

## Bamboo-shoot fruit flies (Diptera : Tephritidae) of southern Thailand

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### Abstract

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**Bamboo-shoot fruit flies (Diptera : Tephritidae) of southern Thailand**

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In 1995, seven tephritid species of bamboo-shoot fruit flies were firstly recorded from southern Thailand. Nine additional species are reported in this paper. They are *Acanthonevra vaga* (Wiedemann), *Acroceratitis plumosa* Hendel, *Acrotaeniostola quinaria* (Coquillett), *Enicoptera gigantea* Enderlein, *Euphranta* (*Euphranta*) *striatella* (van der Wulp), *Felderimyia fuscipennis* Hendel, *Gastrozona fasciventris* (Macquart), *Ptilona confinis* (Walker) and *Taeniostola vittigera* Bezzi. Total number of bamboo-shoot breeding flies species has increased up to 16. They are recognized in 4 tribes of 2 subfamilies, Ceratitidinae and Trypetinae. Of these, *Phaeospilodes torquata* (Hering) is placed as a synonym of *Phaeospilodes fenestella* (Coquillett) and *Taeniostola limbata* Hendel as that of *Cyrtostola limbata* (Hendel).

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**Key words :** Tephritidae, bamboo-shoot fruit flies, southern Thailand, taxonomy

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Bamboos (Gramineae : Bamboosoideae) are one of the common tropical plants and widely abundant through the tropical zones of Chile, Argentina, Puerto-Rico and Australia (Detwinit, 1993). They have a wide range of natural abundance through low elevation of Thailand's tropical rain-forests, and are an important resource in this country, with an ever increasing need for sustainable natural stands and commercial plantations. Forty-seven genera, 1,250 species, have been recorded worldwide. Of these, 13 genera, and 60 species, have been surveyed in Thailand. (Anantachote, 1991, Detwinit, 1993). It was expected that some 35 species would be discovered in southernmost 4 provinces which is close to the border of Malaysia (Watcharapuk, 1980). Furthermore, some bamboo species are important resources for local communities, such as for food (from shoots), ornamental plants or use in some traditional ways of life. These increasing needs influence expansion of commercial bamboo plantations. This has highlighted the importance of tephritid fruit flies as pest of these crops rather than the ordinary coccids and bamboo weevils which have formerly occupied the territories. (Chunram, 1993)

Permkam (1995) recorded 7 tephritid fruit flies species utilising shoots of varieties of bamboos from Thailand southern peninsula. They were recognized in 2 subfamilies, Ceratitinae (later becomes Ceratitidinae) and Trypetinae. Hancock and Drew (1999) produced a revision the group of Gastrozoninid flies in Asia. Eighty six species placed under 17 genera were reported. Some has been recorded from Thailand but excluded the southern region. I propose all promising species to fill up the current data of this particular group to complete academic references. Of these, *Phaeospilodes torquata* (Hering) is placed as a synonym of *P. fenestella* (Coquillett) and *Taeniostola limbata* Hendel as that of *Cyrtostola limbata* (Hendel) by followed Hancock and Drew (1999).

Permkam (1995) reported 2 subfamilies of Tephritidae containing species that associated with bamboo shoots. In the Trypetinae, species of

*Acanthonevra* Macquart, *A. dunlopi* and *A. vaga*, cause damage on decaying shoots whilst several other genera of Acanthonevrini attack to the stems. Primary damage to developing bamboo shoots is caused by many species of Ceratitinae (later becomes Ceratitidinae; Hancock and Drew, 1999), all referable to the tribe Gastrozonini.

Hosts of the tephritid group are the shoots of various species of bamboo. Many species of the flies are attracted to sliced bamboo shoots exposed in the field. In some cases only females appear to be attracted by their odour.

### Materials and Methods

Individual of 9 species were initially collected as day-flying adults in bamboo bushes without definite host association and localities of Thailand southern peninsula. Further specimens were later reared from larvae infesting shoots of various species of bamboo. Each specimen of the collected bamboo shoots was kept separately in plastic containers based with saw dust and placed in insect cages. Full details were accurately recorded on labels. The cages were held under laboratory conditions at approximately 28°C and 60% RH. As soon as the adults emerged, sugar cubes, water and brewer yeast were provided. The adults were allowed to develop their pigments for 3 consecutive days and then they were killed. Host information was recorded. Pinned adults were used in descriptive taxonomy.

Examinations of genitalia were undertaken by removing the whole or part of the abdomen from about segment IV or whole part of the abdomen in males and in females. The removed parts were soaked overnight in 10% solution of potassium hydroxide (KOH) or until the internal tissues had been softened sufficiently to be teased out. The preparations were then washed in distilled water and were mounted in mounting agent, canada balsam, as permanent slides. Labelling was done for reference of the associated specimens.

Photographs of the reported specimens were taken with a fixed camera on a stereo microscope. Measurement of body length and width of wing



Figure 1. *Acanthonevra vaga* (Wiedemann) ♀  
scale bar = 1 mm.



Figure 2. *Acroceratitis plumosa* Hendel ♀  
scale bar = 1 mm.



Figure 3. *Acrotaeniostola quinaria* (Coquillett) ♂  
scale bar = 1 mm.



Figure 4. *Enicoptera gigantea* Enderlein ♀  
scale bar = 1 mm.



Figure 5. *Euphranta (Euphranta) striatella* van der Wulp ♂  
scale bar = 1 mm.



Figure 6. *Felderimyia fuscipennis* Hendel ♂  
scale bar = 1 mm.

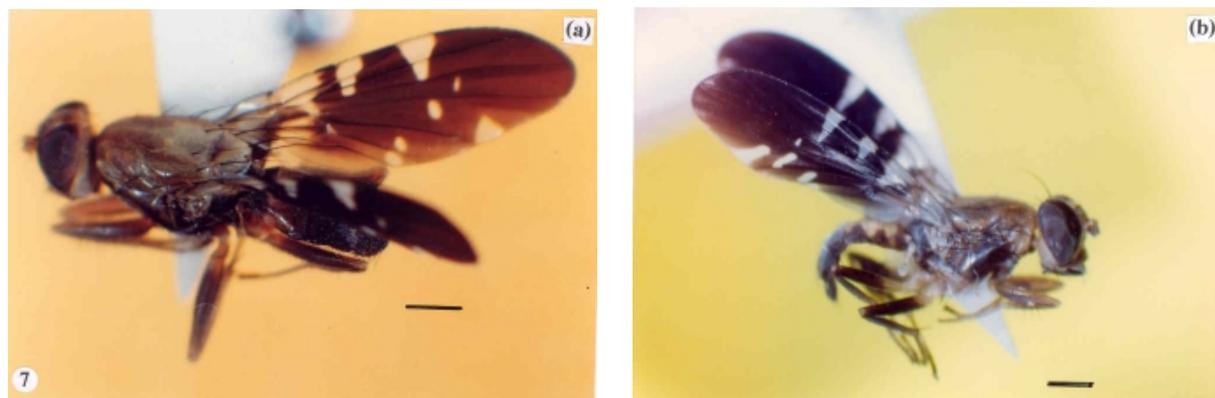


Figure 7. *Ptilona confinis* (Walker) ♂ (a) ♀ (b) scale bar = 1 mm.



Figure 8. *Gastrozona fasciventris* (Macquart) ♀ scale bar = 1 mm.



Figure 9. *Taeniostola vittigera* Bezzi ♂ scale bar = 1 mm.

expanded was done with eyepiece graticules. For each species, the measurements were made from 10 males and 10 females, or from all those available if less than 10. What appeared to be the largest and smallest of both sexes were selected in order to calculate maximum size ranges. Body length was measured from the face to the apex of abdomen. Some measurements were approximate owing to curled under and sunken abdomens and heads at obscure angles. In addition, length of wings was measured between apex of wings when they were fully expanded at the right position.

Abbreviations used in this paper are presented as follows;

- ASB Institute of Zoology, Academia Sinica, Beijing, China
- ASS Institute of Entomology, Academia Sinica, Shanghai, China
- BMNH The Natural History Museum, London, UK
- DEI Institut für Pflanzenschutzforschung (formerly Deutsches Entomologisches Institut), Kleinmachow, Eberswalde, Germany
- MNHN Museum National d'Histoire Naturelle, Paris, France

NHMV	Naturhistorisches Museum, Vienna, Austria
PSU	Prince of Songkla University, Hat Yai, Thailand
TMB	Termesztudományi Museum, Budapest, Hungary
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
ZIW	Zoological Institute, Warsaw, Poland
ZMHB	Museum für Naturkunde der Humboldt-Universität, Berlin, Germany
ZMUA	Zoologisch Museum, Universiteit van Amsterdam, Netherlands
ZSIC	Zoological Survey of India, Calcutta, India

### Systematics

#### Family Tephritidae

#### Subfamily Acanthonevrinae

#### Tribe Acanthonevrini

#### *Acanthonevra vaga* (Wiedemann) (Figure 1)

*Trypeta vaga* Wiedemann, 1830, Auss. Zweift. 2: 40. Type-locality: Bengal India.

*Rioxa vaga* Bezzi, 1913, Mem. Ind. Mus. 3: 112.

*Trypeta mutyca* Walker, 1849, List Spec. Dept. Ins. Coll. Brit. Mus. 4: 1036.

#### Material examined

Thailand: 7 ♂♂, 4 ♀♀ km 23 S. Than To District, Yala, 23.x.1996. S. Permkam; 4 ♀♀, Hot spring area 1 km. from Petcha Kasem HW., Ranong, 12.ix.1996. S. Permkam; 3 ♂♂, 3 ♀♀ Bang Khan, Nakhon Si Thammarat, 4.i. 1996. S. Permkam.

#### Distribution

Previously recorded: Thailand, northern and central regions

Newly recorded: Thailand, southern Thailand (Figure 10a); Ranong, Nakhon Si Thammarat and Yala

#### Description

A predominantly yellow species, without

vittae on the mesonotum. ♀ **head** rufous, with face gently concave. All head bristles black. One pair of inferior orbitals located at about middle of the front. Ocellars rudimentary. Antennae yellow with 3<sup>rd</sup> segment apically rounded. Arista long plumose, the longest rays are greater in length than the width of 3<sup>rd</sup> antennal segment. **Thorax** and legs entirely yellow. All thoracic bristles well developed and black; 2 scupulars, 2 humerals, 2 notopleurals, 2 anterior supra-alars, 2 posterior supra-alars, 2 mesopleurals, 2 pteropleurals and 6 scutellars, with middle pair is the smallest. One mid tibial apical spur. **Wing** predominantly brown decorated with hyaline markings as in the Figure 1. Crossvein r-m approximately situated at apical 2/3 of cell 1<sup>st</sup>M<sub>2</sub>. R<sub>2+3</sub> slightly concave. M<sub>3+4</sub> and basal portion of cell Cu1 not covered with vein setulose. Apical portion of cell Cu with a short extension, approximately 4/5 as long as CuA+1A. **Abdomen** with first 2 segments entirely yellow. Segments III and IV decorated with black marking on both sides. Segments VI short and dark brown. Oviscape also dark brown and equal in length to segments V and VI combined. Aculeus apically sharp with 4 minute pairs of sensory hairs. Three round shaped spermathecae with bulbous neck swollen at middle.

Male as described for the female except abdominal tergite V black. Epandrium and anal plate rather elongate. Ejaculatory apodeme slender, narrow, scarcely expanded distally.

Length of body : 6.5-6.6 mm.

Length of wing : 6.5-6.6 mm.

#### Remarks

Specimens were bred from the shoots of *Bambusa blumeana*. Adults were captured from broken shoots of the stripped trunk bamboo (under identified species).

#### *Acroceratitis plumosa* Hendel (Figure 2)

*Acroceratitis phumosa* Hendel, 1913, Suppl. Ent. 2:82. Type locality : Kankau, Taiwan. Holotype ♀ in DEI [not examined]: Hardy, 1973: 231.

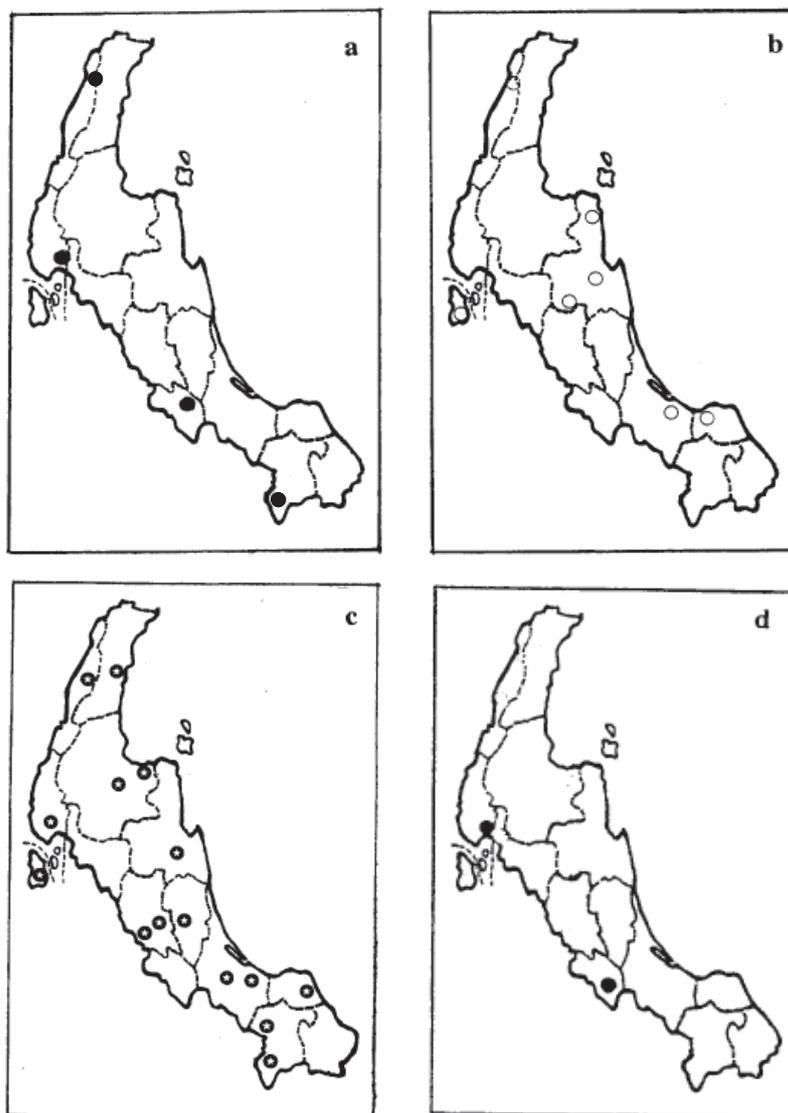


Figure 10. Distribution maps of fruit flies species in southern Thailand; a) *Acanthonevra vaga* (●), b) *Acroceratitis plumosa* (○), c) *Acrotaeniostola quinaria* (⊛), d) *Enicoptera gigantea* (●)

*Chelyophora plumosa* (Hendel); Chen, 1948: 92.

**Material examined**

Thailand: 10 ♂♂, 21 ♀♀ from same locality: Bamboo Garden, Phuket, 13.i.1996. S. Permkam; 18 ♂♂, 9 ♀♀ Wipawadee Waterfall, Surat Thani, 16.ix.1996. S. Permkam; 3 ♂♂, 4 ♀♀ Sawee dis-

trict, Chumphon, 17.ix.1996. S. Permkam; 4 ♂♂, 6 ♀♀ Bang Khan, Nakhon Si Thammarat, 4.i.1996. S. Permkam.

**Distribution**

Previously recorded: Vietnam, Taiwan and China (Zhejiang Province)

Newly recorded: southern Thailand (Figure

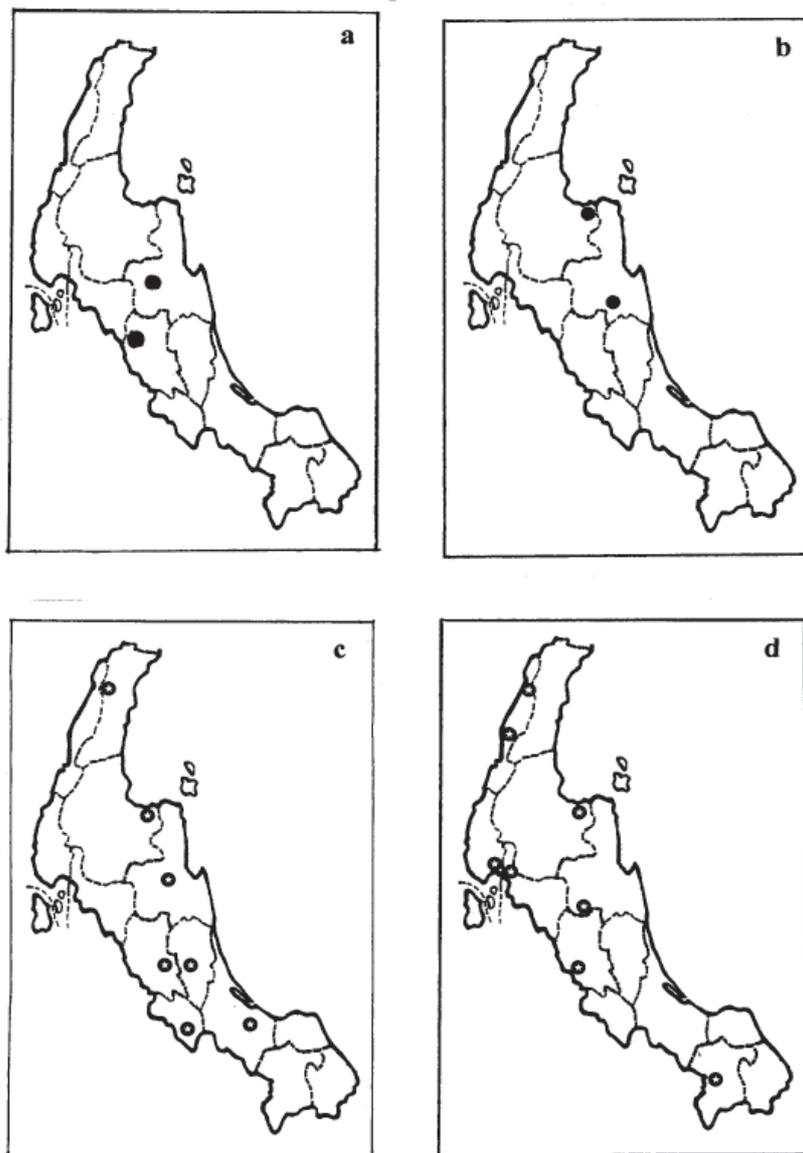


Figure 11. Distribution maps of fruit flies species in southern Thailand; a) *Euphranta (Euphranta) striatella* (●), b) *Felderimyia fuscipennis* (●), c) *Gastrozona fasciventris* (⊕), d) *Ptilona confinis* (⊕)

10b); Chumphon, Surat Thani, Phuket and Nakhon Si Thammarat

**Description**

Similar to *Acroceratitis tomentosa* in general appearance which have already been published (Permkam, 1995). ♀ **Head** fulvous and pale. Front

gently sloping with pale pubescent. Head bristles black, 3 pairs inferior orbitals, 2 strong superior orbitals. Ocellars well developed, equal in size to lower pair of superior orbitals. Third antennal segment slender, apicodorsally sharp with long plumose arista. Face vertical and the occiput slightly swollen. **Thorax** with mesonotum pre-



Figure 12. Distribution of *Taeniostola vittigera* (●) in southern Thailand.

dominantly shining black, covered with densely gray to yellow-gray pubescent. Two longitudinal submedian vittae of gray pollinosy overlying from extreme anterior margin to the level of notopleurals. Two longitudinal yellow stripes fused together posteriorly presenting on the posterior extremity. Yellow markings also present in areas just before posterior supra-alars and in areas of the mesonotal sutures. The postero-lateral margins of the mesonotum broadly shining black and this marking extends onto the extreme bases of scutellum. The scutellum distinctly inflated, yellow with 3 black apical spots, 1 at middle and the other 2 presenting on each side at base of outer scutellar bristles. Mesopleura brownish yellow with a broad creamy-white mark extending most of mesopleuron onto notopleuron. The upper 2/3 of metapleuron and pterotergon white. Post scutellum and metanotum polished black. Bristles well developed and black; 4 scapulars, 2 humerals, 2 presuturals, 2 notopleurals, 2 anterior supra-alars, 2 posterior supra-alars, 2 dorsocentrals, 2 mesopleurals, 2 pteropleurals, 2 sterno-pleurals, 2 prescutellars and 4 scutellars. Dorsocentrals placed at the same level

of anterior supra-alars. **Legs** predominantly yellow tinged with brown over median portions of middle and hind femora. One strong, black, apical spur on middle tibia. **Wings** with bands mostly brown, costal band interrupted well beyond apex of cell sc by a transverse hyaline band, band across dm-cu crossvein and subapical band both connected to costal band, r-m crossvein placed beyond apex of cell sc. Scutum grayish with variable black areas and post suture and prescutellar yellow vittae, united as a broad band along hind border. Abdomen yellowish cream with paired basal black patches submedially on terga III-V. Oviscape reddish-brown, black apically and as equal in length to terga III-V combined. Apex of aculeus sharp. Two spermathecae presented.

Male as those of female except 5 abdominal segments. All segments yellowish tinged with dark brown. Epandrium dark brown. Surstylus rather narrow and pointed posteriorly. Anal plate developed in round shape, covered with black, minute, hairs.

Length of body : 4.4-4.6 mm.

Length of wings : 4.3-4.6 mm.

**Remarks**

This species is commonly found at trunks and shoots of *Bambusa blumeana*

***Acrotaeniostola quinaria* (Coquillett) (Figure 3)**

*Trypeta quinaria* Coquillett, 1910: 308.

Type locality: Hong Kong, Syntype ♂♀ in USNM [not examined]

*Spilographa quadrifasciata* Enderlein, 1911, Zool. Jahrb. (Syst.) 31: 436. Type locality: Soekaranda, Sumatra. Holotype ♀ in ZIW. [not examined]; syn. nor.

*Acrotaeniostola quinaria* (Coquillett); Chen, 1984: 72.

*Acrotaeniostola rubra* Chen, 1948, Sinensia 18: 95. Type locality : Hoa-Binh, Tonkin. Vietnam. Holotype ♂ in ASS [not examined] (Hardy, 1973: 171, as syn. of *A. quadrifasciata*).

*Acrotaeniostola quadrifasciata* (Enderlein) Hardy, 1973: 171.

**Material examined**

Thailand: 75 ♂♂, 88 ♀♀ from same locality, Bamboo Garden, 22.5 km SW PSU (Hat Yai campus), Songkhla. 12.ii.1996. S. Permkam; 45 ♂♂, 30 ♀♀ from same locality, Bamboo Garden, Phuket. 3.i.1996. S. Permkam.

**Distribution**

Previously recorded: Indonesia (Sumatra), Vietnam, China (Guangdong-Province), Hong Kong, Malaysia (Sabah), Thailand and Laos

Thailand: Previously recorded : central and northern regions

Newly recorded: southern Thailand (Figure 10c); Phuket and Songkhla

**Description**

Predominantly yellow to rufous species. ♂  
**Head** is yellow, decorated with 2 pairs superior orbitals and 3 pairs of inferior orbitals. Ocellars comparatively strong, as equal in size to that of the lower pair of superior orbitals. Antennae placed at middle of head height. Third antennal segment sharp point apically. The arista short plumose with the longest rays scarcely over 1/2 the width of the

3<sup>rd</sup> segment. Thorax entirely yellow to orange. Post pronotal lobe yellow, anepisternum fuscous, without a yellow band. Scutellum yellow. Metanotum yellow tinged with redish brown on both sides. **Legs** yellow with 1 black, apical spur of middle tibia. **Wings** hyaline with 5 transverse brown bands, that from base of wing to humeral vein, from base of cell sc ending at cell cup, a complete band over r-m crossvein, a complete band over dm-cu crossvein, a complete subapical band leaving wing apex hyaline. The r-m crossvein placed at about middle of cell 1<sup>st</sup> M<sub>2</sub>. **Abdomen** throughly dark brown. Epandrium slender, long, each terminates in a prominent spine at apex. Surstylus long and pointed posteriorly.

Female is similar to those of the male except abdominal tergite VI as equal in length to V. Oviscape as long as the combination of segments V and VI. Aculeus short and blunt apically. Two, brown, spherical shaped spermathecae.

Length of body : 6.0 mm.

Length of wings : 6.0 mm.

**Remarks**

This species is commonly found in bamboo, especially in *Bambusa vulgaris*, *B. blumeana*, *B. suberceta* and *Dendrocalamus latiforus*.

***Enicoptera gigantea* Enderlein (Figure 4)**

*Enicoptera gigantea* Enderlein, 1911: 413.

Type locality: Soekaranda, Sumatra. Lectotype ♂ in ZIW [not examined]. (designated by Hardy, 1969: 480).

**Material examined**

Thailand: 5 ♂♂, 6 ♀♀ from same locality; Thap Put Village 1 km S. of Thab Put District, Phangnga. 9.i.1996. S. Permkam; 3 ♂♂, 4 ♀♀ same details as above, 26.ix.1996. S. Permkam; 1 ♀, Forest Conservation Authority, Khuan Don District, Satun, 16.x.1996. S. Permkam.

**Distribution**

Previously recorded: Indonesia (Sumatra) and Peninsular Malaysia

Newly recorded: southern Thailand (Figure

10d); Phangnga and Satun

### Description

A large size species with orbital and inferior orbitals respectively. Third antennal segment comparatively long, almost equal in length to the face, and rounded apically. Arista slightly long plumose. **Thorax** rufous in ground colour. Scutum with dorsolateral and median black vittae, the later broadly expanded posteriorly and isolated. Scutellum inflated with apical black spot short and broad, extending beyond apical scutellar bristles laterally. Anatergite and ketatergite all yellow. **Legs** entirely yellow. Middle leg with 1 strong, black, tibial spur. **Wings** predominantly hyaline tinged with brownish costal band. Distal and anal portions of wing blade also faintly with brownish colouration. Cell sc comparatively long, almost equal in length to cell 1<sup>st</sup> M<sub>2</sub>. Vein R<sub>2+3</sub> branched apically. R<sub>4+5</sub> decorated with setulae through its length. M<sub>1+2</sub> gently curved. Crossvein r-m situated at cell 1<sup>st</sup> M<sub>2</sub> extremity. **Abdomen** with submedial black vittae extended to lateral margin and connected across tergum II. Oviscape black, as long as terga III-VI combined.

Male as described in female except abdomen narrow long, parallel sided. Abdominal terga I+II yellow marked with dark brown triangular shape posteriorly. Terga III-V entirely dark brown.

Male and female genitalia has not been dissected for study.

Length of body : 1.4-1.7 mm.

Length of wings : 1.3-1.8 mm.

### Remarks

Adult flies were collected from the stripped trunk bamboo (under identified species), presumably *Giantochloa scortechinii*, in southern Thailand.

### *Euphranta (Euphranta) striatella* (van der Wulp) (Figure 5)

*Lagarosia striatella* van der Wulp, 1891. Tijdschr. Ent. 34: 213. Type locality: Java, Indonesia. Define ♀ in ZMA.

*Euphranta nigra* Enderlein, 1911. Zool.

Jahrb. (Syst.) 31: 439. Type locality: Sumatra, Indonesia. Define ♂ in ZMA.

### Material examined

Thailand: 2 ♂♂, 3 ♀♀, Hot spring buddhist temple, Bang Khan District, Nakhon Si Thammarat, 13.ix.1996. S. Permkam. 1 ♂, Horticulture Research Station, Sikao District, Trang. 26.ix.1996. S. Permkam.

### Distribution

Previously recorded: India Philippines and Indonesia and expected to be in Thailand (Hardy, 1973)

Newly recorded: southern Thailand (Figure 11a); Nakhon Si Thammarat and Trang

### Description

A predominantly black fruit fly species. ♂ **head** with width wider than thorax. Compound eyes redish brown. Face and mouth parts entirely black. Antennae situated at upper 2/3 of the height. Third antennal segment fuscous and round at apex. Arista beared with long plumose. Three strong pairs of inferior orbitals and 1 pair superior orbitals presented on the dark brown front. **Thorax** black with a faint tinge of rufous, densely gray pubescent, covered with short yellow-brown setulae over dorsum and longer yellow setulae on sides. Dorsocentrals situated slightly in front of the inner post alars. Scutellum dark brown to black on dorsum, yellowish on margin, gray pubescent and with numerous brown setulae over dorsal surface. Postscutellum and metanotum entirely black. **Legs** predominantly black, tinged with rufous on basal and distal portions. One strong, black, apical spur on middle tibia. **Wings** narrow long and hyaline with an unusual black markings; the large pre-apical brown spot covering r-m and m crossveins and a cross band extending from base of cell 1<sup>st</sup> M<sub>2</sub> to cell sc and further extending as a narrow costal band running across apical portion and expanding at distal portion of vein M<sub>1+2</sub>. Crossvein r-m situated at apical 3/4 of cell 1<sup>st</sup> M<sub>2</sub>. **Abdomen** entirely subshining black, rather elongate, 5<sup>th</sup> sternum slightly longer than wide, with a V-shaped con-

cavity in middle of hind margin. Surstylus long, slender, beared with a few setulae. Anal lobe decorated with setulae ventrally.

Female as those of the male except VI tergum comparatively short ca. 1/2 to 3/5 of the V. Oviscape dark brown and slightly longer than tergum V. Piercer very short, 1.5 mm, broad and serrated at tip. Three oblong spermathecae.

Length of body : 8.5-9.4 mm.

Length of wings : 7.0-7.8 mm.

#### Remarks

Adult flies were captured on bamboo trunk (*Dendrocalamus brandisii*).

#### *Felderimyia fuscipennis* Hendel (Figure 6)

*Felderimyia fuscipennis* Hendel. 1915. Ann. Mus. Nat. Hung. 13: 431. Type locality: Ost-Indien. Define in the NHMV.

#### Material examined

Thailand: 3 ♂♂, 2 ♀♀ from same locality: Hot Spring Buddhist Temple, Bang Khan District, Nakhon Si Thammarat, 11.i.1996. S. Permkam; 2 ♂♂, 2 ♀♀ Wipawadee waterfall, beside HW, Don Sak, Surat Thani, 11.ix.1996. S. Permkam; 2 ♂♂, 4 ♀♀, Hot Spring Buddhist Temple, Bang Khan District, Nakhon Si Thammarat, 13.ix.1996. S. Permkam.

#### Distribution

Previously recorded: India, Myanmar, Laos, Thailand

In Thailand; Previously recorded : northern Thailand

Newly recorded : southern Thailand (Figure 11b); Surat Thani and Nakhon Si Thammarat

#### Description

A large sized body and almost black species. ♂ **Head** higher than long with face slightly concave on the upper portion. Front yellow to rufous with 1 pair each of superior and inferior orbitals. Antennae yellow, 3<sup>rd</sup> segment about 1/2 longer than wide and round apically. Arista long plumose. **Thorax** predominantly shining black with a

yellow-white median vitta extending from anterior edge of mesonotum down middle continued to apex of scutellum. Also present a yellow white mark extending along the sides from humerus to base of wing. Mesopleura, propleura, upper portion of sternopleura, metapleura and pleuroterga polished black. Metasternum yellow-brown. Dorsocentrals placed almost in line with posterior supra-alars. Prescutellars and presuturals absent. **Legs** entirely black, except tinged with yellowish on basal part of mid and hind femora. **Wings** narrow long, parallel sided, with almost black colour except a narrow hyaline band on anal portion. Abdomen shining black with sternum V nearly 2x wider than long. Epandrium rectangular shape as seen in profile. Anal lobe pointed posteriorly. Surstylus slender, long.

Female similar to the male except abdominal tergite VI relatively short, ca. 1/3 shorter than V. Oviscape black, as equal in length to terga V-VI combined. Piercer blunt at apex. Three black, round spermathecae, each with a short apical appendage.

Length of body : 10.0 mm.

Length of wings : 11.0 mm.

#### Remarks

Adult flies were collected on bamboo trunks (*Dendrocalamus membranaceus* and *D. strictus*)

#### *Gastrozona fasciventris* (Macquart) (Figure 8)

*Tephritis fasciventris* Macquart, 1843: 382, pl. 13. Type locality : India. Holotype ♂ in MNHN [not examined].

*Tephritis vittata* Macquart, 1851: 263, pl. 21. Type locality : Asia. Holotype ♀ in MNHN [not examined] (syn. Hardy, 1973: 190)

*Gastrozona macquarti* Hendel, 1913: 38. Type locality : Kanshirei, Taiwan. Syntype ♂♀ in DEI [not examined] (syn. Hardy, 1973: 190)

*Gastrozona melanista* Bezzi, 1913: 107. Type locality : 5 miles off Calicut, Malabar coast, India. Holotype ♀ in ZSIC [not examined] (syn. Hardy, 1973: 190)

*Gastrozona fasciventris* (Macquart); Edwards, 1919: 49.

*Gastrozona appendiculata* Zia, 1938: 22.

Type locality : SE Gansu Province, China. Holotype ♂ in ASB [not examined] (syn. Hardy, 1973: 190)

*Gastrozona melanophila* Hering, 1940: 3.

Type locality : Tao Tsui Kutsu, Taiwan. Holotype ♂ in BMNH [examined] (syn. Hardy, 1973: 190)

#### Material examined

Thailand: 2 ♂♂, 3 ♀♀ Klong Nam-Tai-Bo bridge, NaWong, Muang. Phatthalung, 9.i.1996. S. Permkam; 4 ♂♂, 2 ♀♀ Suan Pak junction, Ron Phiboon, Nakhon Si Thammarat, 11.ix.1996. S. Permkam; 1 ♂, 4 ♀♀ Ban Bo Hin Village, Than-To, Yala, 9.x.1996. S. Permkam

#### Distribution

Previously recorded: China (Gansu Province) Taiwan, India, Bangladesh, Myanmar, Thailand, Laos, Vietnam, Peninsular Malaysia and Indonesia (Sumatra)

Newly recorded: In southern Thailand (Figure 11c); Nakhon Si Thammarat, Phatthalung and Yala

#### Description

♂ **Head** much higher than long with ocellars well developed. Third antennal segment approximately 3x longer than wide. Arista long plumose. Two pairs superior orbitals and 3 pairs of inferior orbitals. **Thorax** with scutum fulvous, usually with a black posterior spot and black dorsolateral bands. Postsutural lateral yellow vittae present, connected to a pair of prescutellar dorsocentral yellow vittae. Scutellum brown medially, with a dark apical spot. **Legs** entirely rufous. **Wings** with costal band broad, free from basal dark area. Cell sc brown, hyaline at apex extremity. Subapical band united with basal band. Crossvein r-m situated at apical 2/3 of cell 1<sup>st</sup>M<sub>2</sub>. **Abdomen** almost rufous, except black, transverse, band on each side of terga III.

Female scutellum black decorated with red-brown dorsocentral bands. Scutellum also black medially, yellow spot surrounding the basal pair of the scutellars. Legs rufous tinged with black markings on distal part of mid and hind femora.

Abdomen with black bands on terge III-V. Oviscape as long as terga IV-VI combined. Aculeus elongate, setose, weakly trilobe apically and with distinct preapical steps.

Length of body : 6.5-7.0 mm.

Length of wings : 6.0-6.5 mm.

#### Remarks

This species bred from shoots of *Bambusa vulgaris* var. *vulgaris*, *Dendoclamus asper*, *D. giganteus*, *D. latiflorus*, *Gigantochloa auriculata* and *Thyrostachys siamensis*.

#### *Ptilona confinis* (Walker) (Figure 7)

*Rioxa confinis* Walker, 1857, J. Proc. Linn. Soc. Lond. 1: 132. Type locality: Sarawak, Borneo. Type ♀ in BMNH.

*Themara alboguttata* Doleschall, 1858. Natuurk. Tijdschr. Nederl. India 17: 124. Type locality : Amboina. Type ♂ in the ZMHB.

*Rioxa bimaculata* Walker, 1860. J. Proc. Linn. Soc. Lond. 4: 164. Type locality: Amboina. Type ♂ in BMNH.

*Trypeta basifascia* Walker, 1860. J. Proc. Linn. Soc. Lond. 4: 158. Type locality: Makassar. Type ♀ in BMNH.

*Ptilona brevicornis* van der Wulp, 1880. Tijdschr. Ent. 23: 185. Type locality: Java. Lectotype ♀ in ZMUA.

*Ptilona armatipes* Hering, 1953. Siruna Seva 8: 4. Type locality: Kuatun, Fukien, China. Type ♂ in JKCB.

#### Material examined

Thailand: 8 ♀♀ from same locality, Hot Spring Buddhist temple, Bang Khan, Nakhon Si Thammarat, 11.i.1996. S. Permkam; 4 ♂♂, 5 ♀♀ Wipa wadee Water fall, Don Sak, Surat Thani, 11.ix.1996. S. Permkam; 1 ♂, 6 ♀♀ Suwanakeree Primary State School. Kraburi, Ranong, 12.ix.1996. S. Permkam; 2 ♂♂, 2 ♀♀ Bo Nam Ron Buddhist temple, Bang Khan, Nakhon Si Thammarat 13.ix.1996. S. Permkam; 7 ♂♂, 4 ♀♀ Tup Put, Phangnga 13.ix.1996., S., Permkam.; 1 ♂ Mueng. Krabi 13.ix.1996. S. Permkam; 1 ♂, 1 ♀ Kasang Village, Ban Nang Star, Yala. 9.x.1996.

S. Permkam.

### Distribution

Thailand, Laos and Vietnam in Thailand, Previously recorded: Central, North, East and northeastern regions

Newly recorded: southern region (Figure 11d); Ranong, Surat Thani, Nakhon Si Thammarat, Phangnga and Yala

### Description

♂ **Head** fuscous with black marking on ocellar triangle and higher than long, as seen in profile. One pair each of superior and inferior orbitals. Ocellars rudimentary. Antennae situated at upper 2/5 of head height. Third antennal segment entirely yellow, broadly round at apex, 2x as long as the width. Arista long plumose. **Thorax** fuscous with black markings over pleura and metanotum, mostly covered with gray pubescent on the mesonotum and scutellum. Scutellum entirely yellowish-brown. Metanotum, subscutellum and pleurotergum dark brown, tinged with polished black. Dorsocentrals placed at the line of posterior supra alars. Four scutellar bristles. **Legs** pale yellow, tinged with brown on apices of middle and hind femora. One black apical spur on middle tibia. **Wings** dark brown to black except hyaline at base and anal lobe. Hyaline markings present as follows; an oblong hyaline spot in cell  $R_5$  immediately above m crossvein, another oblong spot near apical portion of cell  $1^{st} M_2$  and a pair of spots in lower median portion of cell  $M_4$  and 2 hyaline wedges at basal portions of cells sc and  $R_1$ . Crossvein r-m situated at apical 2/5 of cell  $1^{st} M_2$ . **Abdomen** predominantly dark brown to black, the  $1^{st}$  tergum tinged with brown, the  $2^{nd}$  largely yellow and the  $3^{rd}$  tergum yellow at base, brown to black over remainder of segment. Terga IV-V entirely black. Fifth sternum narrow, approximately 4x wider than long and slightly concave on hind margin. Epandrium densely covered with black setulae. Surstylus broad, and equal in width to that of the epandrium, and pointed posteriorly. Aedeagal apodeme with a clump of microtrichia at about middle.

Female as those described in male excepts terga VI comparatively short, 1/2 as long as the V. Oviscape black and short, about terga V and VI combined. Piercer short, thick, blunt at apex, approximately equal in length to the oviscape. Three round spermathecae.

Length of body : 6.0-7.0 mm.

Length of wings : 6.0-7.0 mm.

### Remarks

Adults were collected from fresh, broken, bamboo shoots of *Dendrocalamus strictus*, *D. asper*, *D. membranaceus*, *Bambusa vulgaris* and stripped trunk bamboo (under identified species).

### *Taeniostola vittigera* Bezzi (Figure 9)

*Taeniostola rittigera* Bezzi, 1913: 119. Type localities: Assam, Sylhet and Lungleh, India. Syntype: ♂ ♀ in ZSIC.

*Taeniostola connecta* Hendel, 1915: 436. Type locality : Kosempo, Taiwan. Syntype : 2 ♂ ♂ in TMB.

*Taeniostola apicata* Hering, 1938: 250. Type locality: Bidang, Menabai, Borneo (Kalimantan). Holotype : ♀ believed lost, Paratype: ♀ in BMNH.

*Taeniostola plagiata* Hering, 1938: 245, Figure 7. Incorrect original spelling.

### Material examined

Thailand: 2 ♂ ♂, 1 ♀ from same locality, Hat Som Pan Buddhist Temple, Maung District, Ranong. 12.ix.1996. S. Permkam.

### Distribution

Previously recorded; Taiwan, India, Myanmar, Thailand and Malaysia

Newly recorded; southern Thailand (Figure 12); Ranong

### Description

Medium sized flies and predominantly rufous species. ♂ **Head** rufous with black median strip. Two pairs each of superior and inferior orbitals. Third antennal segment yellow, slightly pointed at apico-dorsal portion. Arista long plumose. **Thorax** with scutum and scutellum predominantly fulvous,

decorated with 5 lateral, submedial and medial longitudinal black vittae extending from anterior edges to posterior extremities. The medial vittae further extends to almost the length of scutellum. Metanotum dark brown. Dorsocentral bristles black and situated slightly behind the posterior supra-alars. **Legs** entirely pale yellow with 1 strong apical spur on middle tibia. **Wings** pattern banded, transverse, the band across dm-cu crossvein united along much of its length with subapical band and often with subapical band; with either an isolated brown or hyaline apical spot. Cell sc hyaline apically. Crossvein r-m situated beyond middle of cell 1<sup>st</sup> M<sub>2</sub>. Abdomen fulvous with transverse black bands anteriorly on terga II-IV, broadly black laterally or anterolaterally on terga V-VI. Tergum II not elongate. Tergum V shorter than terga III and V combined.

Female as the male except tergite VI comparatively short, ca. 1/2 shorter than tergite V and decorated with a row of setae posteriorly. Oviscape black, as long as terga V-VI combined.

Male and female genitalia have not been dissected for details.

Length of body : 4.0 mm.

Length of wings : 4.0 mm.

#### Remarks

The adults were captured on trunk of *Dendrocalamus asper*.

#### Discussion

In 1995, I reported a single species, *Acroceratitis tomentosa*, under the tribe Ceratitini of the subfamily Ceratitinae. Hancock and Drew (1999) revised the tribe and treated to the Gastrozonini. This tribe is characterized by the sinuous shape of the apical extension to cell cup, presence of a full (or almost full) complement of thoracic bristles and only two spermathecae in the female. The number of the tribe is also based primarily on the biological characters, particularly larvae that develop in the shoots of bamboo or other grasses (Gramineae). The following 9 species, 5 newly recorded, from southern peninsula

of Thailand are currently placed under the Gastrozonini; *A. plumosa*, *A. tomentosa*, *A. quinarina*, *E. gigantea*, *G. fasciventris*, *G. sorrow*, *P. torguata*, *T. limbata* and *T. vittigera*.

One species, *A. vaga*, is added to the Acanthonevrini, which is placed under the subfamily Trypetinae. This is based on ocellar bristles rudimentary, the apical extension to the cell cup rather short and three spermathecae presented in the female (Hardy, 1973). Four species are newly recorded from this part of Thailand. The subfamily Euphrantinae has never been reported as having association with bamboos. The known hosts are varied, i.e. *Ipomoea abrupta* (Convolvulaceae) utilised by *E. (E.) flavina* (Permkam and Hancock, 1995), *Avicennia officinalis* (Avicenniaceae) by *E. (E.) signatifacies* (Permkam, 1995) *Linociera ramiflora* (Olceaceae) bred by *E. (R.) linocierae* (Permkam and Hancock, 1995) and *Cananga odorata* (Annonaceae) by *E. (R.) canangae* (Hardy, 1983). The subfamily characteristics comprise metathoracic postcoxal bridge membranous, pleuroterga densely covered with fine long hairs, 4 seatellar bristles and ocellar bristles rudimentary or absent.

*A. plumosa*, *P. torguata* and *A. quinarina* are widespread in this region. Conversely *E. gigantea* is extremely rare. The presence of the species is related to Hancock and Drew (1999) reporting the species has undergone great radiation within the Philippines and to a lesser extent in Borneo and Indonesia, with only a single species reaching Peninsular Malaysia and extreme southern Thailand.

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