

Marigolds, Fungi & Predatory Mites, Oh Boy!

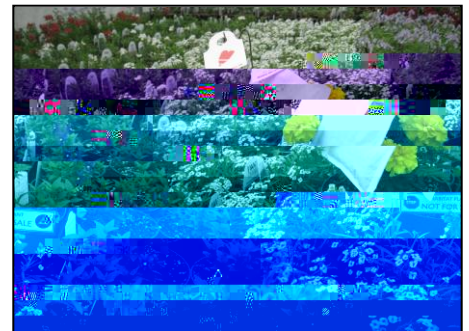
Plant-Mediated IPM Systems for Managing Western Flower Thrips Research Summary 2008-2011

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Introduction

Western flower thrips (WFT) [*Frankliniella occidentalis*] are one of the most persistent and damaging pests of greenhouse ornamentals. Their cryptic behavior and rapid rate of reproduction make management difficult. Feeding results in significant cosmetic damage and they can also transmit deadly plant viruses. Chemical pesticides are commonly used against WFT, often requiring frequent reapplications. Despite repeated chemical sprays, growers find it difficult to keep populations below damaging levels due to increasing resistance and their ability to avoid direct contact with sprays. Several biological controls are available, but their effectiveness has been inconsistent.

Currently, insect-killing fungi are commonly sold as wettable powder (WP) or suspension concentrate (SC) formulations. A major drawback is their requirement for direct contact with the pest for good control. A large portion of the WFT population is in the soil, protected from direct contact with the fungal spores. Targeting the soil stage with a fungus could improve management by reducing the number of adults that emerge. Fungi can be formulated as granules that have advantages over a spray when targeting a soil-borne insect. Nutrients can be added to granules



Marigold plant-mediated IPM system in commercial greenhouse.

Key Findings

In caged trials testing different fungal isolates, after 6 weeks, WFT populations were 90% less on plants treated with the experimental isolate than the untreated controls. WFT numbers on plants treated with the commercial isolate was only 15% less than the controls.

Damage on plants treated with the experimental isolates was 29-43% compared with 86% on plants treated with the commercial isolate, and 99% for the untreated control.

Many of the live WFT collected on foliage from plants treated with a fungus were infected, indicating that adults that emerge from the soil may transmit the fungus to others on the foliage.

WFT populations were significantly less on plants treated with the highest rate of fungal grains tested (0.3 oz). After 6 wks, there were 10 WFT per plant in the highest treatment rate compared with 40 per plant in the controls.

When predatory mites were added to the marigolds in combination with a fungus in the potting mix, there were fewer WFT and damage was less than for treatments without mites. After 5 wk, WFT populations were 3.0 – 3.8 WFT per plant compared with 36 per plant in the untreated plants.

At all of the test sites, damage on the marigolds and crop plants located near the marigolds were less than 10%, suggesting that the marigolds attracted WFT out of the crop and that WFT populations were kept at low levels on the marigolds with the biological control agents on those plants.

Predatory mites thrived in marigold blossoms feeding on pollen and thrips over the 6-