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Effects of Different Entomopathogenic Fungi on Western Flower Thrips and Selected Thrips Predators

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Abstract

Western Flower Thrips, *Frankliniella occidentalis* (Pergande) (WFT) has become a very important pest in Europe that causes significant losses of high value crops in greenhouse and open field production. To overcome increasing selection of pesticide resistant biotypes Integrated Pest Management (IPM) with combinations of safe control alternatives should be the method of choice for thrips management. Besides thrips predators, application of insect pathogenic microorganisms such as Entomopathogenic Fungi (EPF) is highly promising and recommended. EPF are naturally occurring pathogens that attack a wide range of insects and arthropods. However, combination of both strategies may arise some possible antagonistic effects against each other. The main objective of the present study was to investigate under laboratory conditions, the efficacy of nine EPF strains against WFT, and particularly the susceptibility of common predators of thrips such as *Amblyseius cucumeris* (AC), *Orius laevigatus* (OL) and *Hypoaspis aculeifer* (HA). Test organisms were short time immersed in EPF spore solutions and mortality rate was evaluated on daily basis for seven days as main parameter for the susceptibility of each organism. The EPF screened with WFT adults included strains from the following species: *Beauveria bassiana* (Bals.) Vuill., *Paecilomyces fumosoroseus* (Wize) Brown and Smith, *Verticillium lecanii* (Zimm.) Viégas and *Metarhizium anisoplae* (Metsch.). After a series of screening experiments, including optimisation of test arena layout and assessment of convenient humidity regimes, the strains *B. bassiana* (Naturalis), *P. fumosoroseus* (Fwa3) and *M. anisoplae* (2936) were selected for further testing against predators. By using the Kaplan-Meier estimator the survival function for each predator was estimated from life-time data. The obtained data suggest statistically significant differences on cumulative survival (for seven days) by Naturalis treatment (AC: 0.386 ± 0.103 , HA: 0.438 ± 0.105 , OL: 0.190 ± 0.086) compared with the control (AC: 0.656 ± 0.099 , HA: 0.917 ± 0.056 , OL: 0.864 ± 0.073), for the three predators evaluated. Further experiments will distinguish possible formulation effects before finally rating the impact of the evaluated EPF on non-target organisms.

Keywords: Entomopathogenic fungi, non-target effects, predators, western flower thrips