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Bio-fumigation in the management of stem and pod rot of groundnut caused by *Sclerotium rolfsii* (Sacc.)

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Management of soil borne fungal pathogens is most difficult because of long-term survival and wide host range of the pathogen. Since, this pathogen not only persists in the soil as saprophyte along with other thousands of soil organisms but also transmits through seeds; we need to manage the problem more cautiously. However, use of fungicides has been discouraged because of certain disadvantages viz., ground water pollution, residues on food crops, effect on non-target organisms and development of resistance to the chemical fungicides besides their high cost. There is worldwide acceptance to the use of eco-safe, eco-friendly methods of protecting crops from the plant pathogens. Using plant produced allelochemicals in agricultural and horticultural practices which could minimize synthetic pesticide use, reduce the associated potential for environmental contamination and contribute to a sustainable agricultural system. Glucosinolates compounds that occur in agronomically important crops may represent a viable source of allelochemical control for various soil borne pests. Insecticidal, nematicidal, fungicidal and phytotoxic effects are often associated with tissues of cruciferous plants. Brassica species contain glucosinolates (GSL) which upon tissue disruption are hydrolyzed in the presence of water by endogenous myrosinase enzyme into numerous compounds, notably toxic isothiocynates (ITC). The detrimental effect of pure ITC to certain fungi has long been known and the potential of Brassica crops to control soil borne pests and pathogens mainly attributed to these compounds. The present investigations suggested that the growth of the pathogen, *Sclerotium rolfsii* the incitant of stem and pod rot of groundnut gradually increased from 24 to 72 hours and maximum inhibition was observed at 36 hours after inoculation in pathogen inoculated leaf discs (43.07%) compared with un-inoculated leaf discs (22.56%) over control. With an increase in time of exposure to mustard powder there was a significant increase in the growth of the pathogen. The incorporation of the mustard plant parts into the soil reduced the infectivity of *Sclerotium rolfsii* at every date at which inoculum was added to soil over the 13 day period of assessment. A significant reduction in the disease incidence was also observed due to infection of S. rolfsii, persistence of Brassica residues was significantly shorter than the persistence of residue action. In field studies, the treatment FYM application at 6 kg per plot+*in situ* application of Brassica residues+rhizobium seed treatment at 20 g per Kg seed (T_9) showed the highest plant height, leaf area at 30, 60 and 90 DAS respectively, fresh weight and dry weightand pod yield at the time of harvest.Soil drenching with propiconazole at 0.1%+*in situ* application of Brassica residues at 4 kg per plot+rhizobium seed treatment at 20 g per Kg seed resulted in maximum reduction in stem rot and pod rot disease as well as the lowest fungal and bacterial population. Soil exposed to dried mustard leaf volatiles followed by onion and cabbage had minimum microbial population under *in vitro* conditions. Finally, it can be concluded that *Brassica* residues had an impact on disease incidence of *Sclerotium rolfsii* and improved the plant growth.

Biography

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