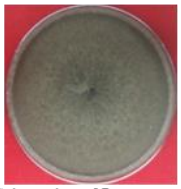
Artificial mass screening methodology for brown spot disease of Rice

Background

Rice brown spot disease caused by *Bipolaris oryzae* is emerging as a major threat to rice cultivation, especially under Direct Seeded Rice (DSR) ecosystems. The disease occurs widely across all rice-growing regions of India, causing yield losses ranging from 4% to 52% depending on the severity and environmental conditions. None of the present-day rice cultivars possess effective resistance to brown spot disease, and reliable donor sources for resistance are not yet identified. Therefore, systematic screening of diverse germplasm is essential to identify potential resistant donors for use in breeding programs.

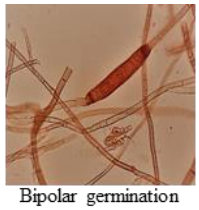
Screening Protocol developed at ICAR - IIRR

The genotypes sown following the sandwich method wherein, every five test entries were surrounded by the border susceptible varieties like BPT 5204. Pure culture of the brown spot pathogen mass multiplied by growing pathogen on rabbit food agar medium at 27 ± 20 C for 5 days and later on 12 h alternate exposure of the culture to near UV light (NUV) and dark conditions to induce enhanced conidial production. Conidia were harvested in sterile distilled water by passing through cheese cloth and concentration of conidia was adjusted to 10^5 conidia/ml using haemocytometer. Inoculation was done by spraying spore suspension in the evening hours) after adding 0.01% of tween 20.

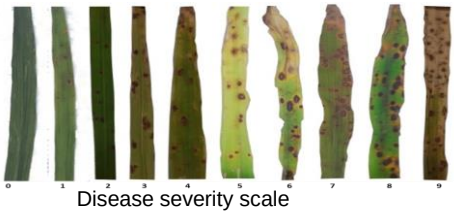


Culture plate of *B. oryzae*

Exposure to NUV



Bipolar germination



Disease severity scale

Brown spot screening facility

Severe disease on Susceptible lines

Conclusions: This methodology is high throughput, simple, highly reproducible and cost effective method (as it does not involve sophisticated glass house with temperature and humidity control) to screen large number of rice breeding material/genotypes. Identification of resistant donors and its utilization in resistant breeding program helps in development of durable brown spot resistant varieties.

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