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Research article

MYCOPARASITISM OF *TRICHODERMA* SPP. ON *RHIZOCTONIA BATATICOLA*, THE CAUSAL AGENT OF DRY ROOT ROT OF CHICKPEA

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ABSTRACT: Mode of parasitism between *Trichoderma* and *Rhizoctonia bataticola* was examined under a microscope. Formation of several loops and coiling around the hyphae of pathogen, forming a thick compact rope like structure followed by rupturing, twisting and leakage of hyphal protoplasm, air bubbling inside the cytoplasm, breaking of cytoplasmic continuity, aggregation of cytoplasm within cell leading to severe vacoulation were observed at later phase of interaction.

Key Words: Mycoparasitism, *Trichoderma*, *Rhizoctonia bataticola*

INTRODUCTION

Chickpea (*Cicer arietinum* L.) is an important food legume crop, which has world wide acceptance as a major source of protein and essential amino acids for human as well as for animal consumption. *Rhizoctonia bataticola* is always considered as the most destructive pathogen of chickpea in semi-arid region (Ashraf *et al.,* 2005). Effective and practical chemical control is not feasible. Biological control appears to be the only solution for long-term sustainability and effective management of soil borne diseases. Different *Trichoderma* species are effective against *Rhizoctonia*. Mode of parasitism depends upon the different enzymatic potential and biochemical activity of the antagonist. Mycoparasitism is the most important antagonistic association where the pathogen is killed by the lysis of fungal mycelia, perforation and digestion of fungal hyphae. The parasitic infection is initiated by hyphal contact or coiling around the fungal cell or by direct invasion of hyphae around fungal cells. In this context the mode of parasitism between *Trichoderma* and chickpea dry root rot pathogen *Rhizoctonia bataticola* was thoroughly studied.

MATERIALS AND METHODS

Antagonism between *Trichoderma* and *Rhizoctonia bataticola* was studied by using the dual culture technique as described by Morton and Straube, 1955. The observations were recorded on radial growth after every 24h till the colony of the pathogen was completely overgrown. The diameter of pathogen was also recorded in dual culture till the growth of pathogen ceased. After contact of antagonist with pathogen, microscopic observations were carried out after every 24h. the slides were prepared from overgrown intermingling zone of dual culture. Detailed study was done to observe hyphal interaction by applying another technique in which coverslip was placed in between the contact zone of the pathogen and antagonist in the center of culture plate. In this way, the hyphae from both organisms came over the cover slip. This cover slip was placed on slid for microscopic study. This facilitated natural integrity of hyphal contact and least disturbance in antagonized mycelium during observation under microscope. Clear and characteristically parasitized hyphae were examined at high power of magnification for microphotography.

RESULTS AND DISCUSSION

Initially some sclerotia were observed near the intermingled contact zone of *Rhizoctonia bataticola* and *Trichoderma*. However there was no sclerotia formation on antagonized portion of hyphae. Later on as the hyphae proceeded further on the colony of *Rhizoctonia*, it was not possible to distinguish or locate the pathogen in dual culture.

The parallel moving hyphae of *Trichoderma* also formed circular loop like structure and tightly coiled around the hyphae of *Rhizoctonia*. Initially hyphae of *Trichoderma* came in close contact with *Rhizoctonia* hyphae. (Figure-1).*Trichoderma* hyphae often coil around *Fusarium* and get attached to pathogen hyphae by forming hook or peg like structure (Upadhyay and Mukhopadhyay, 1986). Hyphae of antagonist moved either parallel or spiral around the pathogen. Later on, pegging started and knob like haustoria formed inside the hyphae of *Rhizoctonia*. The haustoria formation was numerous within the pathogen cell. Three to four haustoria were observed inside each cell of hyphae. *Trichoderma* took out of the cytoplasmic contents through haustoria and left only scar of the pathogen hyphae. The scar of cell wall was clearly visible without cytoplasm. The parasite obtains nutrients through haustoria from appressoria like hyphal coiling (Barnet and Binder, 1973). Production of knob like, haustorial structure with infection peg followed by penetration of host hyphae and finally coagulation, vacuolation and lysis of host protoplasm have been reported to be the principal mechanism in the mycoparasitism of *Rhizoctonia solani* by *Trichoderma virens* (Pant and Mukhopadhyay 2001).

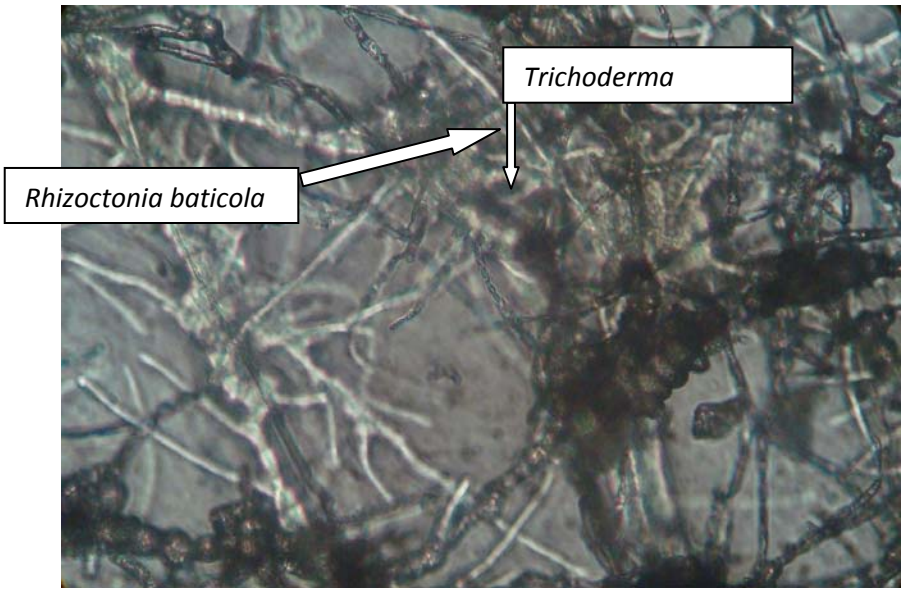

Figure-1: Photomicrograph showing mycoparasitism of *Trichoderma* on *Rhizoctonia bataticola*

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