

SURVIVAL AND VARIABILITY IN FUSARIUM MONILIFORME SHELDT.

AND MANAGEMENT OF BAKANAE DISEASE OF RICE

By

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Fusarium moniliforme Sheldt. survived from one season to other (November-July) in Haryana under all the conditions studied. The pathogen remained viable for more than 14 months in infected grains of cvs. Haryana Gaurav, Taraori Basmati and Basmati 370, and for 27 months in infected-dried stubbles stored at room temperature. The survival of the pathogen was more in sterilized than in unsterilized soil. Lower temperature (10°C) and relative humidity (32%) were found more favourable for the survival of the pathogen in infected grains and stubbles. Burial depths of stubbles in fields and pots had nonsignificant effect on survival. The viability of the pathogen was significantly low in stubbles mixed in soil at 60 and 80 per cent of MHC than at 10, 20 and 40 per cent. In soil inoculated with fungal propagules, the population of the pathogen was observed maximum at 40 per cent of MHC after eight months of incubation.

There was no significant effect of different levels of N, P and K on the survival of the pathogen in stubbles, however, the higher dose of N (150 mg/kg) reduced its population significantly in propagules-inoculated soil. Among various nutrient combinations, the soil amendment with NPK.ZnSO₄.FeSO₄ reduced the survival in stubbles but none of the treatments significantly affected the fungal recovery from propagules-inoculated soil.

Considerable variations were recorded among 28 isolates of F. moniliforme from rice with respect to their growth, sporulation, colony colour and conidial size on PDA; growth and sporulation on different media, pH and temperatures; sensitivity to fungitoxicants; gibberellic acid (GA₃) production; pathogenic behaviour; and vegetative compatibility. The isolates were categorized in 5 virulence groups, 5 gibberellic acid production

groups and 10 vegetative compatibility groups on the basis of their pathogenic behaviour on different paddy cultivars, GA₃ production in culture and vegetative compatibility, respectively.

GA₃ production in vitro had no correlation with mycelial growth but was positively correlated ($r=0.731$) with pathogenic behaviour of the isolates. Neither GA₃ production nor virulence pattern had any relationship with vegetative compatibility.

Amongst 222 scented and non-scented genotypes of paddy evaluated 12 genotypes viz., C 4-64 (green base), Karjat x 13-21, BR 1067-84-1-3-2-1, BR 1257-31-1-1, BR 4363-8-11-4-9, IR 39464-54-1-3-2-1-3, IR 58109-109-1-1-3, AS 34011, BG 936, CNA 3886, HKR 86-104 and PR 106 were found resistant to bakanae.

Among seven fungitoxicants tested in vitro, carbendazim proved most inhibitory to F. moniliforme with EC₉₀ value of 0.9 ppm a.i. followed by propiconazole and MEMC (EC₉₀ - 4.0 ppm a.i. for both). All the fungitoxicants significantly reduced the recovery of F. moniliforme from grains of cvs. Taraori Basmati and Haryana Gaurav at all the six soaking periods from 10 min to 36 h when plated without surface washing. Complete eradication of the pathogen from grains of Taraori Basmati was recorded at 24 hours of soaking with MEMC (1.0 g/l) and propiconazole (2.0 ml/l), and at 36 hours of soaking with MEMC (0.5 g/l). Surface washing of treated grains before plating abated the efficacy of fungitoxicants in both the cultivars.

All the fungitoxicants except lower concentration of thiram (2.0 g/l) reduced the bakanae incidence significantly. MEMC proved most effective in reducing disease incidence and enhancing grain yield closely followed by carbendazim and propiconazole.

