

Bio-efficacy of microbial-fortified rice straw compost on rice blast disease severity, growth and yield of aerobic rice

ABSTRACT

The bio-efficacy of microbial-fortified rice straw compost was evaluated for plant growth promotion, resistance induction and yield increment with *Pyricularia oryzae* challenged inoculation at 14, 56 and 80 days after sowing (DAS) on rice variety M4 under greenhouse conditions. Soil treatments included control (laterite soil alone), rice straw compost and rice straw compost fortified with four plant growth-promoting rhizobacteria: *Pseudomonas aeruginosa* (UPMP1), *Corynebacterium agropyri* (UPMP7), *Enterobacter gergoviae* (UPMP9), *Bacillus amyloliquefaciens* (UPMS3) and two plant growth-promoting fungi: *Trichoderma harzianum* (UPMT1) and *Trichoderma virens* (UPMT2). Soil amended with microbial-fortified rice straw compost significantly increased plant growth and productivity. Rice yield was highly correlated to productive tiller number ($r=0.96$), leaf area index (LAI) ($r=0.96$) and plant height ($r=0.97$) for *P. oryzae* inoculation at 14 DAS. However, 1000 grain weight ($r=0.96$), area under disease progress curve (AUDPC) ($r=-0.62$) and infected panicle ($r=-0.59$) were highly correlated to rice yield with *P. oryzae* inoculation at 80 DAS. Low productivity was expected with *P. oryzae* infection at the later growth stage. This was due to increase in panicle blast that caused deterioration of grain quality and resulting in severe yield loss (30.99 %) as compared to early infection at 14 DAS in soil amended with microbial-fortified rice straw compost. Disease development and yield loss data with different *P. oryzae* inoculation timings is important for disease management in rice under aerobic cultivation system.

Keyword: Aerobic rice; Microbialfortified rice straw compost; Panicle blast; *Pyricularia oryzae*