

# MANGOSTEEN THRIPS AND ITS CONTROL

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## ABSTRACT

Thrips is a new recorded pest of mangosteen. There are three species involved. These are: 1) the red banded thrips, *Selenothrips rubrocinctus* (Giard); 2) *Heliothrips haemorrhoidales* (Bouche); and 3) *Caliothrips striatopterus* (Kobus). These are potential pests of mangosteen especially *S. rubrocinctus* which is more dominantly observed on the flowers, fruitlets and flushes. The characteristic damage is the brown discoloration on the affected plant parts.

The total life cycle of the dominant species, *S. rubrocinctus* (Giard) stage ranges from 26 to 34 days. Thrips damage was observed in all the mangosteen farms surveyed in Davao City, South Cotabato and North Cotabato.

## INTRODUCTION

There was no reported incidence of any serious pest of mangosteen in the Philippines but when a grower of mangosteen in Maligatong, Baguio District, Davao City consulted the Bureau of Plant Industry, Davao National Crop Research and Development Center, Davao City, regarding their pest problem on mangosteen sometime in 1987, it was found out that there was a serious thrips infestation on the flowers and was affecting the fruit formation. There were a number of trees infested in the said farm, hence this study was conducted.

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## REVIEW OF LITERATURE

Almeyda and Martin (1976) reported that once in a while the mangosteen fruits is also attacked by mites that inflict damage on the surface making fruit unattractive in the market. The mites are difficult to detect with the naked eye because their size are about 0.16 mm in size.

*S. rubrocinctus* is one of the reported thrips pests of the tropics causing serious damage to cacao, cashew and mango trees (Wilson, 1975). *Selenothrips rubrocinctus* is pantropical in distribution and extends into the subtropical areas of Florida and Southern Mexico.

Ananthakrisnan (1971) also reported *S. rubrocinctus* as a common pest that occurred in large numbers on chestnut leaves in India.

Wilson (1975) as cited Callan (1943) listed among the natural enemies of *S. rubrocinctus* several entomogenous fungi, eleven species of wasps, predaceous thrips, anthocorids, capsids, lycacids, reduviids, chrysopids, coccinellids, cecidonyids, syrphids, ants, mites and spiders. It was further cited by Wilson (1975) that a wasp parasite *Dasyscapus parvipennis* (Gahan) from Gold Coast and Java attacks many species of thrips but its principal host is *Selenothrips rubrocinctus*, which it is able to control.

## OBJECTIVES

1. To study the biology, ecology and alternate host of the pest.
2. To formulate effective and practical control measures.

## METHODOLOGY

Observations on mangosteen were made in the mangosteen orchard of BPI compound at Bago-Oshiro, Davao City.

**Laboratory Observation-** Mangosteen fruits were collected for laboratory rearing of the thrips. Techniques were devised in a trial and error method.

Thrips collected were introduced on green or immature mangosteen fruits placed in plastic jars (2.5" x 2") with organdy cloth as covering. Three to five adult thrips were introduced in each fruit for oviposition were observed. Fruits were changed as needed for their feeding. Newly hatched nymphs were individually transferred with the use of a Camel hair brush to another plastic jars provided with freshly picked green fruit for further observation on the different life stages.

Some adult thrips were preserve for identification and for other necessary observations.

**Field Observations-** Terminal shoots of the mangosteen trees were tagged in the orchard, taking samples from four directions. Five samples were taken per direction. Thrips damage were recorded.

## RESULTS AND DISCUSSIONS

**Identity of the Insect-** Thrips is a sucking insect. It is usually found underneath the calyx of the fruit.

There were three species of thrips observed to be new record on mangosteen (Pableo and Velasco, 1992) and identified as the following:

1. *Heliothrips haemorrhoidales* (Bouche). This measures 1.39 mm in length and 0.16 mm in width (Fig. 1). The diagnosis made by Reyes (1990) follows.

Body dark brown and covered with hexagonal reticulation except for median third of tergites. Ocellar are not produced. Antennal segment III pedicellate, legs yellowish white. Forewings yellowish, broad basally, vein satae minute. Mesoscutal sculpture notched posteriorly. Metascutal median sculpture in form of broad triangle. Antecostal line of tergites thickened, anteriorly convex medially. B1 setae on tergites IX and X pale, stout, nearly pointed at apex.

Distribution - According to Reyes (1992), this species has a cosmopolitan distribution. This species is present in the principal zoogeographic regions, Palawan, Luzon, Visayas and Mindanao.

Host - According to literature, this species is known as the "greenhouse" thrips.

This species is a pest on tea and *Pinus* sp. in east Africa and in coastal regions of eastern Australia and on *Cinchona* sp. and a pest of tea in Kenya and Tanzania as cited by Reyes (1992). This species was also collected from the following: grass, dry plants; leaves of "ceriales", "almasiga", leaf of *Artrocarpus*, flower of *Glericidia*, leaf of *Sarcocephalus orientalis*, leaves of unknown shrubs, sweeping grass, leaves of avocado plants, *Ipomea batatas*, plants in virgin forest, leaves of mango, potted plants in greenhouse, *Eugenia* sp., *Citrus* sp., camphor, bamboo, leaves of croton, tea, dry vines, *Rhus verniciflua*, on numerous plants.

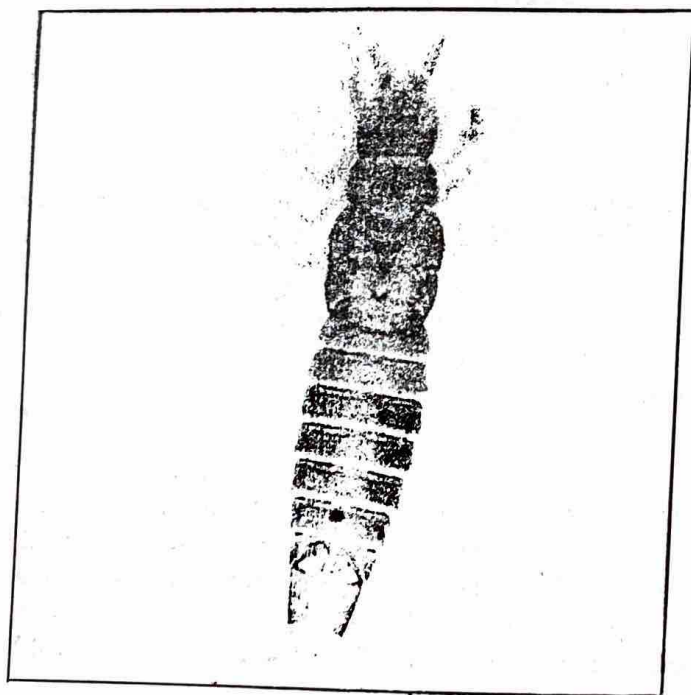


Figure 1. *Heliiothrips haemorrhoidales* (Bouche)

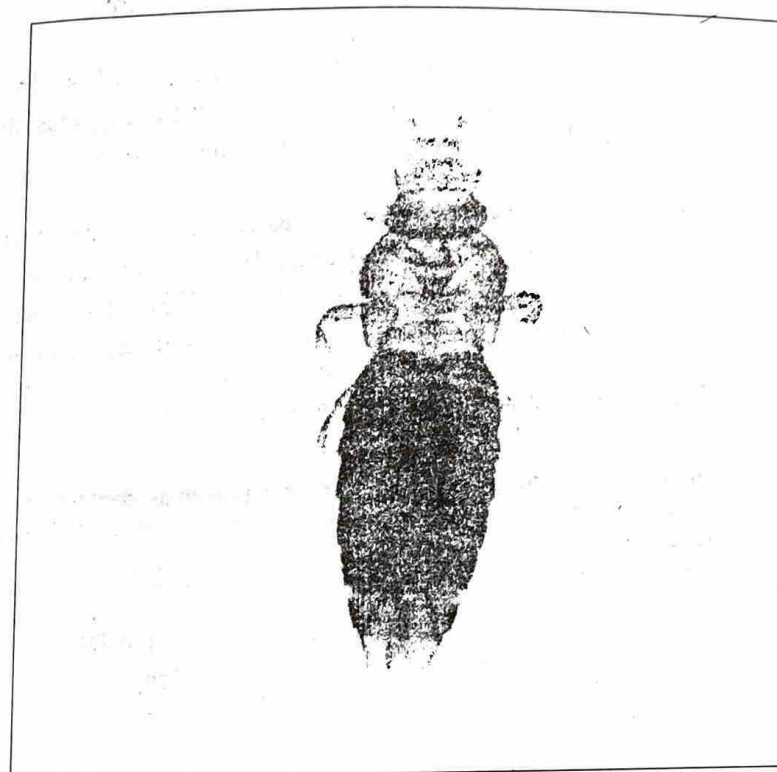


Figure 2. *Caliothrips striatopterus* (Kobus)

2. *Caliothrips striatopterus* (Kobus)- This measures 1.41 mm in length and 0.14 mm in width (Fig. 2). The diagnosis of Reyes (1992) follows:

Body dark brown. Head and thorax reticulate, most reticulations with internal wrinkles. Antennae bicolored. Femora brown with pale apex; tibiae yellow in apical third; tarsi yellow. Forewings with broad brown cross band; base pale, apex dark; veinal setae strong dark. Mesonotum reticulate medially; reticules with internal wrinkles; anterior medium quarter smooth.

Metascutum reticulate; reticules with internal wrinkles; lateral reticules larger. Abdominal pleurites, lateral quarter of tergites and sternites covered with anastomosed striae.

Males of *C. striatopterus* are important in species recognition since females of related species of *Caliothrips* are similar in structure.

**Distribution** - The known range of this species extends from India eastward in the Indonesian archipelago to Australia. In the Philippines, this species is known from the three principal zoogeographic regions.

**Host** - Based on the citations made by Reyes (1992), this species infests sugarcane plants in the Philippines (Capco, 1957) and injuring leaves of sugarcane and maize in Java, Indonesia (Wilson, 1975). This species was also collected from the following leaves of Curran's lipote, *Ageratum*, *Cucurbita maxima*, *Calocasia esculentum*, *Calocasia* sp., flowers of everlasting, *Zea mays* seedlings and *Rhynchelytrum repens*.

**Table 1.** Different species of thrips collected from mangosteen as identified by Dr. Cecilia P. Reyes a thysanopterist of Entomology Department, USM, Kabacan, North Cotabato.

SPECIES	BODY	BODY
	LENGTH (mm)	WIDTH (mm)
1. <i>Heliothrips haemorrhoidales</i> (Bouche)	1.3965	0.1554
2. <i>Caliothrips striatopterus</i> (Kobus)	1.410	0.145
3. <i>Selenothrips rubrocinctus</i> (Giard)	1.425	0.19

**Table 2.** Different stages of fruit development showing their presence and visible damage on mangosteen.

STAGES OF FRUIT DEVELOPMENT	OBSERVATIONS	
	Presence of Thrips	Visible Damage
1. Flushing	(+)	(+)
2. Floral-emergence (Floral Bud)	(+)	(+)
3. Flower opening	(+)	(+)
4. Ripening Stage	(+)	-

**Table 3.** Life cycle of mangosteen thrips *Selenothrips rubrocinctus* (Giard).

STAGES	RANGE (days)	MEAN (days)
egg	5-8	7.75
nymphal/larval stage	19.7-23.7	23.30
pupal stage	2-3	2.30
Total	26.7-34.7	33.35
Adult Longevity	8-14	9.5

3. *Selenothrips rubrocinctus* (Giard)- This measures 1.42 mm in length and 0.19 mm in width (Fig. 3). This species is the most dominant species infesting mangosteen.

**Diagnosis**- Its body is brownish black. Head and abdomen generally reticulate; thorax straight. Ocella hump broad. Antennal segment IV strongly vasiform. Legs bicolored. Forewings brown, with subbasal pale area; costal setae dark; longer than anterior fringe cilia. Mesoscutal sculpture entire. Metascutal median sculpture in form of broad triangle. Abdominal tergites IV and VIII with scattered microtrichia on posterior half (Reyes, 1992).

**Distribution**- This species is widespread in the new and old world tropics. In the Philippines, this species is known in Luzon and Mindanao (Reyes, 1992).

**Host**- *S. rubrocinctus* infest leaves and flowers of mango plant in the Philippines (Capco, 1957) as cited by Reyes (1992). This species is known as the "cacao thrips" and is often reported as serious pests of mango, and cashew (Wilson, 1975). This species was collected by Reyes (1992) on the following grass: *Psidium guajava*, leaves of "San Juan", leaves of avocado plant, *Bixa orellana*; *Plumiera acutifolia*, flowers of unknown shrubs, tomato plant, sweeping grass in coffee grove, leaves of oak, *Coffea arabica*, *Diospyros kaki*, *Codiaeum variegatum*, dry leaves, on numerous plants.

#### Life Cycle of *Selenothrips rubrocinctus* (Giard):

**Eggs** - The eggs are laid singly on the fruits and calyx of the mangosteen. It is partially embedded on the fruit surface. The newly

deposited egg is light yellow in color and turns dark-orange to red when about to hatch. The incubation period observed ranged from 5 to 8 days.

**Larval or Nymphal Stage** - The color is light yellow with red band on the thorax. It is the mobile stage and takes an average duration of 23.3 days. This is the destructive stage of the insect.

**Pupal Stage** - The color turns black with wing formation. The duration of this stage is from 2 to 3 days. This is the immobile stage of the insect.

**Formation of Pupa to Adult** - During this stage, the wings open slowly into adult stage which ranges from one to 1.5 days. Adult longevity ranges from 8 to 14 days (Table 3).

**Nature of Damage-** The characteristic damage of the mangosteen thrips is the brown discoloration of the young leaves, flower buds and

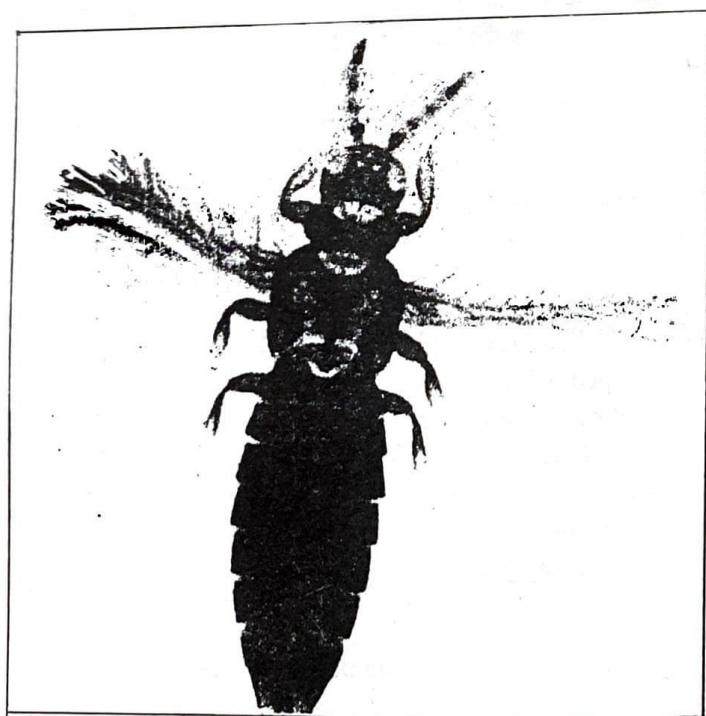


Figure 3. *Selenothrips rubrocinctus* (Giard)

scabbing on the fruits when severely infested. It is because when these plant parts are injured, there is latex in them that results to discoloration. Infested fruits also results to stunting of growth and deformation in shape. In the later stage of infestation, the yield or the edible portion of the fruit may not be affected but the discoloration results to poor appearance thereby reducing its market value.

**Distribution-** Thrips is already widely distributed in mangosteen plantings. As it is observed in Davao area, North and South Cotabato, where observations and surveys were made for the presence of the pests of mangosteen (Table 4).

Table 3. Life cycle of mangosteen thrips *Selenothrips rubrocinctus* (Giard).

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Table 4. Mangosteen farms surveyed for the presence of thrips damage (1987-1988)

PROVINCE/CITY	PRESENCE/ABSENCE
1. Davao City	
DNCRDC - Bago Oshiro	+
Miyake Farm - Maligatong, Baguio District	+
Lorenzo Farm - Pangian, Calinan District	+
Manambulan Station	+
Llaneza Farm - Mulig, Toril	+
2. South Cotabato	
Concepcion Farm	+
3. North Cotabato	
Makilala	+

**Control Recommendation-** Thrips start to infest from the flushing stage, floral-emergence, flower opening up to approaching maturity stage (Table 2). Control measures should be applied when thrips are observed with the use of any of the following insecticides: 1) Dimethoate; 2) Azinphos-ethyl; 3) Synthetic pyrethroids at their recommended rate for sucking insects.

Spraying should be started during flushing, fruit formation and up to 91 days (13th week) from flower opening at 7 days interval depending on the presence of thrips. This is based on the observation made by Odtojan (1982) that at 13th week from flower opening, the mangosteen fruit has attained the maximum size and growth of mangosteen. Anabesa (1991) results showed that mangosteen fruits harvested as early as 113 to 116 days after flower opening have qualities comparable to those harvested at full ripeness (119 days from flower opening).

### RECOMMENDATION

A verification trial for the control of these thrips should be conducted in a farmer's mangosteen plantation. Further observation for the presence of natural enemies should still be included in this study.

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