

Research Article

Management of *Phytophthora* Blight of Pigeonpea using *Trichoderma asperellum* and a Chemical Fungicide

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Abstract

Commercial formulations of mefenoxam + mancozeb (Ridomil Gold MZ 68 WG) and metalaxyl (Apron 35 SD) were highly inhibitory to mycelial growth of *Phytophthora cajani* *in vitro*. Effective dose (ED₅₀) of both the fungicides for 50 per cent inhibition of mycelial growth was less than 0.30 and 0.40 µg a.i. ml⁻¹ of culture medium, respectively. For both the fungicides, zoospore production was inhibited by 100 per cent at 5 µg a.i. ml⁻¹. Efficacy of *Trichoderma asperellum* against growth of *P. cajani* tested and *T. asperellum* inhibited the growth by 80.52 per cent *in vitro*. The sensitivity of *T. asperellum* to mefenoxam + mancozeb at different concentrations was evaluated and the grown *T. asperellum* was tolerant up to 0.4 % concentrations. Further seed treatment with mefenoxam + mancozeb and combination of mefenoxam + mancozeb and bioagent (*T. asperellum*) significantly reduced the *Phytophthora* blight caused by *P. cajani* under greenhouse and field conditions in three pigeonpea cultivars (ICP 87119, ICP 8863 and ICP 7119) tested. The grain yield in ICP 87119, ICP 8863 and ICP 7119 for fungicide alone were 11.2, 10.8 and 7.0 q ha⁻¹; for combination of fungicide and bioagent were 11.6, 10.4 and 7.1 q ha⁻¹; for untreated control were 5.2, 4.8 and 1.1 q ha⁻¹ respectively.

Keywords: Biocontrol, fungicide, *Phytophthora*, pigeonpea and seed treatment

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Pigeonpea is an important grain legume crop cultivated worldwide under rainfed conditions in an area of 5.41 m ha accounting to an annual production of 4.49 million tons (FAO 2016). India alone contributes 72 per cent of the area and two thirds portion of the global pigeonpea production. Pigeon-pea can be planted as a food security crop. It is a good source of protein and vitamin B and it can be grown on a wide range of agro ecosystems. Pigeonpea is susceptible to many diseases and insect pests but only a few of them are economically important. Among all Fusarium wilt and sterility mosaic disease and *Phytophthora* blight are very important (Kannaiyan et al 1984). The first suspected occurrence of *Phytophthora* blight on pigeonpea in India was reported in 1966 by Williams et al (1968). Since its appearance, the

disease had spread to most pigeonpea growing areas in Deccan Plateau of India (Pande et al 2011).

The reason for occurrence of disease in isolated areas in severe form could be susceptibility of varieties used by farmers for the disease especially *Phytophthora* leaf blight. PB disease is soil borne and the pathogen overwinter as chlamydospores, oospores and dormant mycelium in soil as well as on plant debris (Reddy et al 2012). Erratic rainfall, warm and humid weather followed by infection results in rapid disease development and death of plants. Wind and rain water help to disseminate zoospores and facilitate the infection in the host plant (Sharma et al 2006). Typical characteristic symptoms of the disease are water soaked lesions on the leaves and brown coloured lesions and girdle on stems, followed by drying of foliage (Vishwa dhar et al 2005). Pande et al (2011) reported flooding caused by heavy rainfall