

# Fruit Flies (Diptera: Tephritidae) Intercepted by Japanese Import Plant Quarantine at Narita International Airport

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**Abstract:** Fruit flies (Diptera: Tephritidae) intercepted by Japanese import plant quarantine at Narita International Airport between April 2008 and March 2011 were examined. As a result, five species in three subfamilies (Dacinae, *Bactrocera psidii*; Tephritinae, *Acanthiophilus helianthi*, *Oxyaciura tibialis*; Trypetinae, *Carpomya schineri*, *Euphranta signatifacies*) were newly recorded in plant quarantine. Diagnoses for these five fruit flies are presented.

**Key words:** *Bactrocera psidii*, *Acanthiophilus helianthi*, *Oxyaciura tibialis*, *Carpomya schineri*, *Euphranta signatifacies*

## Introduction

A great variety of plants from many countries around the world have been inspected by Japanese import plant quarantine at Narita International Airport (there were about 100,000 inspections of carry-on plants and about 270,000 inspections of air cargo in 2008).

Fruit flies (Diptera: Tephritidae), including many economically important species such as *Bactrocera cucurbitae*, *B. dorsalis* species complex, *B. tryoni*, and *Ceratitis capitata*, have been frequently intercepted and recorded on those plants (Ichinohe and Kaneda, 1992; Takeishi, 1992; Tsuruta and Kawashita, 2002).

Ichinohe and Kaneda (1992) made an identification key to the tephritid species of known quarantine importance that have been intercepted thus far.

However, there are some fruit flies that have been intercepted on rare occasions, the specimens of which have been left unidentified. Information for their identification is scanty compared with the major pest species mentioned above.

In the present study, tephritid flies intercepted at Narita International Airport were examined. As a result, five species of these flies were recorded for the first time in plant quarantine.

In this report, diagnoses useful for their identification are presented.

Before proceeding to the main subject, the author wishes to thank Dr. K. Tsuruta, Yokohama Plant Protection Station, for his help with preparing the manuscript, and the members of the plant quarantine staff at Narita International Airport for supplying specimens.

## Materials and Methods

Adult specimens, puparium specimens, and both pupal and larval photographs preserved in the plant protection station at Narita International Airport were investigated. These fruit flies were intercepted on plants imported as carry-on plants or as air cargo at Narita International Airport from April 2008 to March 2011.

## Fruit flies recorded

Five species were recorded.

### Dacinae

#### *Bactrocera psidii* (Froggatt)

#### (Plate 1)

**Specimens examined:** 2♂, 2♀, New Caledonia → Narita International Airport (carry-on plants), intercepted on fruit of

*Psidium guajava* (Guava) in the larval stage, 3 October 2009, Y. Tsuchiya.

**Distribution:** New Caledonia (Mille, 2008).

**Diagnosis:** Wing length about 4.8mm. Face with small spot; first flagellomere length at least three times as long as broad (Fig. 4). Scutum glossy black, without medial yellow vittae, with anterior supra-alar setae, lateral yellow vittae ending before intra-alar setae and prescutellar acrostichal setae; scutellum yellow with a broad triangular black mark and one pair of apical scutellar setae (Fig. 5). Leg nearly yellowish brown (Fig. 3). Wing with pale fuscous color around costal margin, vein r-m and dm-cu; vein r-m shorter than vein dm-cu; cell cu $\phi$  extension longer than vein A $_1$ +CuA $_2$  (Fig. 6). Abdomen with all tergites glossy black; tergite 3 of male with pecten; tergite 5 with 1 pair of shining spots (cero-mata); ovipositor of female with pointed aculeus (Figs. 7, 8).

**Remarks:** In New Caledonia this species was reared from 26 fruit species (Mille, 2008).

## Tephritinae

### *Acanthiophilus helianthi* (Rossi)

#### (Plate 2)

**Specimens examined:** 2♂, 1♀, France → Narita International Airport (air cargo), intercepted on bud of *Cynara scolymus* (Artichoke) in the larval stage, 12 August 2009, T. Hiramoto.

**Distribution:** Africa, Asia, Europe, Madeira, Russia, the Canary Islands, the Middle East (Bei-Bienko and Steyskal, 1988; Carroll *et al.*, 2006; Thompson, 1998; White, 1998; White and Elson-Harris, 1992).

**Diagnosis:** Wing length 4.5–5.5mm. Body greenish-grey, with many tomentum-like setae (Figs. 9–11). Postocellar, outer vertical, postocular setae all white; 2 pairs of orbital setae present, the posterior one white and reclinate, the anterior one dark; 3 pairs of frontal setae dark; frons yellow to orange; ocellar setae long; proboscis short and capitate (Figs. 12, 13). Two pairs of scutellar setae present, with the apical one at most half as long as the basal one (Fig. 14). Leg yellow-orange (Fig. 11). Wing with pale reticulate pattern and individual variation; cell cu $\phi$  about as deep as cell bm (Figs. 15–17). Oviscape of female uniformly black, its length nearly equal to the length of tergites 3–6 (Fig. 18). Larva yellow-white (Fig. 19). Puparium black; in each anterior spiracle the number of tubules 5–6; in each posterior spiracle 3 slits sub-parallel (Figs. 20–22).

**Remarks:** This species is well known as pest of safflower (*Carthamus tinctorius*). Artichoke (*Cynara scolymus*) was reported as a host of this species from Egypt (White and Elson-Harris, 1992).

### *Oxyaciura tibialis* (Robineau-Desvoidy)

#### (Plate 3)

**Specimen examined:** 1♀, Israel → Narita International Airport (air cargo), intercepted on leaf of *Rosmarinus officinalis* (Rosemary) in the adult stage, 9 February 2011, S. Satoh.

**Distribution:** Africa, Central Asia, China, Europe, Russia, the Canary Islands, the Middle East (Bei-Bienko and Steyskal, 1988; Smit, 2006; Thompson, 1998; Xing-Jian, 1996).

**Diagnosis:** Wing length about 3.7mm. Postocular setae all black and slender; 1 pair of orbital setae convergent; 3 pairs of frontal setae present; first flagellomere length not longer than three times as long as broad; proboscis capitate (Figs. 25, 26). Scutum and scutellum glossy black with 1 pair of basal scutellar setae (Fig. 27). Leg nearly black, tarsi paler brown (Fig. 24). Wing predominantly dark brown, with 2 hyaline indentations on anterior margin, 3 hyaline indentations on posterior margin, 1 hyaline spot in cell r $_{4+5}$ , and 2 hyaline spots in cell dm; cell sc length about 1/4 as long as cell c; cell cu $\phi$  about as deep as cell bm; oblique hyaline band extending from base of wing to anterior margin of cell c and the base color light brown (Fig. 28). Abdomen glossy black (Fig. 29).

**Remarks:** An adult was detected on the face of a leaf of rosemary.

According to Xing-Jian (1996), larvae of this species develop in the inflorescence of rosemary.

Genus *Oxyaciura* belongs to subfamily Tephritinae (Smit, 2006; Thompson, 1998; Xing-Jian, 1996). In some characteristics this species differs from other typical members of Tephritinae recorded in Japanese plant quarantine. For instance, *A. helianthi* and *Terellia fuscicornis* (Ichinohe and Kaneda, 1992) have white postocular setae on the head, which this species does not have.

**Trypetinae*****Carpomya schineri* (Loew)****(Plate 4)**

**Specimen examined:** 1 ♀, Bulgaria → Narita International Airport (air cargo), intercepted on fruit of *Rosa* sp. (Rose-Hip) in the larval stage, 16 October 2008, H. Naitoh.

**Distribution:** Central Europe to Kazakhstan, Israel (Bei-Bienko and Steyskal, 1988; Carroll *et al.*, 2006; Thompson, 1998; White and Elson-Harris, 1992).

**Diagnosis:** Wing length about 3.7 mm. Ocellar setae long; 2 pairs of orbital setae present, with the posterior one reclinate; 3 pairs of frontal setae present; first flagellomere pointed dorsoapically (Figs. 32, 33). Scutum black with white-yellow sections and presutural supra-alar setae; scutellum black with white-yellow M-shaped mark section and 2 pairs of scutellar setae; katepisternum almost dark brown except for upper part (Figs. 34, 35). Wing with distinctly brownish yellow transverse bands; cell *cu<sub>1</sub>* about as deep as cell *bm*; cell *cu<sub>1</sub>* extension short, its length shorter than one-fifth as long as vein *A<sub>1</sub>+CuA<sub>2</sub>*; vein *r-m* nearly at the middle of cell *dm*, apex of vein *M* straight (Fig. 36). Abdomen without distinct spot (Fig. 37). Puparium yellowish white; in each anterior spiracle the number of tubules about 17, rows of tubules slightly depressed in the middle; in each posterior spiracle 3 slits sub-parallel (Figs. 38–40).

**Remarks:** This species is regarded as a pest of damask rose (*Rosa damascena*) in Bulgaria (White and Elson-Harris, 1992). Bulgaria belongs to the temperate zone; therefore, in rearing this species, the pupa may need exposure to low temperatures.

The information on rearing of this species follows below.

1. The larva pupated in a plastic cup with wet filter paper on 17 October 2008.
2. The pupa was transferred into a plastic cup containing wet sand with a lid punched with about 20 pencil-sized holes. (To avoid dryness distilled water was frequently sprayed on the sand in the plastic cup until the emergence of the adult.)
3. It was placed in a room kept at about 23°C until 19 October 2008, and subsequently in a refrigerator kept at about 3°C until 22 December 2008.
4. It was returned to the room kept at about 23°C.
5. The emerged adult was collected on 4 August 2009.

The pupa ultimately succeeded in emerging as an adult; however, it took about ten months from pupation to adult emergence. For research of this species, a more efficient rearing method must be established.

***Euphranta signatificies* Hardy****(Plate 5)**

**Specimens examined:** 11 ♂, 9 ♀, the Philippines (Cebu Island) → Narita International Airport (carry-on plants), intercepted on fruit of *Avicennia* sp. (Mangrove Plant) in the larval stage, 2 February 2010, T. Nishiguchi.

**Distribution:** Malaysia, Thailand (Hancock and Drew, 1994; Hardy, 1981; Permkam, 1996).

**Diagnosis:** Wing length 5.7–6.3 mm. First flagellomere yellow with round apex; face with large spot; postocular setae black and slender; head with postocellar setae, 1 pair of orbital setae, 2–3 pairs of frontal setae and 1 pair of stout genal setae, without ocellar setae (Fig. 44). Scutum dark brown-black with postpronotal setae, lateral yellow vittae extending beyond intra-alar setae and yellow prescutellar spot between dorsocentral setae, without prescutellar acrostichal seta, scutellum yellow except for brown basal part with 2 pairs of scutellar setae; anepisternum with longitudinal line (Figs. 45, 46). Wing with brown pattern and hyaline vitta through section near vein *R<sub>1</sub>* in cell *r<sub>1</sub>*, section near vein *r-m* in cell *r<sub>4+5</sub>*, the lower part of vein *dm-cu* and apex side of cell *r<sub>4+5</sub>*; cell *r<sub>2+3</sub>* with oval-shaped hyaline spot; cell *cu<sub>1</sub>* about as deep as cell *bm* (Fig. 48). Leg nearly yellow except for brown tibia; mid tibia with 1 strong spur (Figs. 43, 47). Tergites 1–5 yellowish brown in central part and dark brown on both sides; tergite 6 and oviscapae of female yellowish brown (Fig. 49).

**Remarks:** This species has been recorded only from Malaysia and Thailand. In this case, however, this species was intercepted in import plant quarantine on fruit of *Avicennia* sp. carried from the Philippines (Cebu Island), where the occurrence of this species had been unknown. This result implies that this species may have become established in the Philippines.

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## 和 文 摘 要

## 成田空港における輸入植物検疫で発見されたミバエ

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2008年4月から2011年3月までの期間に成田空港の輸入植物検疫で発見されたミバエ（ハエ目：ミバエ科）が調査された。

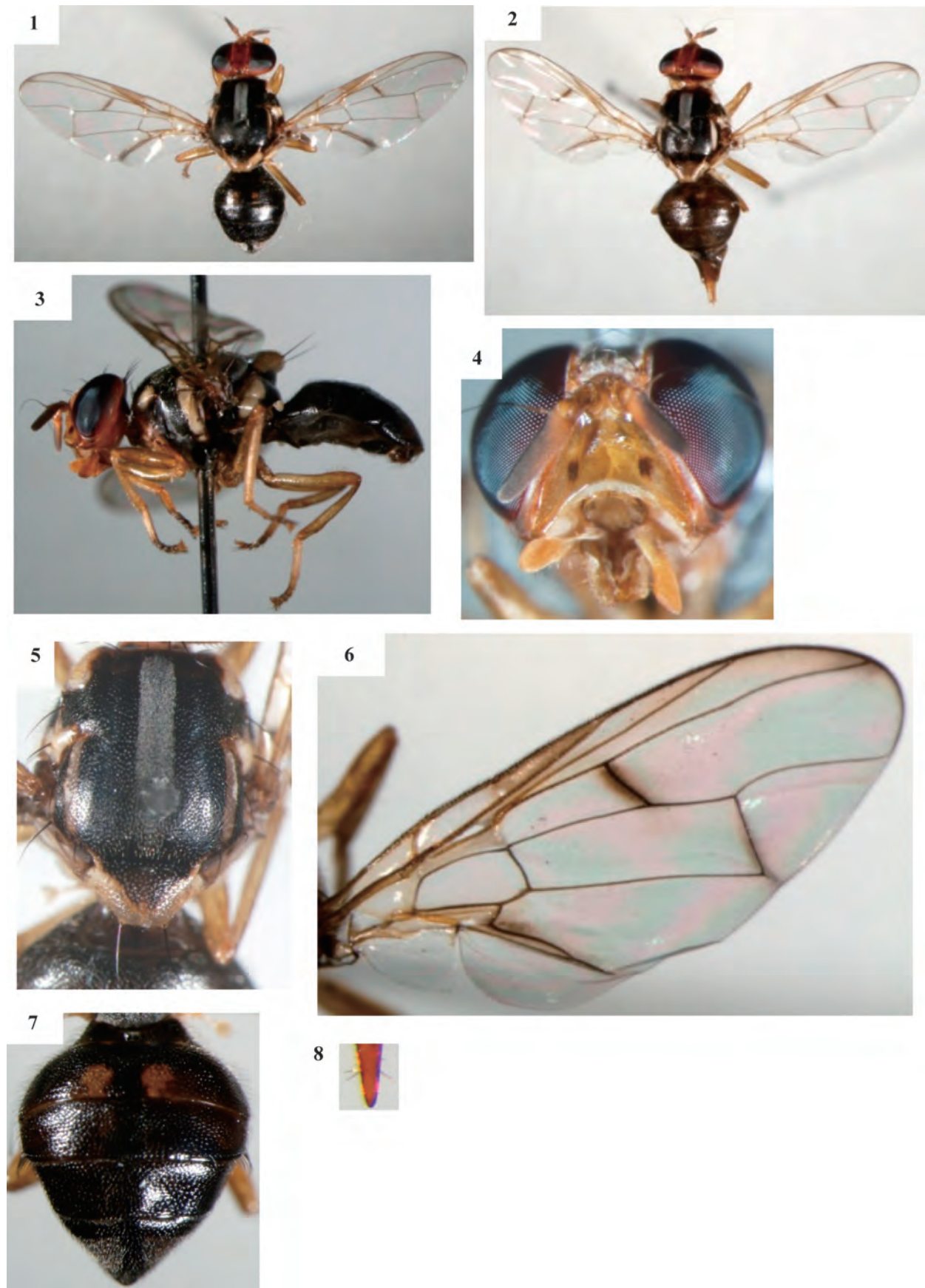
その結果、3亜科5種（ミバエ亜科, *Bactrocera psidii*;

ケブカミバエ亜科, *Acanthiophilus helianthi*, *Oxyaciura tibialis*; ハマダラミバエ亜科, *Carpomya schineri*, *Euphranta signatifacies*) が植物検疫で新しく記録された。

これら5種に係る診断法が示された。



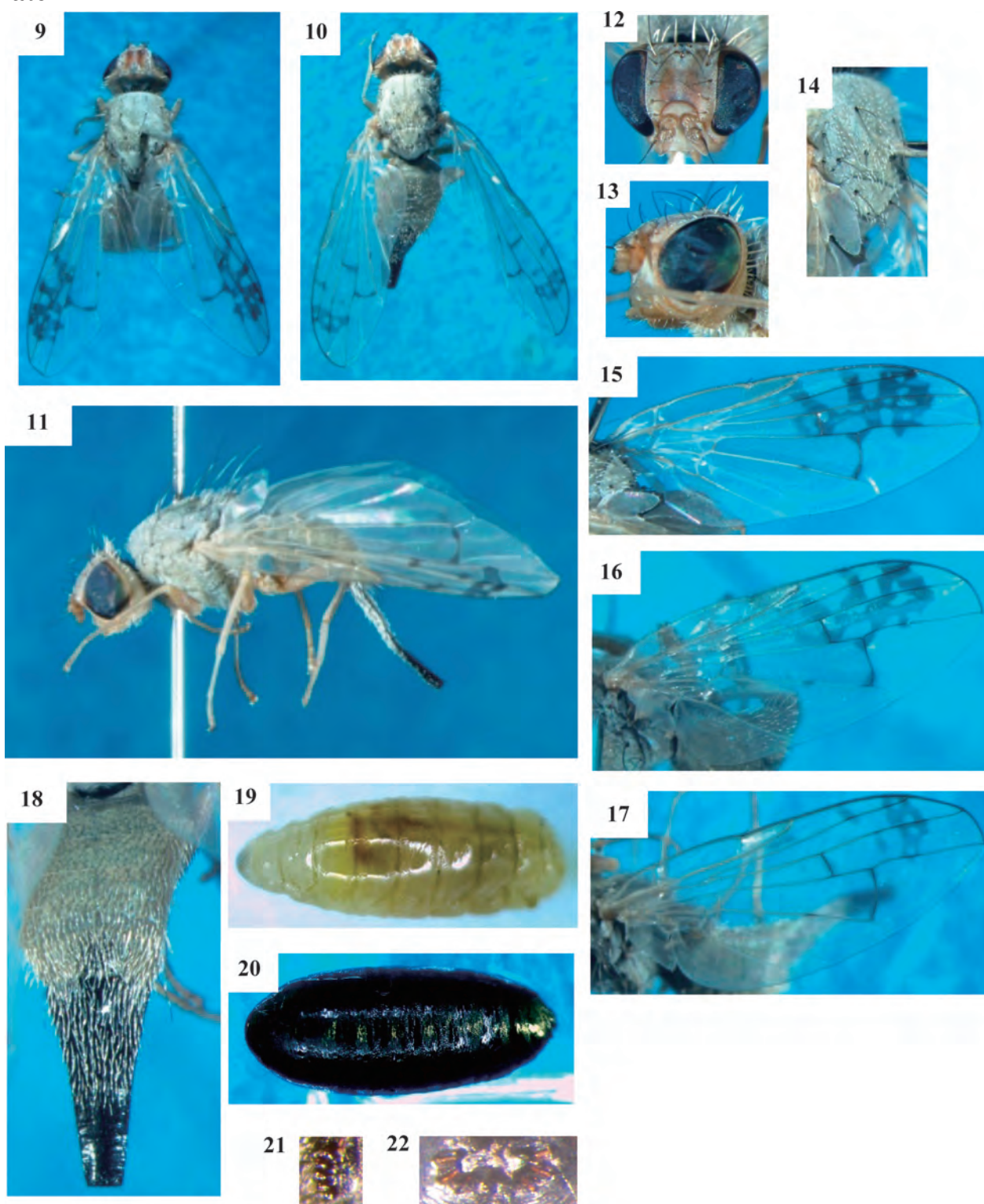
## Plate 1



Figures 1-8. *Bactrocera psidii* (Froggatt)

1-2, Dorsal view, 1, Male. 2, Female. 3, Male in left lateral view. 4, Head of male in frontal view. 5, Thorax of female in dorsal view. 6, Right wing of female. 7, Abdomen of male in dorsal view. 8, Aculeus on ovipositor of female.

## Plate 2

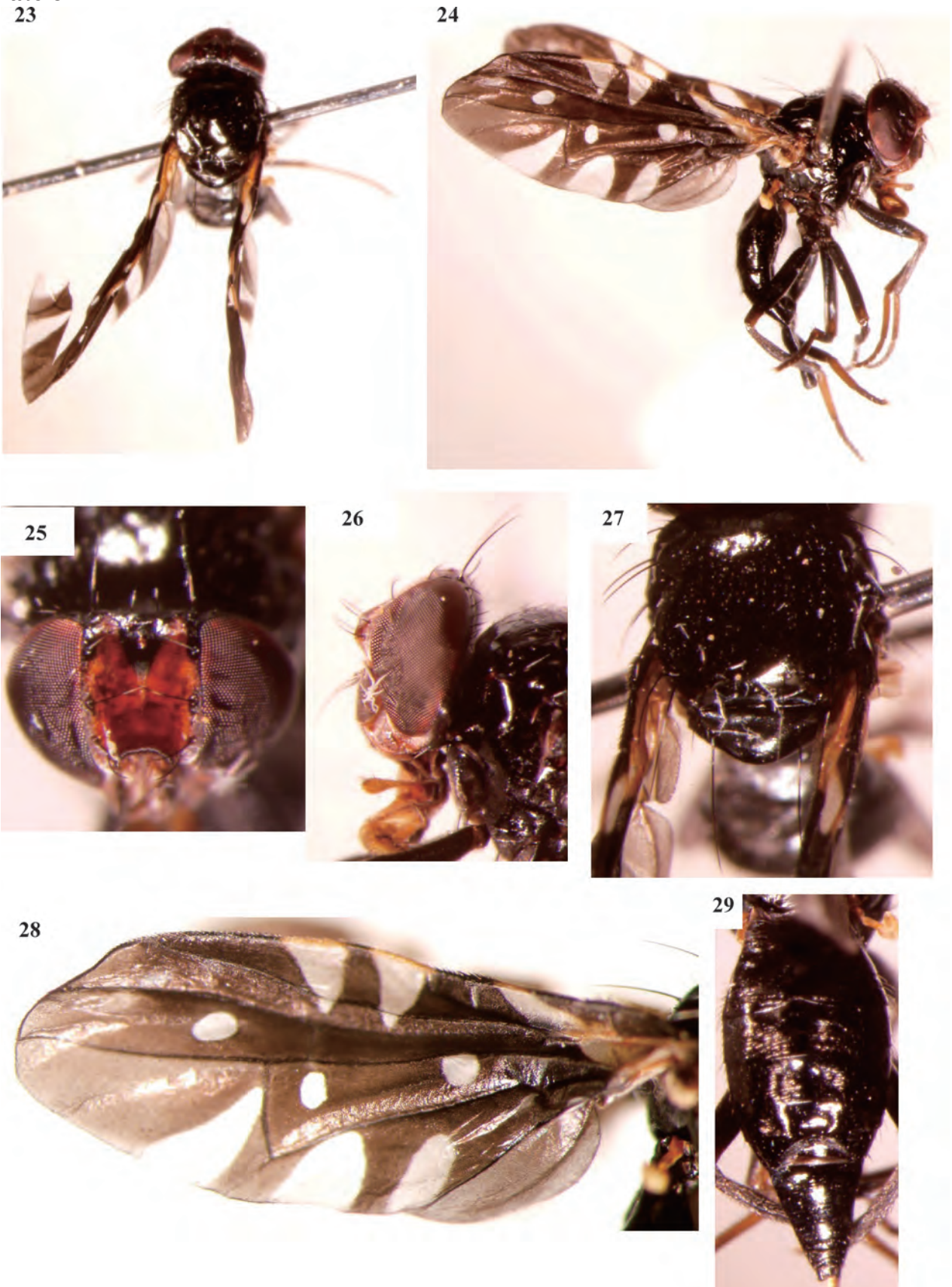


**Figures 9-22.** *Acanthiophilus helianthi* (Rossi)

9-10, Dorsal view, 9, Male, 10, Female. 11, Female in left lateral view. 12, Head of female in dorsal view. 13, Head of female in left lateral view. 14, Thorax of male in dorsal view. 15, Right wing of male (a). 16, Right wing of male (b). 17, Right wing of female. 18, Abdomen of female in dorsal view. 19, Last-instar larva immediately before pupation. 20, Puparium. 21, Left anterior spiracle of puparium. 22, Posterior spiracles of puparium.



# Plate 3

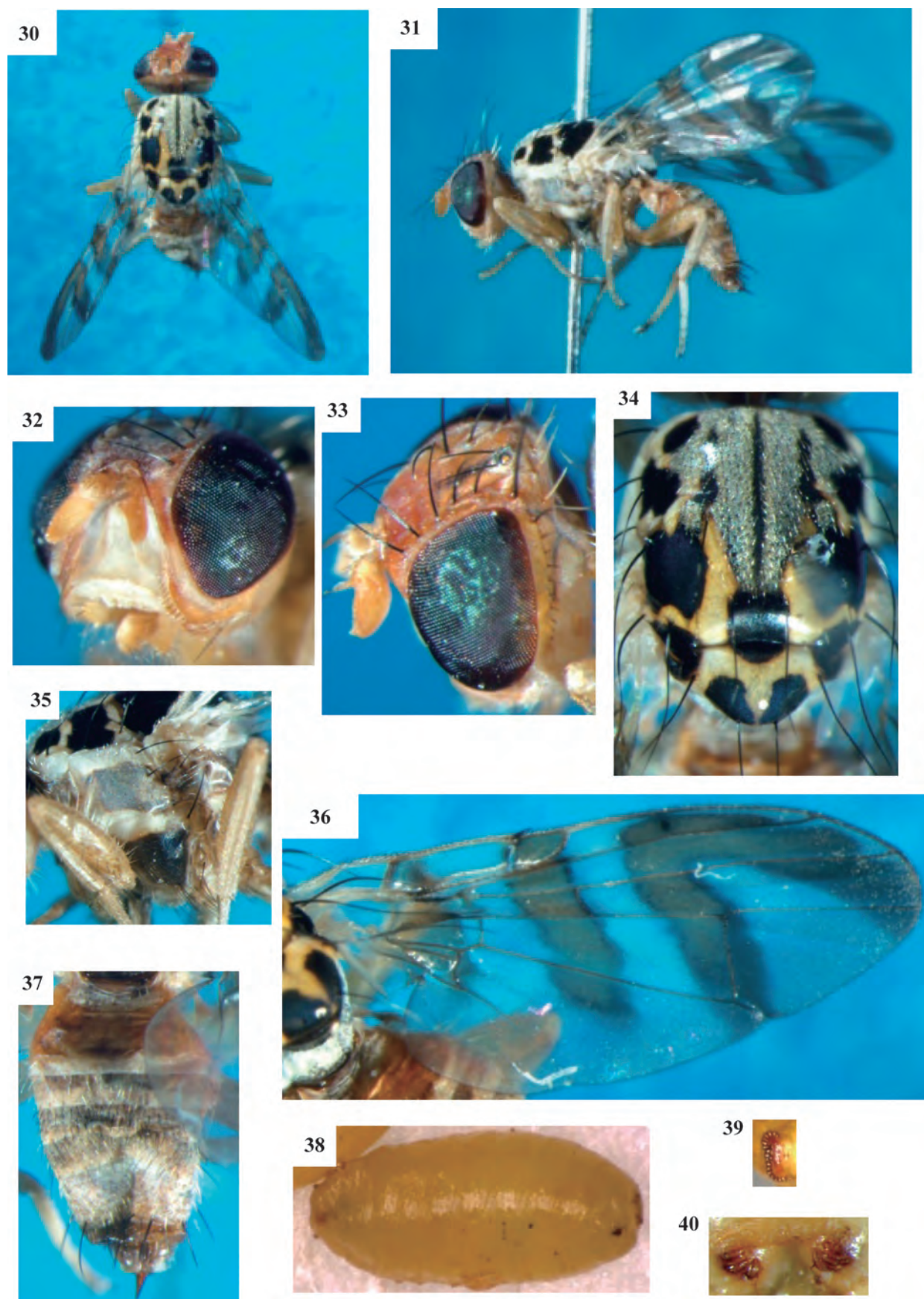


**Figures 23–29.** *Oxyaciura tibialis* (Robineau-Desvoidy), female.

23, Dorsal view. 24, Right lateral view. 25, Head in dorsal view. 26, Head in left lateral view. 27, Thorax in dorsal view. 28, Right wing (reverse side). 29, Abdomen in dorsal view.



## Plate 4

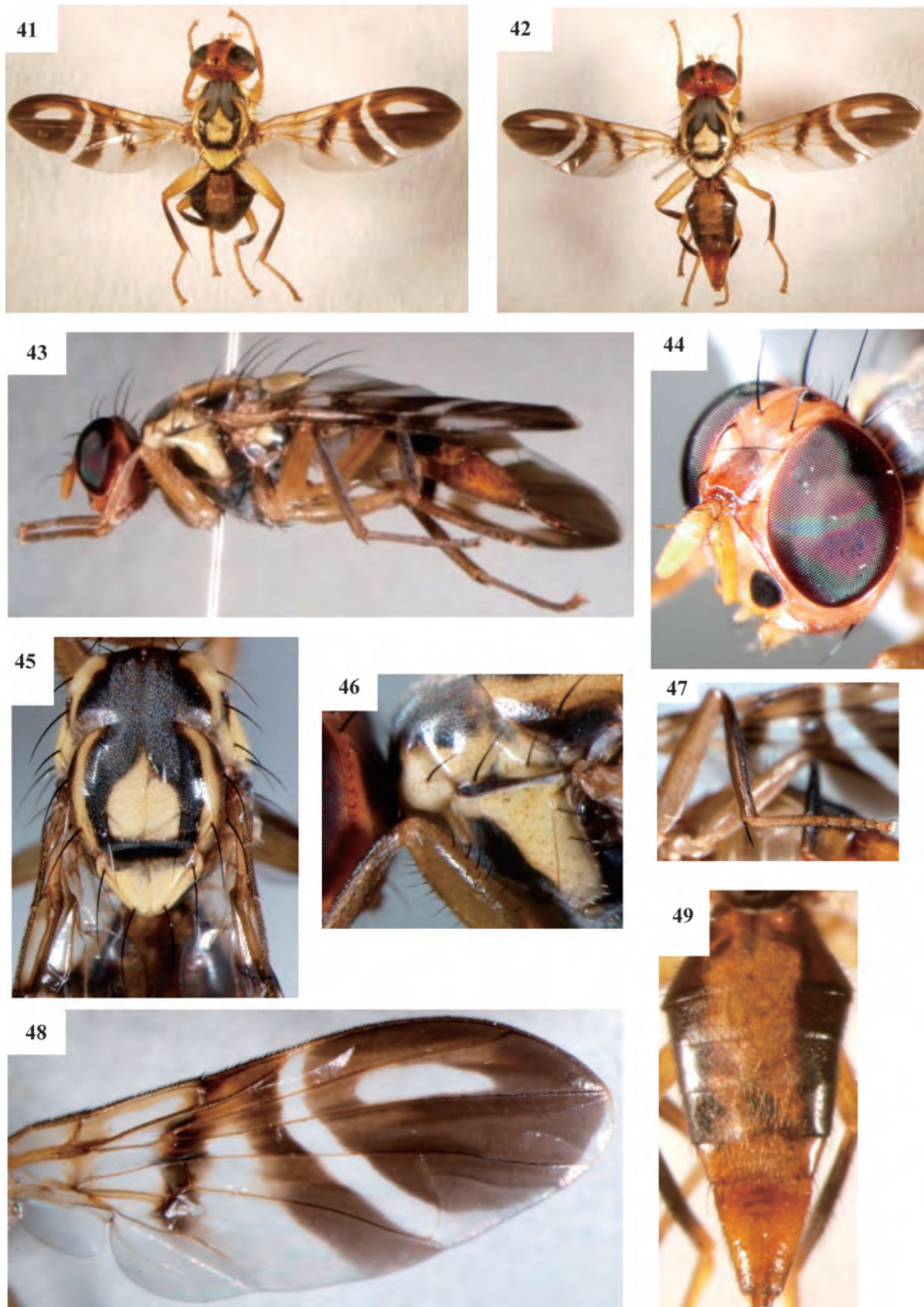


**Figures 30–40.** *Carpomya schineri* (Loew), female.

30, Dorsal view. 31, Left lateral view. 32, Head in frontal view. 33, Head in left lateral view. 34, Thorax in dorsal view. 35, Thorax in left lateral view. 36, Right wing. 37, Abdomen in dorsal view. 38, Puparium. 39, Left anterior spiracle of puparium. 40, Posterior spiracles of puparium.



## Plate 5



**Figures 41-49.** *Euphranta signatificacies* Hardy

41-42, Dorsal view, 41, Male. 42, Female. 43, Female in left lateral view. 44, Head of female in left lateral view. 45, Thorax of female in dorsal view. 46, Thorax of female in left lateral view. 47, Left mid leg of female. 48, Right wing of female. 49, Abdomen of female in dorsal view.