The economic impact of *Scirtothrips perseae* Nakahara (Thysanoptera: Thripidae) on California avocado production

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Abstract

In 1996, *Scirtothrips perseae* Nakahara (Thysanoptera: Thripidae) invaded California avocado orchards and moved pest management practices that relied almost exclusively on biological control to strategies dependent on insecticides to maintain thrips densities below economically damaging levels. By 1998, average losses due to thrips feeding damage in untreated infested groves reduced industry revenues by 12%. Producer costs increased by about 4.5% when *S. perseae* populations required management. In the short run (i.e., the time period during which the industry adapts to managing a new pest), producers cannot fully adapt to increases in production costs and the annual cost of *S. perseae* to producers with a thrips infestation is estimated to be $8.65 million (US). In the long run (i.e., the time period after which the industry has fully adapted to the effects of a new pest), producers are able to fully reallocate resources to their most efficient use and the annual cost of *S. perseae* is calculated to be $5.22 million (US) per year. For the entire USA avocado industry, the annual short-run loss attributable to *S. perseae* in California is calculated to be $8.51 million (US) and $4.45 million (US) in the long run.

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1. Introduction

The introduction of an exotic pest of agricultural importance can cause significant economic damage because of explosive population growth, which results in part, because the natural enemies that control the pest in its native environment are missing in the new environment. Economic damage resulting from an exotic pest can include reduced yields and produce quality, increased incidence of disease, or higher pest control costs.

In June 1996, *Scirtothrips perseae* Nakahara (Thysanoptera: Thripidae), a pest native to Mexico and Guatemala, was discovered damaging foliage and fruit of Hass avocado, *Persea americana* var. *drysfolia* Blake (Lauraceae) in Ventura County, CA, USA (Nakahara, 1997; Hoddle et al., 2002a). Heavily infested orchards in Ventura County experienced 50–80% crop damage in 1997 and fruit was either unmarketable or downgraded in packing houses (Hoddle and Morse, 1997, 1998). By May 1998, *S. perseae* infested 80% of California avocado acreage (Hoddle et al., 1998) and pest densities were highest in areas with a cool coastal climate (Hoddle, 2002a). Currently, approximately 95% of fruit bearing acreage has this pest and around 80% of producers experience economic losses to *S. perseae* (Hoddle unpublished).

Immature avocado leaves and fruit are preferred feeding and oviposition sites for *S. perseae* (Hoddle et al., 2002b). Feeding damage by high densities of *S. perseae* larvae and adults over the late fall through spring period can result in defoliation. However, the main source of economic loss attributable to *S. perseae* is scarring of immature fruit in spring by feeding thrips. Scarring ≥5% of the fruit surface by feeding thrips results in economic losses to producers (Phillips, 1997).

Before the introduction of *S. perseae*, arthropod biological control succeeded in California avocado