

## Biocontrol Potential of *Trichoderma longibrachiatum* as an Entomopathogenic Fungi against *Bemisia tabaci*

**Authors :** Waheed Anwar, Kiran Nawaz, Muhammad Saleem Haider, Ahmad Ali Shahid, Sehrish Iftikhar

**Abstract :** The whitefly, *Bemisia tabaci* (Gennadius), is a complex insect species, including many cryptic species or biotypes. Whitefly causes damage to many ornamental and horticultural crops through directly feeding on phloem sap, resulting in sooty mould and critically decreases the rate of photosynthesis of many host plants. Biological control has emerged as one of the most important methods for the management of soil-borne plant pathogens. Among the natural enemies of insects different entomopathogenic fungi are mostly used as biological control of the pest. The purpose of this research was to find indigenous insect-associated fungi and their virulence against *Bemisia tabaci*. A detailed survey of cotton fields in sample collection was conducted during July and August 2013 from the central mixed zone of Punjab, Pakistan. For the isolation of *T. longibrachiatum*, sabouraud dextrose peptone yeast extract agar (SDAY) media was used and morphological characterization of isolated *T. longibrachiatum* was studied using different dichotomous keys. Molecular Identification of the pathogen was confirmed by amplifying the internal transcribed spacer region. Blastn analysis showed 100% homology with already reported sequences on the database. For these bioassays, two conidial concentrations  $4 \times 10^8$ /mL &  $4 \times 10^4$ /mL of *T. longibrachiatum* was sprayed in clip cages for nymph and adult *B. tabaci* respectively under controlled environmental conditions. The pathogenicity of *T. longibrachiatum* was tested on nymph and adult whitefly to check mortality. Mortality of *B. tabaci* at nymphal and adult stages were observed after 24-hour intervals. Percentage mortality of nymphs treated with  $4 \times 10^4$ /mL conidia of *T. longibrachiatum* was 20, 24, 36 and 40% after 48, 72, 96, 72, 96, 120 and 144 hours respectively. However, no considerable difference was recorded in percentage mortality of whitefly after 120 and 144 hours. There were great variations after 24, 48, 72 and 96 hours in the rate of mortality. The efficacy of *T. longibrachiatum* as entomopathogenic fungi was evaluated in adult and nymphal stages of whitefly. *Trichoderma longibrachiatum* showed maximum activity on nymphal stages of whitefly as compared to adult stages. The percentage of conidial germination was also recorded on the outer surface of adult and nymphal stages of *B. tabaci*. The present findings indicated that *T. longibrachiatum* is an entomopathogenic fungus against *B. tabaci* and many species of *Trichoderma* were already reported as an antagonistic organism against a wide range of bacterial and fungal pathogens.

**Keywords :** efficacy, *Trichoderma*, virulence, bioassay

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