Rice Research Institute (CRRI), Cuttack and in Karnataka yield loss was up to 75 per cent. Severe infection of panicles may even result in total crop loss with the introduction of high yielding varieties and change in recent rice growing practices i.e., heavy fertilization accompanied by denser spaced planting, the severity of the disease may assume serious proportions in near future. In view of importance of the disease, the possibilities of scoring environment friendly resistant source for blast epidemiology and integrated management practices, multiple disease resistance and exploring slow blasting lines to achieve durable resistance was attempted in this study.

1230 genotypes were screened to know how they could withstand on slight of blast. Out of 1230 rice genotypes the most promising 20 medium, 22 long and 33 extra long duration were identified for further evaluation. The medium duration genotypes, the lines IET-13808, IRLON 90/40, IET-13901 and KHP-2 performed extremely well compared to any other lines tested with respect to resistance for both leaf and neck blast as well as seed yield (kg/ha).

The epidemiological studies were undertaken in Coorg studies on different genotypes and there reaction to blast disease. The medium duration genotype IET-17744 was recorded lowest TDS (0.00%) and AUDPC (0.00%) genotype M-249 found highest TDS (70.62%) and AUDPC values i.e., 2556. The long duration
genotype IET 18452 having highest TDS (75%) and AUDPC (2700) values and other genotypes IET 17305 should resistant reaction to blast disease, the genotypes recorded 0.00% of TDS and Zero AUDPC values. In Extra long genotypes were screened in nursery beds at Ponnampet to know the blast reaction. The genotypes IET -17744, IET -17305, PUBM-3 and PUMB-4 recorded 0.0% of TDS and 0 values of AUDPC compared with susceptible check Intan. Intan recorded highest TDS (84.68%) and AUDPC values (3068).

Again 20 medium, 21 long duration and 33 local mutants genotypes evaluated for two years and recorded severity of neck blast and seed yield (kg/ha). Out of 20 medium genotypes, the genotypes 13901 showed 0.0% of neck blast with highest yield of 7392 kg/ha. PUBM- 4 recorded 0.0% neck blast with highest seed yield of 3610 kg/ha. In 21 genotypes of long duration, IET-17305 recorded 1.33 per cent of neck blast with highest yield of 5227 kg/ha. The neck blast is also one of important deciding factor to get the seed yield. This genotypes can also use for further breeding programme for developing resistant varieties.

The epidemiological parameters viz., lesion size, production of spores and number of spores/mm² were worked out in medium, long and extra long duration genotypes. An AUDPC value was calculated by using the above data. Blast lesion size was measured and calculated AUDPC values, the genotypes IET-13901 (3.81), PUBM-4 (10.37), IET-17744 (86.25) and IET17305 (57.25) recorded least AUDPC values compared to susceptible check Intan (117.62).

With respect to spores production per lesion was worked out by using haemocytometer and calculated AUDPC values. The genotypes Iet-13901( 4187.5)
recorded least spore production on the lesions compared to susceptible check Intan variety, in Intan variety AUDPC values was 208000. In another epidemiological parameter i.e. number of spores production per square meter area of the lesion was worked out and data was converted to AUDPC values. Least spore production per sq/mm^2 observed in IET-13901 (3720), PUBM-4 (4625.0), IET-17305 (6885) with compared to susceptible check. In susceptible check Intan variety produced higher spore production (6600).

The genotypes IET-13901, PUBM-3, PUBM-4, IET-17305 and IET 17744 showed least leaf blast incidence, neck blast with highest seed yield, least number of spore production per lesion, least number of spore production per sq/mm^2 and minimum lesion size compared to susceptible check Intan varieties. These genotypes can be exploited for further breeding programme for the development of resistant varieties in Coorg district.

In addition to the above mentioned components of disease resistance, the early aspects of infection that would indicate host reaction such as spore germination, germtube production, appressorial formation etc., were also investigated on six genotypes. The spore germination on genotype IET-13989 was observed up to 86 per cent with 8.8um germtube length compared to other genotypes. The same genotype produced low appressorial formation (10.60%) with 8.35um diameter compared to other genotypes.

Twenty two new and other fungicides were sprayed at the recommended rates at tillering, booting and heading stages for management of blast disease during 2004-05 and 2005-06. The fungicides Win( Protega), Tricyclazole, Filia and Amistar
significantly reduced the incidence of leaf and neck blast and increased seed yield than compared to control. The neck blast incidence in Win(Protega), Amistar, Tricyclazole and Filia sprayed field was 7.80, 10.87, 13.67 and 20.17 per cent respectively. The highest seed yield recorded in Filia, Tricyclazole, Sivic , Win and Amistar sprayed fields i.e. 5525, 5527,5251,4905, and 3648kg/ha respectively . The leaf blast and neck blast incidence in control was 29.30 and 58.32 per cent respectively and lowest yield recorded in control field i.e., 619 kg/ha. The new fungicides Win, Amistar and Filia were effective against blast disease and these fungicides on par with the fungicide Tricyclazole, which is commonly use for the management of blast disease.

The commercial fungicides tested were Hinosan, Bavistin, Fuzi-one, Beam, Kitazin and Protega against blast disease during 2004-05 and 2005-06. All the fungicides reduced the disease incidence and increased grain yield compared with the untreated control. Tricyclazole was the best fungicide in controlling the blast disease and increasing yield. Among all the fungicide, Beam and Protega were highly effective against blast disease.

The fungicide viz., Hinosan, Bavistin, Beam and Protega were applied seed treatment or Nursery spray or Tillering spray and or Panicle emergence stage for the management of blast disease during 2004-05 and 2005-06. In all four applications, the fungicide Protega and Beam reduced leaf blast and neck blast incidence and increased seed yield.

The experiment on effect of Neem based products with combination of fungicides were tried in field condition to know the efficacy of this product on rice.
blast incidence during 2004-05 and 2005-06. The product was sprayed during tillering and panicle emergence stages. Neem azal sprayed field infested with 19.06 per cent neck blast and produced yield up to 2716.5kg/ha. The first spray of neem azal given during tillering stage and second spray with fungicides viz., Hinosan, Bavistin, Beam, Protega and Neem azal were sprayed during panicle emergence stage. Neem azal followed by protega recorded least neck blast incidence i.e., 15.35 per cent with highest yield of 3059.50kg/ha. In without spray field recorded highest neck blast incidence (66.32%) with lowest seed yield (885kg/ha).

In another experiment organic products viz., Cow urine, panchagavya, leaf extract of Eupatorium, Jatropa, Neem were tried against blast disease. All these products have little effect to reduce the neck blast incidence with slight increase in seed yield. In neem azal sprayed field observed 19.06 per cent neck blast with seed yield of 2716.5kg/ha. In unsprayed field neck blast incidence was 55.21 per cent with yield of 895.5kg/ha. The leaf extracts were used alone or in combination with some recommended fungicides. The extracts showed high antifungal activity in neem azal followed by beam or protega fungicide sprayed field.

The effect of nitrogen fertilizer on incidence of blast disease was studied. The different levels of nitrogen (0 to 200Kg/ha) applied to the soil at the time of transplanting and leaf, neck and seed yield recorded. Lowest leaf (15.73%) and neck blast (12.19%) was observed in without application of nitrogen fertilizer applied field and also in these plot recorded lowest seed yield (1078kg/ha). If increase the dosage of nitrogen fertilizer, the leaf and neck blast incidence also increased. The optimum yield level recorded at 75kg/ha applied field.
The experiment on effect of cultural practices on blast incidence on various genotypes was tested at Ponnampet. In with management field, the entire recommended package and practices were followed and without management field was not followed any recommended package and practices after transplanting. The leaf blast and neck blast incidence was more in without management field than compared to with management field. The highest seed yield was recorded in well maintained field compared to unmanaged field. In susceptible check Intan, the highest leaf blast, neck blast incidence with lowest yield recorded i.e., 35 per cent, 40.82 per cent and 1884.5kg/ha respectively. In with management field recorded lowest leaf blast, neck blast and highest seed yield i.e., 20.0per cent, 27.83 per cent and 1884.5kg/ha respectively.

Field experiments conducted during Kharif from June to September month at ARS, Ponnampet, Coorg district to study the effect of sowing date on the incidence of rice blast. Leaf blast (58.75%) and neck blast (41.92%) incidence was significantly greater in the susceptible Intan variety when compared to the resistant variety (IET-13901) in the month of August. The lowest yield (3627 kg/ha) was recorded in susceptible Intan variety during August month compared to other months, in July sown crop recorded highest yield i.e.,6780kg/ha in Intan variety. In Intan variety also recorded lowest leaf and neck blast during in the month of July sown crop. It is concluded that rice blast incidence in rain fed crop can be reduced by delaying the sowing of the susceptible variety or by growing the resistant variety.

Seventy five genotypes based on their past performance were selected for intensive screening in field conditions against blast, udabatta, sheath blight, false smut, brown spot disease.
Blast, though occurs through the growth stages of plant, causes severe loss in yields when it affects neck and/or fingers. The nursery blast which is more common in seed beds, raised for transplanting, may at the most result in reduction in number of transplantable seedlings while, leaf blast phase rarely causes severe direct damage other than forming a source of inoculums for neck and finger phase. The genotypes IET-17744, IET-17305, IET-18457, KHRS-28, Sharavathi recorded lowest average scale for the all the diseases were 2.66, 1.50, 0.83, 2.66 and 2.33 MDR scale respectively. In susceptible check Hemavathi and Intan recorded highest MDR scale i.e., 6.16 and 7.0 respectively. These varieties also recorded highest yield range from 4150 to 6352 kg/ha compared to susceptible varieties Hemavathi and Intan, seed yield recorded in these two varieties range from 1365 to 2050kg/ha.

The genotypes IET-17305, IET-18457, IET-17744, KHRS-28, Sharavathi recorded lowest average scale for the all the diseases scored, hence these genotypes having multiple disease resistance against blast, brown apot, udabatta, sheath blight and false smut disease. The relative performance of these genotypes under various seasonal and geographical conditions is essential before they be selected as multiple disease resistant genotypes. In future these genotypes can be exploited for developing multiple disease resistant varieties in order to get higher yield.