

NATURAL ENEMIES OF THRIPS ON AVOCADO

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ABSTRACT

*Two species of thrips occur sporadically on avocado leaves and fruit in South Africa. These are the pine-tree thrips, *Heliothrips haemorrhoidales* (Bouche), and the red-banded thrips, *Selenothrips rubrocinctus* (Giard). Damage is caused by the insects feeding on both the leaf and fruit surfaces, extracting chlorophyll which results in the browning of the plant tissue. Various predators and parasitoids have been recorded attacking these thrips species in other countries. In South Africa a small pirate bug and a parasitic wasp were found attacking *H. haemorrhoidales*.*

INTRODUCTION

Two species of thrips occur sporadically on avocado leaves and fruit in South Africa. These are the pine-tree or greenhouse thrips, *Heliothrips haemorrhoidales* (Fig. 1) and the red-banded or cacao thrips, *Selenothrips rubrocinctus*. Although these two thrips species differ morphologically, their bio-ecology are very similar. Packhouse surveys in the Nelspruit/ Hazyview region during 1990 showed that the above mentioned thrips species together were the second most important pests of avocado, accounting for a loss of 2,1% of the fruits (Dennill, 1992). Outbreaks of these two thrips species caused losses of up to 80% of the fruits in the Hazyview area during 1989 (W.J. du Toit, personal communication).

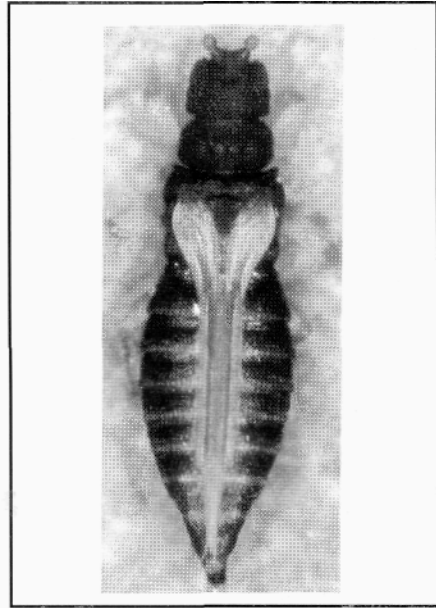


FIG. 1 An adult pine-tree thrips, *Heliethrips haemorrhoidales*.
(Photo : W. Steyn)

These two thrips species of the family Thripidae is widely spread throughout the world. They also attack a wide range of other economic important crops such as: tea (*Camellia sinensis*), guava, (*Psidium guajava*), mango (*Mangifera indica*) citrus (*Citrus spp.*), pecan (*Caryaillinoensis*), coffee (*Coffea arabica*), banana (*Musca spp.*) and various ornamentals (Hill, 1975; Avidov & Harpaz, 1969; De Villiers, 1980). It is also a serious pest of avocado in California (Goodall *et. al.*, 1987).

The adults of both species are about 1,25 mm long and most of them are females. Males are rare and the females reproduce parthenogenetically. The small kidney-shaped eggs are laid singly beneath the epidermis of the leaf or fruit. The insect passes through four different stages before reaching maturity (first instar nymph, second instar nymph, prepseudopupa and pseudopupa) (Hill, 1975; Avidov & Harpaz, 1969; Russell, 1909) (Fig. 2).

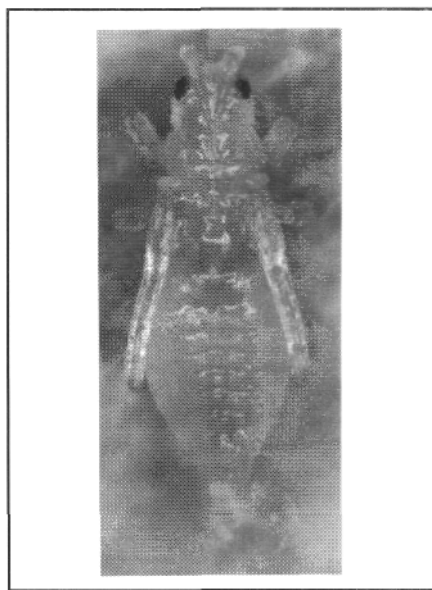


FIG. 2 A pupa of the pine-tree thrips, *Heliothrips haemorrhoidales*.
(Photo : W. Steyn)

Damage is caused by both the mature and immature stages, feeding on the leaf and fruit surfaces, extracting chlorophyll which results in the browning of the plant tissue. The leaves turn brown and eventually drop. Fruits damaged by these two thrips species are unsuitable for export (De Villiers & Van den Berg, 1987; De Villiers, 1990).

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Various predators and parasitoids have been recorded attacking these thrips in other countries.

- Various species of the families Coccinellidae and Crysopidae were found attacking the pine-tree and red banded thrips in Bahia and Brazil (Callan, 1943).
- *Goetheana parvipennis* (Gahan) (Hymenoptera: Eulopidae) a nymphal parasitoid was introduced from West Africa to Trinidad in 1935 and from Trinidad to California in 1982. Success in establishing this parasitoid in California could unfortunately not be obtained (Hessein & McMurtry, 1989).
- *Megaphragma mymaripenne* (Timberlake) (Hymenoptera Trichogrammatidae) an egg parasitoid is indigenous to the USA. It was first found in California in 1937 and surveys have shown that up to 27% of the thrips eggs in certain orchards was parasitised by this parasitoid. Apparently *M. mymaripenne* does not provide effective control (Hessein & McMurtry, 1988).
- A predatory thrips, *Franklinothrips vespiformis*, is indigenous to the USA. The adults are black and wasp-like and they feed on both the mature and immature stages of the pine-tree thrips. These predatory thrips are bigger than the pine-

tree thrips and they are very active and therefore successful in finding their prey. They consume a relatively large amount of thrips at a time but they have a low rate reproduction (Ebling, 1959).

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- In 1990 a small pirate bug was found eating a nymph of *H. haemorrhoidales* between touching fruits. More specimens were found in 1991 and they were identified as *Orius tripoborus* (Hesse) (Hemiptera : Anthocoridae). The small size of this bug allows it to prey upon thrips between touching fruits. It may be partly responsible for the rarity of thrips outbreaks and has the potential to control thrips on avocados. Outbreaks of thrips have occurred in areas where insecticides have been applied and this may be responsible for the reduction of predatory and parasitic insects such as *O. tripoborus*. (Dennill, 1992).
- A parasitic wasp was recently found attacking pine-tree thrips, feeding on *Croton* spp. at the ITSC at Nelspruit. This is the first record in South Africa of the thrips feeding on *Croton* spp. Closer investigations showed that many of the pine-tree thrips nymphs were swollen and distorted. Small black pupae (looking like pieces of charcoal) were also found on the *Croton* leaves. The adult wasps were identified as *Tripobius semiluteus* (Boucek) (Hymenoptera : Eulopidae) (Fig. 3).

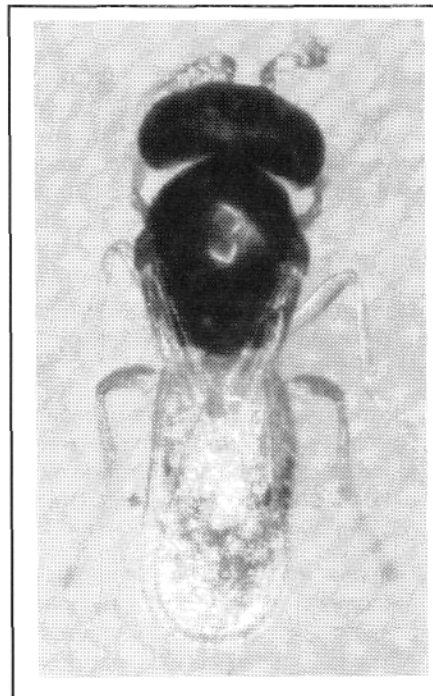


FIG. 3 The adult parasitic wasp, *Tripobius semiluteus*. (Photo : W. Steyn)

T. semiluteus is uni-parental, which means all individuals are female. The wasp only attacks certain species of plant feeding thrips and males of the species are unknown. The adult female parasite inserts her eggs singly in the body cavity of pine tree thrips larvae, usually the first or the early second instar larvae. The parasite larvae grows rapidly until it fills the entire body cavity of its host. The parasitised thrips becomes distorted and swollen and is killed while still in the larval stage. The full grown *Tripobius* larva breaks through the skin of the thrips and transforms into the pupal stage.

T. semiluteus was introduced from Australia to the USA in 1986 and again from Brazil in 1988. It is currently established in some orchards in California where *H. haemorrhoidales* is a serious pest on avocados and surveys indicated that it has survived both cold and hot extremes of the region. Extensive surveys indicated that up to 60% parasitisation by *T. semiluteus* occurred within 2 years after releasing approximately 11 000 wasps in three release sites (McMurtry *et al.*, 1992).

The potential of this parasitoid as biological control agent of thrips forms part of a comprehensive study currently conducted by the Institute for Tropical and Subtropical Crops in Nelspruit.

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