

# Pathogenicity of *Fusarium semitectum* against crop pests and its biosafety to non-target organisms.

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## Abstract

Microbial control is receiving more attention, since these alternative tactics, compared to chemical control methods, are energy saving, non polluting, ecologically sound and sustainable. A mycopathogen, *Fusarium semitectum* Berk. and Rav. (ARSEF 7233) was isolated from diseased cadavers of aphid (*Aphis gossypii*) and cultured in Saboraud Maltose Agar supplemented with Yeast extract medium (SMAY). Being isolated first time from the chilli ecosystem its potential was evaluated. Experiments were conducted to understand its pathogenicity against crop pests as well as to ensure its safety to non target organisms such as silk worm (*Bombyx mor*), honey bee (*Apis indica*) and earthworm (*Eisenia foetida*). A paper-thrips-paper sandwich method for thrips and detached-leaf bioassay method for mites were used. Test insects and mites either reared in laboratory or obtained from the field were topically applied with spore suspension of *F. semitectum* ( $1 \times 10^9$  spores/ml). Mortality was recorded and dead animals were surface sterilized with 0.5% NaOCl and placed in SMAY medium to confirm pathogenicity. Mulberry leaves sprayed with the fungal suspension were fed to larvae of *B. mori* and reared. Newly emerged *A. indica* were topically applied with fungus. The fungus grown in cow dung for two weeks was used to assess the composting ability of *E. foetida*. *F. semitectum* produced mycosis and caused mortality to sucking pests such as chilli thrips (*Scirtothrips dorsalis*), broad mite (*Polyphagotarsonemus latus*), sugarcane wooly aphid (*Ceratovacuna lanigera*), spiraling whitefly (*Aleyrodicus disperses*), whitefly (*Bemisia tabaci*, *A. gossypii*) and coconut mite (*Aceria guerreronis*). The fungus did not cause mortality on larvae of lepidopteran insect pests and ladybird beetle (*Menochilus sexmaculatus*), predatory mite (*Amblysius ovalis*) and larval parasitoid (*Goniozus nephantidis*). *F. semitectum* failed to infect the larvae of *B. mori* and newly emerged *A. indica* and its brood. The mycopathogen had no influence on the composting ability and growth of *E. foetida*. *F. semitectum*, in general, expressed its selectivity against sucking pests and proved its eco-friendly characteristics to the beneficial organisms and especially safe to Sericulture, Apiculture and Vermiculture industries in Karnataka, India. This novel fungus can be well incorporated as a viable tactics into the integrated management programmes of crop pests.

## Indexed keywords

**EMTREE medical terms:** animal; article; bacterial count; biological pest control; fungus spore; *Fusarium*; growth, development and aging; insect; insect control; methodology; microbiology; pathogenicity; physiology; safety; species difference

**MeSH:** Animals; Colony Count, Microbial; *Fusarium*; Insect Control; Insects; Pest Control, Biological; Safety; Species Specificity; Spores, Fungal