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EFFECT OF FUNGICIDES ON *IN VITRO* GROWTH OF *SCLEROTIUM ROLFSII*

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Abstract

Six fungicides viz., Benomyl, Sancozeb, Thiovit, Dithane M-45, Carbandazim and Topsin-M were tested against *Sclerotium rolfsii* by food poison method. At low concentration, no fungicide inhibited the growth of *S. rolfsii*, however, at high concentration Dithane M-45 and Sencozeb significantly reduced the growth.

Introduction

S. rolfsii is a soil-borne plant pathogen of world wide occurrence that infects more than 500 plant species (Aycock, 1966 Punja, 1985). Mostly *S. rolfsii* diseases have been reported on dicotyledonous hosts, but several monocotyledonous species have also been infected (Aycock, 1966; Mordue, 1974) humid weather is conductive to sclerotial germination and mycelial growth. Consequently the diseases caused by the fungus are more serious in tropical and subtropical regions than in temperate regions (Yorinori, 1994). The large number of sclerotia produced by *S. rolfsii* and their ability to persist in the soil for several years, as well as the profuse growth rate of the fungus make it well-suited facultative parasite and a pathogen of major importance throughout the world (Punja, 1988). The first confirmed report of losses due to the pathogen in USA was made by Rolfs in 1892 on tomato (*Lycopesicon esculentum* Miller) in Florida (Aycock, 1996). Use of fungicides for the control plants diseases is a common practice. There are several reports where fungicides have been used for the control of diseases caused by soilborne pathogens (Saoud *et al*., 1982; Iliesea *et al*., 1985).

Captan and Benomyl have been used successfully against several seed-borne fungi under laboratory and field condition (Goulart, 1992). The fungicide Banodenil and Pentachloronitobenzene (PCNB) were found effective in delaying on set of southern blight of apple seedling and root rot and in slowing disease progress (Conway *et al*., 1996). The high amount of Banzeldehyde (0.4 ml/kg of soil) and velvet bean (100g/kg) inhibited mycelial growth and sclerotial germination of *S. rolfsii*. The number of soybean (*Glycine max*) plants was higher and the disease was lower in amended soil than the non-amended soil (Blum *et al*., 2004).

The effect of interaction of certain hydroxyl radical scavengers (dimethyl sulfoxide, *p*-nitrosodium ethylaniline, ethanol, benzoate, salicylate and thiourea) were the most effective inhibitors of sclerotial differentiation and growth of *S. rolfisii* and *S. minor*. (Georgiou *et al*., 2000). During the present studies, six fungicides viz., Benomyl, Sancozeb, Thiovit, Dithane M-45, Carbendazim and Topsin-M were evaluated for their efficacy against *S. rolfsii In vitro*.

Materials and Methods

Culture of *S. rolfsii*, previously isolated from sugerbeet roots was obtained from the Karachi University Culture Collection (KUCC) and maintained on potato sucrose agar (PSA) at room temperature. Fungicides viz., Dithane M-45, Topsin M, Sancozeb, Benomyl, Thoivit and Carbandazim were suspended in sterile water and added to Potato

sucrose agar (PSA) @ 0.1, 1, 10, 100, 1000 and 10,000 ppm and poured in sterilized 9cm diameter Petri plates. PSA without fungicides served as control. A 5 mm inoculum disc of *S. rolfsii* was inoculated in the center of each Petri plate. There were three replicates of each treatment. The plates were incubated at 28±2ºC and radial growth of the fungus was measured after 24 h intervals.

Results and Discussion

All the fungicides used during the present studies showed a gradual decline in growth of *S. rolfsii* with increase in concentration in the medium. Sancozeb was found to be the most effective and gave 60% reduction in growth of *S. rolfsii* when used @ 100ppm. Dithane M-45 was the next most effective however its efficacy was not significantly different from that of Sancozeb. It gave >50% reduction in 100 ppm treatment. Benomyl and Carbendazim produced >50% reduction in the growth when used @1000ppm. Similarly, Thiovit and Topsin-M resulted in >50% reduction in the growth of *S. rolfsii* when used @ 10,000 ppm (Fig. 1).

It has been reported that at 200 ppm concentration, rot of cocoyam tubers was completely prevented by Dithane M-45, whereas, Benomyl and Iprodione at 600 ppm concentration respectively showed 100 and 80% inhibition in mycelial growth of *Sclerotium rolfsii* (Ohazorike *et al.,* 1996). Similarly, Dithane M-45 significantly reduced the growth of *Fusarium oxysporum* (Mustika *et al*., 1984). *S. rolfsii* forms brownish sclerotia that can survive in soil for long period frequently tolerating biological and chemical degradation due to the presence of melanin in the outer membrane (Chet, 1975).

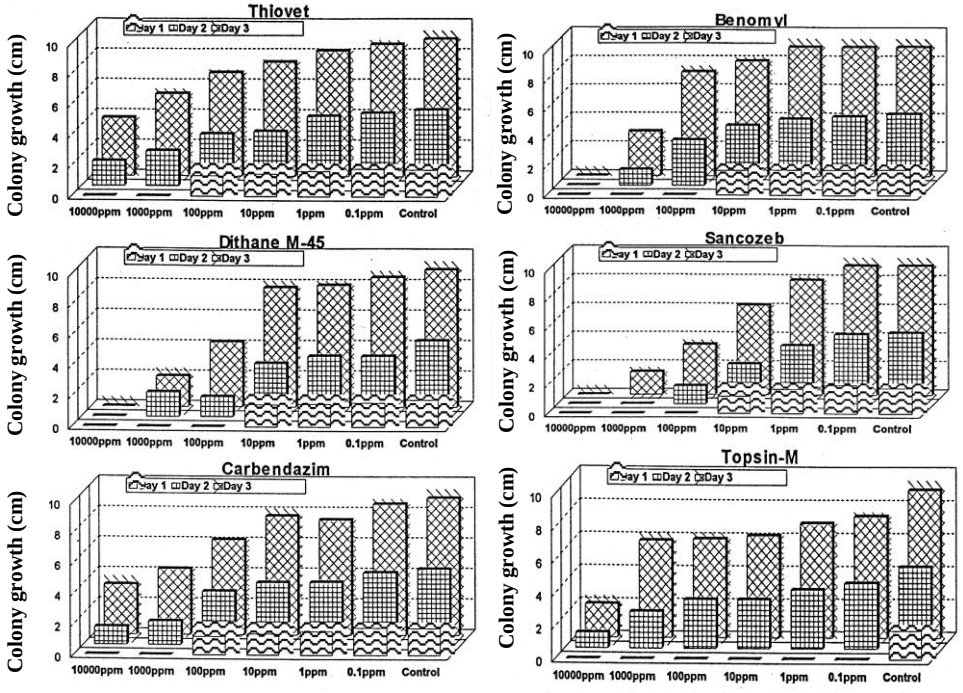

Fig. 1. Reduction in growth of *Sclerotium rolfsii* on potato sucrose agar cantaining different concentration of fungicides viz., Thiovet, Dithane M-45, Carbendazim, Benomyl, Sancozeb and Topsin-M.

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