

## THE FRUIT FLIES (Tephritidae - Diptera) OF THAILAND AND BORDERING COUNTRIES<sup>1,2</sup>

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*Abstract.* This study treats 211 species, about 1/2 described as new, and brings up to date our knowledge of these flies for Thailand, Cambodia, Laos, Vietnam, Malaya, and Tenasserim, Lower Burma. The species are arranged in 4 subfamilies, 13 tribes, 69 genera (13 are new), and 7 subgenera.

The family Tephritidae has been almost totally neglected in Thailand. Previous to this study only 9 species have been recorded from this country (Cantelo 1965, Munro 1935b: 17). Two of these are synonyms, 2 are misidentifications, and of the 5 valid species, 3 are now placed in different combinations. This study is based upon the examination of all available specimens from this region and brings together the information on these flies from Thailand, Cambodia, Laos, Vietnam, Malaya, and Tenasserim, Lower Burma (for information concerning the fauna of Upper Burma, refer to Hering 1938 and 1941e).

This is a very rich fauna — the study treats 211 species; about 1/2 are described as new. The species are arranged in 4 subfamilies, 13 tribes, 69 genera (13 are new), and 7 subgenera. The study fills a large gap in our knowledge of the fauna of the Oriental Region. Various elements of the fauna show affinities with flies from India, China, Malaysia, and Indonesia and this region is the key to solving of problems concerning phylogenies in many genera and species groups.

As background for this study the types of most (at least 90%) of the fruit flies of the Oriental Region have been examined. These are widely scattered in Museums throughout Europe and the U.S. National Museum. All of the available collections from this region have been studied and I am indebted to the following personnel for their kind cooperation and assistance in this study: H. Schumann, Zoologisches Museum der Humboldt Universität zu Berlin; G. Morge, Deutsches Entomologisches Institut, Eberswalde; J. Nast, Polish Academy of Sciences, Institute of Zoology, Warsaw; W. Hackmann, Zoological Museum, Helsinki; P. I. Persson and L. Brundin, Naturhistoriska Riksmuseet, Stockholm; L. Lyneborg, Universitetets Zoologiske Museum, Copenhagen; W. Ellis, Zoologisch Museum der Universiteit, Amsterdam; P. J. van Helsdingen, Rijksmuseum van Natuurlijke Historie, Leiden; A. Kaltenbach, Naturhistorisches Museum, Vienna; L. Matile, Museum National d'Histoire Naturelle, Paris; H. Oldroyd, P. Freeman, B. H. Cogan, A. C. Pont, and K. G. V. Smith, British Museum (Natural History); R. W. Crosskey, Commonwealth Institute of Entomology, London; C. Conci and C. Leonardi, Museo Civico di Storia Naturale, Milan; A. Stone and G. Steyskal, Systematic Entomology Laboratory, U. S. Department of Agriculture (U. S. National Museum); R. Kawasaki, Yokohama Plant Protection Station, Japan; W. W. Cantelo, formerly U. S. Operations Mission to Thailand; F. G. Nichols and P. Lohavanijaya, Applied Scientific Research Corporation of Thailand; B. Napompeth, Kasetsart University, Bangkok; A. Wattanapongsiri, Thai-

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Most species of fruit flies are highly ornamented, with brightly contrasting color patterns on the bodies and usually elaborate markings on the wings. The wing markings are specific in most cases and sometimes show considerable sexual dimorphism in patterns. It has been demonstrated by Tauber & Toschi (1965), Bush (1966, 1969) and others that these distinctive body and wing patterns serve as visual releasers in courtship and agonistic displays.

We have comparatively little biological data and host information on tephritids of the Oriental Region. These flies are all plant feeders, their larvae infest practically all parts of the plants depending upon the species involved. The large subfamily Dacinae and probably many of the Trypetinae infest almost all kinds of fleshy fruits, including those of solanaceous and cucurbitaceous plants. Many species are of great economic importance and do tremendous damage to commercial fruits and vegetables. Most species of the subfamily Tephritinae and probably many of the Trypetinae breed in the flower-heads of a large group of plants especially Compositae and Labiatae; for the most part the larvae feed in the developing seeds and cause serious losses of viability. Some species of Trypetinae are known to be leaf-miners on Compositae and Umbelliferae and some, such as *Acidoxantha* Hendel, infest buds of large flowers such as *Bombax*, *Hibiscus* and *Bauhinia*. Some Tephritinae and Trypetinae are gall formers on various parts of the plant and some are stem-miners in Compositae and probably other plants. During the course of this study it has been noted that an assortment of genera and species of Trypetinae are miners in the young shoots of bamboo in Thailand and probably throughout the Oriental Region. Also circumstantial evidence suggests that *Rhaibophleps*, new genus may infest stems of grasses in Thailand and surrounding countries. It is hoped that this monograph will stimulate biological research on these flies. These data are critically needed to solve problems concerning generic and tribal concepts in this family.

The higher classifications of the Tephritidae are in a rather chaotic state. The subfamily and tribal concepts are based largely upon those of Bezzi and Hendel as modified by Hering, Munro and Aczél. Some of these are highly controversial and based upon characters which are of questionable value at the subfamily and tribal levels. These problems can only be solved by extensive monographic studies of large geographic areas and bringing together knowledge of these flies from a world standpoint, including host preferences, biological data, external and internal morphologies, and if possible, cytological data.

From the standpoint of the total tephritid fauna my observations are still preliminary. In some of the groups which are obviously Oriental elements, I believe enough information is now available, however, to make some definite conclusions. It is obvious that *Adrama* Walker and related genera do not belong in the subfamily Dacinae. These flies show much closer relationship to *Euphranta* Loew and related genera (Euphrantini) than to *Dacus* Fabricius. The only common character shared with Dacinae is the reduction in head and thoracic bristles, but in Adramini an assortment of different bristle combinations is evident. In general facies *Adrama* and related genera are much more like Euphrantini; the presence of 3 spermathecae in the female appears highly signifi-

cant in linking the relationship of these groups; also the presence of fine erect hairs on the pleuroterga (portion of thorax on each side between metanotum and metapleuron) seems very important. These hairs are characteristic of Euphrantini and are present on most of the genera which seem related to *Adrama*. For the present I feel it best to treat *Adrama* and related genera, and *Euphranta* and related genera as distinct tribes under Trypetinae. The latter group needs to be studied thoroughly over its entire range. Of the Adramini I have had opportunities to study only the Oriental genera but the ones which have been examined to date, with exception of *Ichneumonopsis*, new genus, have 3 spermathecae in the female.

I also prefer to treat Tephrellini under Tephritinae, and Aciurini as a tribe under Trypetinae. I see no justifications for retaining Aciurinae as a subfamily. I also prefer to treat Euribiini as a Tribe under Trypetinae rather than as a distinct subfamily. I do not see that the development of the apex of the cubital cell is of subfamily importance.

In treating the Oriental species it seems much more logical to combine those genera which have previously been placed in the Tribe Ceratitini with the Trypetini. Ceratitini have been differentiated by having the scutellum inflated and by the presence of dark brown to black subbasal streaks in the wing (*Ceratitis*-like) at level with humeral crossvein. At least for the Oriental genera I find these characters of questionable value; the shape of the scutellum intergrades to the point where decision cannot be made and I find no character pertaining to the scutellum which can actually be measured; the presence or absence of black streaks in the wing base definitely breaks down. The genera *Xanthorrhachis* Bezzi and *Galbifascia*, new genus (fig. 118a and 138a) have the slightly inflated scutellum, but the wing characters do not fit. *Carpomyia vesuviana* A. Costa has a slightly convex scutellum and would seem to fit the concept of Ceratitini but this genus is obviously very closely related to *Myiopardalis* Bezzi which has the scutellum flat.

I am treating the genus *Xyphosia* Robineau-Desvoidy under Tephritini. The one species known from Southeast Asia does not possess characters which would justify placing it in a distinct Tribe (Xyphosiini, of Hering and other authors).

The art work has been done largely by Miss Geraldine Oda, with contributions by the following assistants: Sybil Seto, Kazim Nemazee, Eric Enos, Noreen Naughton, Amy Farmer, Laura Casey, Camille Wong, Dennis Morihara, and Jocelyn Izu. This is one of the most important aspects of this monograph and I greatly appreciate all of the painstaking effort and the talent which has gone into this work.

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#### Taxonomic Arrangement

##### Dacinae

*Callantra* Walker

*destillatoria* (Bezzi)

*eumenooides* (Bezzi)

*inferna* n.sp.

*sphaeroidalis* (Bezzi)

*Dacus* (*Asiadacus*) Perkins

*maculifacies* n.sp.

*modicus* n.sp.

*Dacus* (*Hemigymmodacus*) n. subgenus

*diversus* Coquillett

*Dacus* (*Pacifodacus*) Drew

*infestus* (Enderlein)

*vimulus* n.sp.

*Dacus* (*Paratridacus*) Shiraki

*expandens melanius* Hardy & Adachi

- Dacus* (*Strumeta*) Walker  
*aculeus* n.sp.  
*aethriobasis* n.sp.  
*arecae* Hardy & Adachi  
*bulliferus* n.sp.  
*cilifer* Hendel  
n.sp. nr. *cilifer*  
*citimus* n.sp.  
*correctus* (Bezzi)  
*cucurbitae* Coquillett  
*diaphorus* (Hendel)  
*dorsalis* Hendel  
*dorsaloides* Hardy & Adachi  
*frauenfeldi* Schiner  
*incisus* Walker  
*latifrons* (Hendel)  
n.sp. rel. *limbiferus*  
*mcgregori* (Bezzi)  
*nigrotibialis* (Perkins)  
n.sp. nr. *nigrotibialis*  
*occipitalis* (Bezzi)  
n.sp. nr. *parvulus*  
*pedestris* (Bezzi)  
*propinquus* Hardy & Adachi  
*tillyardi* (Perkins)  
*tuberculatus* (Bezzi)  
*umbrosus* Fabricius  
*yoshimotoi* n.sp.  
*zonatus* (Saunders)
- Dacus* (*Zeugodacus*) Hendel  
*aptatus* n.sp.  
*atrifacies* (Perkins)  
*caudatus* Fabricius  
*diaphoropsis* (Hering)  
*isolatus* n.sp.  
*maculatus* (Perkins)  
*pendleburyi* (Perkins)  
*platamus* n.sp.  
*rubellus* n.sp.  
*scutellaris* (Bezzi)  
*tau* (Walker)  
*ubiquitus* n.sp.  
*vultus* n.sp.
- Subgenus? nr. *Daculus* sp. ?
- Trypetinae  
Acanthonevrini  
*Acanthonevra* Macquart  
*desperata* Hering  
*dunlopi* van der Wulp  
*formosana* Enderlein  
*fuscipennis* Macquart
- hemileina* Hering  
*marginata* n.sp.  
*ochropleura* Hering  
*siamensis* n.sp.  
*soluta* (Bezzi)  
*vaga* (Wiedemann)
- Diarrhagma* Bezzi  
*modestum* (Fabricius)
- Dirioxa* Hendel  
*quatei* n.sp.
- Ectopomyia* n. genus  
*baculigera* n.sp.
- Hexacimia* Hendel  
*radiosa* (Rondani)
- Mimosophira* n. genus  
*rubra* n.sp.
- Platystomopsis* Hering  
*clathrata* Hering
- Rioxa* Walker  
*parvipunctata* de Meijere  
*sexmaculata* (van der Wulp)  
*vinmula* n.sp.
- Thenara* Walker  
n.sp. rel. *alkestis* Walker  
*hirtipes* Rondani
- Tritaeniopteron* de Meijere  
*elachispilotum* n.sp.  
*tetraspilotum* n.sp.  
n.sp. ♀
- Xarnuta* Walker  
*leucotelus* Walker
- New genus nr. *Ectopomyia*  
n.sp.
- Aciurini  
*Sphaeniscus* Becker  
*atilius* (Walker)  
*quadrincisus* (Wiedemann)
- Adramini  
*Adrama* Walker  
*apicalis* Shiraki  
*determinata* Walker  
*nigrifrons* n.sp.
- Adramoides* n. genus  
*picta* n.sp.
- Heterosophira* n. genus  
*decora* n.sp.
- Ichnexamonopsis* n. genus  
*burmensis* n.sp.
- Meracanthomyia* Hendel  
*intermedia* n.sp.  
*kotiensis* Kapoor

- maculipennis* (Macquart)  
*nigrofemorata* n.sp.  
*rufithorax* n.sp.  
*spenceri* n.sp.
- Euphrantini
- Dimeringophrys* Enderlein  
*bilineata* (Walker)  
*pallidipennis* n.sp.
- Euphranta* (*Euphranta*) Loew  
*presignis* n.sp.  
*striatella* (van der Wulp)  
*Euphranta* (*Staurella*) Bezzi  
*apicalis* Hendel  
*burtoni* n.sp.  
*corticicola* (Hering)  
*laosica* n.sp.  
*maculifacies* n.sp.  
*maculifemur* de Meijere  
*ormei* n.sp.
- Felderimyia* Hendel  
*fuscipennis* Hendel
- Ptilona* van der Wulp  
*confinis* (Walker)  
*maligna* Hering  
*nigrifacies* n.sp.
- Tetrameringophrys* n. genus  
*parilis* n.sp.
- Euribiini
- Cycasia* Malloch  
*flava* n.sp.
- Gastrozonini
- Acrotaeniostola* Hendel  
*fuscinotum* Hering  
*quadrifasciata* (Enderlein)  
*spiralis* Munro  
 n.sp. ?
- Callistomyia* Bezzi  
*flavilabris* n.sp.  
*pavonina* Bezzi
- Chaetellipsis* Bezzi  
*atrata* n.sp.  
*dispilota* n.sp.  
*paradoxa* Bezzi
- Dietheria* n. genus  
*fasciata* n.sp.
- Gastrozona* Bezzi  
*balioptera* n.sp.  
*fasciventris* (Macquart)  
*parviseta* n.sp.  
*soror* (Schiner)
- Paraxarruta* n. genus
- anephelobasis* n.sp.  
*bambusae* n.sp.
- Phaeospilodes* Hering  
*fritilla* n.sp.  
*torquata* Hering
- Rhaibophleps* n. genus  
*seclusa* n.sp.
- Spaniothrix* n. genus  
*vittata* n.sp.
- Spilocosmia* Bezzi  
*bakeri* Bezzi
- Taeniostola* Bezzi  
*apicata* Hering  
*limbata* Hendel
- Genus unplaced \_\_\_\_\_  
 species ? prob. new
- Trypetini
- Acidoxantha* Hendel  
*assita* n.sp.  
*totoflava* n.sp.  
 n.sp. rel. *totoflava*
- Acroceratitis* Hendel  
*aberrata* n.sp.  
*adnata* n.sp.  
*bimacula* n.sp.  
*cognata* n.sp.  
*histrionica* (de Meijere)  
*incompleta* n.sp.  
*maai* (Chen)  
*plumosa* Hendel  
*septemmaculata* n.sp.  
*siamensis* (Munro)  
*similis* n.sp.  
*tomentosa* n.sp.
- Anomoia* Walker  
*kraussi* n.sp.  
*pusilla* (Hering)  
*vana* (Hering)
- Anoplomus* Bezzi  
*nigrifemoratus* n.sp.  
*rufipes* n.sp.
- Carpomyia* A. Costa  
*vesuviana* A. Costa
- Galbifascia* n. genus  
*quadripunctata* n.sp.  
*sexpunctata* n.sp.
- Hemilea* Loew  
*araliae* Malloch  
*bipars* (Walker)
- Myoleja* Rondani  
*disjuncta* n.sp.

- fossata* (Fabricius)  
*radiata* n.sp.  
*ravida* n.sp.  
*setigera* n.sp.  
*superflucta* (Enderlein)  
*Paratrirhithrum* Shiraki  
*nitidum* n.sp.  
*Proanoplomus* Shiraki  
*laqueatus* (Enderlein)  
*longimaculatus* n.sp.  
*minor* n.sp.  
*nitidus* n.sp.  
*spenceri* n.sp.  
*trimaculatus* n.sp.  
*vittatus* n.sp.  
*Trypeta* Meigen  
*aberrans* n.sp.  
*accola* n.sp.  
*Xanthorrhachis* Bezzi  
*amandalei* Bezzi  
*assamensis* n.sp.
- Schistopterinae
- Rhabdochaeta* de Meijere  
*ampla* n.sp.  
*asteria* Hendel  
*bakeri* Bezzi  
*multilineata* Hering  
*venusta* de Meijere
- Tephritinae
- Ditrichini
- Dictyotrypeta* Hendel  
*longiseta* Hering
- Platensinini
- Platensina* Enderlein  
*acrostacta* (Wiedemann)  
*ampliipennis* (Walker)  
*euryptera* (Bezzi)  
*intacta* n.sp.  
*quadrula* n.sp.
- tetrica* Hering  
*xodiacalis* (Bezzi)
- Tephrellini
- Indaciura* Hering  
*xanthotricha* (Bezzi)
- Isocomia* Munro
- reinhardi* (Wiedemann)  
*Spathulina* Rondani  
*acroleuca* (Schiner)
- Tephritini
- Acanthiophilus* Becker  
*helianthi* (Rossi)  
*Craspedoxantha* Bezzi  
*octopunctata* Bezzi  
*Dioxyna* Frey  
*sororcula* (Wiedemann)  
*Elaphromyia* Bigot  
*pteroallaeformis* (Bezzi)
- Scedella* Munro
- formosella* (Hendel)  
*Sphenella* Robineau-Desvoidy  
*sinensis* Schiner  
*Stylia* Robineau-Desvoidy  
*apiciclara* n.sp.  
*iracunda* (Hering)  
*parvula* (Loew)  
*siamensis* n.sp.  
*spenceri* n.sp.
- Tephritis* Latreille
- lyncea* Bezzi  
*Trupanea* Schrank  
*brunneiipennis* n.sp.  
*convergens* Hering  
 n.sp. nr. *convergens*  
*isolata* n.sp.  
*vernoniae* n.sp.
- Xyphosia* Robineau-Desvoidy
- malaisei* Hering

## Totals of taxa treated

Dacinae	49 species		2 genera	6 subgenera
Trypetinae	126 species	7 tribes	49 genera (2 unplaced)	1 subgenus
Schistopterinae	5 species		1 genus	
Tephritinae	31 species	4 tribes	15 genera	

Total 209 species from Thailand and bordering countries, plus 2 from India included for comparison.

## KEY TO SUBFAMILIES

1. Cell M broad, 2× wider than cell Cu and usually about 2× longer than wide (fig. 9a). Cell Cu with an elongate apical lobe, equal or longer than vein  $Cu_1+1st\ A$ . Almost without exception having a large, smooth, slightly depressed area on each side of 5th tergum (tergal glands) and usually a stridulatory apparatus developed on ♂♂; a row of prominent long hairs on each side of 3rd tergum and an area of dense microtrichia over cubital cell and lower margin of cell  $M_4$ . ♀ with 2 spermathecae consisting of tight set coils, somewhat resembling a bunch of grapes (fig. 14d). Third antennal segment 3 or more times longer than wide. Abdomen short and broad, in ♂ about 1/2 longer than wide. Chaetotaxy of head and thorax reduced; lacking ocellar, postocellar, dorsocentral, presutural, sternopleural and usually humeral bristles. Typically yellow and black flies with wings hyaline except for a brown band along costal margin and a brown streak through cubital area (fig. 9a). Fruit infesters. ....**Dacinae**  
 Not as above, sometimes having reduced chaetotaxy (Adramini) but with cell M narrow, equal in width to Cu and usually over 4× longer than wide; lobe of cell Cu short (in Adramini, rarely elongate in other groups); tergal glands and stridulatory structures lacking; ♀ with 2-3 spermathecae but never formed of tight set coils; 3rd antennal segment typically short (except in Adramini); abdomen typically more slender, straight sided. Wings usually with elaborate markings. ....2
2. Lacking ocellar, postocellar, dorsocentral, presutural and usually humeral bristles; postocular setae inconspicuous. ....**Trypetinae**.....**Adramini**  
 Never simultaneously lacking all of the above bristles; usually a full complement of head and body bristles and with the postocular setae (small bristles) well developed. ....3
3. Costa lacking a deep cleft and a lobe at end of subcostal vein. ....4  
 Costa with a deep cleft at end of subcostal vein and forming a definite angle (lobe) at anterior side of the cleft which bears 2 bristles at its apex. Wing markings distinctive as in figures 140d, 141e. ....**Schistopterinae**, Genus *Rhabdochaeta* de Meijere
4. Postocular setae (occipitals) thin, pointed, black or dark brown. Sixth tergum of ♀ shorter than 5th (except in some Euphrantini and some Trypetini). Dorsocentral bristles usually behind supraalars. Wings variously marked but rarely spotted. Vertical suture of mesopleuron well developed. Mesonotum rarely tomentose, never with scale-like, white, recumbent setae. ....**Trypetinae**  
 Postoculars stubby, thick, flat, rather scale-like, mostly white or yellow-white. Sixth tergum equal or longer than 5th. Mesonotum usually tomentose and covered with flat, recumbent, scale-like, white setae. Dorsocentrals before or near supraalars. Vertical suture on mesopleuron lacking or rudimentary. Wings typically spotted.....**Tephritinae**

## SUBFAMILY DACINAE

Members of this subfamily are characterized by having the chaetotaxy greatly reduced, lacking many of the major bristles of the head and thorax. The following bristles are lacking: ocellars, postocellars, dorsocentrals, presuturals, sternopleurals and usually humerals; the latter are rarely present. Also the postocular setae are poorly developed, inconspicuous, represented by a few fine hairs. Cell M is short and broad, approximately 2× longer than wide in *Dacus* sens. lat., and 3× longer in *Callantra* Walker, and cell M is 2× wider than cubital cell (fig. 15a). Cubital cell with a long narrow apical lobe which is equal or longer than vein  $Cu_1+1st\ A$ . Radial veins rather closely spaced in anterior portion of wing; compared to other fruit flies the radial veins are crowded together, fairly near the costal margin so that the distance from vein  $R_{4+5}$  to the costa

is equal or less than the length of the r-m crossvein. Only 2 spermathecae present. These are very characteristic in development, in the form of a tight set coil, sometimes resembling a cluster of grapes (fig. 14a). Almost without exception the Dacinae have a stridulatory apparatus in the ♂ consisting of a row of strong hairs on each side of 3rd tergum and an area of dense microtrichia on the ventral surface of the wing in the area of the cubital cell (fig. 15a) and except in rare cases with a pair of prominent, flat, smooth, glandular areas on the 5th tergum of both sexes. The abdomen is comparatively short and broad, rounded at sides and in ♂ about 1/2 longer than wide. The femora lack ventral spines except in some *Callantra* Walker which have ventral spines on the front femora.

Members of this subfamily are the most important fruit infesters throughout the Oriental and Pacific Regions. The 2 genera known from Thailand and surrounding areas are separated as follows.

Antennae elongate, 2nd and 3rd segments combined about equal to vertical length of head and entire length of antennae about equal to combined length of front and face. First antennal segment equal in length to 2nd and at least 1/2 as long as face (fig. 2d). Abdomen strongly clavate and petiolate, with a prominent hump on each side of 1st tergum. First segment parallel sided or narrower at apex than at base. Abdomen arched as seen in lateral view and the suture between terga 3 and 4 markedly concave. Basal segment of ovipositor tubular in shape. Cell M rather elongate, approximately 3× longer than wide.

.....**Callantra** Walker  
 Antennae comparatively short, 1st segment about 1/2 as long as 2nd and less than 1/2 as long as face; the entire antennae about equal to or shorter than front (fig. 4a). Abdomen not strongly petiolate or arched and with no well-developed tubercles at sides of 1st tergum; 1st segment 2× as wide at apex as at base. Suture between terga 3 and 4 straight or nearly so. Ovipositor usually flattened dorsoventrally. Cell M broad, scarcely 2× longer than wide. ....**Dacus** Fabricius sens. lat.

#### Genus *Callantra* Walker

*Callantra* Walker, 1860, *Proc. Linn. Soc. Lond.* 4: 153. Type-species: *smieroides* Walker, by original designation.

*Calantra*, error in spelling

*Mellessis* Bezzi, 1916, *Bull. Ent. Res.* 7: 114. Type-species: *Monacrostichus crabroniformis* Bezzi, by original designation.

Differentiated from *Dacus* Fabricius by the elongate antennae which are much longer than the head — the 2nd and 3rd segments combined are about equal to the vertical length of the head; 1st antennal segment elongate, equal in length to the 2nd and almost equal to the visible portion of the palpi. Abdomen strongly clavate, 1st segment parallel sided or narrower at apex than at base, petiolate. The flies are distinctly wasp-like in appearance with the abdomen strongly arched from a lateral view and hollowed out ventrally. Ovipositor cylindrical, tube-like, and tapered. Lower median portion of the front swollen, gibbose, rather similar to that of *Adrama*. No presutural bristles present on the mesonotum. Cell M is slightly longer than in *Dacus*, approximately 3× longer than wide. The wing margin not distinctly indented at apex of vein  $Cu_1+1st A$  in the ♂ (no supernumerary lobe present). Subcostal cell elongate, equal in length to 2nd costal. Also the 5th costal section is rather long, subequal to the 4th section. Scutellum short, over 2× wider than long. The tergal glands (on 5th tergum) are well developed, as are the stridulatory hairs on 3rd tergum of ♂ as in other Dacinae. The ♀ spermathe-



cae are also like others of the subfamily.

Malloch (1939a: 410) considered this as a subgenus of *Dacus* and it is possible that, when the group has been studied in detail throughout its geographic range, many of the characters will intergrade. There are a number of borderline species which are difficult to place at the present time.

Twenty-eight species have been described to date from the Asian and Pacific regions; only 4 have been seen from the area covered in this paper.

#### KEY TO CALLANTRA KNOWN FROM THAILAND\* AND SURROUNDING COUNTRIES

1. Costal band broad throughout its length, not expanded at wing apex. Face with a small black spot on each side, and with a narrow transverse band over lower margin in *destillatoria*. .....2  
Wing with a large brown spot covering entire apex, extending into upper portion of cell 2nd  $M_2$  (fig. 2a). Antennal furrows entirely black. India, Pakistan, and Thailand. ....  
..... *sphaeroidalis* (Bezzi)
2. Pleuroterga dark rufous, tinged with brown or black. Inferior fronto-orbital bristles lacking or represented by only 1 pair of fine hairs. Mesonotum predominantly rufous, lacking a prominent pale yellow postsutural median mark. Lunule narrow. As seen from lateral view, antennae situated slightly above or at middle of head. ....3  
Pleuroterga yellow. Two pairs of strong inferior fronto-orbital bristles. A large triangular yellow spot in middle of posterior margin of mesonotum. Mesofacial plate (area bordered by ptilinal suture) large, lunule unusually well developed. Antennae situated near lower 1/3 of head as seen in lateral view (fig. 3a). Thailand. ....*inferna*, n. sp.
3. Apex of cell  $R_3$  entirely dark brown, lacking a hyaline streak and with a narrow transverse brown band across lower portion of face. ♀ ovipositor cylindrical. Burma, Thailand and Laos. ....*destillatoria* (Bezzi)  
Wings with a hyaline streak near apical portion of cell  $R_3$ . Face with a small brown to black spot in each antennal furrow but lacking the black mark across lower margin. Basal segment of ovipositor flat. Burma and Thailand. ....*eumenooides* (Bezzi)

#### *Callantra destillatoria* (Bezzi) Fig. 1a-e.

*Mellessis destillatoria* Bezzi, 1916, *Bull. Ent. Res.* 7: 118. Type-locality: Bhamo, Upper Burma. Type ♀ in the Museo Civico di Storia Naturale, Milan.

Specimens on hand from Thailand and from Laos fit the original description and apparently are this species. This species is very close to *smieroides* Walker and to *eumenooides* (Bezzi). This complex needs to be studied in considerable detail to determine the reliability of the characters. *C. destillatoria* is apparently differentiated by having the apex of cell  $R_3$  entirely dark brown, lacking a hyaline streak and by having a narrow black border in median portion of face above the mouthparts in addition to small black spots in antennal furrows. I question the reliability of the wing character. The hyaline mark in cell  $R_3$  may possibly be due to tenacity. In a long series of *smieroides* which I have on hand from Borneo and New Guinea there is some variation in the development of the hyaline mark near apex of cell  $R_3$ , but in all the specimens I have studied, the face is yellow except for the spots in the antennal furrows. *C. destillatoria* may eventually prove to be a variation of *smieroides*. The following notes are based on the specimens from Thailand and Laos.

\**Callantra satanas* Hering, 1939, *Verh. VII Intern. Kongr. Ent.* Berlin 1938, 1: 166, from Hoa Binh, Tonkin was inadvertently omitted.

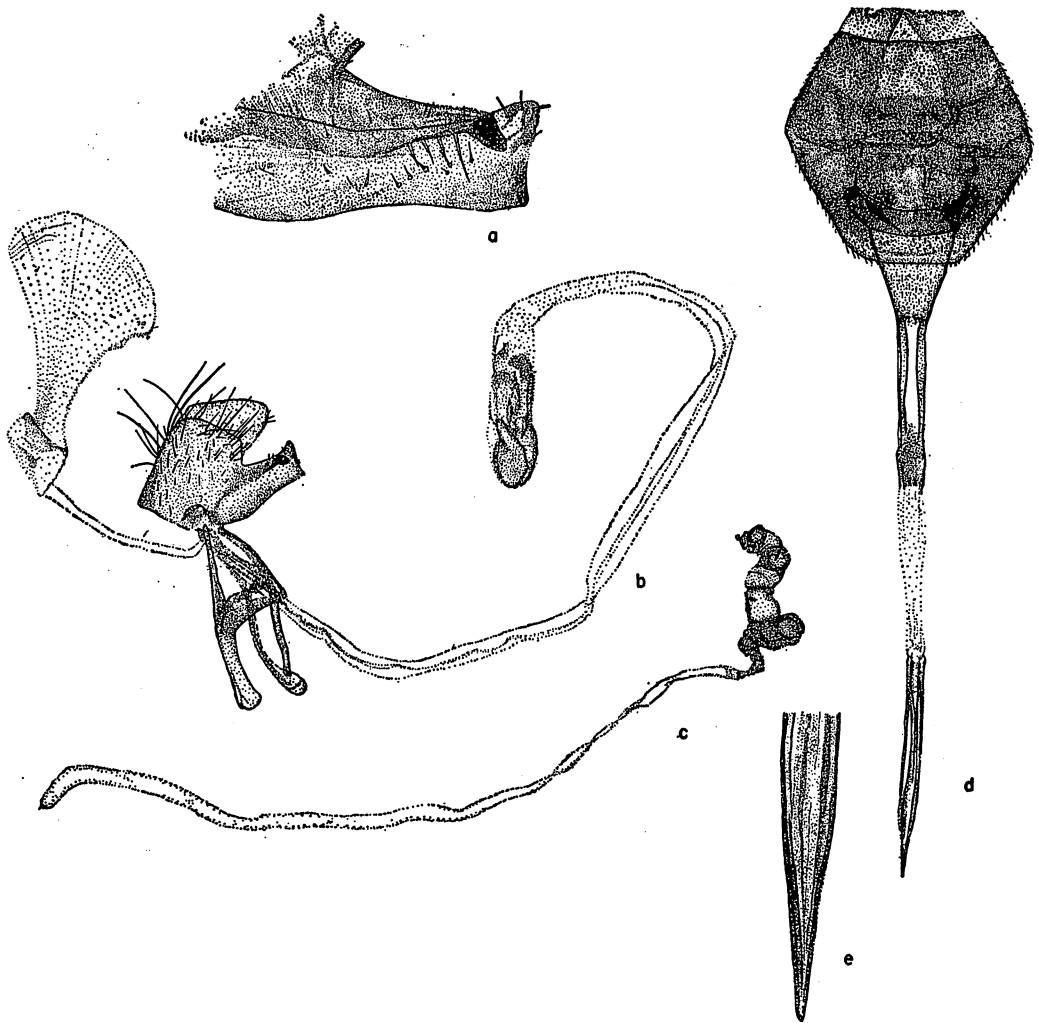


Fig. 1. *Callantra destillatoria* (Bezzi). a. ♂ surstylus and 10th sternum; b. ♂ genitalia; c. ♀ spermatheca; d. ♀ abdomen; e. apex of piercer.

Face marked as noted above. Thorax predominantly rufous, bright yellow on the sutures, with this marking continuous over hind portion of mesopleuron and onto upper edge of sternopleuron. A very narrow dark brown to black vitta extends down median portion of mesonotum and in some specimens a faint indication of 2 narrow vittae are present on each side just beyond inner edge. Hypopleuron covered by a bright yellow spot, except for the black anterior edge. Scutellum bright yellow with a broad brown to black basal margin. Legs rufous, tinged faintly with brown. Wings largely subhyaline with a broad brown band extending along anterior margin through upper  $1/3$  to  $2/5$  of cell R. Vein  $R_{1+2}$  rather thickly setose almost its entire length, the setae extend to a point opposite end of vein  $R_{3+4}$ . Vein  $Cu_1 + 1st A$  about equal in length to r-m crossvein in the ♀ and scarcely over  $1/2$  as long as r-m in the ♂. Abdomen predominantly black, tinged with rufous on basal portion; with sides and apex of 1st tergum yellow, also apex

of 2nd and 5th yellow and with a prominent apicomedian yellow spot on 4th tergum. The tergal glands on the 5th are brown, tinged with red. Entire abdomen densely yellow pilose. Two spermathecae present; these are long and coiled (fig. 1c). The ovipositor characters are as in fig. 1d-e. The piercer is long and slender, sharp-pointed at apex. ♂ genitalia as in fig. 1a-b. The surstyli are truncate at apices and almost completely hide the 10th sternum as seen in direct lateral view.

Length: Body, 9.5-10.0 mm; wings, 7.5-8.5 mm.

Eleven specimens on hand apparently belong here from the following localities in THAILAND: Nan, 10.VII.1963, collected on *Luffa acutangula*, R. Kawasaki; Nakornpatom, 14.IX.1963, no collector given; Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa. LAOS: Sayaboury Prov., Muong Sayaboury, 305 m, 6.X.1967, F. G. Howarth.

### **Callantra eumenoides (Bezzi)**

*Mellessis eumenoides* Bezzi, 1916, *Bull. Ent. Res.* 7: 119. Type-locality: Takton, Upper Burma. Type ♂ in British Museum (Natural History).

Host: Bred from fruits of *Trichosanthes cucumerina*. Also from cucumber.

According to the original description, this species differs from *destillatoria* (Bezzi) by having the ovipositor flattened (I do not believe this to be a valid character; he probably was dealing with an aberrant specimen); by having the face yellow, with only a small black spot on each side near upper portion of the antennal furrow, lacking the dark band above the mouth and black markings on upper median portion of face. Also, the wings have a hyaline streak near the apical portion of cell  $R_3$ . It will be necessary to study further specimens in order to clarify the position of this species. It is obviously very close to *smieroides* Walker and may be synonymous with that species.

One ♂ specimen has been studied from the British Museum collection, from Pleun Chitr, Siam, XI.1933 (W. R. S. Ladell) which compares favorably with the syntype series in the British Museum although it is obviously a teneral specimen.

### **Callantra sphaeroidalis (Bezzi) Fig. 2a-f.**

*Mellessis sphaeroidalis* Bezzi, 1916, *Bull. Ent. Res.* 7: 115. Type-locality: Dehra Dun, India. Type ♂ in the British Museum (Natural History).

This species is differentiated from other *Callantra* by the very large brown spot occupying the entire apex of wing, extending through upper portion of cell 2nd  $M_2$  (fig. 2a); also by having the antennal furrows completely occupied by elongate black spots; and the anterior supraalar bristles lacking.

A predominantly rufous species with black bands across bases of abdominal terga 3 and 5, and with lateral margins of 5 narrowly black. Also, as noted above, the antennal furrows are black. Front with a small brown spot at base of each bristle and hind femora and tibiae tinged with brown on their apices. Head as in fig. 2d, as seen from direct lateral view. Wing as in fig. 2a. Tergal glands on 5th tergum rufous, faintly tinged with brown. Sterna brown, tinged with rufous. Fifth sternum of ♂ slightly wider than long and gently concave on hind margin. ♂ genitalia (from Pakistan specimens), as in fig. 2e-f. The epandrium is longer than wide and the surstyli are short, straight-sided, each produced into a narrow lobe at upper apex. The ejaculatory apodeme is only slightly expanded distally. ♀ ovipositor rather short for *Callantra*, as seen from direct dorsal view the basal segment is distinctly shorter than 5th tergum, the length of basal segment measured from above is 1.17 mm. The length of the extended ovipositor from above is 5.8

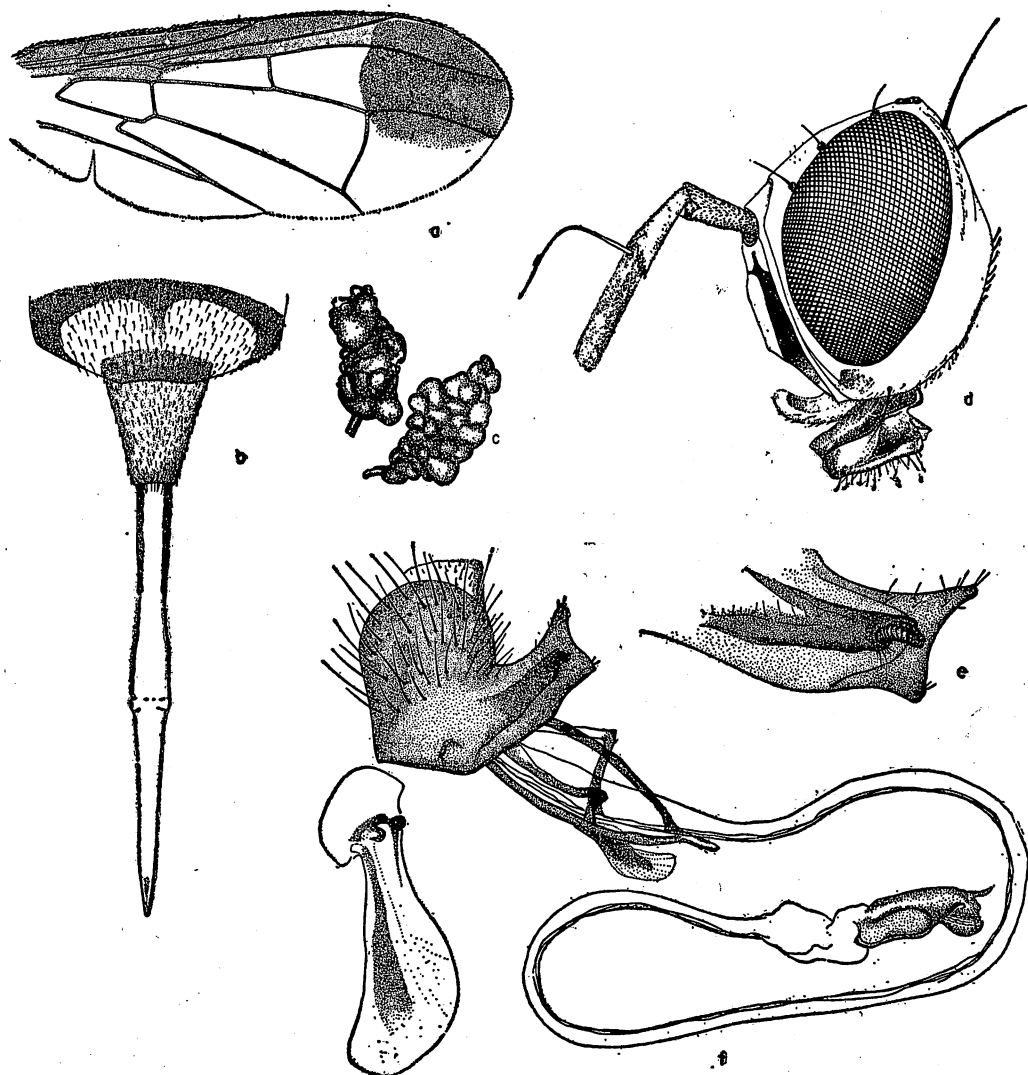


Fig. 2. *C. sphaeroidalis* (Bezzi). a. wing; b. ovipositor; c. ♀ spermathecae; d. head; e. ♂ surstylus and 10th sternum; f. ♂ genitalia.

mm. The piercer is slender, sharp-pointed at apex (fig. 2b) and measures approximately 2.3 mm.

Length: Body, 7.8–8.75 mm for the specimens at hand (Bezzi gave the body measurement as 10.0 mm); wings, 6.7–7.0 mm.

Three specimens on hand from following localities in THAILAND: Phu Kae, 9.IV.1965, no collector given; Chiangmai Prov., Doi Suthep, 1278 m, 29.III.—4.V.1958, T. C. Maa; also 1 specimen from S. VIETNAM: Dai Lanh, N of Nha Trang; 30.XI.—5.XII. 1960, C. M. Yoshimoto.

Hosts: A series of specimens on hand from Rawalpindi, Pakistan, reared from fruit

of *Telosma cordata* (Chinese violet) and from "fruits of *P. palida*."

It should be noted that there is a remarkable resemblance between this species and *Dacus (Pacifodacus) infestus* (Enderlein) from Indonesia, Thailand and Laos. Refer to the discussion under that species.

**Callantra inferna** Hardy, new species      Fig. 3a.

Resembling *destillatoria* (Bezzi) because of the wing markings but readily differentiated by having the pleuroterga yellow; 2 pairs of strong inferior fronto-orbital bristles; a large triangular yellow spot in middle of posterior portion of mesonotum; by the enlarged mesofacial plate; and by having the antennae located near lower 1/3 of head as seen in lateral view (fig. 3a).

♀. Predominantly black species, the unusual development of the mesofacial plate is a distinguishing character. **Head:** Shaped as in figure with the frontal portion rather prominent as seen from direct lateral view. Front, measured from median ocellus to ptilinal suture scarcely longer than wide and mesofacial plate distinctly longer than front, with postantennal portion (lunule) very well developed, extending well above antennae and with antennae situated only slightly above median portion of this plate, making the actual face (that portion between antennae and oral margin) very short. Front mostly yellow with a brown discoloration in median portion and a small brown spot at base of each bristle. Two pairs well developed inferior fronto-orbitals and 1 pair superior fronto-orbitals. Lunule brown. Face with a large polished black spot filling each antennal furrow and also with a small median black spot just below antennae. Antennae brownish red, shaped as in other members of this genus with 3rd segment subacutely pointed at lower apex (fig. 3a). **Thorax:** Black in ground color rather densely gray pubescent and short yellow to white setose, except for the following yellow-white markings: humeri, suture, notopleural calli, a narrow vertical stripe over hind margin of each mesopleuron, a small spot on upper margin of each sternopleuron, notopleura, pleuroterga, scutellum except for narrow brown to black base, and a large triangular median spot on posterior portion of mesonotum. Bristles rather small, supraalar weak, less than 1/2 as long as postalar bristles. Halteres pale yellow-white. Postscutellum and metanotum tinged with yellow to rufous and posterolateral margins of mesonotum rufous up to wing bases. Also

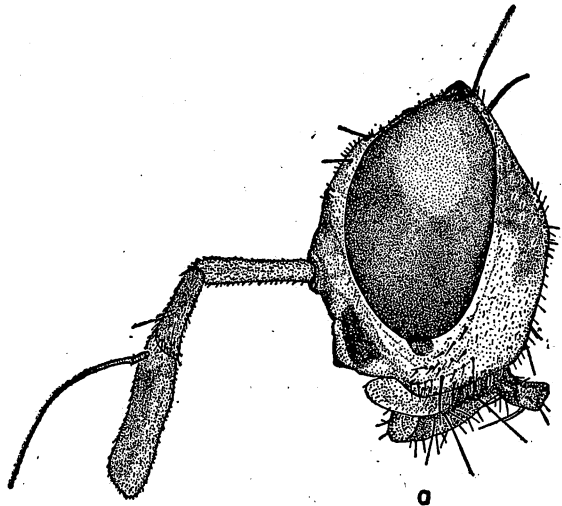


Fig. 3. *C. inferna* n. sp. a. head.

propleura predominantly rufous, tinged with black. **Legs:** Front and middle femora brown, tinged with rufous, yellow on extreme apices and bases. Hind femur bright yellow on basal 2/3, brown to black, tinged with rufous on apex. Tibiae dark brown, tinged faintly with rufous and tarsi yellow. Coxae and trochanters dark brown to black. **Wings:** Hyaline except for broad, dark brown costal band, this extends below vein  $R_{4+5}$  along upper margin of cell  $R_5$ . Costal cells brownish yellow, densely covered with microtrichia. Crossvein r-m situated distinctly beyond middle of cell 1st  $M_2$  and vein  $Cu + 1st A$  almost equal in length to the lobe of cubital

cell. *Abdomen*: Predominantly shining black in ground color covered with short yellow setae and with the integument microscopically punctate. Abdomen as seen from lateral view rather highly arched. First tergum with a rather broad yellow band across apex. Second with yellow mark on each side extending over most of posterior  $2/3$  of segment, with a black longitudinal band through middle, and with lateral margins broadly black. Third tergum entirely black except for a pair of submedian yellow to rufous spots on hind margin. Fourth tergum with a pair of large submedian rufous spots covering apical  $1/2$  to  $3/5$  of segment and 5th tergum yellow to rufous down submedian areas (a longitudinal black vitta extends from 3rd tergum to apex of 5th). Tergal glands yellow. Basal segment of ovipositor cylindrical, largely shining black, rufous at apex. Measured on venter, basal segment 1.5 mm. The piercer has not been extruded for study.

Length: Body, excluding ovipositor, 6.5 mm; wings, 5.5 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9945), THAILAND: Tak Prov., area on W side of Ping R., opp. Tak, 110 m, 8.VII.1969, J. J. S. Burton.

Type in the B. P. Bishop Museum.

### Genus *Dacus* Fabricius

*Dacus* Fabricius, 1805, *Syst. Antl.*, 272. Type-species: *armatus* Fabricius, by subsequent designation (Hendel 1927: 24).

*Dacus* (*Tridacus*) Bezzi, 1915, *Bull. Ent. Res.* 6: 88. Type-species: *Dacus armatus* Fabricius, by subsequent designation (Collart 1935: 9).

This group has been split up into numerous "genera" by various authors, but as I have discussed (Hardy 1955), these are all based upon presence or absence of single bristles or upon secondary sexual characters in the ♂ and it seems much more logical to treat these as subgenera. The latest review is by Drew (1972).

*Dacus* sens. lat. differ from other Dacinae by having the antennae comparatively short, the 1st segment about  $1/2$  as long as 2nd and the 2nd scarcely  $1/4$  as long as face; the entire antennae about equal to or shorter than the front; abdomen not strongly petiolate or arched and with no well-developed tubercles at sides of 1st tergum; the 1st segment  $2\times$  as wide at apex as at base; suture between terga 3 and 4 straight or nearly so; ovipositor usually flattened dorsoventrally. Two spermathecae are present; these are peculiar in shape, like a bunch of grapes (fig. 14d). Both sexes of most *Dacus* have 2 glandular areas on the 5th abdominal tergum; these are referred to as the tergal glands. These have been studied by Dr J. J. T. Evans (1967). Dr Evans recorded that "in living *Dacus tryoni* the glandular areas are usually studded with several small droplets of an aqueous secretion. Each droplet is covered with a thin film of a waxy material that retards its evaporation. In the process of cleaning itself, the fly appears to wipe the secretion over the surface of its body."

Six subgenera are present in this region.

#### KEY TO SUBGENERA OF DACUS FROM THAILAND AND ADJOINING COUNTRIES

(AFTER DREW 1972: 8; based upon ♂ ♂)

1. Posterior lobe of ♂ surstylus elongate, about  $6\times$  longer than anterior lobe (fig. 6b). Fifth sternum of ♂ with a slight concavity on hind margin. (This character is readily seen in situ). .....*Dacus* group of subgenera. ....2
- Posterior lobe of surstylus short, not strongly produced (fig. 19b). Fifth sternum with a

- deep V-shaped concavity on hind margin extending about 1/2 length of segment (fig. 19c). ..... **Strumeta** Walker
2. Scutellum with only 1 pair of bristles. ....3  
Scutellum with 2 pairs of strong bristles. ....6
3. Prescutellar bristles present. ....4  
Prescutellars absent. ....5
4. Pecten present on 3rd abdominal tergum.....**Dacus (Zeugodacus) cucurbitae** Coquillett  
(Fits in *Zeugodacus* according to Drew's classification)  
Pecten absent on abdomen. ....**Hemigymnodacus**, n. subgen.
5. Anterior supraalar bristles present. ....**Pacifodacus** Drew  
Anterior supraalars absent. ....**Asiadacus** Perkins
6. Third tergum with a pecten on each side and with an indentation in wing margin at apex of vein Cu +1st A. ....**Zeugodacus** Hendel  
Pecten absent and no indentation at apex of Cu.+1st A. ....**Paratridacus** Shiraki

#### Subgenus *Asiadacus* Perkins

*Asiadacus* Perkins, 1937, *Proc. R. Soc. Qld* 58(9): 57. Type-species: *Chaetodacus bakeri* Bezzi, by original designation.

The status of this taxon has been confused in the literature because of Perkins' incorrect diagnosis of the type species. Drew (1972: 10) has reexamined the type of *bakeri* and it does have a pecten of cilia on the 3rd abdominal tergum and both the prescutellar and anterior supraalar bristles absent.

#### KEY TO SPECIES OF DACUS (ASIADACUS) KNOWN FROM THAILAND

1. Face with a broad, polished black transverse band across middle. Mesonotum prominently marked with black (fig. 4b) and wings with a narrow costal band. ....**maculifacies**, n.sp.  
Face with 2 small black spots; mesonotum mostly rufous and wings with a large apical brown spot. ....**modicus**, n.sp.

#### **Dacus (Asiadacus) maculifacies** Hardy, new species Fig. 4a-b.

This species differs from other *Asiadacus* by having a broad, polished black, transverse band extending across the face, a dark brown costal band, in combination with the predominantly black mesonotum with distinctive markings as in fig. 4b.

♂. *Head*: Slightly higher than long, with occiput moderately swollen and face almost straight, gently concave in median portion as in fig. 4a. Front with 2-3 lower inferior fronto-orbitals plus the 1 inferior fronto-orbital at middle of front, and 1 pair of superior fronto-orbital bristles. Front yellow with a black spot at base of each bristle and a prominent brown median spot. Vertex with a black transverse line connecting with black mark over ocellar triangle. Occiput bright yellow around margin, yellow, tinged with brown on posterior portion. Genae and face yellow-white except for the broad transverse polished black band over middle of face. The lunula is also shining black. Antennae yellow tinged with brown on apical 1/3 to 1/2 of 3rd segment. The 3rd segment is 4× longer than wide. Palpi entirely yellow. Mentum brown, tinged with yellow. *Thorax*: With prominent black markings on mesonotum and pleura and also postscutellum and metanotum black, yellow down median portion of the latter. Mesonotum with 3 broad postsutural yellow vittae, the lateral pair continuous with yellow mark over notopleuron and suture to posterolateral margin of mesonotum. The median yellow mark rather triangular in shape, broad posteriorly, narrowed anteriorly and extending to a level with suture. The area

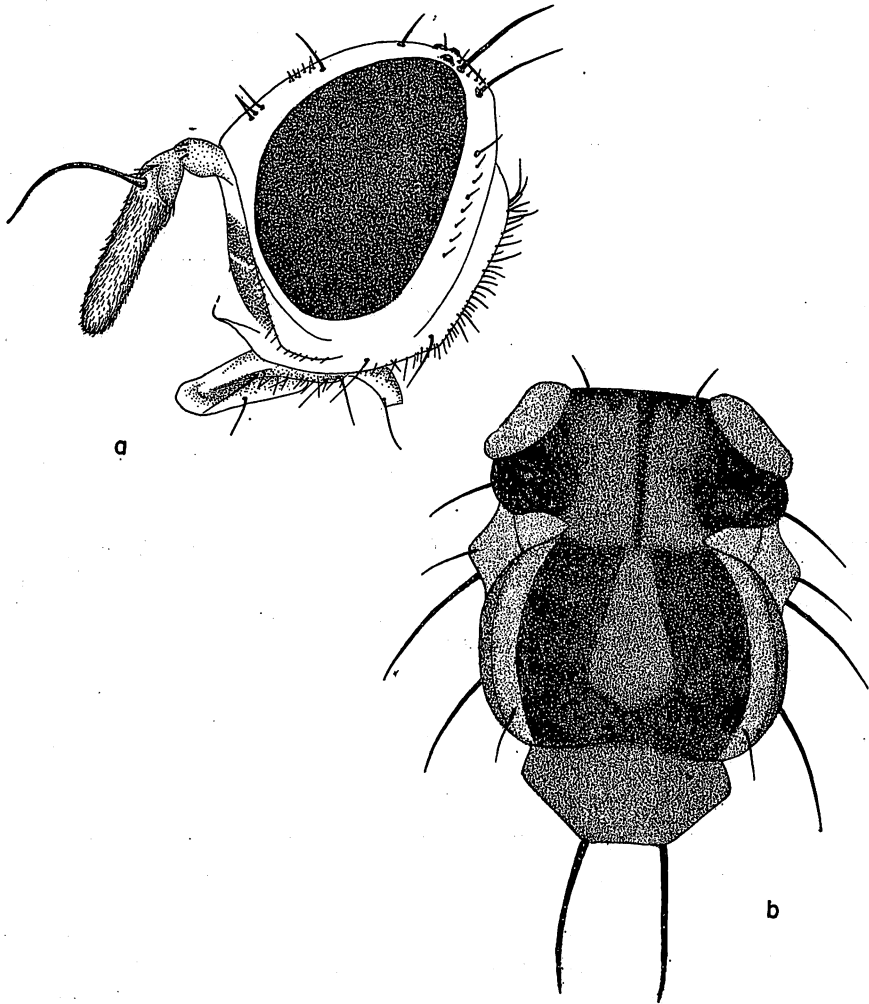


Fig. 4. *Dacus (Asiadacus) maculifacies* n. sp. a. head; b. thorax.

of mesonotum posterior to suture, between postsutural yellow vittae, is shining black, covered with gray pollen. The posterior margin of mesonotum is black, and a large black spot is present on each side behind humerus, also a narrow black vitta extends from anterior margin between inner scapular bristles to median postsutural yellow mark and the area laterad of anterior median vitta is rufous (fig. 4b). Propleura and anterior portion of each mesopleuron immediately behind suture yellow, also with a large transverse pale yellow mark extending over posterior  $2/3$  of each mesopleuron and a moderately large yellow-white mark on upper posterior edge of each sternopleuron, this mark extends posteriorly for a considerable distance beneath pteropleuron. Upper  $2/3$  of each metapleuron and upper  $3/4$  of each pleurotergon pale yellow-white. Halteres entirely yellow. *Legs*: Predominantly yellow, hind coxae dark brown to black and front and hind femora each with a brown preapical posterior spot. Front tibia with a prebasal posterior mark of brown and hind tibia very narrowly marked with brown on posterobasal surface. *Wings*:



Hyaline except for the dark brown costal band and broad cubital streak, 1st 2 costal cells devoid of microtrichia except for extreme apex of 2nd. Crossvein r-m situated distinctly beyond middle of cell 1st  $M_2$ . *Abdomen*: Predominantly yellow, polished black on lateral margins of all terga and 2nd and 3rd with a complete band across bases. A black, narrow, longitudinal vitta extends from 3rd tergum over apex of 5th and lateral margins of 4th and 5th broadly black. Tergal glands yellow. The genitalia have not been dissected for study.

Length: Body, 6.25 mm; wings 7.75 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9946), THAILAND: Chanthaburi Prov., Chanthaburi, nr sea level, 18-20.VI.1969, collected in Steiner's trap baited with Cur-lure, J. J. S. Burton. One ♂ paratype from Thailand: Chiangmai Prov., Fang, 500 m, 12.IV.1958, T. C. Maa.

Type returned to the B. P. Bishop Museum. Paratype in the University of Hawaii collection.

**Dacus (Asiadacus) modicus** Hardy, new species      Fig. 5a-e.

In my key to the *Neodacus* (1954: 6) this would run near *affinis* Hardy, from India. The 2 are not related and *modicus* is readily differentiated by having 3 postsutural yellow vittae on the mesonotum, a very large isolated spot at apex of wing, as well as by other details. This species shows relationship to *D. (Asiadacus) infestus* (Enderlein) but differs by having a small black spot at each side of face, rather than a broad band across face; by having 2 pairs of inferior fronto-orbital bristles, rather than 3; and by having the wing spot not filling all of apex of cell  $R_5$ , rather than extending into the upper portion of cell 2nd  $M_2$ .

A comparatively small, chiefly rufous species. ♂. *Head*: Entirely yellow except for the dark reddish brown compound eyes, a small black spot on each side of face, a black mark along vertex over ocellar triangle, and a faint brown spot on gena below each eye margin. Front rather broad, measured from median ocellus to anterior margin, just slightly longer than wide. Antennae yellow except for a tinge of brown on apices of 3rd segment. Front with only 1 pair of inferior fronto-orbital bristles, situated near anterior margin, also with 1 pair of superior fronto-orbitals. *Thorax*: Mesonotum rufous in ground color, covered with gray pubescence, usually with a faint brown median vitta extending over anterior 1/2 and a faint brown mark on each side between postsutural yellow vittae. This is variable and in some specimens the entire mesonotum will be rufous except for yellow vittae. Pleura predominantly rufous, with brown to black markings over sternopleuron and median portion of mesopleuron and upper pteropleuron. The yellow mark over top edge of sternopleuron extends posteriorly beneath pteropleuron. The lateral yellow vittae on mesonotum are narrow, extending to posterior margin of the sclerite. The median vitta extends to a level about opposite the outer posterior supraalar bristles. Postscutellum and metanotum rufous, tinged faintly with brown. *Legs*: Mostly yellow, coxae and trochanters rufous, tinged with brown; tibiae very faintly tinged with brown. Hind tibia each with a dense sensory patch on a slightly raised area, just before apex. *Wings*: Subhyaline with costal band faint in cell  $R_1$ , interrupted in anterior portion of 5th costal section (cell  $R_5$ ), and with an isolated brown spot occupying apices of cells  $R_3$  and  $R_5$ . Cubital streak broad, occupying basal portion of cell  $M_4$  along vein Cu. *Abdomen*: Rufous, black on the lateral margins and along bases of terga 2 and 3, and with broadly interrupted bands of black on terga 4 and 5, also with a median black vitta extending from base of tergum 3 almost to apex of 5. Tergal glands rufous. Fifth sternum almost 2 × wider than long and gently concave on hind margin. Genitalia as in fig. 5d-e. The

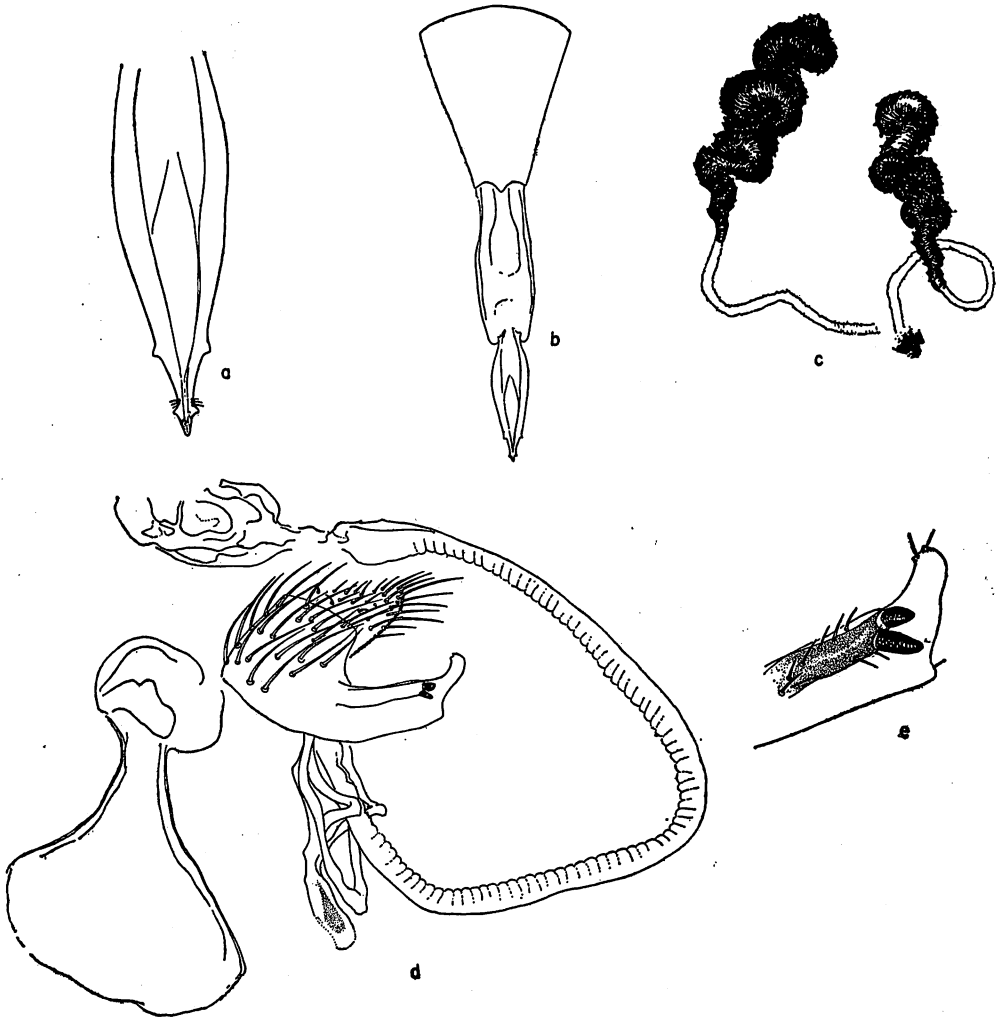


Fig. 5. *D. (A.) modicus* n. sp. a. ♀ apex of piercer; b. ♀ abdomen; c. ♀ spermathecae; d. ♂ genitalia; e. ♂ surstylus and 10th sternum.

surstyli are slender, and each terminates in a prominent apical lobe. The 10th sternum is plainly visible from direct lateral view. The ejaculatory apodeme is fan-shaped.

Length: Body, 5.3 mm; wings, 5.0 mm.

♀. Fitting description of ♂ except for sexual differences. The sensory organ on hind tibia is lacking. The basal segment of ovipositor is rufous and as seen from direct dorsal view just slightly longer than 5th tergum. Measured on venter, the basal segment is 1.3 mm in length, and the entire ovipositor is short and thick; when fully extended it measures just slightly less than 3.0 mm. The piercer is 0.9 mm in length, slightly bulged medianly and very distinctive in shape (fig. 5a-b).

Length: Body, not including ovipositor, 6.0 mm; wings, 5.3 mm.

Holotype ♂ and allotype ♀, THAILAND: Nakornsawan 12.IX.1963, no collector given. Paratypes, 7 ♂♂, 10 ♀♀, from the following localities in Thailand: Same as type; Pak Chong, 7.III.1963; Bang Khen, 20.X.1966; Muak Lek, 12.IX.1964; Patumthani, 10.VII.1964; and Saraburi, 26.VIII.1955, collected on *Trichosanthes* sp., P. Panchitra.

Type and allotype returned to Kasetsart University, Bangkok. Paratypes in the collections of the Thailand Department of Agriculture, B. P. Bishop Museum, U. S. National Museum, and the University of Hawaii.

#### Subgenus **Hemigymnodacus** Hardy, new subgenus

In order to adapt to the new subgeneric classification of Drew (1972) it is necessary to erect a new subgenus for *Dacus diversus* Coquillett. I had previously (Hardy 1954: 18) placed this under *Dacus* (*Gymnodacus*) Munro but this taxon as defined by Drew, based upon the type (*Dacus mesomelas* Bezzi, from Africa), fits in the *Strumeta* group of subgenera by having the posterior lobe of the ♂ surstylus short and the 5th sternum with a deep V-shaped cleft on hind margin. *Dacus calophylli* (Perkins & May), from Australia, and *hastigerinus* Hardy, from New Britain, both fit this concept.

*D. (Hemigymnodacus)* fits in the *Dacus* group of subgenera by having the posterior lobe of surstylus elongate and only a slight concavity on hind margin of 5th sternum. It fits nearest *Pacifodacus* Drew but differs by lacking pecten on the 3rd abdominal tergum of ♂ and by having prescutellar bristles. It differs from *Paratridacus* Shiraki by having only 2 scutellar bristles.

Type of subgenus: *Dacus diversus* Coquillett.

*Asiadacus absomus* Hering (1941e: 1) from Burma will fit either here or in *Gymnodacus*. The ♂ abdominal characters have not been studied.

#### **Dacus (Hemigymnodacus) diversus** Coquillett Fig. 6a-e.

*Dacus diversus* Coquillett, 1904, *Proc. Ent. Soc. Wash.* 6: 139. Type-localities: Colombo, Ceylon and Bangalore, India.

*Asiadacus diversa*: Perkins, 1937, *Proc. R. Soc. Qld* 49(9): 57; 1938, *Proc. R. Soc. Qld* 49(11): 134 (as *diversus*).

*Dacus (Gymnodacus) diversus*: Hardy, 1954, *Proc. Ent. Soc. Wash.* 56(1): 18, fig. 6a-c.

The species is readily differentiated by the subgeneric characters in combination with the presence of 3 yellow vittae on the mesonotum and the dimorphism in the coloration of the face in the 2 sexes: with the ♂ face entirely pale yellow and the ♀ with a transverse black band over face. Because of the latter character and the wing markings the ♀♀ fit near *D. (Strumeta) diaphoru* Hsendel from Formosa, and differ by having the black transverse band on the face confined to the concavity on lower 1/3 and with lower margin of face yellow, rather than having the entire lower 1/3 to 1/2 of the face polished black as in *diaphorus*; also by having the femora yellow except for tinges of brown at apices, rather than having the front femora and apical 1/2 to 2/5 of mid and hind femora black. The species has been adequately described by Hardy (1954: 18, fig. 6a-c). It should be noted that the hind tibia of the ♂ lacks the preapical dorsal keel-like development which is so often found in other *Dacus*. One freak ♂ specimen on hand has 3 strong scutellar bristles (borderline *Zeugodacus*). The 5th sternum is short and broad, 3 × wider than long and straight on hind margin. ♂

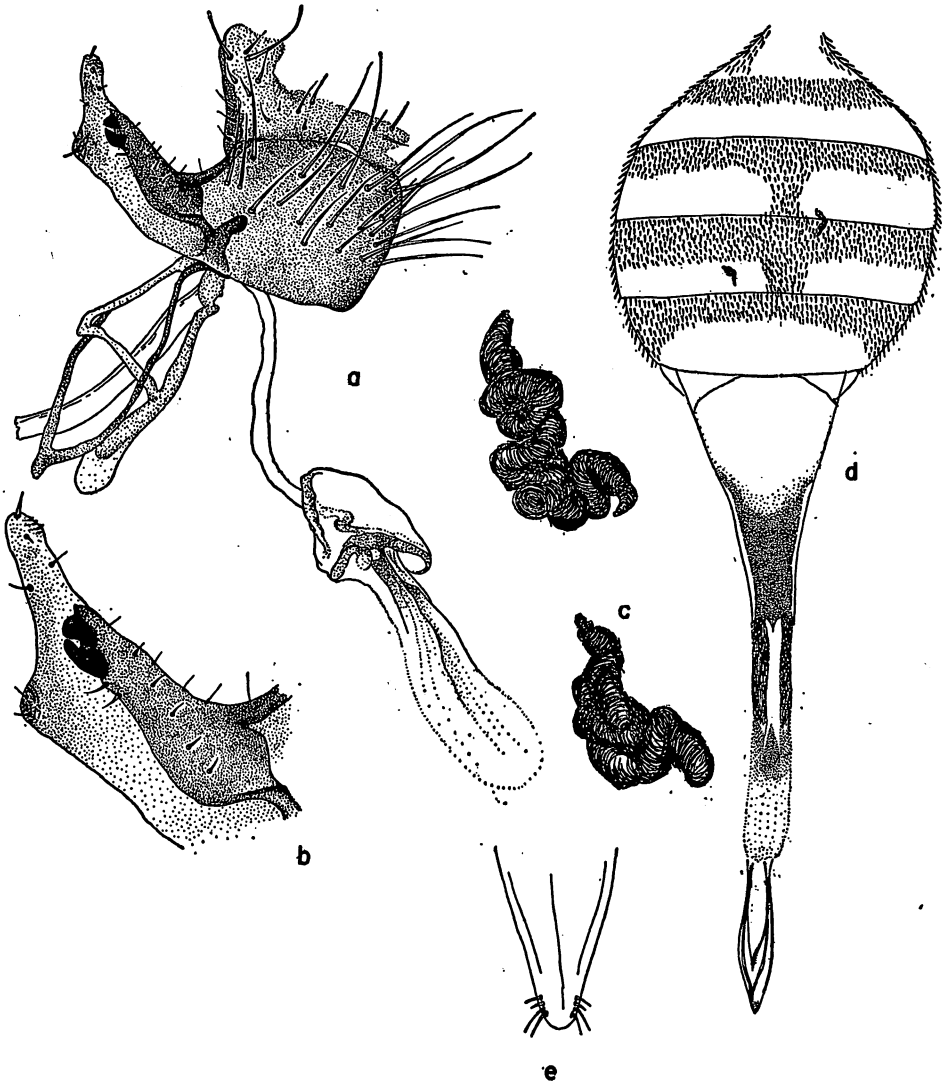


Fig. 6. *D. (Hemigymnodacus) diversus* Coquillett. a. ♂ genitalia; b. ♂ surstylus and 10th sternum; c. ♀ spermathecae; d. ♀ abdomen; e. apex of piercer.

genitalia as in fig. 6a. The surstyli are produced into slender apical lobes and the 10th sternum is almost completely hidden from direct lateral view. The 6th sternum of ♀ is narrow, approximately 5 × wider than long. Basal segment of ovipositor largely brown, yellow at the base and gradually tapered, almost equal in length to terga 3-5 and approximately 1.5 mm long. The extended ovipositor measures slightly over 4.0 mm. The piercer is 1.2 mm long, and is tapered to a sharp point at apex (fig. 6d).

Distribution: Widespread over India, Ceylon and Burma.

Hosts: This species apparently infests a wide range of fruits, ranging from citrus

to cucurbits and is of considerable economic importance in some areas. I have studied a large series of specimens reared from several species of Cucurbitaceae in India.

Twenty-five specimens are on hand from the following localities in THAILAND: Saraburi, 4.III.1963; Bang Khen, VIII-X.1963 and 1965; Choburi, 4.VII.1965; Muak Lek, 29.VIII.1964; Phu Kae, 12.VIII.1965; Petchabon, 31.V.1965; Nan, 10.VII.1963, collected on fruit of *Eugenia malaccensis* and on leaf of *Luffa cylindrica*, R. Kawasaki; and Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

#### Subgenus *Pacifodacus* Drew

*Dacus* (*Pacifodacus*) Drew, 1972, *J. Austral. Ent. Soc.* 2: 12. Type-species: *Asiadacus triangularis* Drew, by original designation.

I had considered *Asiadacus* to be a synonym of *Polistomimetes* Enderlein, except for genital characters they seem to be very similar. Dr R. A. I. Drew has recently had an opportunity to restudy specimens from the type series of *P. minax* Enderlein and found that the posterior lobe of the ♂ surstylus is short, the 5th sternum has a deep concavity on hind margin and the anterior supraalar bristle is lacking. This fits in the *Strumeta* group of subgenera and *Daculus* Speiser is probably a synonym.

Drew erected *Pacifodacus* to include 6 South Pacific species which had previously been placed incorrectly either in *Asiadacus* or *Neodacus*. The following diagnosis of Drew's is adequate: "Dacini with combined lengths of antennal segments less than vertical length of head; abdomen elongate oval; posterior lobe of male surstylus long; abdominal sternite V of male with a slight concavity on posterior margin; one pair of scutellar bristles; prescutellar bristles absent; anterior supraalar bristles present; abdominal tergites free; pecten of cilia present on abdominal tergite III of male."

Two species occur in the area being studied; they are separated by the following key:

#### KEY TO SPECIES OF DACUS (PACIFODACUS) FROM THAILAND

1. Rufous species, with only a short median yellow vitta on mesonotum or with 3 postsutural yellow vittae. A large brown spot fills all or nearly all of apex of cell  $R_5$ ..... **infestus** (Enderlein)
- ..... Mostly black species, with 2 postsutural yellow vittae and without the large apical wing spot (fig. 8c)..... **vinnulus**, n. sp.

#### *Dacus* (*Pacifodacus*) **infestus** (Enderlein), new combination Fig. 7a-d.

*Polistomimetes infestus* Enderlein, 1920, *Zool. Jahrb. (Syst.)* 43: 359. Type-locality: Sumatra. Location of type not known.

This species is differentiated by the very large apical spot in the wing; by having a complete black band along lower portion of face; 3 pairs of inferior fronto-orbital bristles; and lacking the lateral postsutural yellow vittae on mesonotum, only a short median vitta is present. It is remarkably similar in appearance to *Callantra sphaeroidalis* (Bezzi). The wing markings are almost identical. The body markings are rather similar and the abdomen is petiolate, *Callantra*-like. The antennae are not developed as in *Callantra*, the first 2 segments are short as in other *Dacus*.

♂ head yellow, except for the broad shining black band across lower face in area of the concavity, a brown spot at base of each inferior fronto-orbital bristle, and a black mark across

vertex over ocellar triangle. Antennae yellow, tinged faintly with brown on apex of 3rd segment. Third segment about equal in length to face. Three pairs of inferior fronto-orbital bristles, the 2 lower pairs situated close together on lower 1/5 of front. Front about 1/5 longer than wide, measured from median ocellus to anterior median margin. Thorax rufous, except for brown to

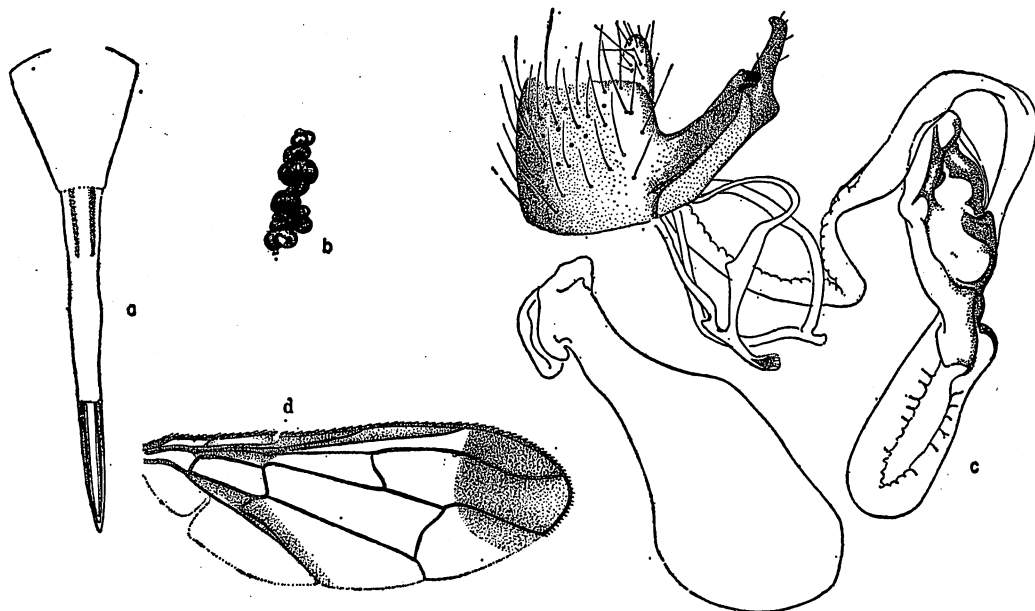


Fig. 7. *D. (Pacifodacus) infestus* (Enderlein). a. ♀ ovipositor; b. ♀ spermatheca; c. ♂ genitalia; d. wing.

black markings on sternopleuron, median portion of mesopleuron and over pteropleuron and hypopleuron. Suture covered on each side by a rather broad wedge of yellow extending from notopleural callus. Postsutural median yellow mark ending slightly before a line drawn between outer postalar bristles; mesonotum otherwise rufous. Scutellum yellow except for a narrow black band at base. Postscutellum and metanotum black on sides, broadly rufous down median portion. Halteres pale yellow. Legs largely rufous, coxae dark brown to black. Front femur with a tinge of brown dorsally at about middle. Front tibiae tinged faintly with brown on the posterobasal portions. The dorsomedian surfaces of middle tibiae, and hind tibiae near apices are tinged faintly with brown. The basal 2/3 of hind and basal 1/3 of middle tibiae are pale yellow. The preapical sensory areas on hind tibiae are densely covered with short pale setae. Costal band complete and with a very large brown spot occupying entire apex of wing (fig. 7d). Costal cells yellow, bare of microtrichia, except in apical portion of 2nd cell. Also, basal portion of cell R and cell M devoid of microtrichia. The section of cell R immediately above cell M is densely covered with microtrichia and colored yellow, with a faint tinge of brown. Cubital streak well developed and occupying entire basal portion of cell M, above vein  $Cu_1$ . Abdomen petiolate, the first 2 terga rather sharply tapered to base, broadest at about segment 4 and distinctly arcuate as seen in lateral view, similar to *Callantra*. Largely yellow, narrowly brown to black on extreme lateral margins of the terga, with an almost crescent-shaped dark brown to black band over base of 2nd tergum and a complete black band across the base of 3rd. Terga 4 and 5 broadly black along posterolateral margins, yellow to rufous medianly except for a narrow black vitta which extends from base of 3rd almost to apex of 5th tergum. Tergal

glands rufous. Fifth sternum about 1/2 wider than long and gently concave on posterior margin. ♂ genitalia as in fig. 7c. The surstyli are extended at apices and the 10th sternum is plainly visible from lateral view.

Length: Body, 7.5-80 mm; wings, 6.9-7.3 mm. One paratype on hand measures: body, 6.2 mm; wings, 5.3 mm.

♀ fitting the description of ♂ in most respects. Basal segment of ovipositor rufous, as seen from direct dorsal view about equal in length to 5th abdominal segment. Measured on venter the basal segment of ovipositor is approximately 1.4 mm long. Two long, coiled spermathecae present (fig. 7b). Piercer rather short and thick but tapered and pointed at apex (fig. 7a), 1.4 mm long. Extended ovipositor (fig. 7a) 4.8 mm.

Length: Body, 7.8 mm; wings, 7.1 mm.

Eight specimens on hand from the following localities: THAILAND: Nakorn-Nayok, 20.XI.1963, no collector given. Allotype ♀, Phu Kae, 19.IX.1933 and 4.VI.1965, no collector given; Nakorn-Patom, 30.VII.1966; Pak Chong, 20.IX.1963; and Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa. LAOS: Dong Dok, 23.VIII.1965, native collector.

**Dacus (Pacifodacus) vinnulus** Hardy, new species      Fig. 8a-c.

This species fits near *bakeri* (Bezzi) from the Philippines in my key to *Neodacus* (1954:7), but the 2 are apparently not closely related. *D. vinnulus* is readily differentiated by having the front distinctly longer than wide, rather than about as broad as long; by having the mesonotum black except for the yellow vittae and a narrow area at side of each humerus, rather than predominantly reddish with "a narrow black stripe, ending at suture; a triangular patch on each side before suture, with base on dorsocentral line and vertex on notopleural line just behind humeral callosities"; by having the costal band not greatly enlarged apically, filling only upper 1/2 of apex of cell  $R_5$ , not broadly filling all of the apex of this cell as in *bakeri*, compare with Bezzi (1919, pl. 1, fig. 8); also the femora are broadly blackened apically, rather than being all yellow-red.

♂. *Head*: Mostly yellow to rufous. Hind portion of occiput brown, a large black spot on each side of face, occupying lower 1/2 of the antennal furrow. A narrow black stripe extends across vertex connecting with the black ocellar triangle. Also with a brown spot on gena immediately below eye margin and a faint tinge of brown at base of each frontal bristle. First antennal segment brown dorsally. Third segment brown, tinged with yellow on basal portion. Two pairs inferior fronto-orbital bristles present. *Thorax*: Shining black in ground color, except for the usual yellow markings and a rufous mark on each side of anterior portion of mesonotum bordering humerus. Thorax gray pubescent. Mesonotum with narrow subshining black vittae extending longitudinally and marking off a pair of submedian gray vittae. Two postsutural yellow vittae present, these are broad, straight-sided, extending from suture distinctly beyond inner postalar bristles. The yellow mark at upper portion of sternopleuron extends posteriorly for a short distance beneath pteropleuron. Halteres pale yellow. *Legs*: Mostly yellow, coxae black, trochanters yellow-brown, tinged with black. Front femur brown to black on apical 1/2 to 3/5, middle femur brown to black on apical 1/2 and hind femur brown to black on apical 1/3. Hind tibiae brown on bases and apices, and each with slightly raised densely brown setose patch before apex on posterodorsal surface. *Wings*: Largely hyaline, with a broad costal band extending from apex of 2nd costal cell through upper apical portion of cell  $R_5$  and filling most of cell  $R_4$  (fig. 8c). Also with a broad dark brown cubital streak occupying basal portion of cell  $R_4$  above cubital vein. Crossvein r-m slightly oblique and situated near apical 3/5 of cell 1st  $M_2$ . Base of cell 1st  $M_2$ , all of cell M, and extreme basal portion of cell R, bare of microtrichia. Area of cell R immediately

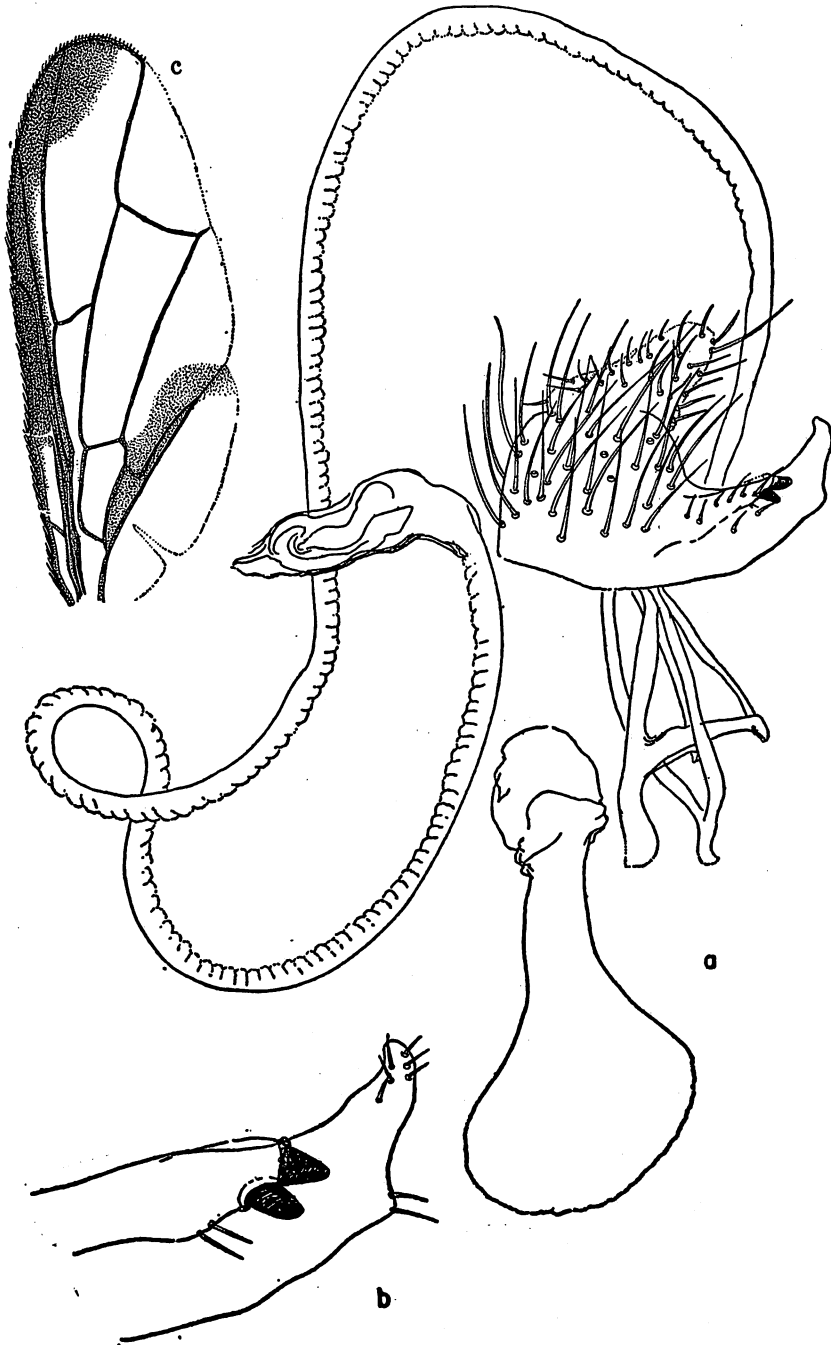


Fig. 8. *D. (P.) vimulus* n. sp. a. ♂ genitalia; b. ♂ surstylus and 10th sternum; c. wing.



above cell M densely covered with microtrichia and brown in color. *Abdomen*: Mostly rufous, terga 1-3 banded with black at bases and along lateral margins, and with a narrow black vitta extending from base of 3rd to apex of 5th tergum; 4th and 5th terga otherwise rufous including the tergal glands. Fifth sternum 2× longer than wide and slightly concave on posterior margin. Genitalia as in fig. 8a-b, with the surstyli developed into prominent lobes at apices.

Length: Body, 6.5 mm; wings, 6.0 mm.

♀. Unknown.

Holotype ♂ and 2 ♂ paratypes from THAILAND: Yala, 15.VIII.1965, Anand.

Type returned to the Thailand Department of Agriculture, Bangkok. Paratypes in the collections of the B. P. Bishop Museum and the University of Hawaii.

### Subgenus *Paratridacus* Shiraki

*Paratridacus* Shiraki, 1933, *Mem. Taihoku Imp. Univ. Fac. Sci. Agr.* **8**: 109. Type-species: *Dacus yayeyamanus* Matsumura, by original designation=*expandens* Walker (1859).

This subgenus is differentiated from *D. (Zeugodacus)* only by secondary sexual characters. The ♂♂ lack the row of long cilia on each side of 3rd abdominal tergum and have no indentation in wing margin at apex of vein  $Cu_1+1st\ A$ .

### *Dacus (Paratridacus) expandens melanius* Hardy & Adachi

*Dacus (Paratridacus) expandens melanius* Hardy & Adachi, 1954, *Pacif. Sci.* **8**: 157, fig. 4. Type-locality: Singapore. Type in U.S. National Museum.

The subspecies *melanius* is differentiated by having the mesonotum extensively marked with black. The area between the postsutural yellow vittae is entirely black except for a brief interruption just behind the suture.

This has also been recorded from Kuala Lumpur, Malaya. Host: *Garcinia dulcis*.

### Subgenus *Strumeta* Walker

*Bactrocera* Guérin-Méneville, 1832, *Voy. de Coquille Zool.* **27**, fig. 6 (illustration); 1838, op. cit. **28**: 301 (description). Type-species: *longicornis* Guérin-Méneville, by monotypy, nomen dubium.

*Dasyneura* Saunders, 1841, *Trans. Ent. Soc. Lond.* **3**: 60, nomen oblitum, under the provisions of Art. 23b of the International Code. Type-species: *zonata* Saunders, by monotypy.

*Strumeta* Walker, 1857, *Proc. Linn. Soc. Lond.* **1**: 33. Type-species: *conformis* Walker, by monotypy. Equals synonym of *Dacus umbrosus* Fabricius (Hardy & Adachi, 1954, *Pacif. Sci.* **8**: 184).

*Chaetodacus* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 93. Type-species: *Musca ferruginea* Fabricius, by original designation. = syn. of *Dacus (Strumeta) dorsalis* Hendel.

*Dacus (Marquesadacus)* Malloch, 1932, *Bull. B. P. Bishop Mus.* **98**: 1145. Type-species: *Chaetodacus perfuscus* Aubertin, by original designation.

*Sinodacus* Zia, 1936, *Chinese J. Zool.* **2**: 157. Type-species: *hochii* Zia, by original designation.

*Dacus (Strumeta)*: Hardy, 1951, *Pacif. Sci.* **5**: 142.

The members of this subgenus are characterized by having just 1 pair each of scutellar, prescutellar, and supraalar bristles; by having a row of prominent cilia (stridulatory bristles) on each side of 3rd tergum of ♂; and with a distinct notch (indentation) at end of vein  $Cu_1+1st\ A$  (supernumerary lobe of other authors).

This is the largest subgenus of *Dacus*, with about 150 known species from the Oriental (including Japan and Ryukyu and Bonin Islands), Australasian and Pacific Regions.

KEY TO SPECIES OF DACUS (STRUMETA) KNOWN FROM THAILAND AND  
BORDERING COUNTRIES

1. Wings without complete crossbands (pl. 1, fig. 2). .....2  
 Wings with 1 or more complete crossbands (pl. 1, fig. 4) .....20
- 2(1). Face marked with black. Third tergum of ♂ with row of prominent setae on each  
 posterolateral margin. ....3  
 Face entirely yellow. ....28
- 3(2). Mesonotum with prominent postsutural yellow vittae.....4  
 Mesonotum with no postsutural yellow vittae. Malaya. ....**fillyardi** (Perkins)
- 4(3). Mesonotum with 2 postsutural yellow vittae. ....5  
 Mesonotum with 3 postsutural yellow vittae. ....21
- 5(4). Costal band continuous at least as a narrow band to wing apex .....6  
 Costal band interrupted in cell R<sub>3</sub> beyond tip of vein R<sub>2+3</sub> (pl. 1, fig. 2) or lacking  
 beyond cell Sc (pl. 1, fig. 6). ....23
- 6(5). Costal band expanded at apex forming a spot which extends below vein R<sub>4+5</sub> in apical  
 portion of cell R<sub>5</sub>. Abdomen rufous, lacking distinct black marks. Front broad,  
 measured from median ocellus to anteromedian edge, it is just slightly longer than  
 wide. Legs yellow. Ovipositor of ♀ trilobed at apex (fig. 17f). Formosa, Malaya,  
 Thailand, and Laos. ....**latifrons** (Hendel)  
 Not as above; if costal band is slightly expanded the abdomen is mostly black. ....7
- 7(6). Front and middle femora largely or entirely black, hind femora broadly black at  
 apices. ....8  
 Femora largely or entirely yellow, not more than tinges of brown at apices. ....11
- 8(7). Face with 2 black spots, or with 1 or 2 black transverse bands. Postsutural yellow  
 vittae straight-sided, extending beyond postalar bristles. ....9  
 Face shining black except for narrow margins along eyes. Postsutural yellow vittae  
 short, tapered to sharp point posteriorly and ending well before postalar bristles.  
 Malaya, Thailand and Laos. ....**nigrotibialis** (Perkins)
- 9(8). Face with 1 or 2 transverse brown to black bands (fig. 12a). ....10  
 Face with a large black spot in each antennal furrow. Tergal glands on 5th abdominal  
 segment dark brown. Thailand. ....n.sp. rel. **nigrotibialis** (Perk.)
- 10(9). Face with a single transverse band, in the concavity. Terga 1, 2 and 5 mostly yellow to  
 rufous. Tergal glands rufous. Middle femora brown to black. Burma. ....  
 ....**incisus** Walker  
 Face with 2 transverse bands (fig. 12a). Abdomen black except for yellow apex of  
 5th tergum. Tergal glands black. Middle femora broadly yellow at bases. Formosa  
 and Thailand. ....**cilifer** Hendel
- 11(7). Terga 3-5, including tergal glands, and base of ovipositor black except for a faint  
 yellow tinge at extreme apex of 5th. Small species, body, 4.0 mm. Mesonotum  
 shining black, except for yellow postsutural vittae, marking of rufous on each side  
 over suture, and a pair of rufous submedian vittae extending over anterior 1/2.  
 Tibiae black. Basal segment of ovipositor short, as seen from above shorter than  
 5th tergum. Thailand. ....n.sp. rel. **parvulus** Hendel  
 Not fitting the above. ....12
- 12(11). Costal band narrow, scarcely, if at all, extending into cell R<sub>3</sub> except at wing apex.  
 ....13  
 Costal band broad, filling all, or nearly all, of cell R<sub>3</sub>. ....19
- 13(12). Median portion of mesonotum black. ....14  
 Median portion of mesonotum yellow to rufous in ground color. ....18
- 14(13). ♀ ovipositor pointed at apex. ....15

- Ovipositor trilobed at apex. Borneo, Singapore, Laos, Cambodia and Philippine Islands.  
 .....**propinquus** Hardy & Adachi
- 15(14). Piercer of ovipositor yellow, long, slender, straight-sided, gradually tapered to a sharp point at apex and 9 to 13 × longer than wide. Postsutural yellow vittae broad, straight-sided, extending beyond inner postalar bristles. Yellow spot on sternopleuron extending a short way under the pteropleuron. ....16  
 Piercer brown on sides, comparatively short and thick, 4.5–5 × longer than wide, rather abruptly tapered at apex (fig. 16a). Postsutural yellow vittae rather narrow, slightly tapered, not extending beyond postalars. Yellow spot on sternopleuron small, not extending under pteropleuron. Philippines, Vietnam, Thailand. ....  
 .....**dorsaloides** Hardy & Adachi
- 16(15). In situ, basal segment of ovipositor (measured from above) slightly longer than 5th tergum. Extended ovipositor approximately 6.0 mm. Philippine Islands, Indonesia, Malaya. ....**pedestris** (Bezzi)  
 Basal segment of ovipositor about 2/3–3/4 of 5th tergum as seen from above. Extended ovipositor 4.5–4.7 mm. ....17
- 17(16). Costal band not extending below vein  $R_{3+4}$  except at apex of wing (fig. 15a). Wide-spread over Orient and Pacific. ....**dorsalis** Hendel  
 Costal band extending along underside of  $R_{3+4}$  its entire length. Philippines to Malaya. ....  
 .....**occipitalis** (Bezzi)
- 18(13). Tibiae fulvous. Third section of costa (cell Sc) about 1/2 longer than 2nd costal section (pl. 2, fig. 11). Median portion of mesonotum rufous in ground color. Ovipositor elongate, over 9.0 mm. Apex of piercer trilobed. Large species, body 8.0–9.0 mm. Thailand. ....**aethriobasis**, n.sp.  
 Tibiae brown, middle pair yellow apically. Third costal section scarcely longer than 2nd. A yellow median band extending full length of mesonotum. Ovipositor short, approximately 3.5 mm, apex of piercer sharp-pointed. Smaller species, 6.0–6.4 mm. Malaya. ....**arecae** Hardy & Adachi
- 19(12). Abdomen rufous, with a black band on bases of terga 2 and 3 and a black median vitta from 3 over 5. Tergal glands rufous. Postsutural yellow vittae broad straight-sided. Femora all yellow. Thailand. ....n.sp. ♂ rel. **limbiferus** (Bezzi)  
 Abdomen mostly brown to black, tinged with rufous down middle of terga 4–5 and an indistinct brown median longitudinal vitta. Tergal glands dark reddish brown to black. Postsutural yellow vittae narrow, tapered posteriorly and ending at inner postalar bristles. Apices of femora brown. Thailand. ....**citimus**, n.sp.
- 20(1). Wings with 1 crossband, over r-m and m crossveins (pl. 1, fig. 4) and lacking a prominent costal band. Solomon Islands, Indonesia, New Britain, Micronesia, Malaya. ....**frauenfeldi** Schiner  
 Wings with 3 complete crossbands and a distinct costal band (pl. 2, fig. 12). Wide-spread over Southeast Asia and South Pacific. ....**umbrosus** Fabricius
- 21(4). Wing lacking brown markings over the crossveins (fig. 9a). ....22  
 Wing with a broad brown mark over m crossvein and narrowly marked with brown over r-m. Widespread (note: = *Zeugodacus* according to ♂ genitalia). ....  
 .....**cucurbitae** Coquillett
- 22(21). Costal band narrow, only slightly wider at apex (pl. 1, fig. 3). ....26  
 Costal band expanded into a large apical spot filling all of cell R. Piercer of ovipositor as in fig. 9c. Thailand. ....**aculeus**, n.sp.
- 23(5). Wing with costal band interrupted or very narrow in cell R but with a brown mark on costa at apices of cells  $R_2$  and  $R_3$  (pl. 1, fig. 4). ....24  
 Costal band represented only by a yellow-brown mark in cell Sc. Burma, Thailand, Vietnam. ....(*pl. 1, fig. 6.*) .....**tuberculatus** (Bezzi)

- 24(23). Face with 1 or 2 black transverse bands. Mesonotum conspicuously marked with black. ....25  
 Face with a black spot in each antennal furrow. Mesonotum rufous except for yellow vittae. India, Thailand, Laos, Vietnam.....**zonatus** (Saunders)
- 25(24). Face with 1 crossband in the furrow. Abdomen rufous except for black basal marks on terga 2 and 3 and a median black vitta from terga 3 over 5. Legs yellow. India, Pakistan, Ceylon, Thailand. ....**correctus** (Bezzi)  
 Face with 2 black transverse bands. Abdomen all black. Front femora brown to black, apices of middle and hind femora broadly brown to black. Formosa, Thailand, Laos. ....**cilifer** (Hendel)
- 26(22). Face with a black transverse band or with lower 1/3 to 1/2 polished black. ....27  
 Face with 2 black spots. Vietnam. ....**yoshimotoi**, n.sp.
- 27(26). Lower 1/3 to 1/2 of face polished black, in ♂ usually entire median and lower portion black. Front femora and apical 1/2 to 2/5 of middle and hind femora black. Formosa, Thailand, Malaya. ....**diaphorus** (Hendel)  
 Black transverse band on face confined to concavity at lower 1/3, lower margin of face yellow. Femora yellow, except for tinges of brown at apices (♀ ♀). India, Ceylon, Thailand. ....**Dacus (Hemigymnodacus) diversus** Coquillett
- 28(2). ♂ with a row of strong posterolateral setae on 3rd tergum. No glands on 5th tergum. Wing with a bulla in cell  $M_1$  above vein  $Cu_1$ . If ♀, the face is all yellow. ....29  
 ♂ lacking row of setae on 3rd tergum. Tergal glands present. No bulla in wing. (♀ ♀ have the face marked with black and will run elsewhere). Ceylon, India, Thailand.....**Dacus (Hemigymnodacus) diversus** Coquillett
- 29(28). Predominantly rufous-bodied species. Costal band not expanded at apex. Costal and basal cells hyaline. Third antennal segment obliquely truncate at apex (fig. 18b). Philippines and Malaya. ....**mcgregori** (Bezzi)  
 Predominantly black-bodied. Costal band greatly expanded, filling entire apical portion of cell  $R_5$  (fig. 11a). Costal and basal cells dark brown. Third antennal segment rounded at apex. Thailand. ....**bulliferus**, n.sp.

**Dacus (Strumeta) aculeus** Hardy, new species      Fig. 9a-c.

This species fits near *apicalis* de Meijere, from Java, but differs by having the abdomen entirely black. The ♀ of *apicalis* has not been studied and it is probable that the ovipositor also is different in this species. The other details appear to fit de Meijere's original description of *apicalis* (1911:376). I do not have specimens on hand from Java for comparison.

♀. *Head*: Yellow, front with black spots at bases of bristles and with 3 pairs of inferior fronto-orbitals. Face with a prominent black spot on each side extending almost to epistoma. Antennae yellow, tinged faintly with brown at apex of 3rd. *Thorax*: Largely rufous, covered with gray pubescence and fine yellow pile, with a pair of black vittae on each side between the median and lateral postsutural yellow vittae. These are marked off by rufous lines extending between the black vittae. Also, a narrow brown to black vitta extends down the median portion from the median yellow vitta to inner scapular bristles. Median postsutural vitta broad, blunt at each end and extending from just behind suture to just before prescutellar bristles. Lateral yellow vittae broad, extending to hind margin of mesonotum. Propleura and anterior portion of each mesopleuron, behind the spiracle, yellow, densely gray pubescent. The yellow mark at upper portion of sternopleuron rather large, extending slightly beneath pteropleuron. Scutellum entirely yellow except for a narrow black basal line. *Legs*: Yellow with front and hind tibiae tinged with brown and a slight tinge of brown at bases of middle tibiae. *Wings*: Largely hyaline, costal band broad,

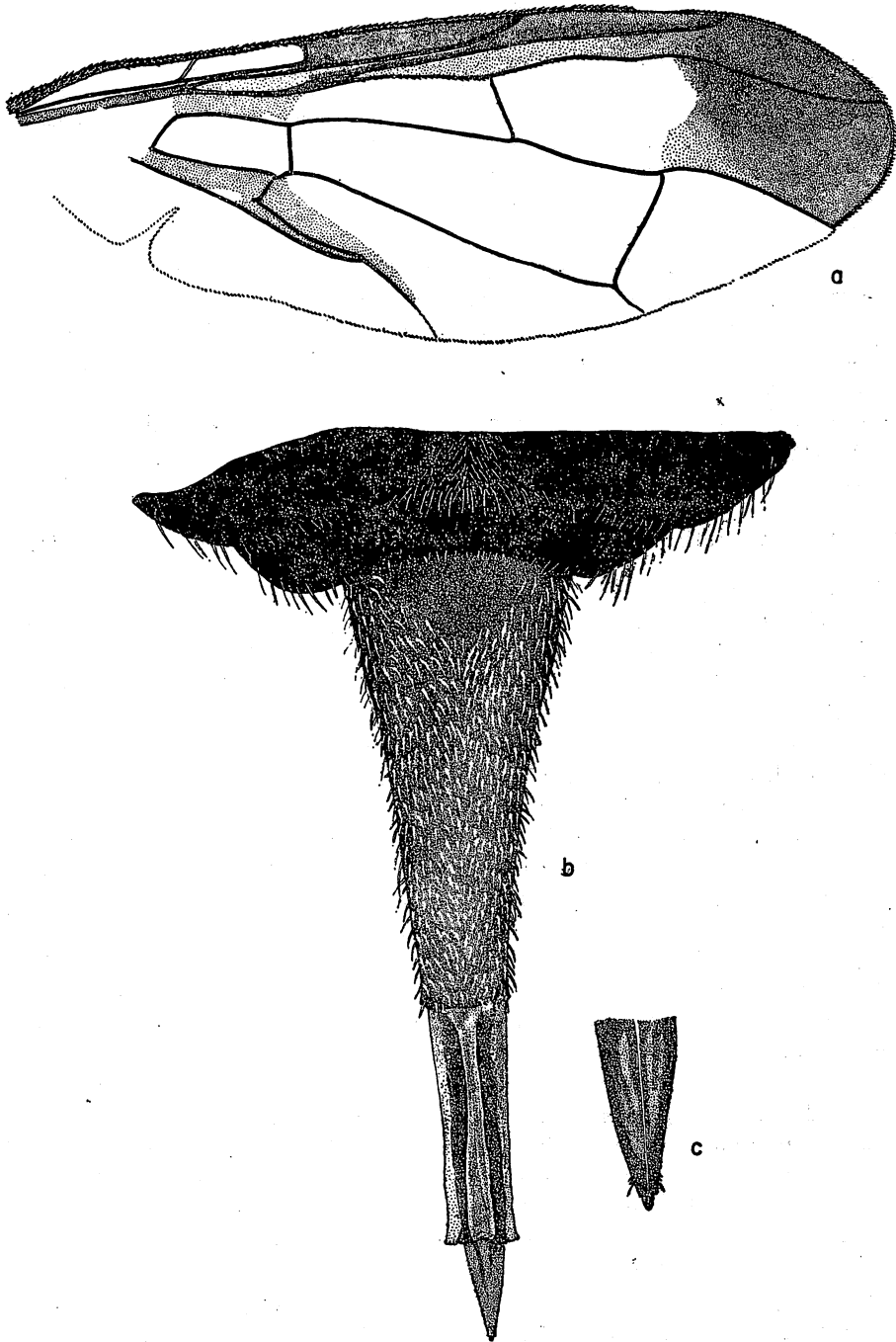


Fig. 9. *D. (Strumeta) aculeus* n. sp. a. wing; b. ovipositor; c. apex of piercer.

filling cell R<sub>3</sub> and greatly expanded at apex with a large brown spot filling entire apical portion of cell R<sub>3</sub> beyond a level with m crossvein (fig. 9a) (except for a very narrow margin at the extreme apex). Lower portion of m crossvein faintly tinged with brown. *Abdomen*: Black, with a faint tinge of rufous on first 2 terga. Basal segment of ovipositor dark brown to black on basal 1/2, rufous apically. The base is approximately equal to abdominal terga 4-5, and 1.5 mm long as seen from dorsal view (fig. 9b). The piercer has not been extruded for study, but the tip is visible on the type. It is shaped as in fig. 9c.

Length: Body, 7.8 mm; wings, 7.2 mm.

♂. Unknown.

Holotype ♀, THAILAND: Bang Khen, 25. IX. 1965, no collector given.

Type returned to Kasetsart University, Bangkok.

One ♂ specimen is on hand from Pak Chong, Thailand, 7. III. 1963, which runs to *apicalis* and seems to fit de Meijere's original description except that the front has black spots at the bases of the bristles and the apical wing spot is not so enlarged, filling only about the upper 1/2 of cell R<sub>3</sub> rather than the entire apex of the cell. It probably represents an undescribed species but it will be necessary to obtain further specimens and to compare with specimens from Java.

**Dacus (Strumeta) aethriobasis** Hardy, new species    Fig. 10a-e; pl. 2, fig. 11.

This species closely resembles *D. moluccensis* (Perkins) from the Molucca, Solomon and Bismarck Islands. *D. moluccensis* has been resurrected from synonymy with *froggatti* Bezzi and its status discussed in a report of the Tephritidae collected by the Danish Noona Dan Expedition (Hardy 1970). Like *moluccensis*, this species is large, has the entire median portion of mesonotum rufous in ground color, the face with 2 black spots, and legs all yellow. It differs from *moluccensis* by having the costal and basal cells completely hyaline, rather than being distinctly tinged with yellow. Cell R almost completely bare with just a small clump of setae along upper edge above cell M, not with cell R densely covered with microtrichia to the base of cell M. Cell M just slightly over 2× longer than wide, rather than approximately 2× longer than wide, and almost as broad at base as at apex rather than being distinctly narrowed basally. Costal band narrow, not extending below vein R<sub>2+3</sub> except at apex, rather than costal band extending rather broadly through entire length of cell R<sub>3</sub>. Cubital streak lacking, the yellow to brown coloring confined to cell Cu<sub>1</sub>; in *moluccensis* a broad cubital streak is present, extending through the basal portion of cell M<sub>4</sub> above vein Cu<sub>1</sub>. Abdominal terga 3-5 broadly blackened on the sides with submedian yellow markings and with tergal glands on 5th dark brown, in *moluccensis* the sides of terga are rather narrowly blackened and the tergal glands are rufous, tinged faintly with brown. Also, in *aethriobasis* the 5th sternum of ♂ is deeply cleft, the concavity on hind margin extends 3/4 the length of segment and the 4th sternum is as wide as long, quadrate in shape and differences are evident in the ♂ genitala. In *moluccensis* the 5th sternum has a V-shaped cleft on hind margin extending about 1/2 the length of sclerite and the 4th sternum is distinctly wider than long.

♂. *Head*: Yellow, except for large oval spots on the face, and for faint brown markings at bases of frontal bristles. Frontal bristles black, vertical and genal bristles yellow. Antennae yellow, tinged faintly with brown at apices of 3rd segment. Third segment elongate, almost 5× longer than wide. *Thorax*: Predominantly red, tinged faintly with brown in ground color, with

2 broad postsutural yellow vittae which extend distinctly beyond inner postalar bristles. Mesonotum thickly covered with yellow-white hairs. Scutellum entirely yellow except for a narrow band of black at the base. The yellow mark on upper portion of the sternopleuron continuous with mark on mesopleuron is rather elongate, 2× longer than wide and continued posteriorly beneath a portion of pteropleuron. Halteres pale yellow. Metanotum and postscutellum black, covered

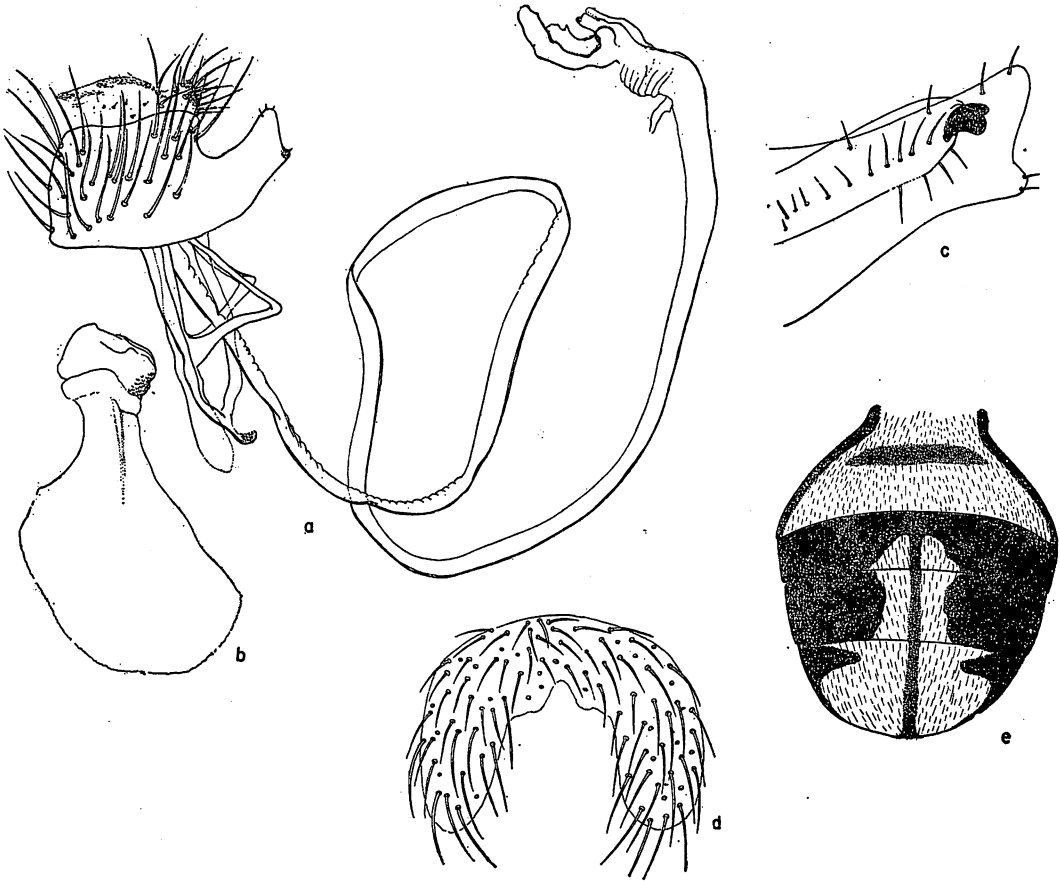


Fig. 10. *D. (S.) aethriobasis* n. sp. a. ♂ genitalia; b. ♂ ejaculatory apodeme; c. ♂ surstylus and 10th sternum; d. ♂ 5th sternum; e. abdomen.

with gray pubescence and with a tinge of rufous down median portion. *Legs*: Entirely yellow except for a tinge of brown along posterior and anterior margins of front tibiae, also with bases of the mid and hind tibiae tinged with brown to black. Hind tibia with a prominent preapical sensory structure located on the posterodorsal surface, this consists of a patch of short scale-like setae and a slight ridge. *Wings*: Almost entirely hyaline, markings as noted above and as in plate 2, fig. 11. *Abdomen*: First 2 terga yellow, marked with brown basally and on extreme lateral margins. Terga 2-5 broadly brown on sides with yellow to rufous submedian markings, separated by a narrow black vitta extending from base of 3rd almost to apex of 5th (fig. 10e). Tergal glands brown, tinged with rufous. Fifth sternum deeply cleft on hind margin, the concavity extends 3/4 the length of segment (fig. 10d). Fourth sternum quadrate. All sterna brown. Genitalia as in fig. 10a. The surstylus developed into 2 short, rounded lobes at apex (fig. 10c). Ejaculatory apo-

deme broadly expanded on 1 side (fig. 10b).

Length: Body, 7.25-8.0 mm; wings, 6.7-7.2 mm.

♀. Unknown.

Holotype ♂, THAILAND: Trang, 15.IX.1965, Arun. Paratypes 8 ♂♂, 4 same data as type and 1 each collected in methyl eugenol trap from the following localities in Thailand by R. Kawasaki: Khon Kaen, 25.VI.1963; Lang Suan, 17.VII.1963; Hat Yai, 21.VII.1963; and from W. MALAYSIA: Kedah St., 1.IX.1963, T. Hamada.

Type returned to the Thailand Department of Agriculture collection, Bangkok. Paratypes in the collections of the National Institute of Agricultural Science, Tokyo, Bishop Museum, U.S. National Museum, and the University of Hawaii.

### **Dacus (Strumeta) arecae** Hardy & Adachi

*Dacus (Strumeta) arecae* Hardy & Adachi, 1954, *Pacif. Sci.* 8(2): 161, fig. 5a-d. Type-locality: Singapore. Type in U.S. National Museum.

This species fits in the *dorsalis* complex but differs by its smaller size, consistently paler color, and by the short stubby ovipositor of the ♀. A broad yellow median band extends the entire length of the mesonotum. It fits nearest to *moluccensis* (Perkins) but is much smaller; the tibiae are brown, except for the yellow apices of the middle pair, in *moluccensis* all tibiae are yellow; by having the 3rd costal section (subcostal cell) only slightly longer than the 2nd costal section, rather than about 1.5 × longer as in *moluccensis*; and by having the ovipositor short and stubby, approximately 3.5 mm in length with the apex sharp-pointed, in *moluccensis* the ovipositor is elongate, over 9.0 mm in length and the apex is trilobed. For a complete description and figures, refer to the original.

Distribution: Known only from Malaya.

Host: The larvae of this species feeds in the nuts of betel nut palm, *Areca catechu* L.

### **Dacus (Strumeta) bulliferus** Hardy, new species Fig. 11a.

This species fits in a complex with *mcgregori* (Bezzi) from the Philippines and Singapore, and *peterstoni* Hardy from the Philippines because of the development of the strange bulla in cell  $M_4$  above vein  $Cu_1$  (fig. 11a), and by having no glands developed on the 5th tergum. It is readily differentiated from *mcgregori* by having the thorax black except for the usual yellow markings, rather than having the mesonotum chiefly or entirely rufous, and the pleura predominantly so. The 3rd antennal segment is normal in shape, 3 to 4 × longer than wide, rather than obliquely truncate at apex, short and thick, scarcely over 2 × longer than wide as in *mcgregori*. The costal band is greatly expanded into a large brown mark which fills the entire apical portion of cell  $R_5$ , in *mcgregori* the costal band is not broadened at apex and extends as a narrow band around the tip of wing (fig. 11a). The costal and basal cells are dark brown; in *mcgregori* they are hyaline. Also the sides of the abdomen are broadly black, whereas in *mcgregori* they are mostly rufous. It differs from *peterstoni* Hardy by having the posteromedian portion of the mesonotum broadly shining black; submedian black vittae on mesonotum narrowed anteriorly and not reaching front margin of mesonotum; postsutural yellow vittae not continuous as a unicolored mark extending beyond suture over humerus;



middle femora entirely yellow and mid and hind tibiae yellow except for a tinge of brown basally.

♂. *Head*: Yellow except for a brown tinge on the posterior portion of the occiput. No brown spots on the front and front rather narrow, nearly 2× longer than wide as measured from median ocellus to anteromedian margin. Face entirely shining yellow, only slightly concave in median portion as seen from lateral view. Antennae yellow except for a tinge of brown at the apices; 3rd segment 3 to 4× longer than wide. Palpi yellow to rufous and almost devoid of setae. Two pairs inferior fronto-orbital bristles. *Thorax*: Predominantly black in ground color, mesonotum

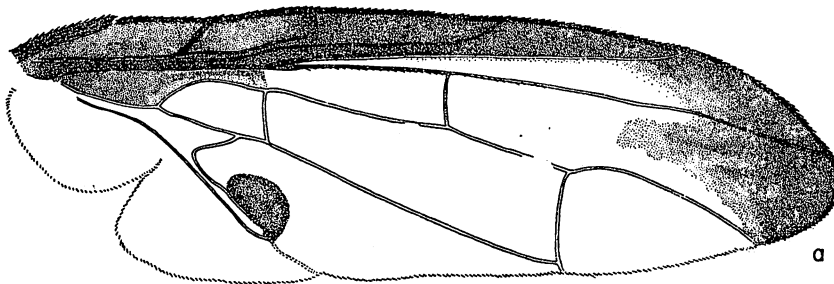


Fig. 11. *D.(S.) bulliferus* n. sp. a. wing.

broadly shining black on posteromedian 1/4 and with 2 submedian black vittae which extend almost to anterior margin and which narrow slightly anteriorly, also a narrow black median vitta. Median area densely gray pubescent, almost obscuring the mostly rufous ground color; also with a densely gray pubescent area directly behind humerus to the suture, covering a rufous ground color. Postsutural yellow vittae broad, straight-sided, extending to inner postalar bristle. Anterior portion of notopleural callus shining black, continuous with a black mark behind each humerus and with a black streak extending behind the suture in line with the anterior supraalar bristles. The lateral areas of the mesonotum ventral to the anterior supraalars are rufous. Mesonotum also black along entire posterior margin. Pleura black except for the yellow mark over mesopleuron onto upper portion of sternopleuron, and the yellow mark over metapleuron and pleurotergon. The scutellum entirely yellow except for a narrow black basal band. Metanotum and postscutellum black. Halteres yellow. *Legs*: Entirely yellow except for brown mid and hind coxae and a tinge of brown at bases of mid and hind tibiae. Hind tibiae lacking preapical anterodorsal ridges which are present on most ♂ *Dacus*. *Wings*: Entire costal margin from base to apex dark brown, the brown coloration extends through base of cell R and expands at apex of wing broadly filling apical portion of cell R. No distinct cubital streak present, the cubital cell is faintly tinged with yellow, but a large broad bulla is present just above cubital vein (fig. 11a). *Abdomen*: Peculiarly shaped, distinctly narrowed behind segment 3, 4th and 5th segments narrower than 2 and 3. First tergum rufous, black on lateral margins, 2nd tergum rufous with a black band along its base and along extreme lateral margins. Remainder of terga broadly blackened on the sides, tinged with rufous submedianly and with a black median vitta extending from base of 3rd to apex of 5th. The genitalia have not been relaxed for study.

Length: Body, 5.0 mm; wings, 4.3 mm.

♀. Unknown.

It should be noted that *D. impunctatus* de Meijere from Java would appear to be similar to *bulliferus* but the costal band is not enlarged at apex and de Meijere made no mention of a bulla being present.

Holotype ♂ (BISHOP 9947), THAILAND, Song Khla, 19.VII.1963, collected on *Ficus maltissima*, R. Kawasaki.

Type deposited in B. P. Bishop Museum.

**Dacus (Strumeta) cilifer** Hendel\* Fig. 12a-f; pl. 1, fig. 1.

*Dacus cilifer* Hendel, 1912, *Suppl. Ent.* 1: 15, pl. 1, fig. 1. Type-locality: Formosa. Type ♂ in the Deutsches Entomologisches Institut, Eberswalde. I have studied the type.

A series of specimens on hand from Thailand, Vietnam and Laos compare with *cilifer*, except that in the type ♂ the costal band is broken in base of cell  $R_3$ , whereas in all the specimens on hand from Thailand the costal band continues as a very narrow brown line along the margin of cell  $R_3$ . The allotype ♀ from Formosa has the costal band narrowed as in the specimens on hand from Thailand; also Hendel's figure shows the narrowed but continuous costal band. I am keying this into separate parts of my key to take care of this discrepancy. It is obviously slightly variable. This species is closely related to *incisus* Walker, from Burma, but differs by having 2 transverse bands across face (fig. 12a), rather than with a single band across facial concavity; also, by having the abdomen black, except for narrow apices of 5th tergum and tergal glands black. In *incisus*, terga 1,2 and 5 are mostly yellow to rufous and the tergal glands are rufous.

This species is readily differentiated by the presence of the bands on the face, by the very narrow, or sometimes interrupted, costal band on the wing (pl. 1, fig. 1), and by the predominantly black body and legs. The markings on face are as in fig. 12a. Mesonotum shining black in ground color, rather distinctly gray pubescent in the area before suture. The lateral brown vittae are straight-sided and extend beyond inner postalar bristles. The white mark over pleuron comparatively narrow, occupying nearly 2/3 width of upper portion of sclerite; anterior portion broadly black. The spot at upper portion of sternopleuron small but continues posteriorly beneath pteropleuron. Front femora brown, except for narrow yellow apices. Middle femora brown on apical 2/3 and hind femora brown on apical 1/3. Hind tibiae brown. Wings as noted above and as in pl. 1, fig. 1. Abdomen black, except for extreme apex of 5th tergum which is yellow. The tergal glands are black. Sterna entirely dark brown to black, 5th sternum of ♂ 3× wider than long, gently concave on posterior margin. Genitalia of ♂ as in fig. 12d-f. The ejaculatory apodeme is broadly expanded distally. Basal segment of ♀ ovipositor rufous, tinged with brown basally and approximately 1/2 longer than the 5th tergum as seen from above. As seen from ventral view, the base of ovipositor is 1.2 mm long. The piercer is short, thick, sharply pointed at apex (fig. 12b), but with a prominent subapical point on each side (fig. 12c), and is 1.4 mm long. The extended ovipositor measures 4.2 mm.

Length: Body, 4.75-6.0 mm; wings, 4.5-5.7 mm.

Twelve specimens on hand from the following localities in THAILAND: Chantaburi, 18-20. VI. 1969, J. J. S. Burton; Thap Sakoe, 15. VI. 1963, collected on *Citrus aurantium* f. *sekkan* and *Citrus tangerina*, R. Kawasaki; Donburi, 28. VII. 1963, collected on *Eugenia malaccensis*, R. Kawasaki; Nan, 10. VI. 1963, collected on *Eugenia malaccensis* R. Kawasaki; Phu Kae, 15. V, 1963; Chiangmai Prov., Chiangdao, 5-11. IV. 1958, T. C. Maa; and 1 in British Museum from Thailand: Pleum Chitr. Five specimens from LAOS: Muong Sing, NW of Luang Prabang, 650 m, 6-10. VI. 1960, S. & L. Quate;

\*According to Drew's classification (1972) based upon the ♂ genitalia this will not fit in *Strumeta*. A new subgenus may have to be erected for it.

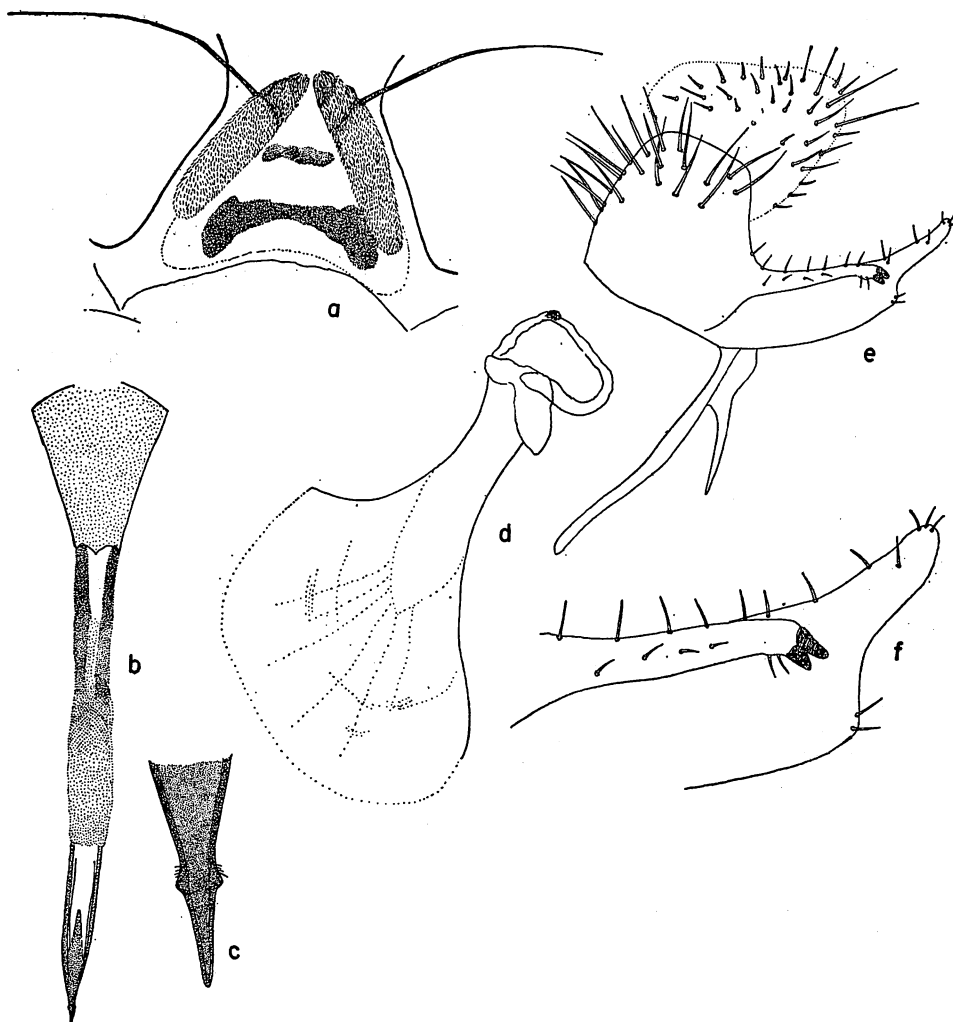


Fig. 12. *D. (S.) cilifer* Hendel. a. face; b. ovipositor; c. apex of piercer; d. ♂ ejaculatory apodeme; e. ♂ genitalia; f. ♂ surstylus and 10th sternum.

Sayaboury Prov., Muong Sayaboury, 300 m, IV. 1968, F. G. Howarth; Sayaboury Pr ov., Ban Nala, 15 km N of Muong Sayaboury, 350 m, 3. IV. 1968, F. G. Howarth; also 1 from N. VIENTNAM: Tonkin, Mt Bavi, in Paris Museum.

**Dacus (Strumeta) new species? close to *cilifer* Hendel**

One ♂ specimen on hand from Nakornsawan, Thailand, 12.IV.1963, would run to *cilifer* except that the tergal glands of the 5th segment are yellow to rufous and the posterior lateral margins of terga 3 and 4 are rufous in ground color. Also, the ovipositor base is very elongate and tubular, almost straight-sided, and as viewed from above the basal segment is almost as long as terga 2-5. The basal segment measured on the ventral

margin is 2.5 mm in length. Also, the costal band is slightly broader than in *cilifer*; at its widest point, it is scarcely broader than at the apex of vein  $R_{2+3}$ . The species is not being described until further specimens can be seen. The specimen has been returned to Kasetsart University, Bangkok.

**Dacus (Strumeta) citimus** Hardy, new species Fig. 13a-d.

This species fits near *D. limbiferus* Bezzi from the Philippines, but differs by the

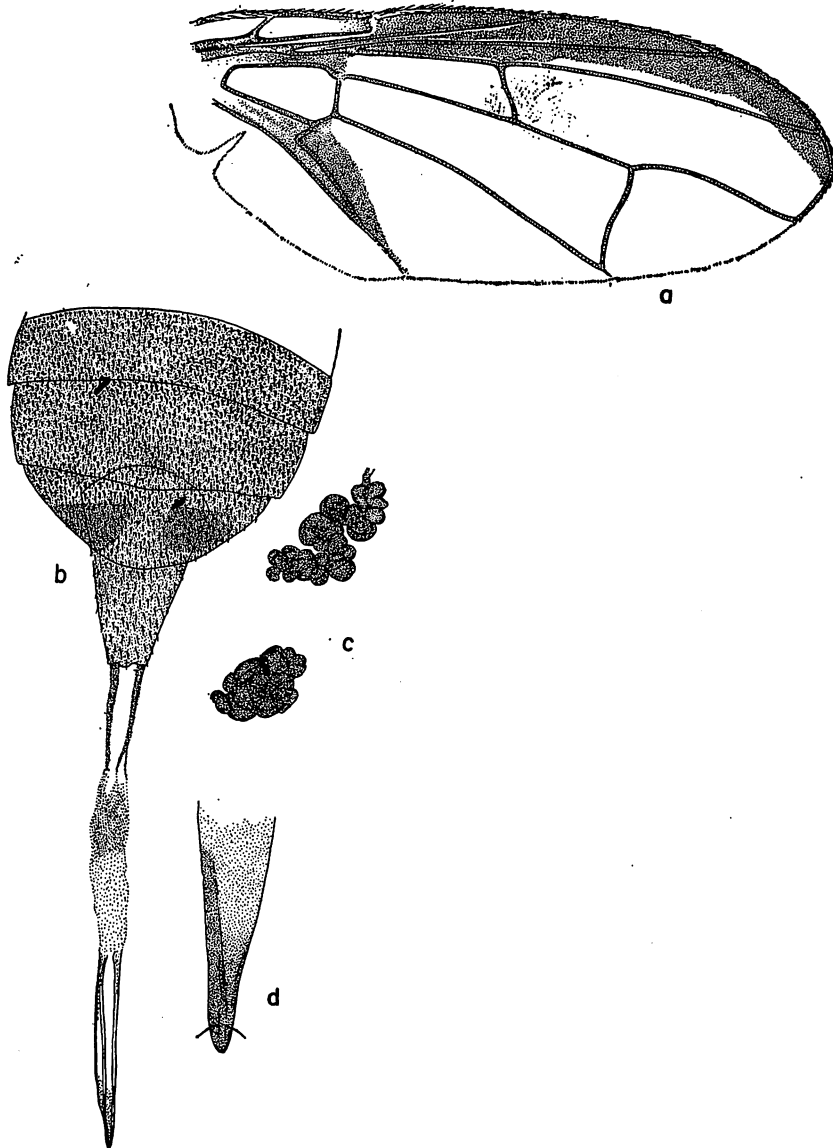


Fig. 13. *D. (S.) citimus* n. sp. a. wing; b. ovipositor; c. ♀ spermathecae; d. apex of piercer.

costal band not filling all of cell  $R_3$ ; postsutural yellow vittae narrow, slightly tapered posteriorly, rather than broad straight-sided; dorsum of thorax entirely black in ground color, except for postsutural yellow vittae, yellow humeri, and notopleural calli, not with posterior corners and area of mesonotum laterad of supraalar and inner postalar bristles, also area immediately above each humerus and for a short distance above each suture rufous, tinged lightly with brown; yellow mark over each mesopleuron comparatively narrow, the anterior edge not extending much beyond level with notopleural callus; the spot at upper portion of sternopleuron very small, instead of the yellow mark over mesopleuron rather broad extending almost to a level with presutural bristle and with a prominent yellow spot at upper portion of each sternopleuron; black mark in each antennal furrow extending to oral margin, not with the spot comparatively small and completely surrounded by yellow; also abdomen predominantly dark reddish brown, tinged with black and the tergal glands brown to black, rather than abdomen predominantly yellow to rufous and tergal glands rufous, tinged lightly with brown; the ♀ ovipositors are distinctive in the 2. In *citimus* the extended ovipositor (fig. 13b) measures 6.0 mm, the piercer is by comparison thicker and shorter, measuring 1.75 mm in length; in *limbiferus* the extended ovipositor is 7.0 mm, and the piercer is long, very slender (refer to fig. 14b, Hardy & Adachi 1954: 173), measuring 2.5 mm in length.

♂. *Head*: Occiput brown, tinged with red except for a rather narrow yellow margin. Front yellow with a black spot at base of each bristle. Vertex brown to black, ocellar triangle black. Facial spots oblong, filling most of antennal furrow and extending to epistoma. Each gena with a prominent brown to black spot below eye margin. Postantennal area of front brown to black and median portion of front tinged with brown on the raised area. Viewed in direct light the front is lightly gray pollinose. Measured from median ocellus to suture, the front is about 1/4 longer than wide. Two pairs inferior fronto-orbitals, 1 pair superior fronto-orbitals. Palpi broad, almost devoid of setae. *Thorax*: Predominantly black, lightly gray pubescent with 2 rather distinct submedian gray vittae on mesonotum. Postsutural yellow vittae ending at inner postalar bristles. Scutellum with a distinct black border across base. Halteres yellow, tinged with brown at bases. *Legs*: Yellow except for a tinge of brown at apices of femora and narrow bases of front and middle tibiae; hind tibiae brown. *Wings*: Hyaline except for the rather narrow costal band and broad cubital streak. Costal cells hyaline, except for extreme apex of 2nd, bare except for apical portion of 2nd, and with scattered microtrichia along dorsal margin of the 1st. Costal band filling approximately upper 2/3 to 3/5 of cell R, and not noticeably expanded at apex. Crossvein r-m oblique (fig. 13a). *Abdomen*: Predominantly brown to black, rather densely gray pollinose, with apices of 1st and 2nd terga rufous, tinged with brown. Median portions of 3rd, 4th and 5th terga and also apex of 5th tergum rufous, tinged with brown and with a faint indication of a reddish brown vitta extending down middle of terga 4 and 5. The genitalia have not been relaxed for study.

Length: Body, 7.25 mm; wings, 6.5 mm.

♀. Fitting description of ♂. Third antennal segment dark brown, tinged with black. Ovipositor brown, tinged with rufous. As seen from dorsal view the basal segment is just slightly longer than the 5th abdominal tergum, measured on the venter the basal segment is 2.0 mm long. Apex of piercer as in fig. 13d.

Holotype ♂ (B SHOP 9948) and allotype ♀, THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, J. L. Gressitt & T. C. Maa. Type and allotype returned to the B. P. Bishop Museum.

**Dacus (Strumeta) correctus** (Bezzi) Fig. 14a-f; pl. 1, fig. 2.

*Chaetodacus correctus* Bezzi, 1915, *Bull. Ent. Res.* 7: 107. Nom. nov. for *Bactrocera zonata* Bezzi (nec Saunders, 1841), 1913, *Mem. Ind. Mus.* 3: 94, pl. 8, fig. 4. Type-locality: Pusa, Bihar, India.

This species has not previously been recorded outside of India and Ceylon. A series of specimens are on hand from Thailand. It is closely related to *zonatus* (Saunders); the wing markings and morphological details are very similar in the 2. *D. correctus* is readily differentiated by having the mesonotum predominantly black, rather than all rufous; and by having a complete transverse band across lower part of face, rather than the usual 2 black facial spots.

*D. correctus* is differentiated from other species known from Thailand and surrounding regions by having the costal band interrupted in cell  $R_3$ , beyond tip of vein  $R_{2+3}$  (pl. 1, fig. 2) and face with a black transverse band at lower 1/3.

Front with brown to black spots at bases of bristles and 2 pairs of inferior fronto-orbital bristles present. Face usually with a continuous band of black extending across furrow at about lower 1/3; this marking is sometimes interrupted in median portion but in fully hardened specimens it appears to be complete at least as a narrow brown to black line. Thorax predominantly black through median portion of the mesonotum, covered with gray pubescence and with 3 rather indistinct subshining black, narrow vittae. Two rather broad, yellow, postsutural vittae present; these are not narrowed posteriorly and extend beyond postalar bristles. The area laterad of the yellow stripes is rufous, tinged faintly with brown. In fully hardened specimens the entire median portion of the mesonotum between yellow vittae is black in ground color, in front of suture this marking extends laterad almost to lateral margins of mesonotum. In teneral specimens this marking varies considerably. Scutellum yellow except for a moderately developed, black, basal band. Hind tibia of the ♂ with a prominent keel-like process developed on posterodorsal surface before apex (fig. 14a). Wing almost entirely hyaline with subcostal cell yellow, a very faint tinge of yellow along costal margin in apex of cell  $R_1$  and a narrow brown spot at lower apex of cell  $R_2$  and upper apex of cell  $R_3$  (pl. 1, fig. 2). Cubital cell faintly yellowed and no cubital streak developed. Abdomen predominantly yellow with a black band across base of 3rd tergum and a narrow black vitta extending down middle from base of 3rd tergum to apex of 5th. First tergum brown to black especially on sides and 2nd tergum with a narrow, interrupted band of brown or black along hind margin. Sterna of both sexes entirely yellow. Fifth sternum of ♂ crescent-shaped, scarcely wider than long but with a deep concavity on posterior margin (fig. 14e). ♂ genitalia as in fig. 14f. Ovipositor rather short, measuring approximately 3.0 mm when fully extended. Basal segment short, approximately equal in length to terga 5-6 and about 0.8 mm long. Piercer gradually tapered to a short point (fig. 14b), about 1.0 mm in length. The descriptive notes on the ♀ are based on specimens from India.

Twelve specimens are on hand from the following localities in THAILAND: Phetburi, 14-15.VI.1963, collected in methyl eugenol trap, R. Kawasaki; Phu Kae, 19.VII.1966, no collector given; Bang Khen, 27.IX.1909; and Bangkok Noi, 19.VII.1966.

**Dacus (Strumeta) cucurbitae** Coquillett\* (The Melon Fly)

*Dacus cucurbitae* Coquillett, 1899, *Ent. News* 10: 129. Type-locality: Honolulu, Hawaii. Type in U.S. National Museum.

\*Because of the gently concave hind margin of the 5th sternum of ♂ and the elongate posterior lobe on surstylus, this would fit in *Zeugodacus* according to Drew's (1972: 16) classification.

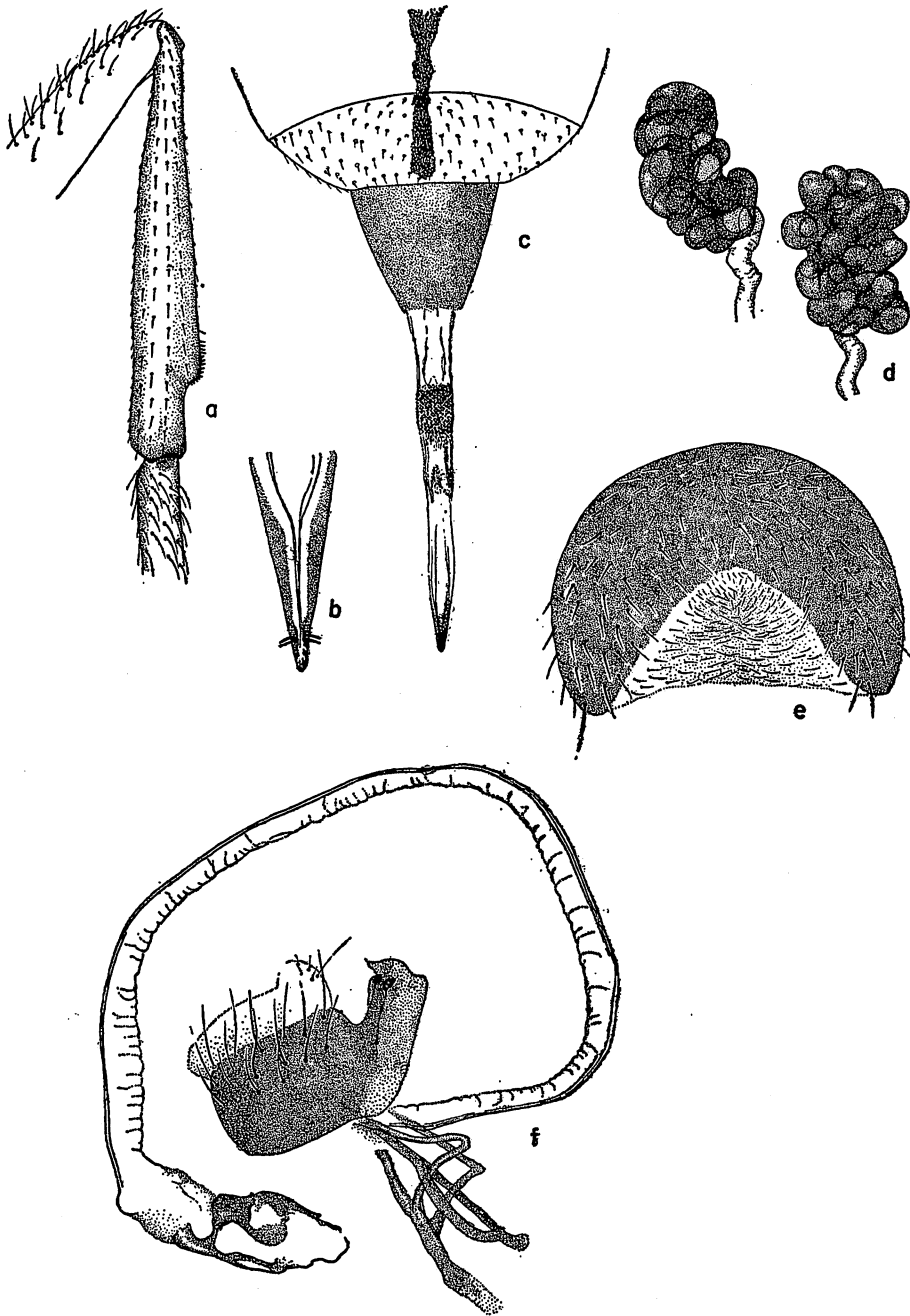


Fig. 14. *D. (S.) correctus* (Bezzi). a. hind tibia; b. ♀ apex of piercer; c. ovipositor; d. ♀ spermathecae; e. ♂ 5th sternum; f. ♂ genitalia.

This species is readily distinguished from other *Strumeta* by having brown markings along the m and the r-m crossveins; by the moderately large apical wing spot formed by the expansion of the costal band; also by its predominately rufous color; by the presence of 3 postsutural yellow vittae on the mesonotum; and by having 3 pairs of inferior fronto-orbital bristles. The species has been adequately described and figured by Hardy (1949: 185).

Distribution: Widespread throughout the Oriental Region, including China, Japan, Ryukyu Islands and much of the Pacific including New Guinea, Solomon and Bismarck Islands and early records from Darwin, Northern Territories, Australia; also known from Mauritius, E. Africa, Kenya and Tanzania. This species is common throughout Thailand and surrounding countries.

Hosts: This species has a wide host range and is one of the most important pests of vegetable crops wherever it is found. It is a serious pest of a wide variety of cucurbitaceous plants and of tomatoes, peppers, and other vegetables.

**Dacus (Strumeta) diaphorus** (Hendel) Pl. 1, fig. 3.

*Chaetodacus diaphorus* Hendel, 1915, *Ann. Mus. Nat. Hung.* **13**: 425. Type-locality: Tapani and Suisharyo, Formosa. Type in the Deutsches Entomologisches Institut, Eberswalde.

*Dacus* (Spec.  $\beta$ ) Hendel, 1912, *Suppl. Ent.* **1**: 23.

This has not previously been recorded outside of Formosa. Five specimens on hand from Thailand, Vietnam and Malaya appear to belong here. I see no way to differentiate them from the original description and the detailed description given by Shiraki (1933: 69).

This species is differentiated from other known *Strumeta* which have 3 postsutural yellow vittae on the mesonotum by having the lower  $1/3$  to  $1/2$  of the face polished black; the front femora entirely shining black except for the narrow yellow bases, middle femora black except for yellow basal  $1/3$ , and hind femur black except for basal  $1/2$ .

Front largely yellow, with black spots at the bases of frontal bristles; 2 closely placed inferior fronto-orbitals arise from the lower spot in most specimens. The front is completely covered with silvery gray pollinosity, as seen in indirect light. In the  $\sigma$ , the entire median and lower portion of the face is usually polished black with a narrow rim of yellow on each side along the eye orbits. A polished black line extends across the vertex. Occiput broadly yellow around the lateral and dorsal margins, otherwise brown to black. Antennae brown, tinged with rufous. Palpi clear yellow. Thorax predominantly polished black in ground color, gray pubescent with a pattern of 4 gray vittae extending down the mesonotum. Scutellum yellow except for a narrow basal margin of black. The coxae are brown, the femora are as described above, and the tibiae are clear yellow except for a faint tinge of brown on the bases. The tarsi are yellow. Wings largely hyaline with a narrow dark brown costal band extending to near apex of cell  $R_5$ , the band is slightly expanded in the apical portion. The cubital streak is broad, well developed (pl. 1, fig 3). Abdomen largely black, 1st tergum yellow to rufous along the hind margin and in the median portion. Second tergum with a broad yellow band across the apical portion. Apex and dorsal portion of 5th tergum rufous, tinged faintly with brown and with a narrow brown to black median vitta. Tergal glands rufous, tinged faintly with brown on the lateral margins. Fifth sternum of  $\sigma$  nearly  $2\times$  wider than long and slightly concave on hind margin. The surstyli are developed into long slender lobes at apices. The 10th sternum is plainly visible from lateral view. The basal segment of the ovipositor in the specimens from Malaya is approximately equal in length to terga



4+5. Shiraki (1933: 71) said that the ovipositor base of *diaphorus* from Formosa, "is about as long as the third, fourth, and fifth abdominal tergites together." The specimen at hand measures 1.3 mm. The piercer has not been studied. The extended ovipositor probably would measure approximately 4.0 mm.

Seven specimens are on hand from the following localities in THAILAND: Bangkhen, 17.IX.1964, no collector given; Saraburi, 4.III.1963, no collector given; Chiangmai Prov., Fang, 500 m, 12.IV.1958, T. C. Maa; also W. MALAYSIA: Cameron Highlands, 19.IX.1963, collected on citron, R. Kawasaki; and S. VIETNAM: Blao (Balao), 600 m, 14-21. X.1960, C. M. Yoshimoto.

Nothing is known of the host preferences of *diaphorus*.

**Dacus (Strumeta) dorsalis** Hendel (The Oriental Fruit Fly) Fig. 15a.

*Dacus dorsalis* Hendel, 1912, *Suppl. Ent.* 1: 18. Type-locality: Koshun, Formosa.

*Musca ferruginea* Fabricius, 1794, *Ent. Syst.* 4: 342 (preoccupied by *ferruginea* Scopoli, 1763, *Ent. Carn.*, 340.) Type-locality: "India orientali."

*Bactrocera conformis* Doleschall, 1859, *Nat. Tijdschr. Ned. Indie* 17: 122 (preoccupied by *conformis* Walker, 1857, *Proc. Linn. Soc. Lond.* 1: 34). Type-locality: Amboina.

*Dacus ferrugineus* var. *mangiferae* Cotes, 1893, *Notes Ind. Mus.* 3(1): 17. Nom. oblitum. A name which has not been used in the literature and which has been discarded under the provisions of article 23b of the International Code of Nomenclature (1961). Type-locality: Tirhoot, North Bihar, India.

*Chaetodacus ferrugineus* var. *versicolor* Bezzi, 1916, *Bull. Ent. Res.* 7: 105. Type-locality: Peradeniya, Ceylon.

*Chaetodacus ferrugineus* var. *okinawanus* Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imp. Univ.* 8: 62. Type-locality: Okinawa.

*Strumeta dorsalis okinawana*: Shiraki, 1968, *U.S. Nat. Mus. Bull.* 263: 23, pl. 9, fig. 1-16.

This species is characterized by having a rather narrow costal band, not extending below vein  $R_{2+3}$  except around wing margin (fig. 15a); by having no other fuscous

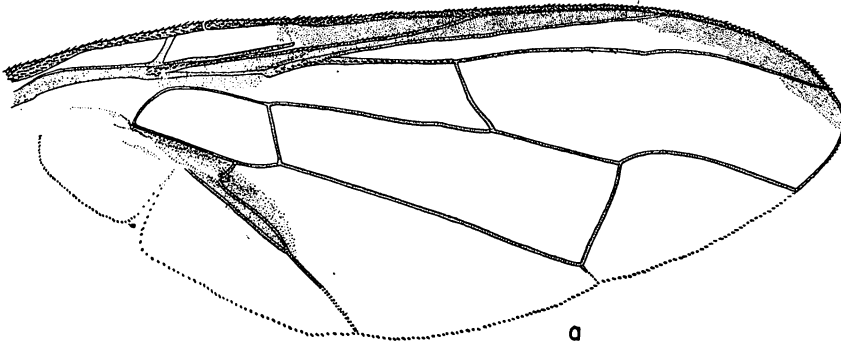


Fig. 15. *D. (S.) dorsalis* Hendel. a. wing.

markings in wing except for the cubital streak; by having 2 broad yellow postsutural vittae on mesonotum and dorsum of thorax marked with black. Face with a pair of large black spots. Abdomen chiefly rufous, terga 2 and 3 with black basal bands and with a narrow longitudinal black vittae extending down median portion of 3 to 5. The ovipositor characters are most useful in distinguishing *dorsalis* from closely related

species. The apex of the piercer is narrowed to a slender point and the extended ovipositor measures 4.5-4.7 mm (refer to Hardy & Adachi 1954: 166, fig. 8a-c).

Distribution: Widespread over Oriental Region, Micronesia and the Hawaiian Islands.

Hosts: This fly has a very wide host range and apparently attacks all types of fleshy fruits. It is especially injurious to mango, guava, carambola, *Eugenia* spp., papaya, etc.

It has been recorded from many localities over Thailand, Laos, and surrounding countries. This is the most injurious species of fruit fly in this part of the world.

**Dacus (Strumeta) dorsaloides** Hardy & Adachi Fig. 16a-c.

*Dacus (Strumeta) dorsaloides* Hardy & Adachi, 1954, *Pacif. Sci.* 8(2): 167. Type-locality: Mt Makiling, Luzon, Philippines. Type in U.S. National Museum.

Specimens on hand from Thailand and Vietnam appear to fit *dorsaloides* except that the basal segment of the ovipositor seems consistently longer than in the Philippine specimens which have been studied. Also the piercer is bordered with dark brown on

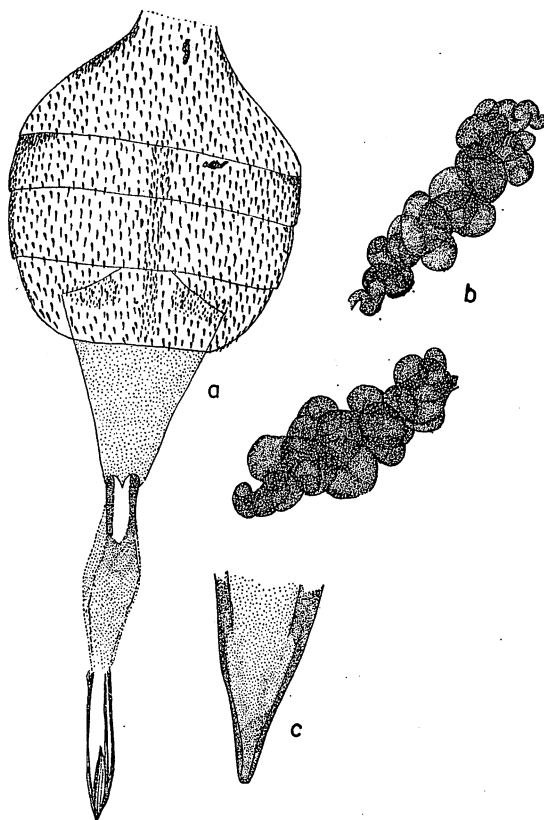


Fig. 16. *D. (S.) dorsaloides* Hardy & Adachi. a. ♀ abdomen and ovipositor; b. ♀ spermathecae; c. ♀ apex of piercer.

the margins and has a brown V-shaped mark extending down middle on apical portion (fig. 16c). It will be necessary to compare further specimens from the Philippines to determine whether or not these are variable characters.

Fitting most of the characteristics of *dorsalis* Hendel except for the details of the piercer of the ♀. Satisfactory ♂ characters have not been found for differentiating the *dorsalis* complex of species. On the specimens of *dorsaloides* at hand the postsutural yellow vittae are comparatively narrow, slightly tapered posteriorly and not extending beyond inner postalar bristles and the yellow spot on upper portion of each sternopleuron is not extended beneath the pteropleuron. Also the propleura are dark brown, whereas in most specimens of *dorsalis* the propleura are yellow to rufous. The ovipositor characters are as in fig. 16a. In the specimens from Vietnam and Thailand the basal segment of the ovipositor is approximately 2× longer than the 5th tergum as seen in direct dorsal view, whereas in specimens from the Philippines the basal segment is slightly shorter than the 5th tergum. Some variations in the length of the basal segment is evident in the specimens at hand varying from 1.5–2.0 mm in length, measured on the venter. The extended ovipositor varies from 4.0 mm–5.4 mm. The piercer measures from 1.25 mm–1.75mm. The piercer is rather abruptly tapered at apex as in fig. 16c.

Nine specimens are on hand from the following localities: THAILAND: Chiangmai Prov., Fang, 500 m, 12.IV.1958, T.C. Maa; Chiangmai Prov., Doi Suthep, 1–8.IV.1958, T.C. Maa. S. VIETNAM: Fyan, 900–1000 m, 11.VII–9.VIII.1961, N.R. Spencer; Dalat, 1500 m, 29.IV–4.V.1960, S. Quate; Dak Song, 76 km SW of Ban Me Thuot, 870 m, 19–21.V.1960, L.W. Quate; and Blao (Balao), 500 m, 14–21.X.1960, C.M. Yoshimoto.

**Dacus (Strumeta) frauenfeldi** Schiner Pl. 1, fig. 4.

*Dacus frauenfeldi* Schiner, 1868, Reise Novara, Dipt., 262. Type-locality: Stuart Is. (apparently the same as Stewart in the Solomon Islands). Type in the Naturhistorisches Museum, Vienna.

*Dacus albistrigatus* de Meijere, 1911, *Tijdschr. Ent.* 54: 377, pl. 20, fig. 33. Type-locality: Batavia.

*Dacus (Strumeta) frauenfeldi*: Hardy & Adachi, 1954, *Pacif. Sci.* 8(2): 168, fig. 10a-d; 1956, *Ins. of Micronesia* 14(1): 9, fig. 3a-d.

I have not seen this species from Thailand, but Perkins (1938b: 128) recorded it from Singapore and it may possibly occur rather widely over Southeast Asia.

The species is distinctive from all known *Strumeta* by having a single transverse band extending over middle portion of wing (pl. 1, fig. 4), and by having the mesonotum black with rather narrow postsutural yellow vittae and with a broad gray pollinose stripe extending down median portion. Also with a large black spot on the disc of scutellum. Refer to the above citations for complete description and figures.

Distribution: Solomon Islands, Indonesia, New Britain, Micronesia and Malaya.

Hosts: This species has been reared from *Psidium guajava*, mango, and *Eugenia*. It evidently attacks a wide assortment of fleshy fruits.

**Dacus (Strumeta) incisus** Walker

*Dacus incisus* Walker, 1860, *Trans. Ent. Soc. Lond.* 5: 323. Type-locality: Burma. Type in the British Museum (Natural History).

This species has been totally confused in much of the literature and is apparently

known only from the type ♂. Bezzi (1916: 105), Hering (1938: 5) and others were in error in treating this as a subspecies of *ferrugineus* (= *dorsalis* Hendel). The concept of this species established by Bezzi was not correct. As I have pointed out (Hardy 1959: 176), this species is obviously closely related to *nigrotibialis* (Perkins) from Malaya.

*D. incisus* would fit in the *nigrotibialis* complex by having the femora black except for the basal 2/3 of the hind pair. It differs from *nigrotibialis* by having a black band extending transversely over middle of face, connecting the lateral spots, rather than having the face shining black except for narrow lateral margins; by having the postsutural yellow vittae on mesonotum broad and extending to hind margin of mesonotum, rather than narrow, pointed, ending well before postalar bristles as in *nigrotibialis*; also by having the costal band very narrow, not extending into cell  $R_3$  except at the wing margin.

One ♂ specimen from Bangkhen, Thailand, 8.V.1963 fits very near *incisus* Walker and may possibly be that species. The original description of *incisus* intimates that the middle femora are all black. The middle legs are broken from the type in the British Museum (Natural History) collection, so I have not been able to check this character. The specimen on hand has the middle femora clear yellow on the basal 1/2. The specimen on hand seems to fit in other regards.

**Dacus (Strumeta) latifrons** (Hendel) Fig. 17a-f.

*Chaetodacus latifrons* Hendel, 1915, *Ann. Mus. Nat. Hung.* **13**: 425. Type-locality: Formosa. Type in the Deutsches Entomologisches Institut, Eberswalde.

*Dacus (Strumeta) latifrons*: Hardy & Adachi, 1954, *Pacif. Sci.* **8**(2): 171, fig. 13a-d.

This species is easily differentiated from other *Strumeta* which have the mesonotum black and with only 2 postsutural yellow vittae; by having the costal band expanded at apex into a brown mark extending across vein  $R_{4+5}$  in upper apical portion of cell  $R_5$ ; by the all rufous abdomen; the trilobed apex of ♀ ovipositor; by the broad front of both sexes, scarcely longer than wide, measured from median ocellus; and by the predominantly yellow legs, with a preapical ventral mark of brown on each femur and a slight tinge of brown on apices of hind tibiae and on apical tarsomeres.

The sterna of the ♂ are brownish yellow, those of the ♀ are yellow. Fifth sternum of the ♂ just slightly wider than long and with a deep concavity on hind margin extending about 1/2 the length of sclerite. ♂ genitalia as in fig. 17a. The apices of the surstyli are blunt. Basal segment of ovipositor brown, very short, about equal in length to the 5th abdominal segment and as seen from direct dorsal view about 0.65 mm long. The extended ovipositor, as seen from dorsal view, is slightly over 4.0 mm long. The piercer is slender, tapered, and trilobed at apex (fig. 17f); approximately 1.75 mm long.

Distribution: Formosa, Malay Peninsula, Thailand, and Laos.

About 3 dozen specimens are on hand from the following localities: THAILAND: Pak Chong, 7.III.1963; Bang Khen, IV.1950, I.1955, and X.1964; Chumporn, 12.VI.1962, some specimens collected on *Capsicum* sp. LAOS: Sayaboury Prov., Muong Sayaboury, 300 m, 29.XI.1966, collected on eggplant, F.G. Howarth; and Vientiane Prov., Vientiane, 12.II.1966, native collector.

Hosts: On Formosa, it has been reared from *Solanum incanum* L. and *S. indicum*

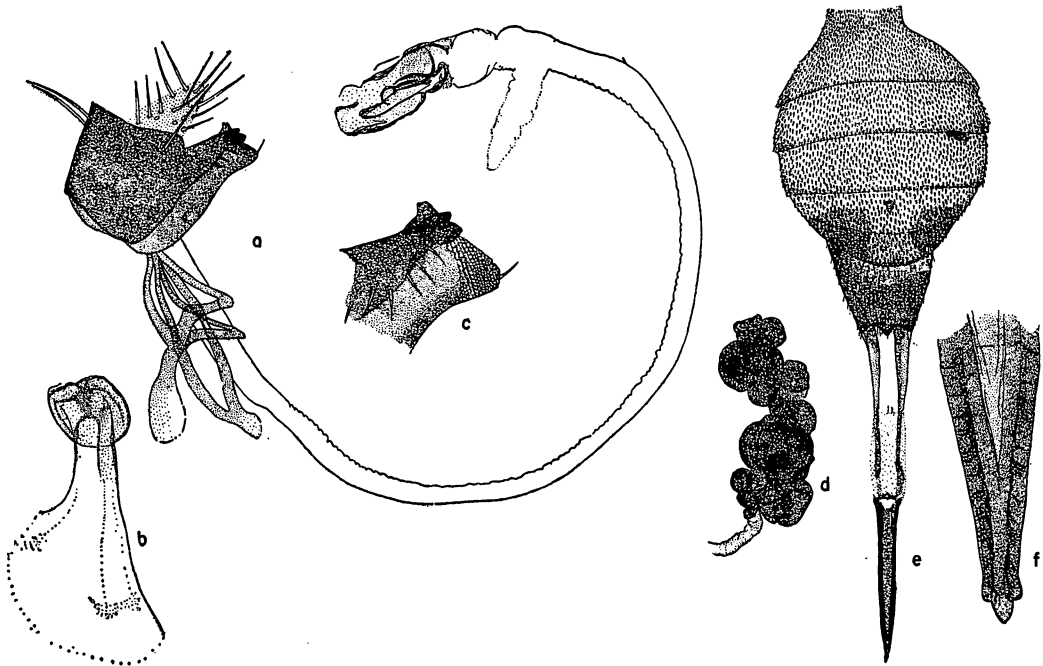


Fig. 17. *D. (S.) latifrons* (Hendel). a. ♂ genitalia; b. ♂ ejaculatory apodeme; c. ♂ surstylus and 10th sternum; d. ♀ spermatheca; e. ♀ abdomen and ovipositor; f. apex of piercer.

L. From Malaya, it has been reared from chili, *Solanum verbascifolium*, *S. sarmentosum*, *Baccaurea motleyana* and *Ponderosa* tomato.

In Malaya the parasite *Opius incisi* Silvestri has been reared from this species.

Two apparently new species are on hand from Thailand represented by 1 specimen each, which fit near *latifrons*. One ♀ from Petchaboon, 30.V.1965, fits that species except that the apex of ovipositor is rounded, rather than trilobed. One ♂ specimen from Phuket Is., Thailand, 25.VII.1963, collected in methyl eugenol trap, R. Kawasaki, also fits near *latifrons* but the front is not expanded, the median portion of mesonotum is rufous, and the abdomen is conspicuously marked with black: lateral margins black, extreme base of 1st tergum and basomedian portion of 2nd; 3rd with a complete broad basal band, and posterolateral margins of 4th and 5th terga black; also, a black vitta extending from 3rd over apex of 5th tergum. Tergal glands rufous. The ♀ specimen has been returned to Kasetsart University, Bangkok, Thailand; the ♂ specimen has been returned to the Yokohama Plant Protection Station, Japan.

**Dacus (Strumeta) new species rel. *limbiferus* (Bezzi)**

One ♂ specimen from Pekan, Pahang, Malaya, 4.IX.1963, methyl eugenol trap, R. Kawasaki, is apparently undescribed. It fits near *limbiferus* (Bezzi) from the Philippine Islands but differs by having the femora all yellow, not brown to black before apices; by having the dark band along costa not quite filling all of cell  $R_3$ . The speci-

men has not been dissected so the genital characters have not been compared and the species is not being described until further specimens can be obtained for study.

The specimen has been returned to the Yokohama Plant Protection Station, Japan.

**Dacus (Strumeta) mcgregori** (Bezzi) Fig. 18a-f; pl. 1, fig. 5.

*Chaetodacus mcgregori* Bezzi, 1919, *Philipp. J. Sci.* 15(5): 426, pl. 1, fig. 7. Type-locality: Batbaten Island, Philippine Islands. Lectotype ♂ in the Museo Civico di Storia Naturale, Milan.

*Dacus (Strumeta) mcgregori*: Hardy & Adachi, 1954, *Pacif. Sci.* 8(2): 176, fig. 16a-d.

Because of the all-yellow face, the presence of a prominent bulla in wing of ♂ and lack of tergal glands of 5th abdominal segment, this species fits very near *bulliferus* n.sp. and is differentiated by the characters pointed out under the discussion of that species. It has been adequately described in the above-cited references.

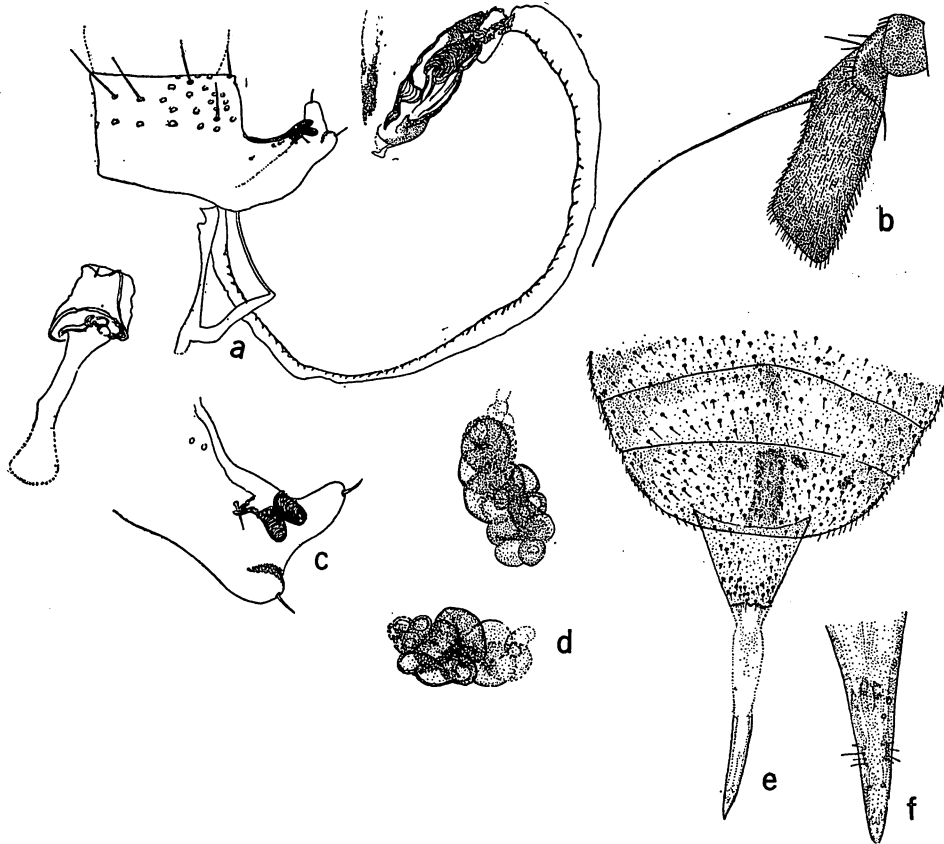


Fig. 18. *D. (S.) mcgregori* (Bezzi). a. ♂ genitalia; b. antenna; c. ♂ surstylus and 10th sternum; d. ♀ spermathecae; e. ovipositor; f. apex of piercer.

The antennae of the ♂ are as in fig. 18b. The wings as in pl. 1, fig. 5. The 5th sternum of ♂ is approximately as wide as long, with a deep U-shaped cleft on hind margin. ♂ genitalia as in fig. 18a. ♀ ovipositor very short, inconspicuous, often scarcely visible from dorsal view with the basal segment extended just a short way beyond 5th tergum. The extended ovipositor

measures, just slightly over 2.0 mm. The piercer is tapered to a sharp point at apex and approximately 0.7 mm long (fig. 18e).

This species has not been recorded from Thailand, but I have studied a large series of specimens from Singapore. It probably occurs throughout Southeast Asia.

Host: The specimens from Singapore were reared from *Gnetum gnemon* (bulbo vine).

**Dacus (Strumeta) nigrotibialis** (Perkins) Fig. 19a-f.

*Strumeta nigrotibialis* Perkins, 1938, *Proc. R. Soc. Qld* 49(11): 129, fig. 7. Type-locality: Larut Hills, Perak, Malaya. The type was in the Selangor Museum.

*Dacus (Strumeta) nigrotibialis*: Hardy & Adachi, 1954, *Pacif. Sci.* 8(2): 178, fig. 18a-c.

This species is readily differentiated by having the femora all black except for basal 2/3 of hind pair; by having the face shining black except for a narrow margin along eyes; the postsutural yellow vittae short, tapered to sharp points posteriorly and ending well before postalar bristles. Abdomen almost all black, yellow to rufous on posterior margin of 2nd tergum, and sometimes tinged with rufous in ground color of apical portion of 5th tergum, with tergal glands black. The species has been adequately described in the above-cited references except for genital characters.

The sterna of both sexes are brown. The 5th sternum of the ♂ is approximately as wide as long but with a deep cleft in the middle of hind margin extending 2/3 to 3/4 the length of the sclerite (fig. 19c). Epandrium with a ring of prominent bristles and setae around margin. Surstyli curved upward apically, rather boot-like and 10th sternum plainly visible from lateral view (fig. 19b). Base of ovipositor brown, tinged with rufous apically and rather short, as seen from direct dorsal view, about equal in length to the 5th tergum and about 0.75 mm measured on venter. The extended ovipositor is 4.0 mm long. The piercer is tapered to a sharp point at apex (fig. 19e) and measures 1.25 mm.

It should be noted, Perkins (1938b) described a variety *lata* which was characterized by having the costal band broad, compared to the typical form, with the brown markings extending along the underside of vein  $R_{2+3}$  through the upper portion of cell  $R_3$ . Two of the specimens on hand would fit this, but I question the advisability of treating this as a distinct variety.

Seven specimens are on hand from the following localities in THAILAND: Songkhla, 19.VII.1963, collected on *Ficus maltissima*, R. Kawasaki; Ranong, 18.VII.1963, collected on *Citrus grandis*, R. Kawasaki; and Yala, 15.VIII.1965, no collector given. Also 1 specimen from LAOS: Bolovens Plateau, 16 km S of Thateng, 1020 m, 22-24.VII.1960, at light, R.F. Leech.

This species has not been reared and no definite host information is available.

**Dacus (Strumeta) new species near nigrotibialis** (Perkins)

Four specimens on hand from Thailand fit near *nigrotibialis* but differ by having a large black spot in each antennal furrow rather than having the face black except for narrow yellow eye margins. The specimens show some variation in the yellow marks on thorax and in the coloration of the femora. In the ♀♀ the postsutural yellow vittae are parallel-sided and extend to postalar bristles. In the 1 ♂ specimen (from Fang) the postsutural vittae are narrowed posteriorly. In 1 ♀ (from Nan) the yellow mark over

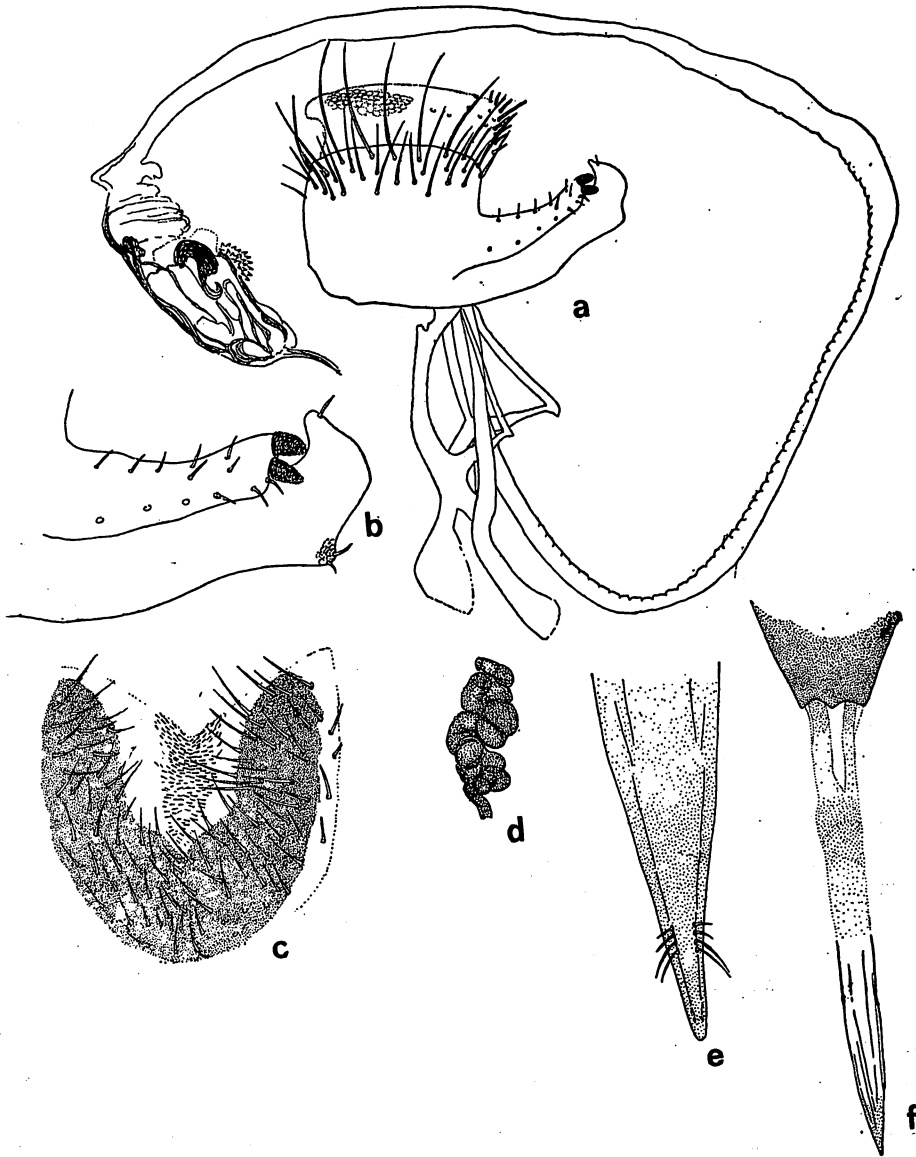


Fig. 19. *D. (S.) nigrotibialis* (Perkins). a. ♂ genitalia; b. ♂ surstylus and 10th sternum; c. ♂ 5th sternum; d. ♀ spermatheca; e. apex of piercer; f. ovipositor.

mesopleuron is sharply narrowed ventrally and extends along most of dorsal margin of the sclerite. In other specimens the mark is almost parallel-sided, narrowing rather slightly on ventral portion. In the ♀ specimens the front and middle femora are dark brown to black except for narrow yellow bases. In the ♂ the basal 1/3 of each front and middle femur is yellow. The specimens at hand may represent 2 species but further



material will have to be studied to determine this. Length: Body, 5.0-6.2 mm; wing, 4.3-5.4 mm.

The specimens on hand are from the following localities in THAILAND: Nan, 10.VII.1963, collected on *Eugenia malaccensis*, R. Kawasaki; Lang Suan, 17.VII.1963, R. Kawasaki; Chiangmai Prov., Fang, 500 m, 12-19.IV. 1958, T. C. Maa; Chiangmai Prov., Doi Suthep, 1278 m, 29.III.-4.V.1958, T. C. Maa.

Two specimens are in the B. P. Bishop Museum and 2 are in the collection of the National Institute of Agricultural Sciences, Tokyo.

#### **Dacus (Strumeta) occipitalis (Bezzi)**

*Chaetodacus ferrugineus* var. *occipitalis* Bezzi, 1919, *Philipp. J. Sci.* **15**: 423, pl.1, fig. 3. Type-locality: Manila. Lectotype ♂ in Museo Civico di Storia Naturale, Milan.

*Dacus dorsalis* var. *occipitalis*: Hardy & Adachi, 1954, *Pacif. Sci.* **8**(2): 166.

Fitting very close to *dorsalis* Hendel and differentiated by having the costal band broader, extending below vein  $R_{2+3}$  over its entire length. I see no other characters which appear to be of importance in separating these.

Distribution: Widespread over Philippines and probably Southeast Asia. A series on hand from Kuala Lumpur, Malaya, IX.1958, reared from fruit *Melastoma malabathricum*, N. L. H. Krauss.

#### **Dacus (Strumeta) new species, rel. to parvulus Hendel**

One ♀ specimen on hand from Phu Ket Is., Thailand, 26.VII.1963, collected on *Eugenia malaccensis*, R. Kawasaki. Fits very near *parvulus* Hendel from Formosa but differs by having the front entirely yellow, not with brown to black spots at bases of bristles. The femora all black, not with brown to black rings before the apices. The mesonotum with a pair of submedian rufous vittae extending over anterior 1/2 to 2/5 of the sclerite, rather than the anteromedian portion being black in ground color; also the ovipositor and other details probably differ. I do not have specimens of *parvulus* on hand for comparison. I am including a note on *parvulus* to record a new synonym. This species is not being described until further specimens can be obtained.

Femora and tarsi yellow, tibiae dark brown to black. Abdominal terga 1 and 2 dark brown to black at bases, broadly yellow at apices. Terga 3-5 entirely black except for a faint tinge of yellow at extreme apex of the 5th tergum. Entire abdomen very coarsely punctulated. Ovipositor base black, as seen from direct dorsal view, slightly shorter than the 5th abdominal tergum.

Length: Body, 4.0 mm; wings, 3.75 mm. Hendel gave the length of *parvulus* as 5.0 mm for the body and 4.5 mm for the wings.

#### **Dacus (Strumeta) parvulus Hendel**

*Dacus parvulus* Hendel, 1912, *Suppl. Ent.* **1**: 21-22. Type-locality: Kanshirei, Formosa.

*Chaetodacus antennalis* Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imp. Univ.* **8**: 56-57. **New synonymy.** Type-locality: Tainan, Formosa.

New synonymy based upon a comparison of specimens of *D. parvulus* from Formosa which had been determined by Shiraki with cotypes of *Chaetodacus antennalis*. Shiraki distinguished *antennalis* from *parvulus* by its shorter 3rd antennal segment and broader wings. A close comparison of the available specimens failed to show any definite differences.

**Dacus (Strumeta) pedestris** (Bezzi)

*Chaetodacus ferrugineus* var. *pedestris* Bezzi, 1913, *Philipp. J. Sci.* **8**: 322. Type-locality: Mt. Makiling, Philippine Islands (the original description gave no specific locality; a lectotype ♂ from this locality has been designated). Lectotype in the U.S. National Museum.

*Dacus (Strumeta) pedestris*: Hardy & Adachi, 1954, *Pacif. Sci.* **8**(2): 180, fig. 20a-b.

This species is closely related to *dorsalis* Hendel and is difficult to differentiate except by comparison of the ♀ ovipositors. The color characters which have been used to separate these are somewhat variable and cannot be wholly relied upon. In situ the basal segment of the ovipositor is distinctly longer than the 5th abdominal segment in *pedestris* and is approximately 3/4 as long as this segment in *dorsalis*. The extended ovipositor is approximately 6.0 mm in *pedestris* and 4.5–4.7 mm in *dorsalis*.

Distribution: Philippine Islands, Indonesia, and Malaysia.

Hosts: Infests a wide assortment of fleshy fruits such as mango, guava, citrus, chico, carambola, chili, tomato, rambutan, breadfruit, and cashew.

Several species of *Opius* parasites have been reared from this species.

**Dacus (Strumeta) propinquus** Hardy & Adachi

*Dacus (Strumeta) propinquus* Hardy & Adachi, 1954, *Pacif. Sci.* **8**(2): 182, fig. 21a-c. Type-locality: Tajap, North Borneo. Type in the U.S. National Museum.

This species closely resembles *dorsalis* Hendel, and is best separated by the shape of the ♀ ovipositor. The piercer is distinctly trilobed at apex. For more detailed description, refer to the original.

Distribution: This species has been recorded from Singapore and the Philippines.

One ♀ specimen on hand from LAOS: Sedone Prov., Paksong, 18.V.1965, P. D Ashlock and 1 from S. VIETNAM: M'Drak, E of Ban Me Thuot, 4–600 m, 8–19 VII.1960, C. M. Yoshimoto.

Hosts: *Garcinia* sp.?, *Garcinia laeana*, and *Sideroxylon* sp.?

**Dacus (Strumeta) tillyardi** (Perkins)

*Strumeta tillyardi* Perkins, 1938, *Proc. R. Soc. Qld* **49**(11): 131, fig. 6. Type-locality: Selangor, Malaya. Type probably in the Selangor Museum.

*Dacus (Strumeta) tillyardi*: Hardy & Adachi, 1954, *Pacif. Sci.* **8**(2): 183.

Known only from the type ♀ and 1 ♀ paratype which Perkins had before him. The ♂ has not been described. This species is differentiated from all known *Strumeta* by lacking postsutural yellow vittae, and having brown infuscations over both crossveins. Refer to the original for a detailed description.

**Dacus (Strumeta) tuberculatus** (Bezzi) Fig. 20a-b.

*Chaetodacus tuberculatus* Bezzi, 1916, *Bull. Ent. Res.* **7**: 106. Type-locality: Taung-gyi, Southern Shan States, Burma. Type ♂ in the British Museum (Natural History). Bezzi also recorded this species from Myitkyina, Burma.

Host: Bezzi recorded this as reared from peach, *Prunus persica*.

A series on hand from Thailand obviously is this species. It is readily recognized

by lacking a costal band or cubital streak, in combination with the predominantly black thorax and abdomen and large round facial spots.

The mesonotum is entirely black, densely gray pubescent, except for the broad postsutural yellow vittae which are straight-sided and extend beyond inner postalar bristles. Pleura largely shining black in ground color, covered with gray pubescence. Propleura tinged with rufous and mesopleura each with a narrow band of yellow extending transversely behind spiracle to lower hind margin of humerus; this is separated from the prominent yellow mark on hind portion of mesopleuron by a narrow band of black which extends to dorsal margin of sclerite at a level with

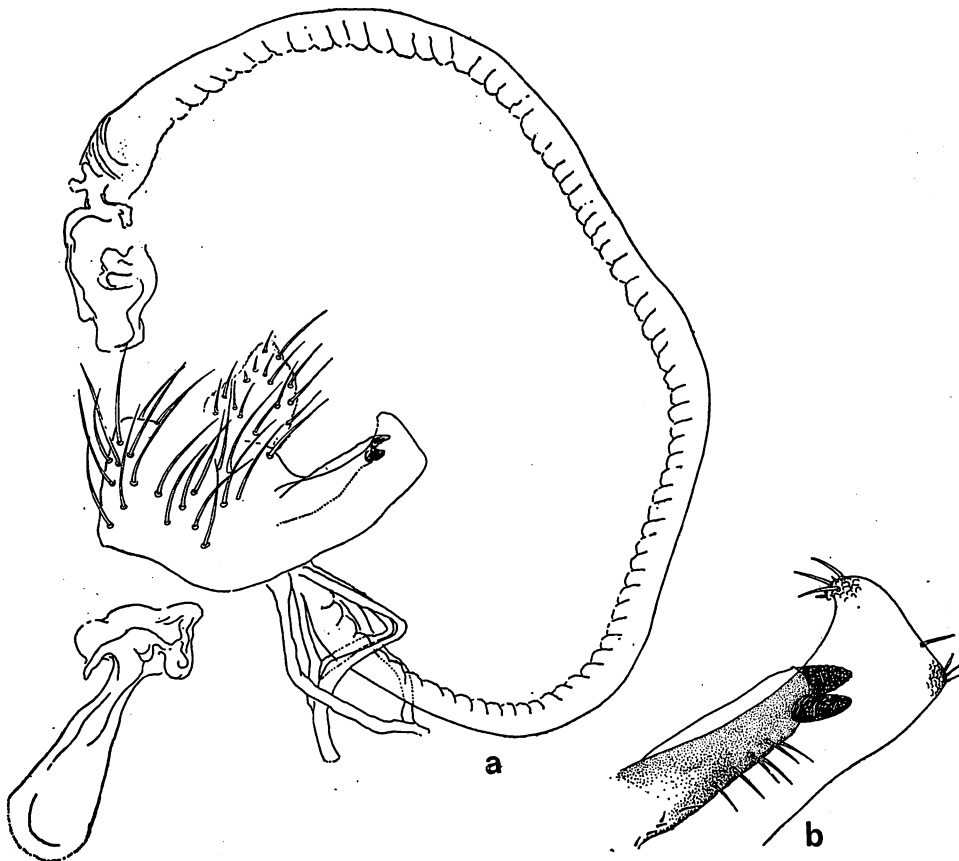


Fig. 20. *D. (S.) tuberculatus* (Bezzi). a. ♂ genitalia; b. ♂ surstylus and 10th sternum.

posthumeral bristle. Legs entirely yellow, including coxae. Hind tibiae each with a prominent anterodorsal ridge before apex. Wings as noted above and as in pl. 1, fig. 6. In the ♂, the lobe of cubital cell is nearly 4× longer than vein  $Cu_1+1st A$ ; in the ♀ the lobe is just slightly longer than vein  $Cu_1+1st A$ . Wing almost completely hyaline; yellow, tinged with brown in subcostal cell and very faintly tinged in cell  $R_1$ . Abdomen mostly black, densely gray setose, yellow on apices of terga 1 and 2. Also the 5th tergum with a large yellow spot at apex on each side separated by a black vitta down middle. The tergal glands are reddish brown. Sterna brown, 5th sternum of ♂ 1/2 to 2/3 wider than long and with a rather shallow concavity on hind margin.

♂ genitalia as in fig. 20a. The surstyli broad, rather truncate at apices. Ovipositor rather short, basal segment rufous, tinged with brown as seen directly from above, scarcely over 1/2 as long as the 5th abdominal segment. When fully extended, the ovipositor measures approximately 3.0 mm. The piercer is tapered to a sharp point and is 1.0 mm in length.

Length: Body, 5.8-6.0 mm; wings, 5.5 mm.

Six specimens on hand from the following localities in THAILAND: Salui Chunporn, on *Caraya arborea*, 15.I.1956, C. Boonyonk; and Saraburi on *Caraya arborea*, 29.V.1961, L. Hungsung. Also 1 S. VIETNAM: 20 km N of Pleiku, 650 m, 9.V.1960, L. W. Quate.

**Dacus (Strumeta) umbrosus** Fabricius Fig. 21a-e; pl. 2, fig. 12.

*Dacus umbrosus* Fabricius, 1805, Syst. Antl., 274. Type-locality: Sumatra. Type in Universitetets Zoologiske Museum, Copenhagen. I have studied the type.

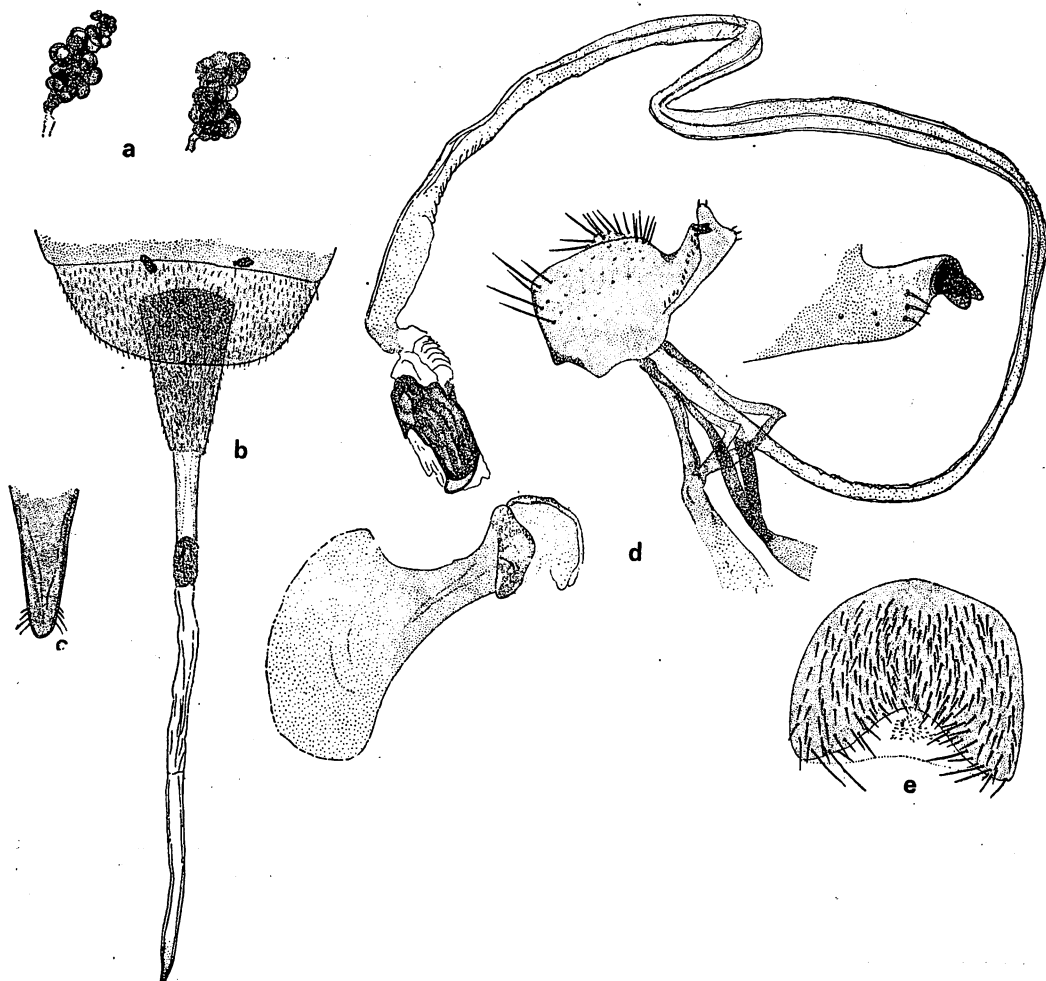


Fig. 21. *D. (S.) umbrosus* Fabricius. a. ♀ spermathecae; b. ovipositor; c. ♀ apex of piercer; d. ♂ genitalia; e. ♂ 5th sternum.

*Dacus fascipennis* Wiedemann, 1819, *Zool. Mag.* 1(3): 28. Type-locality: Java.

*Bactrocera fasciatipennis* Doleschall, 1856, *Nat. Tijdschr. Ned. Indië* 10: 412. Type-locality: Java.

*Strumeta conformis* Walker, 1857, *Proc. Linn. Soc. Lond.* 1: 34. Type-locality: Singapore.

*Dacus frenchi* Froggatt, 1909, *N. S. Wales Dep. Agr. Rep.* 1907-1908: 92, pl. 1, fig. 4 (there is some question concerning this synonymy. Refer to Hardy & Adachi 1954: 184). Type-locality: New Caledonia.

This species is readily recognized by the presence of 3 brown transverse bands across the wing (pl. 2, fig. 12); by the all yellow or rufous scutellum; and by the presence of just 2 pairs of inferior fronto-orbital bristles.

In fully hardened specimens the mesonotum has a pair of broad submedian black vittae extending the entire length of segment, separated by a rufous median vitta. Two broad postsutural yellow vittae are present and the supraalar area, the area along suture and around border of notopleural callus is rufous. The yellow mark on mesopleuron is continuous with the marking on humerus. Abdomen predominantly yellow, and somewhat variable in coloration, typically with brown on sides of terga 3 and 4 with a black vitta extending down middle of terga 4-5; often bases of 1st and 2nd terga are brown. The sterna of both sexes are entirely yellow to rufous, the 5th sternum of the ♂ is about as wide as long, gently concave on posterior margin (fig. 21e). In the ♀ the 6th sternum is nearly 3× wider than long, the hind margin straight or nearly so. ♂ genitalia as in fig. 21d. The surstyli are rather boot-shaped at apices and almost completely hide the 10th sternum. Ovipositor long and slender, basal segment measuring approximately 1.6 mm; membranous area (8th segment) 3.25 mm, and piercer, 2.2 mm totalling 6.8-7.0 mm for the entire ovipositor. Piercer gradually tapered in apex as in fig. 21c.

Perkins (1939: 13) regarded *frenchi* as a distinct species which he separated on the basis of size, color of abdomen, and by the position of r-m crossvein. His observations were based on specimens from the New Hebrides (Froggatt's type was from New Caledonia). In a large series of specimens which I have examined from various localities through Southeast Asia, I find the characters used by Perkins of no value. The size and coloration varies considerably, and I have not been able to confirm the difference he saw in the r-m crossvein.

Distribution: Widespread throughout Malaysia, Indonesia, Philippine Islands, New Guinea, New Hebrides and New Caledonia. Also from Palau Islands, Micronesia.

Specimens are on hand from the following localities in THAILAND: Chumporn, 1963, V. Koonthong & A. Sumvudkit; Pak Thong Chai, 10.VI.1964, no collector given; Prachinburi, 6.IV.1962, no collector given; and Yala, 15.VIII.1965.

Hosts: This species infests various species of *Artocarpus*. I have 1 record of it having been bred from *Momordica charantia* in Borneo. The ♂♂ are strongly attracted to methyl eugenol.

***Dacus (Strumeta) yoshimotoi* Hardy, new species      Fig. 22a.**

This species closely resembles *D. (Hemigymnodacus) diversus* Coquillett but differs by having the row of strong cilia on each side of the 3rd tergum of ♂ and having a polished black spot in each antennal furrow. It would run near *apicalis* de Meijere by having 3 postsutural yellow vittae, but lacks the apical enlargement of the costal band. It would also fit near *diaphorus* (Hendel) but differs by having 2 spots on face rather than having a broad black transverse band, and by having the femora yellow, not pre-

dominantly black.

♂. *Head*: Occiput brown over posterior portion, broadly yellow on margin. A shining black mark extends across vertex over ocellar triangle. Front with a brown spot at base of each bristle and tinged with brown in median portion,  $1/3$  to  $1/2$  longer than wide and rather thickly covered with short, yellow, inconspicuous hairs. Three pairs inferior fronto-orbitals present, the lower bristles are rudimentary, approximately  $1/2$  as long as 2nd bristles. Facial spots large, oblong, rather closely approximated medianly, separated by just a narrow median line about equal in width to length of postantennal region. Genae almost entirely rufous with a very faint tinge of brown just below hind margin. Antennae yellow, tinged faintly with brown on dorsal portion of 2nd segment and on apical portion of 3rd. Third antennal segment  $4\times$  longer than wide, extending distinctly beyond oral margin. Palpi entirely yellow, almost devoid of setae. *Thorax*: Polished black in ground color, densely yellowish pilose, with a pair of gray pollinose vittae extending down mesonotum, and with the following yellow areas: humeri; notopleural calli; hind por-

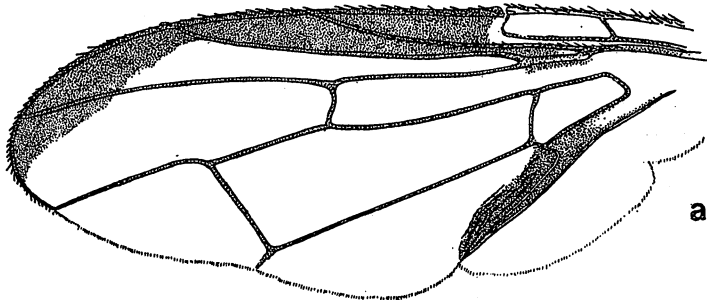


Fig. 22. *D. (S.) yoshimotoi* n. sp. a. wing.

tion of mesopleuron; small spot on upper sternopleuron; mark along suture on each side; 3 postsutural vittae; scutellum except for narrow black base; and upper  $3/4$  of each metapleuron and pteropleuron. The lateral postsutural yellow vittae are slightly attenuated posteriorly and end just before inner postalar bristles. The median vitta is attenuated anteriorly, extending from level with prescutellar bristles almost to suture. *Legs*: Yellow except for brown hind tibiae and bases of middle tibiae. Each hind tibia with a prominent preapical sensory structure on posterodorsal margin. *Wings*: As in fig. 22a. *Abdomen*: Yellow to rufous, shining black on sides, basal portions of terga 2-4 and with a narrow black vitta extending down middle from 3 to 5, this is slightly interrupted at apices of 3 and 4 and does not extend to the apex of 5. Tergal glands rufous, densely covered with yellow hairs. The genitalia have not been dissected for study.

Length: Body, 5.2 mm; wings, 4.7 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9949), S. VIETNAM: 22 km S of Nha Trang, 20-26.XI.1960, C. M. Yoshimoto. Type returned to B.P. Bishop Museum.

*Dacus (Strumeta) zonatus* (Saunders) Pl. 2, fig. 13.

*Dasyneura zonata* Saunders, 1841, *Trans. Ent. Soc. Lond.* 3: 61, pl. 5, fig. 3. Type-locality: Bengal, India. Type in the British Museum (Natural History).

*Bactrocera maculigera* Doleschall, 1859, *Nat. Tijdschr. Ned. Indie* 17: 122. Type-locality: Amboina.

I cannot confirm this synonymy.

*Rivellia persicae* Bigot, 1889, *Ind. Mus. Notes* 1: 192. Type-locality: India.

This species runs near *correctus* Bezzi but differs by having the black spots on the face and by having the mesonotum all rufous.

An almost all yellow to rufous species. The facial spots are large, oval. Front with small rather indistinct brown spots at bases of bristles. Presutural yellow vittae on mesonotum broad, straight-sided, and extending to beyond inner postalar bristles. Yellow mark on mesonotum not quite continuous with the yellow mark over humerus. Legs yellow, hind tibia with a slight anterodorsal ridge before the apex. Wings hyaline, the subcostal cell yellow, cell  $R_1$  very faintly yellowed along margin and with a small brown spot at apex of cell  $R_3$  extending over into apical portion of cell  $R_5$  (pl. 2, fig. 13). Cubital cell faintly yellow and with just a narrow line of yellow coloring at base of cell  $M_4$  above vein  $Cu_1$ . A gray-brown spot present at apex of anal cell, directly below vein  $Cu_1+1st A$ , this is covered with dense setae and along vein with rather long dense pile. The r-m crossvein oblique in position, reaching vein  $M_{1+2}$ , near apical 1/4 of cell 1st  $M_2$  (pl. 2, fig. 13). Abdomen yellow to rufous with a narrow black band across base of 3rd tergum and a narrow longitudinal median vitta from base of 4th almost to apex of 5th. The tergal glands are brown. Fifth sternum of ♂ with a deep V-shaped cleft on hind margin extending almost to base of segment. Ovipositor short, as seen from dorsal view, the basal segment is about equal in length to 5th tergum and about approximately 0.75 mm long. As seen from ventral view, the extended ovipositor is 4.0 mm. The piercer is tapered to a sharp point at apex and is about 1.2 mm long.

Length: Body and wings, 5.7-6.0 mm.

Distribution: Widespread over India, Pakistan and evidently over Southeast Asia.

Hosts: According to Bezzi, this species is very injurious to peach, mango, and a number of other fruits.

Seven specimens are on hand from the following localities in THAILAND: Chiangmai Prov., Chiangmai, 7.VII.1963, in methyl eugenol trap, R. Kawasaki; Chiangmai Prov., Fang, 500 m, 15.IV.1958, T. C. Maa; Nakhon Sawan, 30.VI.1963, in methyl eugenol trap, R. Kawasaki; Lopburi, Pukae, 29.VI.1963, in methyl eugenol trap, R. Kawasaki; Phang, 6.VII.1963, R. Kawasaki. One specimen from S. VIETNAM: Fyan, 900-1000 m, 11.VII-9.VIII.1961, N. R. Spencer; also 3 specimens from LAOS: Sayaboury Prov., 20 km SW Muong Sayaboury, 370 m, IV.1968, F. G. Howarth; Vientiane Prov., Tha Ngone, 3.I.1966, native collector.

#### Subgenus *Zeugodacus* Hendel

*Dacus* (*Zeugodacus*) Hendel, 1927, *In* Lindner, *Die Flieg. Pal. Reg.* 49: 26. Type-species: *Dacus caudatus* Fabricius, by original designation.

*Zeugodacus*: Shiraki, 1933, *Mem. Taihoku Imp. Univ. Fac. Sci. Agr.* 8: 78.

This subgenus is differentiated from *Strumeta* Walker by the presence of 4 scutellar bristles rather than 2 and by genital differences.

#### KEY TO KNOWN SPECIES OF DACUS (ZEUGODACUS) FROM THAILAND AND BORDERING COUNTRIES

- |        |   |    |
|--------|---|----|
| 1.     | With 3 postsutural yellow vittae. ....  | 2  |
|        | With 2 postsutural yellow vittae. ....  | 10 |
| 2 (1). | Face with 2 black spots. ....   | 3  |
|        | Face with a continuous black band over lower portion or predominantly black. .... | 11 |
| 3 (2). | Scutellum with a black spot at apex. ....   | 4  |
|        | Scutellum yellow except for narrow black band at base. ....                       | 6  |

- 4 (3). Costal band narrow, not extending into cell  $R_3$  except at apex (pl. 2, fig. 16). .....5  
 Costal band broad, dark brown, and occupying most of cell  $R_3$  (pl. 2 fig. 17). Thailand. ....**platamus**, n.sp.
- 5 (4). Costal band continuous (pl. 2, fig. 16). Femora yellow except for tinge of brown at extreme apices of mid and hind pair. Abdomen mostly yellow-rufous. Ovipositor rufous, basal segment only slightly longer than 5th tergum. Malaya, Thailand. ....**maculatus** (Perkins)  
 Costal band interrupted or very thin in cell  $R_3$  (pl. 2, fig. 15). All femora broadly blackened at apices. Abdomen mostly black. Ovipositor black, base about equal to terga 4+5. Thailand. ....**scutellaris** Bezzi
- 6 (3). No brown mark over m crossvein. ....7  
 A prominent brown vitta extends over m crossvein (fig. 32f). Philippines, Bismarck Islands, Thailand (possibly widespread in SE Asia).....**ubiquitus**, n.sp.
- 7 (6). Costal band enlarged apically, at widest point at least 2× wider than band measured at apex of vein  $R_{2+3}$  and extending slightly over vein  $R_{2+3}$  into upper edge of cell  $R_3$  (pl. 2, fig. 14). ....8  
 Costal band narrow, same width throughout and not extending into cell  $R_3$ , except at apex (ref. Hering 1952: 270, fig. 2). Borneo and Laos. ....**diaphoropsis** (Hering)
- 8 (7). Costal band distinctly enlarged, at widest point measuring at least 4× wider than band measured at apex of vein  $R_{2+3}$  (pl. 2, fig. 18). Fourth tergum not with an isolated, yellow spot on each side. ♀ ovipositor elongate, extended length equals 7.5-9.0 mm. ....9  
 Costal band only slightly enlarged at apex, at widest point about 2× width of band at apex of  $R_{2+3}$  (pl. 2, fig. 14). Fourth tergum with a large isolated yellow spot on each side (fig. 26a). Extended ovipositor 4.3 mm. Thailand and Laos. ....**isolatus**, n.sp.
- 9 (8). Thorax with prominent black markings. Apical spot in wing filling upper 1/2 of cell  $R_5$  (pl. 2, fig. 18). Piercer pointed at apex (fig. 31b). Widespread over Oriental region. ....**tau** (Walker)  
 Thorax rufous, with only slight dark marks. Apical wing spot filling almost all of apex of  $R_5$ . Piercer trilobed at apex (fig. 29f). Thailand. ....**rubellus**, n.sp.
- 10 (1). Costal band narrow, not extending into cell  $R_3$  except along wing margin, not expanded apically. Cubital streak lacking or very faint. Malaya. ....**pendleburyi** (Perkins)  
 Costal band very broad, filling all of cell  $R_3$  and expanded at apex (pl. 1, fig. 7). Cubital streak present. Thailand. ....**aptatus**, n.sp.
- 11 (2). At least lower 1/2 of face broadly black. Two pairs of inferior fronto-orbital bristles. ....12  
 Face yellow with a narrow brown to black crossband in the furrow. Three pairs of inferior fronto-orbitals. Indonesia, Malaya, Thailand. [**maculipennis** (Doleschall) is a synonym] ....**caudatus** Fabricius
- 12 (11). Front femora entirely black, mid and hind pair black on apical 1/2 to 2/5. Cell  $R_2$  hyaline except at apex along margin (pl. 1, fig. 8). Abdomen mostly black. Malaya. ....**strifacies** (Perkins)  
 Legs yellow, except for brown hind coxae, narrow base of hind tibiae, and a faint streak of brown on posterior surface of each front tibia. Cell  $R_3$  almost all brown, costal band rather broad (fig. 33a). Abdomen mostly yellow. Thailand. ....**vultus**, n.sp.



**Dacus (Zeugodacus) aptatus** Hardy, new species Fig. 23a-b; pl. 1, fig. 7.

This species appears to fit near *quadrissetosus* (Bezzi) from the New Hebrides, but differs in the following ways: postsutural yellow vittae straight-sided, not acute posteriorly; spot on upper portion of sternopleuron large, extended posteriorly under pteropleuron, not divided into 2 small yellow spots; femora predominantly yellow, marked with brown on their apices, rather than femora blackish brown with yellow bases; all tibiae yellow-brown, rather than front and middle tibiae yellowish and hind tibiae blackish on inside, dark reddish on outer surfaces; costal cells hyaline or nearly so, rather than yellowish; costal band broader, extending along underside of vein  $R_{4+5}$  and expanding rather broadly into upper portion of cell  $R_5$  beyond level with the *m* crossvein, rather than costal cell extending only to vein  $R_{4+5}$  except at apex; also the cubital streak is rather narrow, confined to the basal portion of cell  $M_4$  along vein  $Cu_1$ , rather than being very broad, as wide as costal band.

♀. *Head*: Yellow except for black ocellar triangle, brown to black marks at bases of frontal bristles, a large black spot on each side of face and a brown discoloration in middle of front and on each gena below eye margin. Facial spots rather triangular with the point reaching almost to oral margin. Front approximately 1/3 longer than wide. Two pairs inferior fronto-orbitals present. All head bristles black. Two basal segments of antennae tinged with brown. Third segment brown, narrowly yellow at base. Second antennal segment almost 2× longer than 1st and equal to 1/2 the length of face. *Thorax*: Mostly black, covered with gray pubescence. Mesonotum with 2 broad postsutural yellow vittae, these are straight-sided, not attenuated posteriorly and extend slightly beyond inner postalar bristles. Yellow spot at upper portion of sternopleuron as noted in introduction above. *Legs*: Femora pale yellow, except for a brown preapical dorsal mark front pair, an incomplete preapical brown ring on middle pair and hind pair with apical 1/4 brown to black. Hind tibiae entirely dark brown, middle and front tibiae yellow-brown. Basitarsi yellow, other tarsomeres yellow-brown. *Wings*: As noted above and as in pl. 1, fig. 7. At widest point, expanded portion of costal band extends basad slightly below a level with *m* crossvein. The lobe of cubital cell about equal in length to vein  $Cu_1$ +1st A. *Abdomen*: First tergum entirely brown to black, all terga broadly blackened on their lateral margins. Second tergum with a brown to black submedian crossband, narrowly yellow at base of tergum, broadly yellow at apex. Third segment entirely dark brown to black except for submedian marks of yellow at apex, and 4th and 5th terga yellow except for broad lateral markings of brown to black and a broad median black vitta extending from 3rd to apex of 6th. Tergal glands yellow to rufous. Basal segment

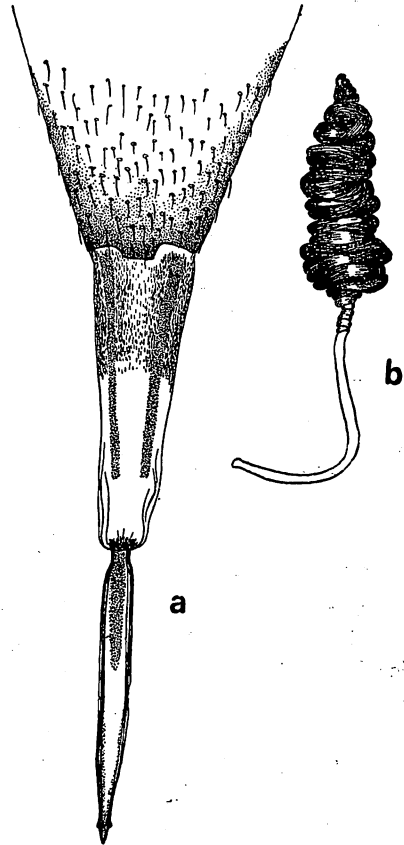


Fig. 23. *D. (Zeugodacus) aptatus* n. sp.  
a. ovipositor; b. ♀ spermatheca.

of ovipositor rather short, rufous, about equal in length to 5th tergum; as seen from above, basal segment 1.17 mm. Piercer slender, with a prominent subapical point on each side (fig. 23a), and 1.75mm long. Extended ovipositor, as viewed from above, 4.3 mm.

Length: Body, 8.5 mm; wings, 7.5 mm.

♂. Unknown.

Holotype ♀, THAILAND: Phu Kae, 15.V.1963, no collector given. Paratype 1 ♀, Thailand: Samut-Songkram, 5.VIII.1962. One teneral ♂, in poor condition, from Thailand: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

Type returned to Kasetsart University, Bangkok. Paratype in the University of Hawaii collection. The teneral specimen is in the B. P. Bishop Museum.

**Dacus (Zeugodacus) atrifacies** (Perkins) Fig. 24a-c; pl. 1, fig. 8.

*Zeugodacus atrifacies* Perkins, 1938, *Proc. R. Soc. Qld* 49 (11): 140, pl. 4, fig. 2.

No type was designated for *atrifacies* and the specimen was supposed to have been in the Selangor Museum. According to Brian H. Cogan, the Selangor Museum collection was transferred to the British Museum but much of the material was in poor condition and some types reported to be at Selangor have never been traced. The ♂ specimen used by Perkins from Bukit Kutu, Selangor, F.M.S., IX.1929, H. M. Pendlebury, cannot be found.

Perkins described this as *limbipennis* Macquart, but indicated that he was not sure that it belonged here. "Macquart's description is very brief, and it is possible that the two species are distinct, in which case the name *atrifacies* is suggested." I have studied the ♂ type of *Dacus limbipennis* Macquart from Java, in the Natural History Museum, Paris. This is very distinct from the species described by Perkins and is not a *Zeugodacus*. It has only 2 scutellar bristles and no prescutellars and would run to subgenus *Asiadacus* Perkins. In my key to known species (1954: 6) it runs to couplet 7, but fits none of the species. The wing has a broad costal band filling all of cell R<sub>3</sub> and most of cell R<sub>5</sub> over the r-m crossvein. Face with a large brown to black spot on each side. Mesonotum with 3 postsutural yellow vittae, the median is narrow, and the lateral vittae rather broad. Abdomen yellow, tinged with brown on bases of most terga; apices of 2nd and 5th terga yellow. This may actually be a *Callantra* since the 1st antennal segment is rather long, approximately equal in length to the 2nd and almost 1/2 as long as the face.

This species is differentiated from other *Zeugodacus* which have 3 postsutural yellow vittae and the lower 1/2 of the face black, by having the front femora entirely dark brown to black and the middle and hind femora black on their apical 1/2 to 2/5; also by having the abdomen predominantly black; and the costal band very slightly enlarged at the wing apex (pl. 1, fig. 8).

One ♀ specimen on hand from Malaya apparently belongs here. Perkins in his description stated that the face is shining black, with yellow margins. In the specimen at hand, the upper 1/2 and also the lateral margins are yellow. The median portion is black, faintly tinged with yellow on the anterior margin above the mouthparts. The following descriptive notes are based on the ♀ specimen at hand.

Third antennal segment rufous in ground color, tinged with black. Thorax mostly shining black in ground color with gray longitudinal markings on mesonotum and with the yellow spot

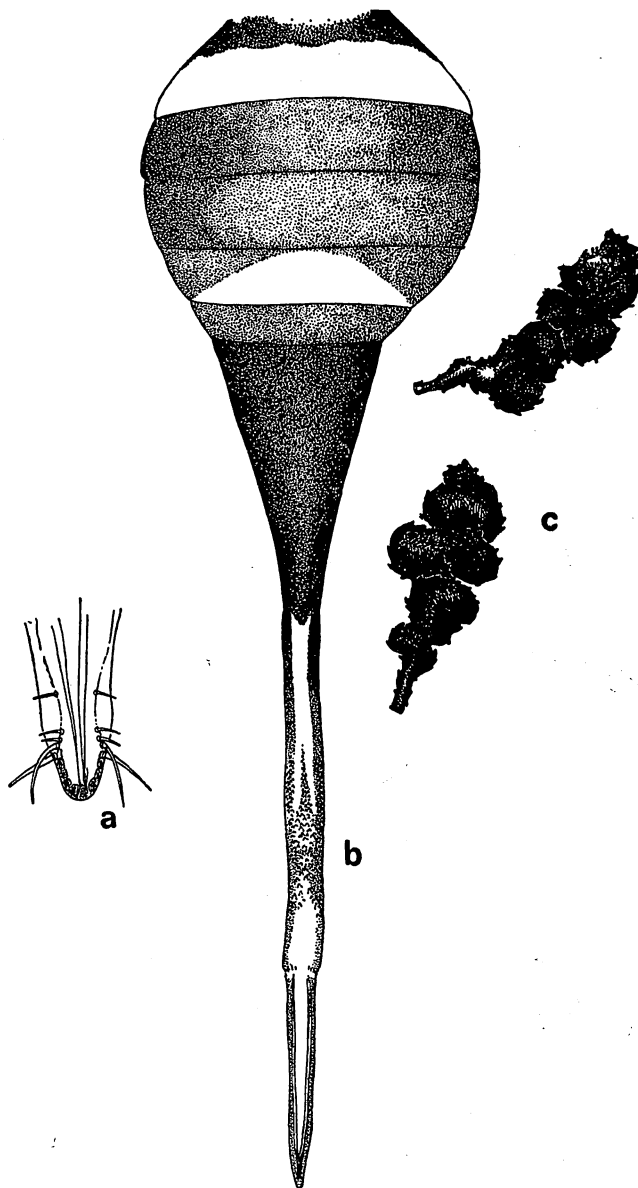


Fig. 24. *D. (Z.) atrifacies* Perkins. a. apex of piercer; b. ♀ abdomen; c. ♀ spermathecae.

on upper part of sternopleuron very small, not extending posteriorly beneath the pteropleuron. The median postsutural yellow vitta is pointed on both ends and extends posteriorly to a level approximately equal with prescutellar bristles. Scutellum yellow except for a narrow brown to black basal band. Legs mostly dark brown to black, broadly yellow on basal portions of middle and hind femora and with tarsi yellow. Costal band of wing rather narrow, slightly expanded apically; at broadest point the band is  $2 \times$  wider than at tip of vein  $R_{3+4}$  (pl. 1, fig. 8). Cubital

streak rather narrow and confined to basal portion of cell  $R_4$  along vein Cu. Abdomen largely brown, broad apices of 1st 2 terga yellow. Tergal glands on 5th segment yellow to rufous and a pair of submedian yellow spots present on the hind margin of 4th tergum; also 6th tergum broadly yellow, submedianly; a median brown vitta extends from apical portion of 4th tergum over the 6th tergum. Sixth tergum about 1/2 as long as 5th as seen from above. Basal segment of ovipositor dark brown, rather elongate and cylindrical; as seen from above, equal in length with terga 3-5, and approximately 2.0 mm long. Ovipositor tapered to a sharp point at apex (fig. 24a-b) and 1.7 mm in length. The extended ovipositor as seen from above is 6.0 mm.

Length: Body, excluding ovipositor, and wings, 5.75 mm.

The specimen on hand is from MALAYSIA: Malaya, Cameron Highlands, 19.IX.1963, collected on citron, R. Kawasaki.

**Dacus (Zeugodacus) caudatus** Fabricius Fig. 25a-c; pl. 1, fig. 9.

*Dacus caudatus* Fabricius, 1805, *Syst. Anth.*, p. 276. Type-locality: Java. Type ♀ in Universitetets Zoologiske Museum, Copenhagen.

*Dacus (Zeugodacus) maculipennis* (Doleschall), 1856, *Nat. Tijdschr. Ned. Ind.* 10: 412, pl. 2, fig. 1. **New synonymy.** Type-locality: Java. Type in Naturhistorisches Museum, Vienna.

I have studied the type ♀ of *caudatus* Fabricius. It is in rather good condition. The previous concept of this species is not correct. *D. caudatus* is actually the species which has been known in the literature as *maculipennis* (Doleschall). There is no

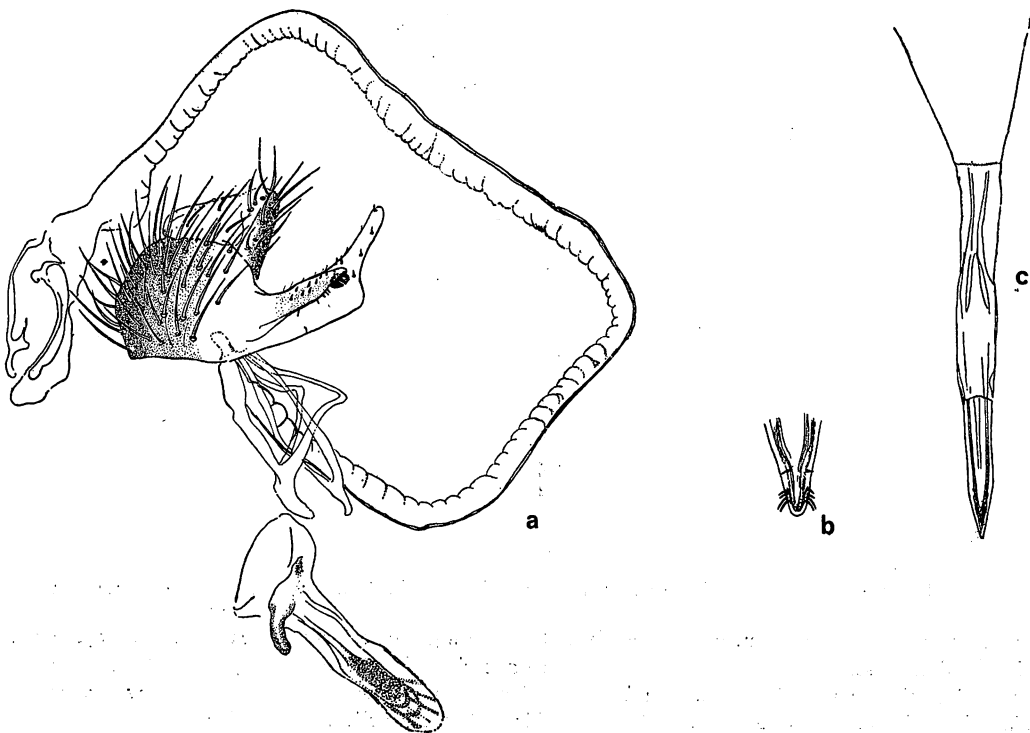


Fig. 25. *D. (Z.) caudatus* Fabricius. a. ♂ genitalia; b. apex of piercer; c. ovipositor.

brown band over the m crossvein, the face has a black band across the furrow, etc. The previous concept of *caudatus* is based upon Wiedemann, 1830, *Aus. Zweifl. Ins.* 2: 518. I have examined the Wiedemann specimens in the Westermann collection, 1 ♂ and 1 ♀ from Batavia, VIII.1815, and the m crossvein is infuscated with brown and fits Wiedemann's concept of *caudatus*, not that of Fabricius. The species which I am describing here as *ubiquitus*, n.sp. will fit the concept of *caudatus* Wiedemann.

This species is recognized from other *Zeugodacus* which have 3 postsutural yellow vittae and transverse black markings on the face, by having the face predominantly yellow with a crossband of black in the furrow; also by having 3 pairs of inferior fronto-orbital bristles and the median postsutural yellow vitta very broad, equal in width or slightly broader than the lateral yellow vittae; and the costal band slightly enlarged at apex (pl. 1, fig. 9).

Abdomen largely yellow to rufous with black bands across bases of 2nd and 3rd terga and with the lateral margins dark brown to black. Posterolateral portions of terga 4 and 5 dark brown and with a median brown to black vitta extending from 3rd tergum almost to apex of 5th. Tergal glands rufous. Basal segment of ovipositor rufous, tinged faintly with brown and approximately equal in length to terga 4+5, 1.25 mm long as viewed from above. Piercer short, rather thick, tapered to apex (fig. 25b), 1.0 mm long. The extended ovipositor 4.25 mm long. Fifth sternum of ♂ 2 × wider than long with the hind margin gently concave. Fifth sternum brown with posterior margin yellow and with a yellow median mark extending from hind margin, 3/4 the length of the sclerite. ♂ genitalia as in fig. 25a. Surstyli developed into long curved lobes at apices.

Length of specimens on hand: Body, 6.25–6.5 mm; wings, 5.7–6.1 mm.

Specimens are on hand from Java, Singapore, Also W. MALAYSIA: Malacca St., 2.IX.1963, reared from ♂ flowers of pumpkin, R. Kawasaki. THAILAND: Thapsakoe, 15.VI.1963, collected on *Citrus aurantium* f. *sekkon*, R. Kawasaki. S. VIETNAM: 22 km S. of Nha Trang, 20–26.XI.1960, C. M. Yoshimoto; M'Drak, E. of Ban Me Thuot, 400–600 m, 8–19.XII.1960, C. M. Yoshimoto.

**Dacus (Zeugodacus) diaphoropsis** (Hering) Pl. 1, fig. 10.

*Zeugodacus diaphoropsis* Hering, 1952, *Treubia* 21(2): 268, fig. 2. Type-locality: East Borneo. Type ♂ in the Rijksmuseum van Natuurlijke Historie, Leiden.

One ♂ specimen on hand from Laos appears to belong here. It fits Hering's original description in all respects except that the legs are predominantly yellow, tinged with brown on front tibiae and on bases and narrow apices of hind tibiae. This species is differentiated from other *Zeugodacus* which have 3 postsutural yellow vittae on the mesonotum, scutellum all yellow, and a black spot at each antennal furrow, by having the costal band narrow, about the same width throughout, not expanded apically and not extending into cell R<sub>3</sub> except along wing margin (pl. 1, fig. 10); also by having only 2 inferior fronto-orbital bristles. The original description is adequate for this species.

The specimen on hand is from LAOS: Muong Sayaboury, secondary woods, 305 m, 30.V.1967, F. G. Howarth.

**Dacus (Zeugodacus) isolatus** Hardy, new species Fig. 26a-b; pl. 2, fig. 14.

This species is closely related to *diaphoropsis* (Hering) from Borneo. It is differ-

entiated by having the costal band slightly expanded at the apex, the apical portion approximately  $2 \times$  wider than the band measured at apex of vein  $R_{2+3}$ , and with costal band extending slightly below vein  $R_{2+3}$  along upper edge of cell  $R_3$ . In *diaphoropsis* the costal band is narrow, the same width throughout, and is not extended into cell  $R_3$  except at apex (ref. Hering 1952: 270, fig. 2). Also, the 4th abdominal tergum of *isolatus* has a completely isolated yellow spot on each side and the yellow mark on upper portion of sternopleuron is elongate, occupying most of the upper edge of that sclerite. The original description of *diaphoropsis* indicates that the lateral postsutural yellow vittae on mesonotum are narrowed behind and reach to inner postalar bristle. In *isolatus* the yellow vittae are straight-sided, not at all narrowed posteriorly, and extend well beyond inner postalar bristles. This species also fits near *tau* (Walker) and is differentiated by the characters pointed out in the key above.

$\sigma$ . *Head*: Yellow except for the compound eyes and for the large polished black spots in antennal furrows; these are oval to slightly oblong, and situated at lower  $1/2$  to  $1/3$  of face but do not extend to oral margin. Front  $1/2$  wider than long, median portion slightly discolored with brown. Two pairs inferior fronto-orbital bristles present. Third antennal segment tinged with brown on ventral and apical portions. *Thorax*: Largely black in ground color, covered with gray

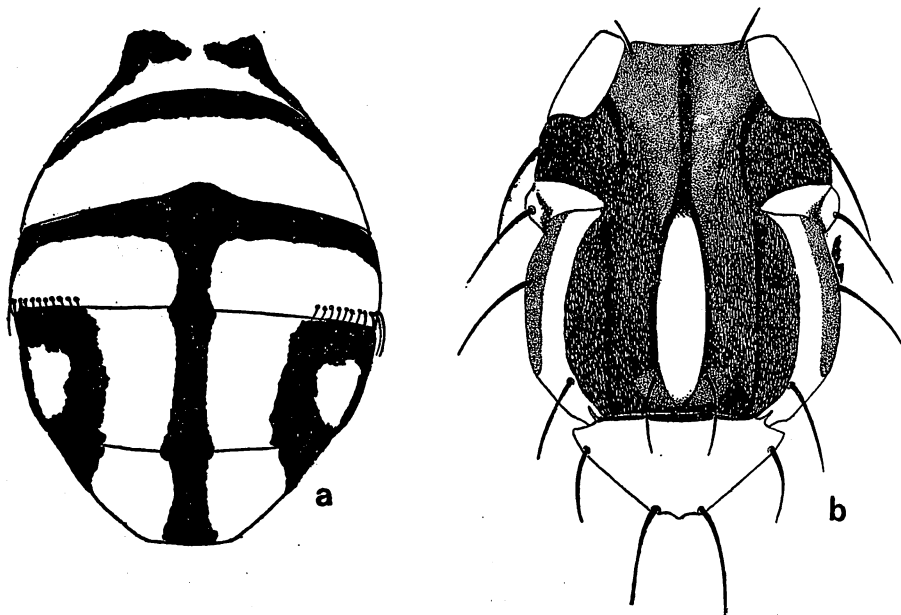


Fig. 26. *D. (Z.) isolatus* n. sp. a. ♀ abdomen; b. thorax.

pubescence, pattern of marks on mesonotum as in fig. 26b. The ground color of the anterior portion is rufous as is the area laterad of the yellow postsutural lateral vittae. The posterior portion of the mesonotum between prescutellar bristles is also rufous in ground color. The yellow vittae are as in fig. 26b. Propleura and mesopleura in area of the suture rufous, covered with gray pubescence. The yellow mark at upper edge of each sternopleuron elongate, covering most of top margin of that sclerite. Scutellum yellow except for a narrow black basal band. *Wings*: Hyaline, markings as in pl. 2, fig. 14. Cubital streak rather narrow, the brown marking not extending over vein  $Cu_1 + 1st A$ . Costal cells hyaline, devoid of microtrichia except at apex of 2nd. *Legs*:

Yellow, except for tinge of brown on hind coxae, tibiae, and apical tarsomeres, and a tinge of brown on posterior surfaces of front and middle tibiae near bases. Sensory area before apex of hind tibia covered with short gray setae. *Abdomen*: Largely yellow to rufous, black on lateral margins of terga and with a complete black band over bases of terga 2 and 3; also with a complete median black vitta extending from base of 3rd tergum to apex of 5th; with a large isolated yellow spot on each side of 4th tergum and with lateral margins of 5th broadly blackened (fig. 26a). Tergal glands rufous. Fifth sternum nearly  $2 \times$  wider than long with a distinct concavity on hind margin. The surstyli extended into narrow curved lobes at apices and with 10th sternum plainly visible from lateral view.

Length: Body, 5.5 mm; wings, 4.8 mm.

♀. Fitting description of ♂ in most respects. Ovipositor rufous, basal segment about  $1/3$  longer than 5th tergum as seen from dorsal view; the base measures approximately 1.2 mm. Piercer tapered to a sharp point at apex, 1.4 mm long. The extended ovipositor measures 4.3 mm.

Length: Body, 5.5-6.2 mm; wings, 4.8-5.5 mm.

Holotype ♂, THAILAND: Nan, 10.VII.1963, collected on *Citrus nobilis*, A. Vattana-tungum. Allotype ♀, same locality and date, Anant. Sixteen paratypes, 9 ♀♀, 7 ♂♂, from the following localities in THAILAND: same data as type; same locality as type, 9.VII.1963, "host: kon-krong (*Ficus* sp. ?), R. Kawasaki; Songkhla, 19.VII.1963, collected on *Ficus maltissima*, R. Kawasaki; Loei Prov., Loei, 250 m, 13-21.IV.1969, J. J. S. Burton; Chanthaburi Prov., Ban Khlong Ta Khong, 180 m, 21.II.1969, J. J. S. Burton. Also 1 ♂ paratype from LAOS: Vientiane Prov., Tha Ngone, 3.I.1966, native collector.

Type and allotype returned to the Thailand Department of Agriculture, Bangkok. Paratypes in the following collections: National Institute of Agricultural Sciences, Tokyo; B. P. Bishop Museum; U. S. National Museum; and the University of Hawaii.

This species evidently breeds in *Ficus*.

**Dacus (Zeugodacus) maculatus** (Perkins) ? Fig. 27a-c; pl. 2, fig. 16.

*Zeugodacus caudatus* var. *maculatus* Perkins, 1938, *Proc. R. Soc. Qld* 49(11): 139.

Three ♀ specimens on hand from Thailand are possibly the same species as that which Perkins described from Bukit Kutu, Selangor, Malaya. This species obviously is closely related to *scutellatus* Hendel from Formosa and Japan, and differs by having the black band at base of 2nd tergum rather narrow, broadly interrupted on sides and not having a complete black basal band on 4th tergum; this is interrupted with yellow submedianly. In *scutellatus*, terga 2-4 have broad complete bands across bases. Also, the spot at apex of scutellum on the specimens at hand is small, confined to area between apical scutellar bristles, whereas in the specimens of *scutellatus* on hand the spot is large extending beyond confines of apical scutellars. This species resembles *tau* (Walker) but is differentiated by having the apical spot on scutellum; by the costal band not so broadly expanded at apex, as in pl. 2, fig. 16; and the entire front portion of thorax black in ground color, including anteromedian portion and area surrounding the humeri, whereas in *tau* this area is rufous in ground color.

The specimens on hand may not be the same as *maculatus* Perkins. In his original description he says "facial markings are in the form of two triangular black spots, whose apices reach the oral margin, and whose bases run along the transverse furrow of the carina, meeting in the middle." This would seem to indicate that the 1 ♀ specimen studied by Perkins has a black band across the lower portion of the face; if so, it pro-

bably is a different species from the one at hand.

The following notes are based upon the ♀♀ at hand. Facial spots almost brown and not extending to the oral margin. A small brown to black spot present at base of each frontal bristle. Three pairs inferior fronto-orbitals present, the lower pair situated close together near level 1/4 of front. Three prominent postsutural yellow vittae present on mesonotum; lateral pair narrowed posteriorly and extending to inner posterior supraalar bristle; median vitta slightly pointed at both ends. Mesonotum otherwise black in ground color covered with gray pubescence, and with 3 very narrow subshining black lines extending most of the length. Legs mostly yellow, apices of femora tinged with brown and tibiae tinged with brown especially on hind pair, and on bases of middle and posterior margins of anterior pair. Wings as in pl. 2, fig. 16. At the broadest point the costal band is slightly over 2 × the width of the band measured at the apex of vein  $R_{2+3}$ . Cubital streak not extending to wing margin. Abdomen predominantly yellow to rufous, lateral margins black, with a black band at base of 2nd tergum which is interrupted at sides, and with a complete black band on base of 3rd tergum. The 4th and 5th terga have broad black markings basolaterally and are interrupted with yellow submedianly. A broad black, median vitta extends from 3rd tergum almost to apex of 5th. Basal segment of ovipositor rufous, rather short, scarcely longer than 5th tergum as seen from dorsal view; measured on the venter, 1.7 mm long. Piercer rather thick and short, trilobed at apex as seen under high magnification (fig. 27b), 1.2 mm in length. Extended ovipositor 4.2 mm. Length: Body ♀, excluding ovipositor, 8.0 mm; wing, 7.2 mm.

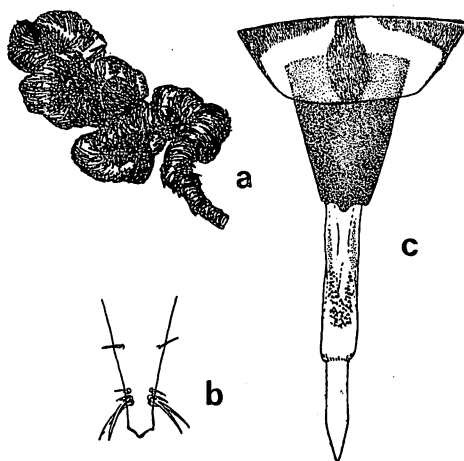


Fig. 27. *D. (Z.) maculatus* (Perkins). a. ♀ spermatheca; b. apex of piercer; c. ovipositor.

The 3 specimens on hand are from the following localities in THAILAND: Kampaengpet, 11.IX.1963; Phu Kae, 4.VIII.1963; and Nan, 10.VII.1963, collected on *Eugenia malaccensis*, R. Kawasaki.

#### *Dacus* (*Zeugodacus*) *pendleburyi* (Perkins)

*Zeugodacus pendleburyi* Perkins, 1938, *Proc. R. Soc. Qld* 49(11): 141, fig. 4. Type-locality: Selangor, Malaya. Type in the Selangor Museum.

*D. pendleburyi* has not been recorded outside of Malaya but is being included here since it may possibly occur in Thailand. I have not seen this species. The original description is adequate. It is differentiated from other *Zeugodacus* in this region, which have only 2 postsutural yellow vittae, by lacking a cubital streak and by having the costal band very narrow, not at all expanded at wing apex.

Hering (1952: 266) had a ♂ specimen from West Java which he considered to be *pendleburyi* Perkins. He placed this in *Paradacus* Perkins, assuming that the prescutellar bristles were absent. He indicated that the "Nadeln" was through the specimen at this point and he could not be sure. Since Perkins stated that prescutellar bristles are present, I would assume that *pendleburyi* is a true *Zeugodacus*.



**Dacus (Zeugodacus) platamus** Hardy, new species    Fig. 28a-c; pl. 2, fig. 17.

This species appears related to *scutellatus* Hendel from Formosa, and is differentiated by having a complete black basal band on the 2nd tergum, rather than being interrupted on sides; by having posterolateral margins of 4th tergum black, with entire submedian portions of tergum yellow to rufous, rather than with a complete black band on 4th tergum; by the much broader costal band on the wing extending through upper portion of cell  $R_3$  along underside of vein  $R_{2+3}$ , rather than having the costal band confined to cell  $R_1$  except at apex of  $R_3$  along wing margin; also by lacking black spots at bases of frontal bristles and having anteromedian portion of mesonotum rufous in ground color, rather than black.

♂. *Head*: Largely yellow, facial spots prominent, consisting of an elongate black spot on each side extending from oral margin,  $1/2$  the length of antennal furrow. Also, a small brown spot below each eye margin on gena, a brown submedian marking on back of occiput, a slight brown discoloration in middle of front and a black line across vertex. Front about  $1/4$  longer than wide

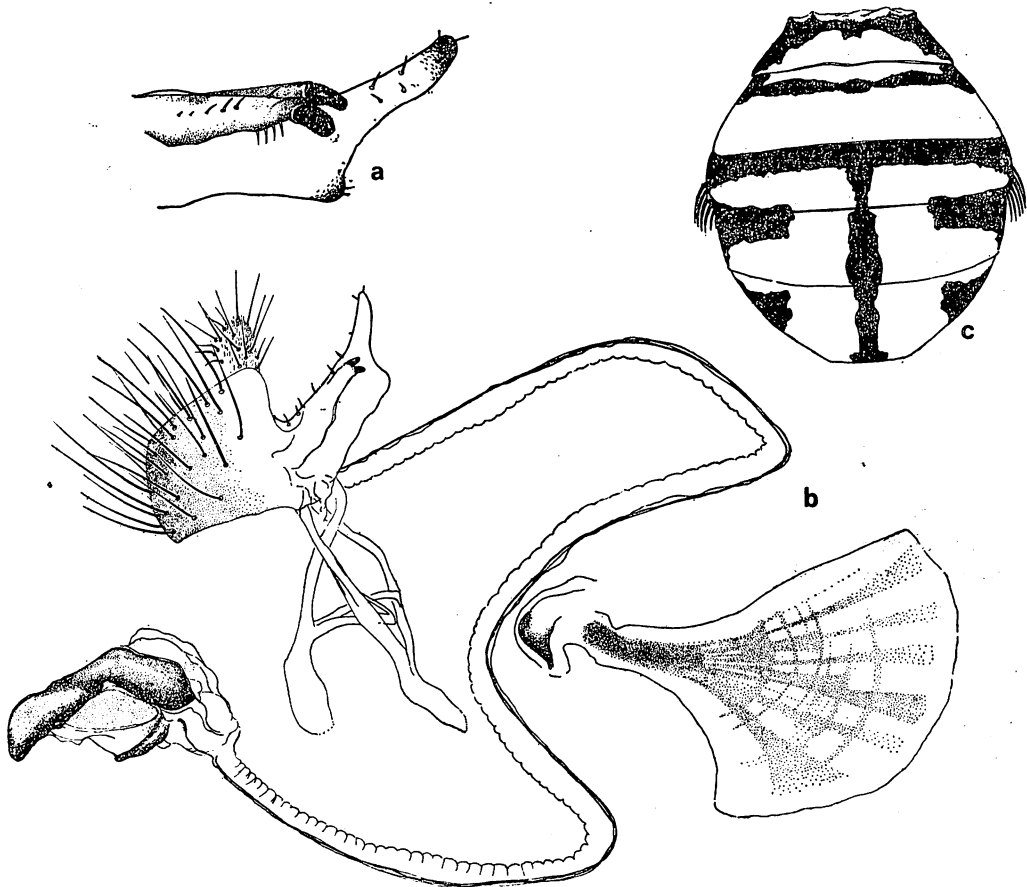


Fig. 28. *D. (Z.) platamus* n. sp. a. ♂ surstylus and 10th sternum; b. ♂ genitalia; c. ♀ abdomen.

and with 3 pairs of inferior fronto-orbitals. Third antennal segment rufous, tinged with brown apically. *Thorax*: Largely black, covered with gray pubescence, anteromedian portion of mesonotum, in front of postsutural yellow median vitta, rufous in ground color. The median postsutural vitta rather broad, approximately equal in width to lateral vittae, blunt posteriorly, extending to prescutellar bristles and tapered to a point anteriorly extending slightly beyond suture. Lateral vittae broad, straight-sided, extending beyond inner postalar bristles, and connected with yellow mark over suture on each side. Yellow mark at upper edge of sternopleuron rather large, extending posteriorly for a short distance beneath the pteropleuron. Scutellum yellow, with a brown spot confined between apical scutellar bristles. *Legs*: Front coxae yellow. Femora predominantly yellow, front and middle pair with a preapical brown spot on posterodorsal surface; hind femur tinged with brown at extreme apex. Hind tibiae entirely dark brown, middle tibiae yellow except for a faint tinge of brown at bases and front tibiae brown on posterior surface, otherwise yellow, tinged faintly with brown. Basitarsi pale yellow, other tarsomeres yellow, tinged with brown. The preapical sensory structure on hind tibia is densely covered with short brown setae. *Wings*: Mostly hyaline, the costal band and cubital streak both rather broad and as in pl. 2, fig. 17. *Abdomen*: Mostly yellow with brown to black markings as in fig. 28c. Fifth sternum nearly 2 × wider than long and slightly concave on posterior margin. ♂ genitalia as in fig. 28a-b.

Length: Body, 7.0 mm; wings, 6.3 mm.

♀. Unknown.

Holotype ♂ and 3 ♂ paratypes, THAILAND: Yala, 15.VIII.1965, Anand. Type returned to the Thailand Department of Agriculture, paratypes in the collections of the B. P. Bishop Museum and the University of Hawaii.

**Dacus (Zeugodacus) rubellus** Hardy, new species Fig. 29a-f.

This species would fit near *tau* (Walker) but is differentiated by having the thorax almost entirely rufous, lacking prominent black markings over mesonotum; by having the apical wing spot large, filling almost all the apex of cell  $R_5$ , rather than filling only about upper 1/2 of cell  $R_5$ ; also by having the piercer of ♀ trilobed at apex (fig. 29f), rather than pointed (fig. 31b). It is most closely related to *nubilus* Hendel from Formosa (Refer: Discussion under *tau* Walker), but is differentiated by the predominantly rufous thorax, lacking distinct black markings except for 2 thin lateral postsutural streaks of brown to black on mesonotum and a rather small brownish spot behind each humerus; by the larger wing spot, also the ♀ ovipositor is shorter; the basal segment 2.2 mm, piercer 2.5 mm and fully extended ovipositor 8.7 mm; *nubilus*' basal segment measures 2.65 mm, piercer, 3.3 mm, and extended ovipositor equals 10.0 mm.

♂ *Head*: Yellow, except for black facial spots and brown to black spots at bases of frontal bristles, the black ocellar triangle and faint marks of brown on vertex. Also, a faint mark of brown on each gena below eye margin. Facial spots oblong, slightly pointed ventrally, but not reaching oral margin. Three pairs inferior fronto-orbital bristles. Front 1/5 longer than wide. *Thorax*: Almost all rufous with only slight markings of brown to black on dorsum and on sides. Mesonotum with a faint brown to black streak on each side extending along inner margin of lateral postsutural yellow vittae, and also with a discoloration behind each humerus. Mesonotum with a vertical streak of brown to black in front of yellow vertical mark and median portion of sternopleuron reddish brown to black, also the upper portion of pteropleuron is tinged brown to black. Yellow spot on upper edge of sternopleuron rather large, extending posteriorly under the edge of pteropleuron. *Legs*: Yellow, tinged with brown on middle and hind coxae, and bases of middle tibiae and with front and hind tibiae predominantly brown; this is much darker on anterior surfaces. Front tibiae brown on posterior surfaces, otherwise yellow. The preapical sensory struc-

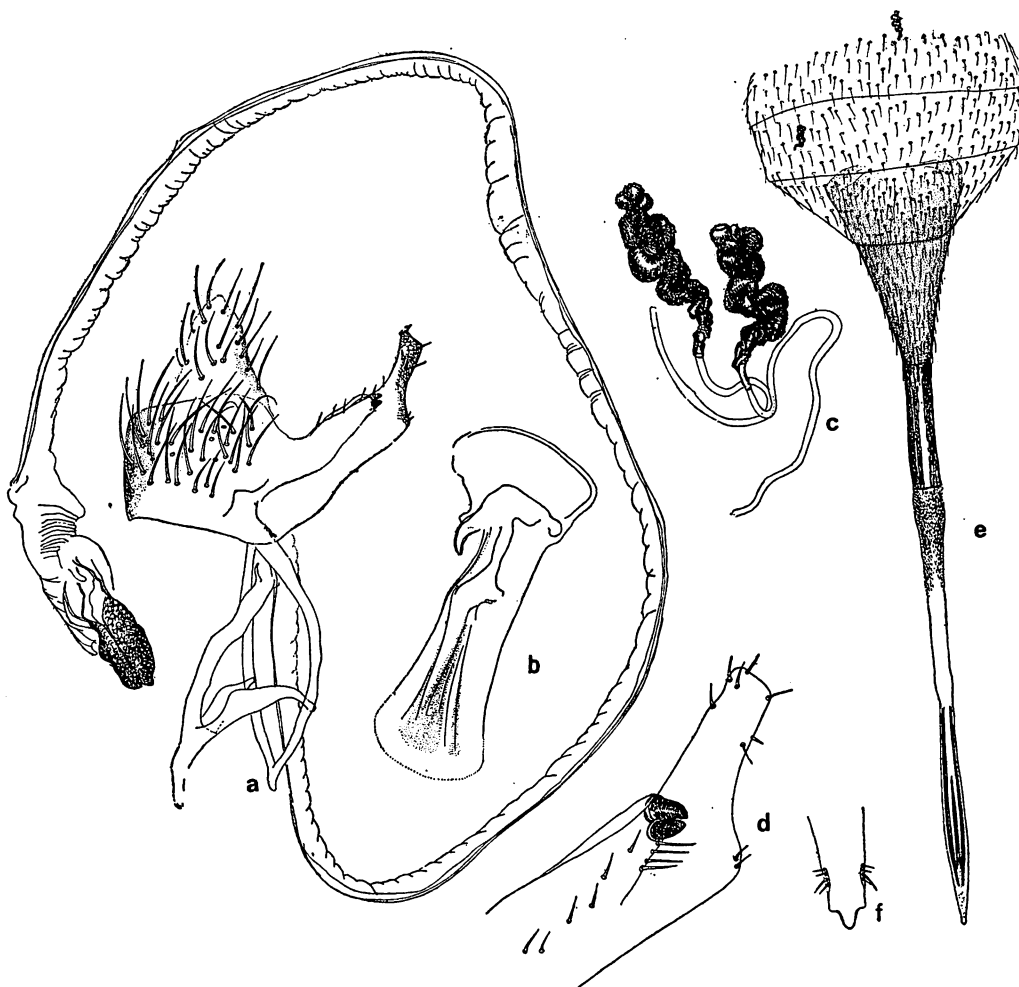


Fig. 29. *D. (Z.) rubellus* n. sp. a. ♂ genitalia; b. ♂ ejaculatory apodeme; c. ♀ spermathecae; d. ♂ surstylus and 10th sternum; e. ovipositor; f. apex of piercer.

ture on hind tibia very prominent, consisting of a flattened area, thickly covered with short brown setae and a slight posterodorsal ridge. *Wings*: Costal band rather broad, brown through subcostal cell and over apical portion, yellow through cells  $R_1$  and  $R_3$ . Band rather broad, the yellow coloring filling most of cell  $R_5$  and the band expanding into a large apical spot which fills most of cell  $R_6$ . Cubital streak broad, filling basal portion of cell  $M_4$  above vein Cu. *Abdomen*: Largely yellow to rufous, narrowly dark brown to black on lateral margins of terga, and with a complete black basal band only on 3rd tergum. Second tergum with a short brown to black band extending for a short distance over median portion, broadly interrupted on sides. Fourth and 5th terga blackened on posterolateral margins and with a brown to black vitta extending over 4th and the basal 2/3 of 5th. The 3rd tergum lacks a median vitta. This is apparently a diagnostic character. Tergal glands rufous. Second sternum yellow, 3rd yellow-brown, other sterna brown. Fifth sternum about 1/2 wider than long, gently concave on posterior margin, and densely setose. ♂ genitalia as in fig. 29a-b. The ejaculatory apodeme is almost straight-sided, not expanded

distally.

Length of type: Body, 7.7 mm; wings, 7.25 mm. Some of the paratypes range in body size from 6.5 mm to 7.7 mm.

♀. Fitting the ♂ in most respects. Ovipositor rufous, the exposed basal portion about equal in length to terga 4+5. The measurements of the ovipositor are as noted above in the introduction; the details of the ovipositor are as in fig. 29e and 29f.

Length: Body, ranging in size from 6.5 to 8.0 mm, average length appears near 8.0 mm; the smaller specimens are apparently abnormal.

Holotype ♂, THAILAND: Bangkok, 3.X.1962, no collector given. Allotype ♀, Thailand: Surattini, 1.IX.1962. 15 paratypes, 8 ♀♀, 7 ♂♂, from the following localities in Thailand: Pak Chong, 7.III.1963; Kanchanaburi, 30.VII.1962; Ratburi, 9.X.1965; Phu Kae, 1.IX.1963; Supanburi, 5.VIII.1963; Prachinburi, 1.IX.1963; Si Racha, 21.VIII.1962; Khon Kaen, 22.IX.1962; Saraburi, 4.III.1963; Chanthaburi, 26.VII.1964; Thapsakae, 15.VI.1963, collected on *Citrus aurantium* f. *sekkan*, R. Kawasaki; and Nan, 10.VII.1963, collected on *Eugenia malaccensis*, R. Kawasaki.

Type and allotype returned to Kasetsart University. Paratypes in the collections of the Thailand Department of Agriculture, Applied Scientific Research Corporation of Thailand, U.S. National Museum, British Museum (Natural History), National Institute of Agricultural Sciences, Tokyo, B. P. Bishop Museum, and the University of Hawaii.

**Dacus (*Zeugodacus*) *scutellaris* (Bezzi)** Fig. 30a-e; pl. 2, fig. 15.

*Bactrocera scutellaris* Bezzi, 1913, *Mem. Ind. Mus.* 3: 98, pl. 8, fig. 10. Type-localities: The following localities in India: Shillong, Assam; Siliguri, N. Bengal; Kurseong, E. Himalayas; and Bhowali, Kumaon.

One ♀ specimen on hand from Thailand belongs to this species. It is differentiated from other *Zeugodacus* which have 3 postsutural yellow vittae, a pair of black spots on face, and apex of scutellum black by having the costal band greatly narrowed, almost interrupted in cell  $R_3$  and expanded into a small spot at apex (pl. 2, fig. 15). Also by the broadly blackened apices of all femora and predominantly black abdomen.

The species has been adequately described by Bezzi.

Three pairs of inferior fronto-orbitals are present. The facial spots are rather small, slightly pointed on inner edges but not continuous across facial concavity. Thorax entirely black in ground color except for usual yellow markings. Mesonotum gray pubescent, with 3 narrow subshining vittae. Postsutural yellow vittae rather narrow, lateral pair extending to inner postalar bristles. Scutellum with a prominent brown to black spot covering entire apex. Femora predominantly yellow, broadly black at apices, also with basitarsi yellow and front and middle tibiae yellow, tinged with brown. Hind tibiae entirely black. Wings hyaline, marked as in pl. 2, fig. 15. The cubital streak is broad in the ♂, extending almost to wing margin. In the ♀, it is less developed. Abdomen predominantly black, narrowly yellow on apex of 1st tergum and broadly so on apex of 2nd, also tinged with yellow on apex of 5th tergum. Tergal glands rufous, tinged with brown. Ovipositor base black as seen from above, almost equal in length to terga 4+5. Fifth sternum of ♂ almost 2× wider than long and gently concave on hind margin. ♂ genitalia as in fig. 30a-b (note ♂ figures based on specimens from India). Basal segment of ♀ ovipositor, measured from venter, 1.7 mm. Piercer short and thick, approximately 1.0 mm long and trilobed at apex (fig. 30e). The extended ovipositor (fig. 30c) measures approximately 4.5 mm.

Length: Body, 6.0-7.0 mm.

I have a large series of this from Ranikhet, U. P., India, and 1 ♀ specimen from

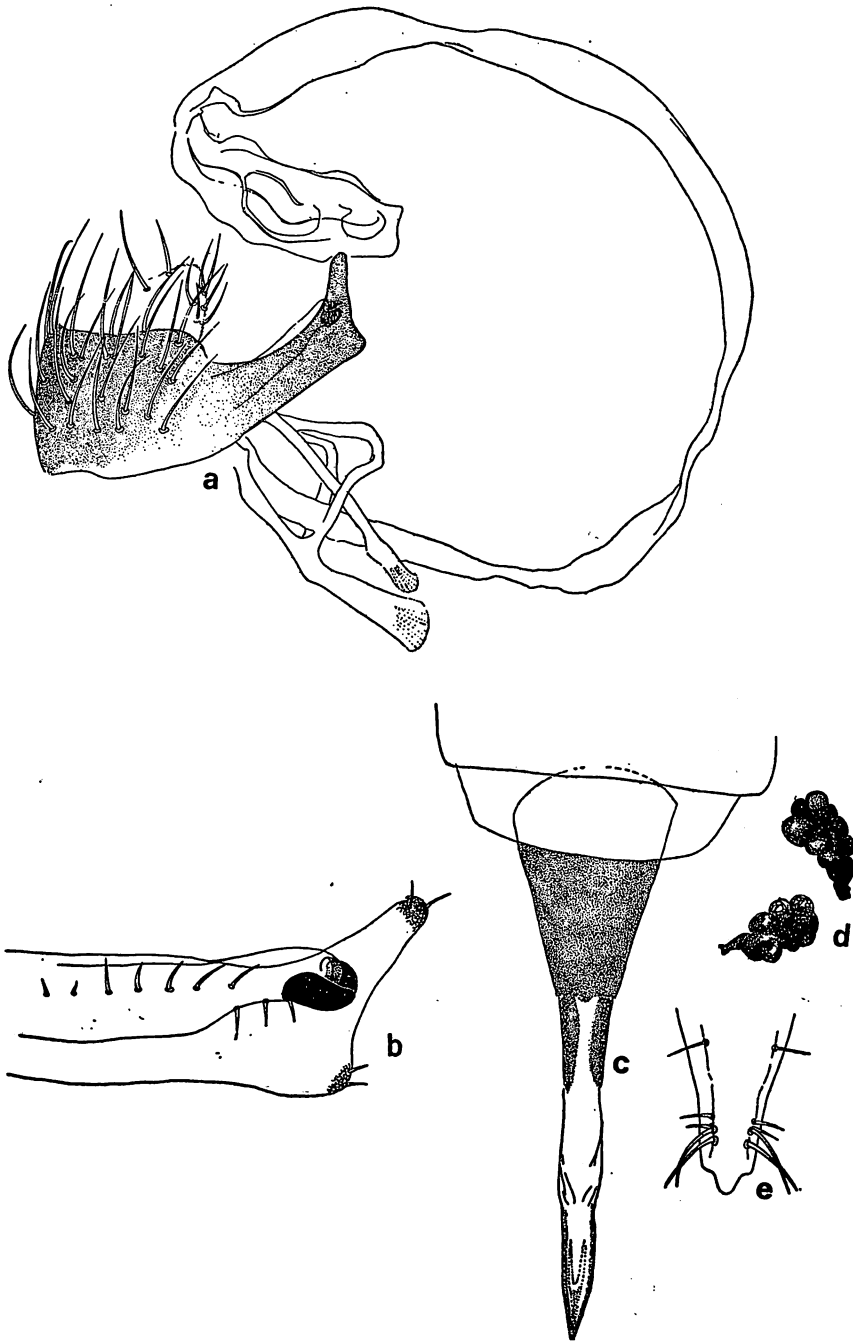


Fig. 30. *D. (Z.) scutellaris* (Bezzi). a. ♂ genitalia; b. ♂ surstylus and 10th sternum; c. ovipositor; d. spermathecae; e. apex of piercer.

Chiang Mai, Thailand, 3.XI.1963.

**Dacus (Zeugodacus) tau** (Walker) Fig. 31a-f; pl. 2, fig. 18.

*Dasyneura tau* Walker, 1849, *List Spec. Dipt. Ins. Brit. Mus.* 4: 1074. Type-locality: Foochow, China.

Type ♂ in the British Museum (Natural History).

*Dacus hageni* de Meijere, 1911, *Tijdschr. Ent.* 54: 375. Type-locality: Tandjong Morawa, Serdang, Sumatra.

*Zeugodacus nubilus heinrichi* Hering, 1941, *Siruna Seva* 3: 11. Type-locality: Celebes.

*Zeugodacus bezziarius* Hering, 1941, *Arb. Morph. Taxon. Ent.* 8(1): 26. Type-locality: Mou-pin, Szechwan, China.

This is the most common species of *Zeugodacus* found in Southeast Asia. It is widespread over the Oriental region and infests a wide range of hosts: several genera of cucurbits; and an assortment of fleshy fruits such as jack fruit, star fruit, guava, mango, chico (Sapodilla), and wax apple. For biology refer to Batra (1968).

This species is differentiated from other *Zeugodacus* which have 3 postsutural yellow vittae, 2 round spots on face and the scutellum yellow except for a narrow black band at base, by having the costal band expanded distally forming a large brown spot broadly occupying upper apical portion of cell  $R_5$  (pl. 2, fig. 18).

*D. nubilus* Hendel from Formosa has previously been treated as a synonym. I have reexamined specimens from Formosa and the basal segment of the ovipositor is more elongate and cylindrical than in *tau*, equalling length of terga 4+5 and as seen from direct dorsal view about 1.65 mm long. Also, the ovipositor is distinctly trilobed at apex, differing radically from that of *tau*. The wings are more distinctly yellow and a much larger, faint brownish yellow spot is present around lower portion of m crossvein over vein  $Cu_1+1st A$ .

*D. tau* fits near *diaphoropsis* (Hering) from Borneo and Laos, but differs by having the costal band distinctly enlarged at apex, broadly filling upper 1/2 of apical portion of cell  $R_5$  and upper edge of cell  $R_3$  tinged with brown under vein  $R_{2+3}$  (pl. 2, fig. 18). In *diaphoropsis* the costal band is not enlarged. Also the ♀ ovipositor of *tau* measures 6.8 mm, whereas in *diaphoropsis* it measures 4.3 mm.

Facial spots moderate in size, almost oval, extending to oral margin. Front usually with a brownish discoloration in median portion, and 1/3 to 1/4 wider than long. Thorax with conspicuous black markings in area between lateral and median postsutural yellow vittae, also area behind each humerus. With the anterior and anteromedian portion of mesonotum almost to suture typically rufous in ground color with a narrow median brown to black vitta extending from near suture to inner scapular bristles. Femora yellow, front and hind tibiae tinged with brown and middle tibiae lightly brown tinged basally. Wings as in pl. 2, fig. 18. With a faint indication of a brownish discoloration in immediate area around vein  $Cu+1st A$ . Costal cells hyaline, devoid of microtrichia except at apex of 2nd cell. Abdomen largely yellow. Lateral margins of terga narrowly black, 2nd and 3rd terga with black basal band; these are broadly interrupted at sides on 2nd but complete on 3rd. Terga 4 and 5 broadly blackened basolaterally, otherwise yellow to rufous except for black median vitta which extends from 3rd tergum over the apex of 5th. Tergal glands rufous. Fifth sternum of ♂ nearly 2× wider than long, gently concave on hind margin and densely setose. Genitalia as in fig. 31d-f. The surstyli are extended into long slightly curved lobes at upper apices. Tenth sternum plainly visible in direct lateral view. Ovipositor base sub-

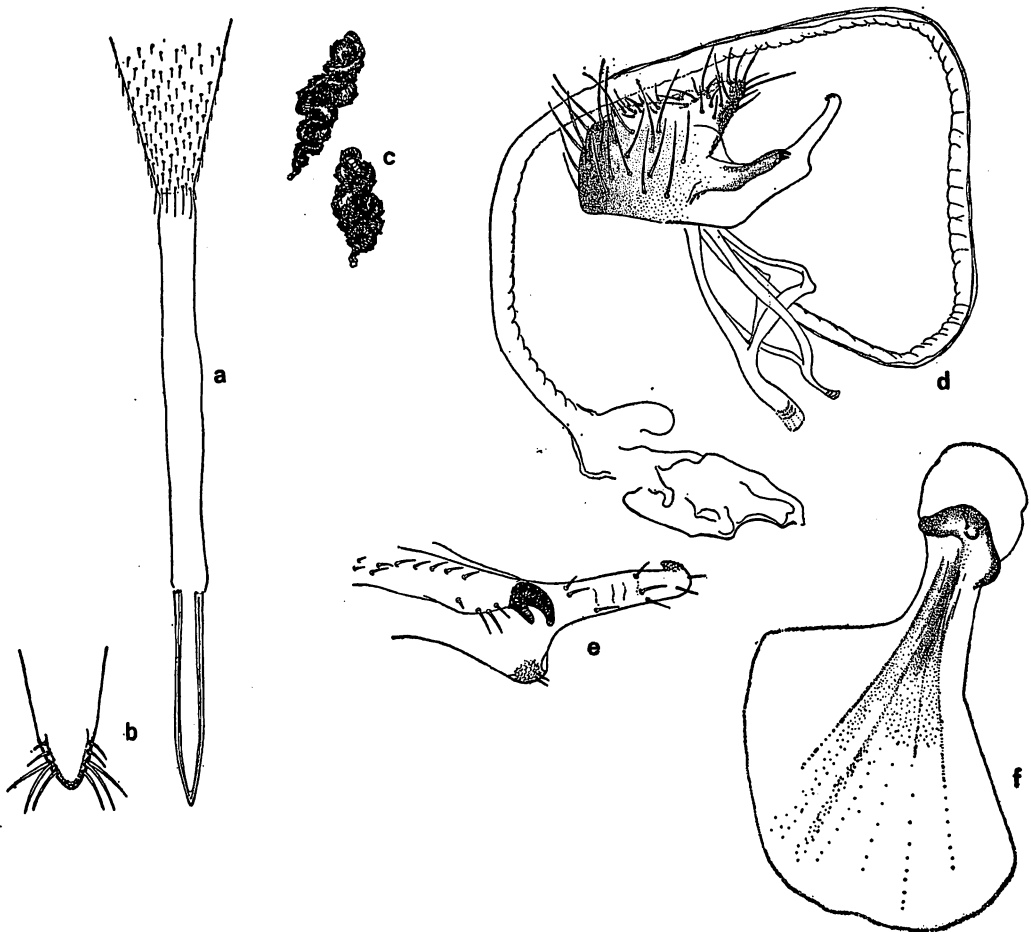


Fig. 31. *D. (Z.) tau* (Walker). a. ovipositor; b. ♀ apex of piercer; c. spermathecae; d. ♂ genitalia; e. ♂ surstylus and 10th sternum; f. ♂ ejaculatory apodeme.

equal to terga 4+5 as seen from dorsal view and usually flattened, measuring approximately 1.6 mm. Extended ovipositor 6.8 mm long. Piercer rather slender, gently tapered to a point at apex (fig. 31b) and approximately 2.1 mm long.

This species is rather variable in size, specimens on hand measure from: body, 6.0-9.0 mm, averaging near 8.0 mm; wings, 5.7-8.5 mm, averaging about 7.5 mm.

A large series of specimens are on hand from many localities over Thailand, Laos, Cambodia, Vietnam, Malaya, etc. Some collected on *Citrullus vulgaris*, *Cucumis melo*, and *Trichosanthes cucumerina*.

***Dacus (Zeugodacus) ubiquitous* Hardy, new species** Fig. 32a-c.

This species fits near *calumniatus* Hardy, from Tawi Tawi by having 3 postsutural yellow vittae, 2 black spots on face, costal band enlarged at wing apex and a distinct brown mark extending over m crossvein. It differs by having the costal band

diffused apically, the brown coloring extending at least faintly through most of cell  $R_5$ , rather than with the dark brown band ending abruptly at about middle of cell  $R_5$ ; by having the 5th sternum of the  $\sigma$  comparatively broad, only about 1/2 wider than long and with a broad V-shaped concavity on hind margin, rather than having the 5th sternum over  $2 \times$  as wide as long and gently concave on hind margin as in *calumniatus* (fig. 32d); and by having the surstyli rather boot-like, with a small basal apical lobe and with upper apical lobe not so elongated, much shorter than basal portion of surstylus (fig. 32c), rather than lacking the basal apical lobe and with apex very elongate, the lobe about equal to basal portion (fig. 32e) as in *calumniatus*.

This is very probably the species which has been treated in the literature as *caudatus* following the concept of Wiedemann, 1830, not Fabricius, 1805. Also it should be noted that *caudatus* of Fabricius has been confused in past literature under the name *maculipennis* (Doleschall).

$\sigma$ . *Head*: Front yellow, lacking brown spots at bases of bristles, but slightly discolored with brown medianly. Two pairs of inferior fronto-orbital bristles. Face with a shining black, oval spot on each side in antennal furrow. Antennae yellow, tinged faintly with brown at apex of 3rd segment. Third segment  $4 \times$  longer than wide. Palpi yellow, almost straight-sided. *Thorax*: Predominantly yellow to rufous on dorsum with a prominent black spot on each side behind humerus and before suture, and another prominent, broad black mark extending from suture almost to a level with inner postalar bristle; in some specimens these marks are joined at suture. Anteromedian, lateral, and posterior portions of mesonotum rufous, and with lateral postsutural yellow vittae pointed behind and extending approximately to inner postalar bristles. Median yellow vitta rather broad, rounded posteriorly, pointed anteriorly and extending from a level near postalar bristles to suture. The yellow mark extending over mesopleuron is rather broad, but the margins are almost straight-sided, only slightly tapered ventrally, and a black transverse mark extends over anterior portion of each mesopleuron. The yellow mark on upper sternopleuron is rather large, occupying most of dorsal portion of that sclerite and extending anteriorly and posteriorly beyond level with mark on mesopleuron. Postscutellum and metanotum shining black on sides, yellow rufous down middle. *Legs*: Femora yellow, tinged with brown at apices. Front and middle tibiae yellow, tinged with brown; hind tibiae brown. In some paratype specimens, the brown apices of femora are much darker in color and the front and middle tibiae are entirely brown. Hind tibia with a prominent posterodorsal keel (sensory area) before apex. *Wings*: Similar to *calumniatus* (fig. 32f), but with costal band greatly expanded at apex so that at widest point it is at least  $4 \times$  wider than band measured at level with tip of vein  $R_{2+3}$ . The brown mark over m crossvein and cubital streak are very prominent. *Abdomen*: Mostly yellow, 1st tergum black on base and on sides, 2nd narrowly black on sides and with a black mark extending across basal portion about 2/3 width of segment. Third tergum with a broad black basal band and with a black median vitta which extends posteriorly over apex of 5th tergum. Fourth and 5th terga broadly blackened on sides and posterolateral margins. Tergal glands yellow to rufous. Fifth sternum about 1/2 wider than long with a broad V-shaped concavity on hind margin. Fourth sternum wider than long.  $\sigma$  genitalia as in fig. 32e, with a short basal apical lobe and a moderately developed dorsal apical lobe, and with the 10th sternum plainly visible from lateral view.

Length: Body, 8.0 mm; wings, 7.0 mm.

$\varphi$ . Fitting the description of the  $\sigma$  in most respects. Basal segment of ovipositor rufous, faintly tinged with brown. As seen from dorsal view about equal in length to 5th tergum; measured on the venter equaling 1.5 mm. Piercer gradually tapered to a sharp pointed apex (fig. 32a) 1.3 mm long. Inversion membrane swollen in median portion. Extended ovipositor 4.5 mm long.



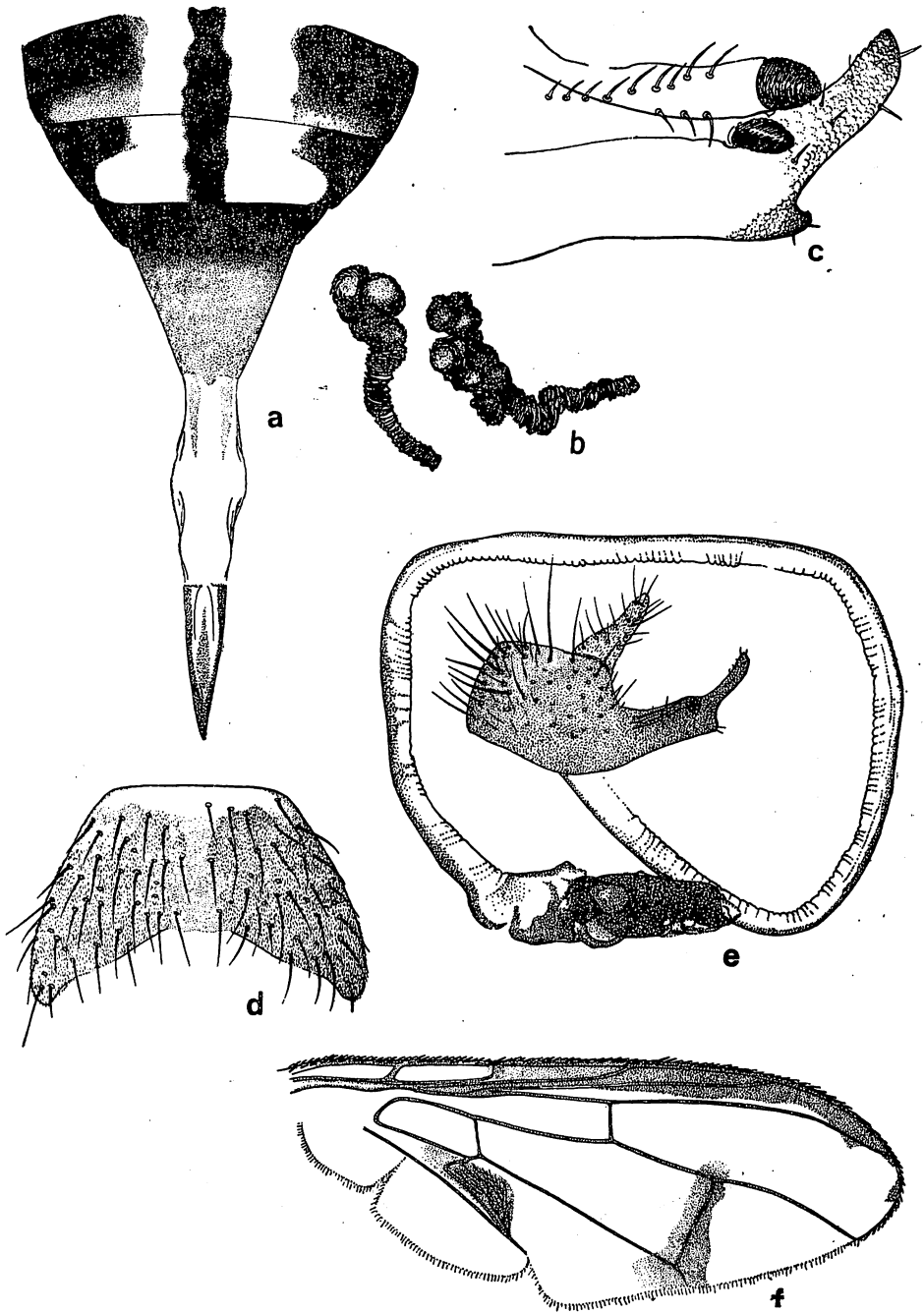


Fig. 32. *D. (Z.) ubiquitous* n. sp. a. ovipositor; b. spermathecae; c. ♂ surstylus and 10th sternum.  
*D. (Z.) calumniatus* Hardy. d. ♂ 5th sternum; e. ♂ genitalia; f. wing.

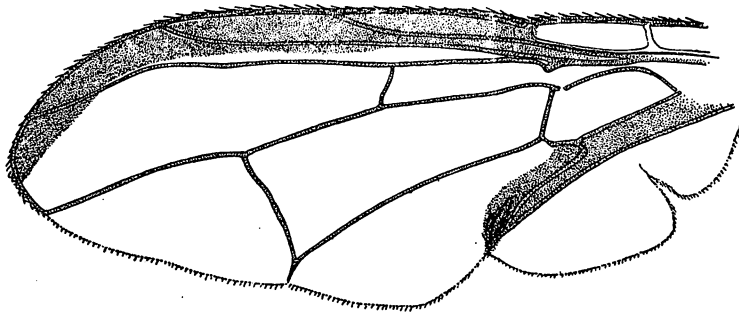
Holotype ♂ (BISHOP 9950), PHILIPPINES: Luzon, Camarines Sur, Mt Isarog, Pili, 800-900 m, 22.IV.1965, H. M. Torrevillas. Allotype ♀, Luzon: Laguna, Mt Makiling, 4.XI.1954, A. A. Marmeto. Paratypes 2 ♂♂, 5 ♀♀, from the following localities: Philippines: Mindanao, Cotabato Prov., Polo, nr base of Mt Matutu, 14.VIII.1958, H. E. Milliron. NEW IRELAND: Lemkamin, 23.IV.1962, Noona Dan Exped. THAILAND: Phu Kae, 7.IX.1965; Ratburi, 24.VII.1965; Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa; Loei Prov., 12 km NW of Loei, 275 m, 14.IV.1969, J. J. S. Burton.

Type in B. P. Bishop Museum. Allotype in the collection of the Bureau of Plant Industry, Manila. Paratypes in collections of B.P. Bishop Museum; Zoological Museum, Copenhagen; Kasetsart University, Bangkok; and University of Hawaii.

**Dacus (Zeugodacus) vultus** Hardy, new species Fig. 33a.

This species would fit close to *atrifacies* (Perkins) by having the face predominantly black and 3 postsutural yellow vittae on the thorax. It differs strikingly from that species by having the legs entirely yellow except for the brown hind coxae, and extreme bases of hind tibiae; also with a narrow posterior streak of brown along basal 1/2 of front tibia. It is also differentiated by the predominantly yellow abdomen and the comparatively broad costal band on wing (fig. 33a).

♂. *Head*: Occiput with a brown band extending vertically through median portion on each side. A black mark extending across vertex and connecting with ocellar triangle. Lower 2/3 of face, black through median portion yellow, tinged with brown on upper 1/3 and along eye orbits. Lower angle of face and portion of gena below compound eye tinged with brown and rather densely gray pubescent. Front 1/4 longer than wide, faintly discolored with brown through median portion and as seen in indirect light, densely gray pollinose (microscopically pubescent). Two pairs inferior fronto-orbital bristles present. First 2 antennal segment rufous, tinged with brown, 3rd segment dark brown to black, covered with gray pubescence. *Thorax*: Largely shining black in ground color, covered with gray pubescence. Median postsutural yellow vitta equal or slightly wider than the lateral vittae and blunt posteriorly, ending just slightly beyond



a

Fig. 33. *D. (Z.) vultus* n. sp. a. wing.

prescutellar bristles. Lateral vittae straight-sided, ending slightly beyond inner postalar bristles and connecting with the yellow mark on each side over suture and extending onto notopleural callus. The yellow mark on upper portion of sternopleuron not extending posteriorly

beneath pteropleuron. *Legs*: As noted above, the preapical sensory structure on hind tibia covered with yellow setae. *Wings*: Largely hyaline, costal band dark brown and approximately the same width throughout, measured at the apex of wing, the band is equal in width to area level with tip of vein  $R_{2+3}$ . The costal band fills the greater portion of cell  $R_3$  as in fig. 33a. Cubital streak broad, filling basal portion of cell  $M_4$  above vein  $Cu_1$ . Costal cells hyaline, devoid of microtrichia except in apical portion of 2nd. *Abdomen*: Largely yellow, with complete black bands across bases of terga 2 and 3 and with lateral margins of terga black. Also posterolateral portions of terga 4 and 5 black, and with a black median vitta extending from base of 3rd almost to apex of 5th. Tergal glands rufous. Second sternum entirely rufous, other sterna brown to black. The genitalia have not been dissected for study; the epandrium and surstyli are rufous, the latter are developed into long curved lobes at their apices.

Length: Body, 5.6 mm; wings, 4.9 mm.

Holotype ♂, THAILAND: Yala, 15. VIII. 1965.

Type returned to the Thailand Department of Agriculture, Bangkok.

#### **Dacus** (subgenus?) species?

One ♀ specimen on hand from Sakaerat, 300 km NE of Bangkok, Khorat Prov., Thailand, 1.III.1966, D. E. Hardy, would run to the subgenus *Daculus* Speiser (= *Polistomimetes* Enderlein) because of the presence of 2 scutellar bristles, lack of prescutellars and lack of anterior supraalars; it cannot definitely be placed to subgenus without the ♂. It does not fit any of the known species of *Polistomimetes*, as it differs by having a large brown isolated wing spot at apex filling almost all of apical portion of cells  $R_3$  and  $R_4$ , in combination with the body almost entirely rufous, 3 postsutural yellow vittae, and 2 short, postsutural, brown to black vittae on mesonotum. The ovipositor also appears to be very distinctive and the piercer is sharp pointed and has 2 widely spaced teeth on each side before apex. It superficially resembles *D. (Pacifodacus) infestus* (Enderlein) because of the large apical wing spot but in that species the spot is much larger and extends through the upper portion of cell 2nd  $M_2$ . The species on hand also has the basal segment of abdomen expanded posteriorly, rather than straight-sided, has a small black spot in each antennal furrow, rather than a black crossband and the thoracic chaetotaxy differs (i.e., lack of anterior supraalar bristle).

The specimen is in the B. P. Bishop Museum.

#### SUBFAMILY TRYPETINAE

A large assemblage of genera characterized by having the postocular setae thin and pointed, almost always dark brown or black; having a complete, or almost complete, set of head and thoracic bristles (except in Adramini); lacking the characteristics of Dacinae or Schistopterinae (refer to key to subfamilies); vertical suture of mesonotum well developed; 6th tergum of ♀ shorter than 5th, except in some genera of Euphrantini and Trypetini. The wings have a wide assortment of markings but are rarely spotted. The ♀♀ have 2 or 3 spermathecae.

The fauna of Thailand and bordering countries is arranged here in 11 tribes, 50 genera (plus 2 unplaced) and 118 species.

KEY TO TRIBES AND GENERA OF TRYPETINAE KNOWN FROM THAILAND AND  
BORDERING COUNTRIES

1. Cubital cell drawn out into a sharp point or prominent lobe at lower apex; section of vein Cu before joining 1st A always angular. ....2  
 Cubital cell not lobate or pointed at apex; portion of vein Cu closing off the cell straight, extending transversely (fig. 78a). Vein  $R_{4+5}$  with not more than a few setae at base. Fifth tergum of ♂ with prominent bullae (fig. 78b). Euribiini. ...  
 .....**Cycasia** Malloch
- 2 (1). A full complement of head and thoracic bristles present except in a few Euphrantini; always with dorsocentral, almost always sternopleural, and at least rudimentary ocellars. Postorbital setae well developed. ....3  
 Chaetotaxy reduced, lacking ocellar, postocellar, dorsocentral, sternopleural, presutural, and usually humeral bristles. Postocular setae small, poorly developed and inconspicuous. Adramini. ....46
- 3 (2). Scutellum inflated, convex dorsally, polished black with yellow marks or yellow with black marks and wider than long. Wings with black longitudinal streaks in basal cells, often with a prominent dark brown to black mark from costa to base of cell Cu in line with the humeral crossvein; with brown and at least partially yellow or yellow-gray transverse bands and a broad costal band on about apical 1/2 of wing; or, in *Xanthorrhachis*, with 3 longitudinal yellow bands (fig. 137a). Trypetini, in part. ....4  
 Scutellum flat, triangular in shape; wings not as above. ....10
- 4 (3). Humeral bristle strong. ....5  
 Humeral bristle lacking. Mesonotum polished black, scutellum mostly yellow. Wings as in fig. 115a. ....**Anoplomus** Bezzi
- 5 (4). Wings with 3 yellow longitudinal bands, 1 on costa, 1 on vein  $M_{1+2}$  and 1 on vein  $M_{3+4}$ ; no black streaks at wing base (fig. 137a). Ocellar bristles represented by a pair of tiny setae. ....6  
 Wings not as above; with black streaks in basal cells and often a large brown to black mark extending along costal margin from the humeral crossvein (fig. 127b, 128a). Ocellars usually well developed. ....7
- 6 (5). Front horizontal, head nearly quadrate, approximately as high as long; antennae situated almost in line with upper margin of eye (fig. 117a). Subcostal cell about equal in length to 2nd costal cell. Lobe of cell Cu scarcely over 1/3 as long as vein  $Cu_1+1st A$  (fig. 118a). Second tergum of ♂ not covering over 3rd tergum on the sides and basal segment of ♀ ovipositor with strong bristles at the apex (fig. 118e). ....**Galbifascia**, n. genus  
 Front sloping, head distinctly higher than long, antennae situated at upper 1/3 of front as seen in direct lateral view (fig. 137f). Lobe of cell Cu 1/2 to equal the length of  $Cu_1+1st A$  (fig. 137a, 138a). Second tergum of ♂ very large, completely covering 3rd tergum on sides (fig. 137b). Ovipositor base lacking bristles at apex. ....**Xanthorrhachis** Bezzi
- 7 (5). Ocellar bristles rudimentary, seta-like. Arista short pubescent. Eyes only slightly higher than long. ....8  
 Ocellar bristles well developed, nearly equal in size to outer verticals. Arista plumose. Eyes narrow, much higher than long. ....9
- 8 (7). Wings dark brown to black with anterior portion entirely brown and with 2 brown bands across posterior portion (fig. 127b). Wing with black streaks at base. Predominantly black species. Two pairs inferior fronto-orbital bristles. Third antennal segment rounded at apex. ....**Paratrithrum** Shiraki

- Wings hyaline with yellow marks as in pl. 7, fig. 64, and lacking basal black streaks. Pale yellow species with polished black marks on mesonotum and scutellum (fig. 116b). Three pairs of inferior fronto-orbitals. Third antennal segment pointed at upper apex (fig. 116a). ..... **Carpomyia** A. Costa
- 9 (7). Third antennal segment with a sharp spine-like point dorsoapically (fig. 108a and 110b), except in *aberrata* n.sp. and *adnata* n.sp. from Laos. Arista long plumose, rays equal to width of 3rd segment. Mesonotum and 5th abdominal tergum not polished black. Occiput not strongly swollen, at widest point equal to about 1/2 eye (fig. 112a). Wings with brownish yellow markings, as in fig. 103a, 104a, 109a. .... **Acroceratitis** Hendel
- Third antennal segment rounded at apex, or very slightly pointed but not spine-like (fig. 128b). Arista short plumose, longest rays 1/2 to 2/3 the width of 3rd. Mesonotum predominantly polished black, also 5th tergum polished black in most Thailand species. Wings with dark brown markings (fig. 128a). Occiput strongly swollen, nearly equal to width of eye (fig. 130a). .... **Proanoplomus** Shiraki
- 10 (3). Presutellar bristles lacking, only 1 strong inferior fronto-orbital; wings entirely dark brown, except for narrow hyaline hind margin (pl. 8, fig. 77). Vein  $M_{1+2}$  setose. Mesonotum dark brown to black with a yellow-white vitta down middle, continuing over scutellum. Euphrantini. .... **Felderimyia** Hendel
- Not as above. .... 11
- 11 (10). Pleuroterga with numerous erect, fine hairs. Euphrantini. .... 12
- Pleuroterga bare or with not more than short microscopic pubescence. .... 17
- 12 (11). Front with at least 2 pairs of orbital bristles; superior fronto-orbitals strong. .... 13
- Front with but 1 pair of orbitals, situated near anterior margin (fig. 64b); superior fronto-orbitals lacking. Dorsocentrals rudimentary, represented by small seta-like bristles. .... **Dimeringophrys** Enderlein
- 13 (12). Front with 1 pair of inferior fronto-orbital bristles. Ocellar bristles rudimentary, seta-like. Prescutellar bristles present in *Tetrameringophrys*, n. genus. .... 14
- Front with 2 to 3 pairs of inferior fronto-orbitals. Prescutellar bristles present or absent. .... 15
- 14 (13). Superior fronto-orbital bristles situated near inferior fronto-orbitals below middle of front (fig. 74b). Prescutellar bristles lacking; wings largely dark brown to black with hyaline wedges from margin (fig. 74a). .... **Ptilona** v. d. Wulp
- Superior fronto-orbitals widely spaced from inferior fronto-orbitals, situated on upper 3/4 of front (fig. 77c). Prescutellars strong. Wings mostly subhyaline (fig. 77a). Laos. .... **Tetrameringophrys**, n. genus
- 15 (13). Prescutellar bristles present. .... 16
- Prescutellars absent. .... **Euphranta** (**Euphranta**) Loew
- 16 (15). Third costal section (stigma) short, usually about 1/2 as long as 2nd costal section. .... **Euphranta** (**Staurella**) Bezzi
- Third costal section equal or longer than 2nd. .... **Staurocneros** Hering
- 17 (11). Middle and hind femora lacking rows of short, stout, anteroventral spines. .... 18
- Middle and hind femora with short, stout spines on apical 1/2 of anteroventral and posteroventral surfaces. Propleural bristle well developed. Gastrozonini. .... **Callistomyia** Bezzi
- 18 (17). With 4 or more scutellar bristles. .... 19
- Two scutellar bristles, only 1 well developed inferior fronto-orbital bristle. Wings banded (fig. 86b). Yellow species with black marks on thorax and abdomen. Thailand, Vietnam. Gastrozonini. .... **Dietheria**, n. genus
- 19 (18). Four to 6 scutellar bristles. .... 20
- Eight or more strong scutellars; ocellar bristles rudimentary; middle tibia with 2

- apical spurs; entire wing membrane densely covered with microtrichia and body densely setose. *Acanthonevrini*. .....30
- 20 (19). Four scutellar bristles. If arista is plumose the wings are not predominantly brown with hyaline wedges on anterior and posterior margins, and  $M_{3+4}$  is bare. ....21  
Six scutellar bristles. Secondaries sometimes small; if secondaries are rudimentary, front with only 1 pair of strong inferior fronto-orbital bristles (see *Acanthonevra*).  
Three spermathecae in ♀. Wing often predominantly dark brown with hyaline wedges on anterior and posterior margins. ....31
- 21 (20). Arista plumose or pectinate. *Gastrozonini*. ....22  
Arista pubescent or bare. *Trypetini* and *Aciurini*. ....40
- 22 (21). Third antennal segment rounded at apex. ....23  
Third antennal segment sharp pointed apicodorsally (fig. 97a). ....27
- 23 (22). Ocellar bristles tiny, rudimentary, seta-like. ....24  
Ocellars well developed, bristle-like. Wings as in fig. 88a and pl. 6, fig. 59. ....26
- 24 (23). Presutural bristles well developed. ....25  
Presuturals absent. Eyes narrow, about 2 × higher than long (fig. 95b). Wing markings as in fig. 95a. Thailand and Laos. ....**Rhaibophleps**, n. genus
- 25 (24). Arista plumose. One strong inferior fronto-orbital bristle plus a small seta-like bristle (♀). Sternopleural and presutural bristles absent. Dorsocentrals posterior in position, situated just in front of posterior supraalar bristles. Wing as in fig. 96a. Thailand. ....**Spaniothrix**, n. genus  
Arista pectinate. Frontal bristles absent in ♂, 4 to 7 inferior fronto-orbital bristles in ♀. Wing with a broad yellow to brown costal band, a short subapical transverse band and a brown spot on m crossvein (fig. 84c), except in ♂ of *dispilota*, n. sp. (fig. 84b). India, Burma, Thailand. ....**Chaetellipsis** Bezzi
- 26 (23). Ocellar bristles strong, equal in size to lower superior fronto-orbitals. Wings as in pl. 6, fig. 59. Ovipositor rounded at apex (fig. 98c). ....**Taeniostola** Bezzi  
Ocellar bristles comparatively weak, not longer than lower inferior fronto-orbitals. Wings as in fig. 88a and 90a. Ovipositor spearhead-shaped at apex (fig. 87d and 88c). ....**Gastrozona** Bezzi
- 27 (22). Ocellar bristles well developed, about equal in size to lower superior fronto-orbital bristles. ....28  
Ocellars rudimentary. Wing with a narrow brown transverse band across r-m crossvein, another at m, and a band across the apex (pl. 6, fig. 58). Philippines, Vietnam. ....**Spilocosmia** Bezzi
- 28 (27). Mesonotum covered with fine yellowish setae; scutellum sparsely pale haired; r-m crossvein near middle of cell 1st  $M_2$ ; wings banded as in fig. 80a and 81a, or spotted (fig. 93c). ....29  
Mesonotum, scutellum and abdomen densely black setose; prominent bristles on sides of abdominal terga; wings marked as in fig. 92b; r-m crossvein near apical 2/3 of cell 1st  $M_2$ . Entire wing membrane densely microtrichose. Arista long plumose. Laos and Thailand. ....**Paraxarnuta**, n. genus
- 29 (28). Arista long plumose, the rays are longer than width of 3rd antennal segment (fig. 93e); basal cells of wing covered with fine microtrichia; wings brown, usually with numerous hyaline spots (fig. 93c); subcostal cell short, about 1/2 as long as 2nd costal cell. ....**Phaeospilodes** Hering  
Arista shorter plumose, longest rays less than width of 3rd; basal cells largely bare; wings hyaline with brown bands (fig. 80a and 81a); subcostal cell about 4/5 as long as costal cell. ....**Acrotaeniostola** Hendel
- 30 (19). Vein  $R_{2+3}$  straight; setae on vein  $R_{4+5}$  extending just a short distance beyond level of m crossvein and r-m crossvein situated at apical 3/5 to 2/3 of cell 1st  $M_1$ .

- Indonesia through Malaysia, Thailand, Australia, New Guinea, Philippines, and Caspian Sea. .... **Xarnuta** Walker  
 Vein  $R_{2+3}$  wavy;  $R_{4+5}$  setose almost to apex; crossvein r-m just slightly beyond middle of cell 1st  $M_2$ . (Wing as in fig. 6, Hering 1939: 173). N. Vietnam.....
- ..... **Platystomopsis** Hering
- 31 (20). Sternopleural bristles absent. ....32  
 Sternopleurals present. ....33
- 32 (31). Arista plumose. Cell Cu with a well developed apical lobe. Subcostal cell (stigma) equal to or longer than 2nd costal cell. Vein  $R_{4+5}$  setose almost its entire length. Wings subhyaline to yellowish with some dark markings along costa and usually along some of the veins. India, Formosa, Malaysia, and SW Pacific. ....  
 ..... **Sophira** Walker  
 Arista pubescent, or very short plumose (fig. 45b.) Cell Cu acute at lower apex but not lobate. Subcostal cell 1/2 as long as 2nd costal cell. Vein  $R_{4+5}$  almost bare. with about 5 widely scattered setae before r-m crossvein. Wings marked as in fig. 45a. Vietnam. .... **Mimosophira**, n. genus
- 33 (31). Only veins  $R_1$  and  $R_{4+5}$  setose above. ....34  
 Vein  $M_{3+4}$  and straight basal portion of Cu also setose. One pair inferior fronto-orbital bristles. Vein  $R_{2+3}$  undulate, wing markings as in fig. 48a. Head broad, eyes of ♂ usually stalked (fig. 48b). .... **Themara** Walker
- 34 (33). Mesopleuron not with a bristle in lower median portion. Wings normal in shape (fig. 34a, 41d).....35  
 Mesopleuron with a prominent bristle near lower edge centrally. Wings broad, about 2 × longer than wide, *Platensina*-like (pl. 3, fig. 28). Head bristles as in fig. 44a. .... **Hexacinia** Hendel
- 35 (34). Only 1 strong apical spur on middle tibia. ....36  
 Two strong subequal apical spurs on mid-tibia. A large white mark covers scutellum and hind portion of mesonotum (fig. 41b). Wing as in fig. 41d-e. ....  
 ..... **Diarrhegma** Bezzi
- 36 (35). Two pairs strong inferior fronto-orbital bristles. Wings as in fig. 50b and pl. 3, fig. 27. ....37  
 One pair of inferior fronto-orbital bristles. Subcostal cell as long as 2nd costal. Mesonotum sometimes brownish vittate but not with isolated black spots. ....  
 ..... **Acanthonevra** Macquart sens. lat.
- 37 (36). Inferior fronto-orbitals evenly spaced, usually about as far apart as superior fronto-orbitals, both bristles incurved. ♂ lacking ornamentations on front femora. Surstyli not abnormally long. ....38  
 Inferior fronto-orbitals situated very close together, the upper bristle is reclinate. ♂ with a large ventral appendage in front femur. Surstyli very elongate, prominent, plainly visible in situ, folding beneath abdomen over sternum 5. Wing as in pl. 3, fig. 26 and 27. .... **Ectopomyia**, n. genus
- 38 (37). Wings mostly dark brown, with hyaline spots (fig. 46a, 47a). ....39  
 Wings with 3 oblique crossbands, venation as in fig. 50b. Yellow species with prominent black markings on thorax and abdomen. .... **Tritaniopteron** de Meijere
- 39 (38). Subcostal vein arched upward; subcostal cell elongate with vein  $R_1$  ending about opposite m crossvein, well beyond r-m crossvein (fig. 46a). .... **Rioxa** Walker  
 Subcostal vein not convex; cell Sc subequal to 2nd costal cell and  $R_1$  ending opposite r-m crossvein (pl. 2, fig. 19). .... aberrant, **Acanthonevra** (*desperata* Hering, Vietnam and Laos and probably *parvisetalis* Hering, from Fukien, China fit here).
- 40 (21). Entirely shining black species. Wings dark brown to black with 1 hyaline spot on

- anterior margin and 3 or 4 on posterior margin (pl. 4, fig. 32, 37). *Aciurini*.....  
.....**Sphaeniscus** Becker
- Not as above. *Trypetini*. ....41
- 41 (40). Wings normal in shape, marked as in fig. 100a, 125b... ..42  
Wings long and slender, almost straight-sided, 3 × longer than wide; anterior 3/4  
dark brown, posterior margin hyaline as in pl. 7, fig. 66. ....**Hemilea** Loew
- 42 (41). Wings with r-m and m crossveins approximately parallel, cell 1st M<sub>2</sub> not sharply  
pointed at apex. Markings as in fig. 100a and 123a. ....43  
Crossvein m strongly oblique in position, cell 1st M<sub>2</sub> acutely pointed. R<sub>1</sub> bent rather  
sharply, almost at a right angle, entering costa parallel to Sc; apex of cell Sc nearly  
square (pl. 8, fig. 76). ....**Anomoia** Walker
- 43 (42). Head and body bristles black. Three pairs inferior fronto-orbitals. Wings usually  
brown. ....44  
Head and body bristles yellow. Two pairs inferior fronto-orbitals. Wing markings  
mostly yellow with a Y-shaped mark in middle as in fig. 100a. Vein R<sub>4+5</sub> bare.  
.....**Acidoxantha** Hendel
- 44 (43). Wings hyaline with yellow markings as in pl. 7, fig. 64. Body yellow with polished  
black spots on dorsum of thorax. ....**Carpomyia** A. Costa
- Not as above. ....45
- 45 (44). Basal 2/3 of wing almost solid brown, apical portion largely hyaline, with narrow  
brown band along margin (fig. 121a and 123a). Crossvein r-m separated from m  
by a distance about equal to its own length. Face about equal in length to front.  
.....**Myoleja** Rondani
- Wing brown with hyaline marks around margin and spots over the field (fig. 135b),  
or largely hyaline with variously arranged brown marks (refer Hering 1938, fig.  
39-46) not as above. Crossvein r-m at least 2 × its length from m. Face much  
shorter than front (fig. 135a). ....**Trypeta** Meigen
- 46 (2). At least 1 pair of femora with prominent ventral spines (fig. 56e). Pleuroterga with  
fine erect hair in *Adrama* and *Meracanthomyia*. ....47  
Femora lacking ventral spines. Pleuroterga bare. Only 1 pair inferior fronto-orbitals  
and 1 pair superior fronto-orbitals; cell Cu with short lobe, wing as in fig. 57a.  
Thailand. ....**Heterosophira**, n. genus
- 47 (46). Inferior fronto-orbital bristles present. Face not over 1/2 as long as eye height. At  
least middle femora with ventral spines. Cubital cell with short apical lobe, not  
over 1/4 as long as vein Cu<sub>1</sub>+1st A, or acute at lower apex. ....48  
Inferior fronto-orbital bristles lacking. Face elongate, equal in length to eye and  
also 3rd antennal segment (fig. 58a). Only front femora with ventral spines.  
Lobe of Cu nearly equal to Cu<sub>1</sub>+1st A. *Ichneumon*-like species. Burma. ....  
.....**Ichneumonopsis**, n. genus
- 48 (47). Antennae short, not extending to edge of face. Usually 4 scutellar bristles. Wings  
as in fig. 55a and pl. 4, fig. 38. Vein R<sub>4+5</sub> setose at least to level of r-m crossvein.  
.....49  
Antennae very elongate, 2 or more times longer than face (fig. 59a). Two scutellar  
bristles. Wings as in fig. 62. Vein R<sub>4+5</sub> bare. ....**Meracanthomyia** Hendel
- 49 (48). Only middle femora with ventral spines. Pleuroterga bare, both pleuroterga and  
metapleura polished black with a dense patch of pubescence on lower edge of  
latter. Cubital cell acute at apex (pl. 4, fig. 38). Largely yellow species with  
vittate mesonotum. Thailand. ....**Adramoides**, n. genus
- All femora with ventral spines. Pleuroterga microscopically pubescent and covered  
with fine erect hairs. Metanotum yellow. Cubital cell lobate (fig. 55a). ....  
.....**Adrama** Walker



## Tribe ACANTHONEVRINI

Members of this tribe are characterized by having 6 or more scutellar bristles (the secondaries may be small or rarely lacking); the arista almost always plumose; and ♀ with 3 spermathecae. The latter are very diversified and are of considerable taxonomic importance. The wings are often predominantly brown with hyaline wedges on anterior margin (fig. 34a, 35a).

Twelve genera and 26 species are treated here.

Genus *Acanthonevra* Macquart

*Acanthonevra* Macquart, 1843, *Dipt. Exot.* 3: 377. Type-species: *A. fuscipennis* Macquart, by monotypy.

*Acanthonevra* Schiner, 1868, *Reise Novara, Zool.* 2: Abt. 1, Dipt., p. 228. Invalid emendation of *Acanthonevra*.

*Rioxoptilona* Hendel, 1914, *Wien. Ent. Zeit.* 33: 78. New synonymy. Type-species: *Trypeta vaga* Wiedemann, by original designation. Based upon the study of the type of the genus, *vaga* Wiedemann, I see no logical way to separate this from *Acanthonevra* as noted below. Hendel, in the original description, placed this near *Rioxa* but the characters he uses do not seem to be reliable. He differentiated *Rioxa* and *Rioxoptilona* from *Acanthonevra* by having the arista long plumose as against short plumose, etc. Shiraki (1933: 125) keyed *Rioxoptilona* as having eyes rounded; in the type-species they are oblong.

The concept of this genus has been greatly confused in the literature. Much of this has probably resulted from the misidentification of the type of the genus by Bezzi (1913: 117). The type ♀, from Bengal, in the Natural History Museum, Paris, is very distinctly different from the species which Bezzi described as *fuscipennis* and the 2 do not appear to be congeneric. Bezzi described vein M as bristly and he very probably was dealing with a *Themara*, possibly *maculipennis* (Westwood). Bezzi was doubtful that the species he had was the same as that of Macquart.

*Acanthonevra* appears to be differentiated from other Acanthonevrini by typically having only 1 pair of inferior fronto-orbital bristles; the subcostal cell equal in length to 2nd costal cell; ocellar bristles rudimentary; and dorsocentral bristles situated distinctly behind anterior supraalars. The genus has usually been differentiated by having vein  $R_{2+3}$  wavy (refer Shiraki 1933: 125, Chen 1948: 84, et al.). This has been the important character for separating this genus from *Rioxoptilona* Hendel, — having  $R_{2+3}$  wavy in *Acanthonevra* and straight or nearly so in *Rioxoptilona*. I have checked 22 species in the British Museum (Natural History) collection under *Acanthonevra*, also 8 under *Rioxoptilona* and find no constant characters which appear to be of any value in separating these. The amount of curvature of vein  $R_{2+3}$  is extremely variable among different species. Taking the 2 extremes (*vaga* Wiedemann, type of *Rioxoptilona* and *fuscipennis* Macquart, type of *Acanthonevra*) the 2 would be distinct but I have found so much intergradation, that I find the character of no value. Also, the measurements of the 4th and 5th costal sections, and other characters which I have compared appeared to be of no value in separating these. Malloch (1939: 417) separated *Acanthonevra* by having "setulae on first vein, not extending over node above," and *Rioxoptilona* by having "setulae on the first vein extending the entire length of the node above." Actually, in the type of the genus, as well as in most species I have examined, the apical portion of the node has setae as in *Rioxoptilona* and I see no notable differences in this

character. Most species have 3 or more setae at the apical part of the node. It should be noted that Chen (1948: 84) and Ito (in press) say *Rioxoptilona* have 2 pairs of inferior fronto-orbital bristles; this is not correct. In the original figure by Macquart, it would appear that the species he drew had 2 inferior fronto-orbital bristles. I asked Monsieur L. Matile of the Museum Nationale d'Histoire Naturelle to reexamine the type for this character. He sent me a sketch of the head and noted that there is only 1 pair of inferior fronto-orbital bristles but that there are some finer setae located on the front; Macquart apparently drew these without paying much attention to the difference in size. This is typical of other *Acanthonevra* which I have seen. Three spermathecae are present in the ♀.

*Rioxoptilona desperata* (Hering), from Vietnam and Laos, and probably *parvisetalis* Hering, from Fukien, China fit the concept of *Acanthonevra* except that they have 2 pairs of inferior fronto-orbitals; I consider these aberrant.

A large genus of about 4 dozen species from the Oriental, Australasian and Pacific regions. Ten species are presently recognized from this area.

#### KEY TO ACANTHONEVRA SPECIES FROM THAILAND AND SURROUNDING COUNTRIES

1. Wing *Hemilea*-like, with anterior 2/3 predominantly dark brown and the entire posterior margin broadly hyaline (pl. 3, fig. 21). India, Vietnam. ....**hemileina** Hering  
Not as above. ....2
- 2 (1). Apex of wing entirely dark brown (fig. 37a). ....3  
Apex of wing broadly subhyaline (pl. 2, fig. 20), or at least with a hyaline spot at apex of cell  $R_5$  beyond vein  $R_{2+3}$  and a subhyaline mark at apex of  $R_5$  (pl. 3, fig. 23). ....7
- 3 (2). Mesonotum with complete, or nearly complete, brown to black median or submedian vittae. ....4  
Mesonotum yellow medianly, lacking complete vittae except along each lateral margin in some species. ....8
- 4 (3). Basal portion of wing largely dark brown, prominent markings in costal cells and cells M, Cu and basal R largely brown. ....5  
Basal portion of wing hyaline or nearly so to level with forking of  $R_5$ . ....6
- 5 (4). Mesonotum with 4 brown to black longitudinal vittae in the ♀♀, 5 in ♂♂, and with lateral margins yellow to rufous. Abdomen shining black except for narrow yellow posterior margins of terga 2-3. Widespread over Oriental region. ....  
..... **formosana** Enderlein  
Posterior portion of mesonotum broadly polished black and lateral margins black from above humerus to wing base, also a pair of submedian brown to black vittae from anterior margin to dorsocentral bristles. Abdomen polished black on sides, broadly yellow down middle. Thailand. ....**marginata**, n. sp.
- 6 (4). Wing with a large hyaline spot in cell  $R_5$  before r-m crossvein. Mesonotum with 5 blackish longitudinal vittae. Scutellum largely dark colored and pleura predominantly blackish. Pleurotergal bristle lacking. Burma. .... **ultima** Hering  
Cell  $R_5$  entirely brown before r-m. Thorax predominantly yellow with a pair of incomplete pale brown submedian vittae on mesonotum. Pleurotergal bristle present. Burma (some may run here). ....**ochrolepura** Hering
- 7 (2). Apex of wing entirely subhyaline. Second costal cell with a brown mark through middle of hyaline area. Abdomen with a narrow yellow vitta extending the full

- length down the middle. India, Indonesia and Thailand. ....**fuscipennis** (Macquart)  
 Wing apex with a broad brown marking extending to margin along vein  $R_{4+5}$  (pl. 3, fig. 23). No brown mark through subhyaline area in 2nd costal cell. Abdominal terga 3-5 in ♂ and 3-6 in ♀ polished black except for a small, median, yellow mark on 3rd tergum of ♂. Thailand. .... **siamensis**, n. sp.
- 8 (3). Vein  $R_{2+3}$  distinctly undulated. Ventral portion of front femur of ♂ densely bristled. Thorax predominantly yellow to rufous. .... **ochropleura** Hering  
 Vein  $R_{2+3}$  straight or nearly so, front femur of ♂ bristled ventrally only in *dumlopi* (van der Wulp). ....9
- 9 (8). Posterior and lateral margins of mesonotum polished black. Wing with a complete (or partially subhyaline) transverse band between r-m and m crossveins. Abdomen bright yellow, shining black on lateral margins of terga and on apex of 5th tergum. India, Thailand. .... **soluta** (Bezzi)  
 Not fitting the above. Abdomen black with narrow markings of yellow on apices of terga 2-4. Thorax yellow to rufous, usually with a streak of pale brown along each lateral margin behind humerus and another along upper edge of pleura .....10
- 10 (9). Only 1 pair of inferior fronto-orbital bristles. Wings with a small hyaline spot in cell  $R_5$  before r-m crossveins and other markings as in fig. 34a. ....11  
 Two pairs inferior fronto-orbitals. No hyaline spot in  $R_1$  before r-m and only 1 hyaline wedge in cell 2nd  $M_2$  (pl. 2, fig. 19). Vietnam, Laos .....**desperata** (Hering)
- 11(10). Front femur of ♂ densely bristled ventrally (fig. 34b). Base of wing largely hyaline, cells M and Cu mostly hyaline. Pleurotergal bristles rudimentary. Indonesia, India, Burma, Thailand. ....**dumlopi** (van der Wulp)  
 Front femur with only posteroventral row of bristles. Cells M and Cu dark brown. Pleurotergal bristles rather well developed. India and Thailand. .... **vaga** (Wiedemann)

**Acanthonevra desperata** (Hering), new combination Pl. 2, fig. 19.

*Rioxoptilona desperata* Hering, 1939, *Verh. VII Int. Kongr. Ent. Berlin*, 1938, p. 176, fig. 10. Type-locality: Cochin China (South Vietnam). Type ♀ in the Museum National d'Histoire Naturelle, Paris.

Because of the presence of 2 pairs of inferior fronto-orbital bristles this does not fit the concept of typical *Acanthonevra*. I see no characters which appear to be of generic importance. Until further materials can be studied, I would prefer to treat this, and also *parvisetalis* (Hering) from Fukien, as *Acanthonevra*. It fits very near the concept of *Dirioxa* Hendel but has ventral hairs on the arista and cell Sc is about equal in length to the 2nd costal cell, rather than lacking ventral setae and with Sc short compared to the 2nd costal. In my key it runs near *dumlopi* (van der Wulp) and *vaga* (Wiedemann) but is readily differentiated by the 2 inferior fronto-orbitals, by having 3 narrow brown longitudinal vittae along sides of thorax, no hyaline spot in cell  $R_5$  before r-m crossvein and only 1 hyaline wedge in cell 2nd  $M_2$ .

Yellow species except for the predominantly black abdomen, a longitudinal brown to black streak on each side of occiput at about upper 2/3; a preapical black spot on each side of posterior portion of mesonotum, a narrow brown vitta on each side of mesonotum extending from upper edge of humerus to wing base, a narrow brown vitta extending from lower anterior corner of humerus along upper edge of pleuron to wing base, a narrow brown to black vitta extending longitudinally across the propleuron and median portion of mesopleuron, also a brown mark extends over upper median portion of pteropleuron across the metapleuron continuous on to the metanotum. The median portions of the 1st 4 terga are marked with yellow. The front legs are

lost from the specimen at hand and the nature of the bristling of the femora is unknown. The genitalia have not been dissected. The surstyli are very elongate and slender, 1/2 longer than epandrium. Wings marked as in pl. 2, fig. 19.

Length: Body, 7 mm; wings, 7.5 mm.

I have studied the type and have a color photograph; the ♂ specimen on hand seems to fit in all respects.

The specimen is from LAOS: Vientiane Prov., Ban Van Eue, 15.II.1967, Malaise trap, "native collector for Rondon".

**Acanthonevra dunlopi** (van der Wulp) Fig. 34a-b.

*Ptilona dunlopi* van der Wulp, 1880, *Tijdschr. Ent.* **23**: 186, pl. 11, fig. 8-9. Type-locality: Padang, Sumatra.

*Rioxa dunlopi*: Bezzi, 1913, *Mem. Ind. Mus.* **3**: 113, pl. 9, fig. 25.

*Acanthonevra dunlopi*: Hering, 1941, *Ark. Zool.* **33B** (11): 4.

This species belongs in the complex which is characterized by having the front femur of the ♂ densely covered with bristle-like setae on the venter (fig. 34b) and the thorax predominantly or entirely rufous. It fits near *ochropleura* Hering but differs by having vein  $R_{2+3}$  straight or nearly so; the 4th costal section, between tips of veins  $R_1$  and  $R_{2+3}$ , nearly  $2 \times$  longer than the 5th, between tips of  $R_{2+3}$  and  $R_{4+5}$ ; a prominent hyaline spot present in cell  $R_5$  before the r-m crossvein (fig. 34a); and abdomen predominantly black, tinged with yellow in the middle of hind margins of terga 2-4. In *ochropleura* vein  $R_{2+3}$  is distinctly curved so that the 4th costal section is approximately equal in length to the 5th; no hyaline spot is present in cell  $R_5$  before the r-m cross-

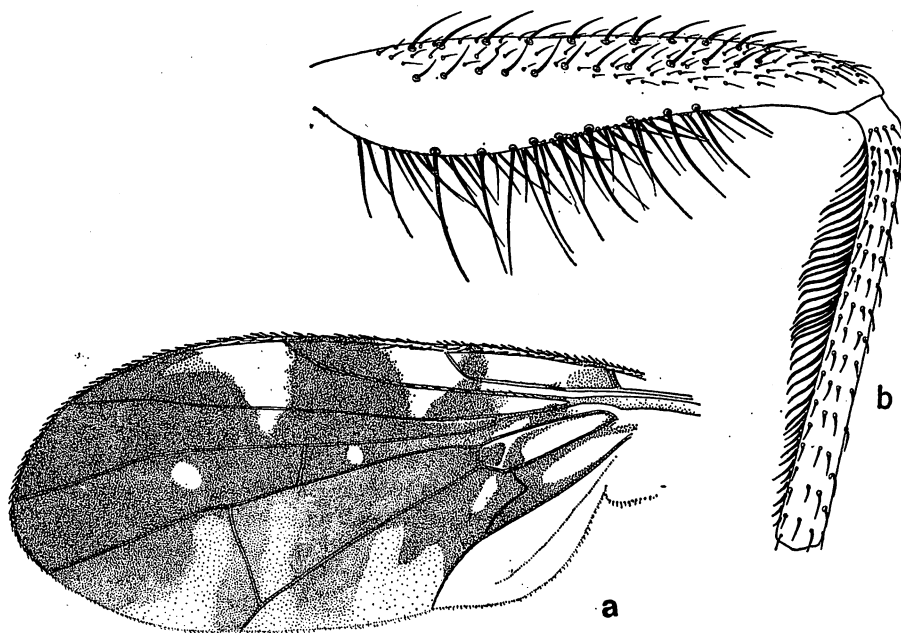


Fig. 34. *Acanthonevra dunlopi* (van der Wulp). a. wing; b. front femur.

vein; and abdominal terga 2-4 are broadly yellow on hind margins.

The thorax typically has a narrow pale brown vitta on each side of mesonotum from humerus to wing base and a faint streak of brown on each side over upper pleura. One ♂ from Thailand has the thorax all pale. The front femur has 2 irregularly placed posteroventral rows of black bristle-like setae in addition to the regular row of posteroventral bristles, so when seen from posterolateral view the ventral portion appears to be very densely bristled (fig. 34b). Front tibia with 2 or more rows of closely placed, short, bristly ventral setae. Wing venation and markings as in fig. 34a. Basal portion of wing largely hyaline, cells M and Cu brown only on apices. Hyaline wedge from 2nd costal cell extending to upper apical portion of cell M. Hyaline wedge in cell Sc just beyond subcostal vein extending to vein  $R_{2+3}$ . Otherwise fitting the description of most species of *Acanthonevra*.

Length: Body, 6.8 mm; wings, 6.2 mm.

I have not studied the ♀.

One ♂ specimen on hand from THAILAND: Chiangmai Prov., Doi Suthep, 1278 m, 29. III-4.V.1958, T. C. Maa.

The species has previously been reported from Indonesia, India, and Burma.

***Acanthonevra formosana* Enderlein** Fig. 35a-f.

*Acanthonevra formosana* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 419, fig. C. Type-locality: Kosempo, S. Formosa.

*Acanthonevra pteropleuralis* Hendel, 1927, In Lindner, *Die Flieg. Pal. Reg.* **49**: 58, pl. 2, fig. 8, text fig. 17. **New synonymy.** Type-locality: Amur, China.

It appears probable that *Acanthonevra amamioshimaensis* Shiraki, 1968: 57, plate 22, is a new synonym of *formosana*. The only difference which I see is that Shiraki indicates that the base of the ovipositor is black on *amamioshimaensis*. In the specimens of *formosana* studied to date, the base of the ovipositor is predominantly rufous, brown on the apical portion and on the basoventral portion. I find some variation in the markings on the abdomen. Shiraki's species was described from 1 ♀ from the Ryukyus. It will be necessary to examine more specimens from this area.

I am unable to find any characters which seem to be reliable for differentiating these and feel that they should be synonymized. The development of the pleurotergal bristles is obviously variable and intergrades from moderately strong to completely absent. Hering (1941e: 4) stated that the pleura of *formosana* are predominantly black. Specimens on hand from Laos have the pleura discolored with brown, while in most of the specimens I have seen from Formosa and other places the pleura are pale yellow.

The species is apparently widely distributed; specimens have been seen from Formosa, China, Burma, India, Laos, Thailand and Vietnam. It has also been recorded from Japan and Korea.

The species is characterized by the wing markings (fig. 35a). These are the same as for *vaga* (Wiedemann). It should be noted that the hyaline mark (or marks) at the apex of cell 1st M. apparently are variable. Hendel's drawing of *pteropleuralis* shows a single round spot just before the m crossvein. Zia (1937: 221, fig. 12) also shows a single spot and Ito (in press) shows a pair of small hyaline spots (specimen from Japan). The specimen on hand from South China shows an elongate hyaline spot extending over most of the apical portion of cell 1st M.; most of the specimens from Southeast Asia are like this. Thorax largely yellow to rufous and mesonotum with 5

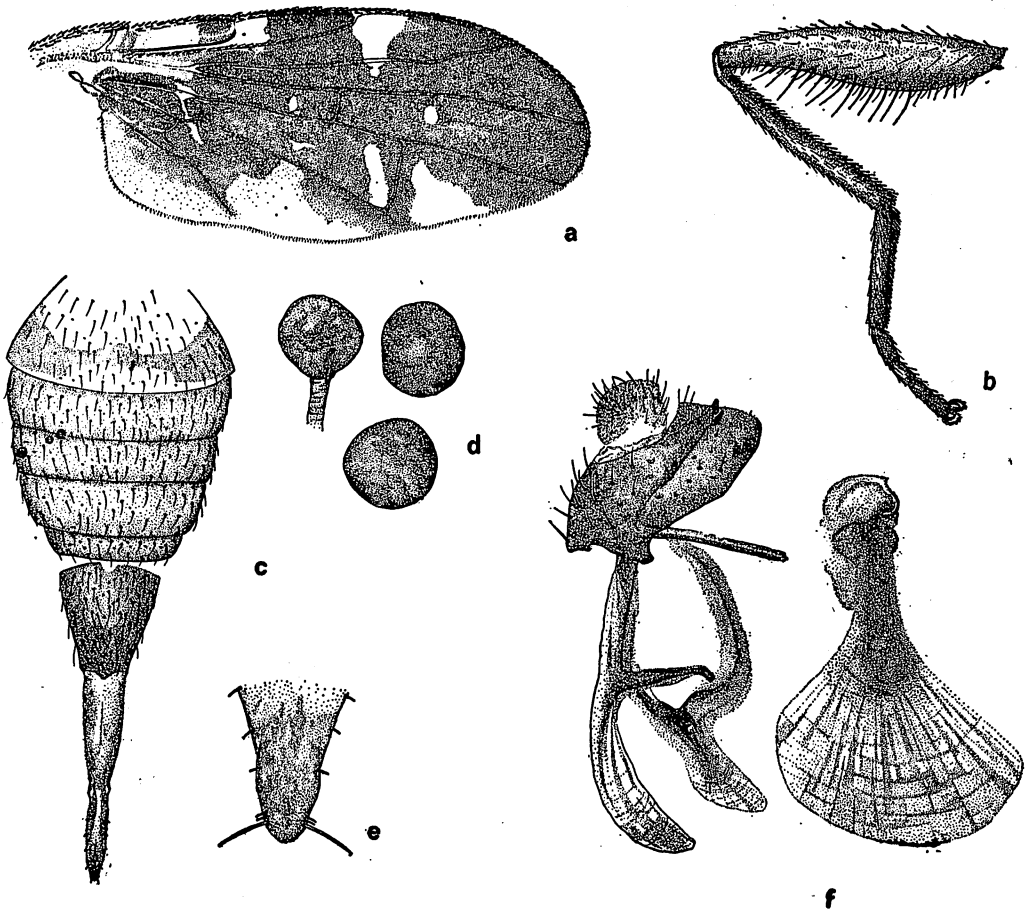


Fig. 35. *A. formosana* Enderlein. a. wing; b. front leg; c. ♀ abdomen and ovipositor; d. ♀ spermathecae; e. apex of piercer; f. ♂ genitalia.

longitudinal brown to black stripes in ♂♂ and 4 in ♀♀; the lateral stripes are interrupted at the suture and the 3 median brown vittae in ♂ are joined together posteriorly between the dorsocentral bristles. The scutellum is yellow, tinged with brown with the apex pale yellow. Front femur of ♂ with an abundance of black bristles and setae on anteroventral and posteroventral surfaces, also front tibia densely black setose on ventral surface (fig. 35b). This character was given as one of the characteristics of *Rioxoptilona* by Malloch (1939a: 437) but because of the distinct curvature of vein  $R_{2+3}$ , *formosana* would more nearly fit *Acanthonevra* sens. str. *A. vaga* lacks this feature, the front legs are not ornate, the femur has only a row of posteroventral bristles on the apical 3/5 and the tibia is not black setose ventrally (fig. 40b). This character has not been completely investigated; it is present on some species which are typical *Acanthonevra* and also present on other species which would fit more nearly the concept of *Rioxoptilona* (straight vein  $R_{2+3}$ ). The degree of ornamentation of the front legs of the ♂ is probably only of specific importance. Abdomen predominantly polished black,

yellow on the 1st tergum, tinged with brown on the sides, with the apices of 2nd, 3rd, and narrow apex of 4th yellow. In the ♀ the 6th tergum is broadly yellow in the middle, brown on sides. The ♂ epandrium is brown, tinged with yellow, short and broad with the surstyli not extended and the 10th sternum not visible from direct lateral view. Anal plates weakly sclerotized and rather inconspicuous. Ejaculatory apodeme large, fan-shaped, other aspects of genitalia as in fig. 35f. (Note the aedeagus is broken off). Basal segment of ovipositor largely yellow, tinged with brown on apices and ventrobasally. Ovipositor short, base about equal to segments 4+5 and approximately 1.2 mm in length. Piercer broad, blunt at apex, shaped as in fig. 35e. Spermathecae (3) hemispherical, toadstool-shaped, the ducts are not enlarged as in *vaga*. The ovipositor and spermathecae of specimens from India compare with those from Laos.

Fourteen specimens on hand from the following localities. THAILAND: Chiang-mai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa. LAOS: Ban Sai, 8.XII.1918, T. Vitalis de Salvaza; Sedone Prov., Muong Paksong, 39 km E of Pakse, 980 m, 7.IX.1967, in secondary woods, F. G. Howarth. S VIETNAM: Fyan, 900-1000 m, 11.VII.-9.VIII.1961, N. R. Spencer; Mt. Lang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer; and Ban Me Thuot, 500 m, 20-24.XII.1960, C. M. Yoshimoto.

***Acanthonevra fuscipennis* Macquart** Fig. 36a-e; pl. 2, fig. 20.

*Acanthonevra fuscipennis* Macquart, 1843, *Mem. Soc. R. Sci., Agr. Arts, Lille*, 1842: 378, pl. 30, fig.

2. Type-locality: Bengal, India. Type in the Museum National d'Histoire Naturelle, Paris.

*Acanthonevra polyxena* Osten Sacken, 1882, *Ann. Mus. Civ. Genova* 16: 462. Type-locality: Java.

New synonymy based upon comparison of specimens from Java.

*Acanthonevra batata* Enderlein, 1911, *Zool. Jahrb. (Syst.)* 31: 417, fig. V. Type-locality: Sumatra.

New synonymy based upon study of the type in the Institute of Zoology, Warsaw. This was placed as a variety of *polyxena* by de Meijere (1924: 61).

This species has not been correctly identified in the literature since the original. Bezzi (1913: 117) described what he thought to be *fuscipennis* Macquart, but the species which Bezzi had was obviously a *Themara*, very probably *maculipennis* (Westwood).

The type has been studied by Dr M. D. Delfinado, who made a sketch of the wing markings and a brief description. Also, Monsieur L. Matile of the Natural History Museum studied the head and sent me a sketch showing the characteristics of the bristling of the front.

*A. fuscipennis* is readily differentiated from all known *Acanthonevra* by having the entire apical portion of the wing subhyaline (pl. 2, fig. 20). It fits near *A. synopica* Hering from Sumatra and Java, but that species differs by lacking a hyaline mark in cell 2nd  $M_2$  and by having the hyaline spot at wing apex extending only about half-way through apical portion of cell  $R_5$  (refer to fig. 9, Hering 1952: 280). Also the hyaline mark in cell  $R_3$  beyond apex of vein  $R_1$  extends to vein  $R_{4+5}$ , while in *fuscipennis* this mark extends only to vein  $R_{3+4}$ .

Front with several thin pale hairs along orbits in area of inferior fronto-orbital bristles. Thorax entirely yellow except for brown on metanotum and on sides of pleuroterga and hind portions of metapleura. With very faint indications of brownish discoloration in lines extending down mesonotum but no clear indications of vittae. Wing markings and venation as in pl. 2, fig. 20, with vein  $R_{2+3}$  very distinctly curved. Abdominal terga 1-2 mostly yellow, and 3-5 in ♂ and 3-6 in ♀ dark brown to black with a narrow yellow vitta down middle. ♂ genitalia as in

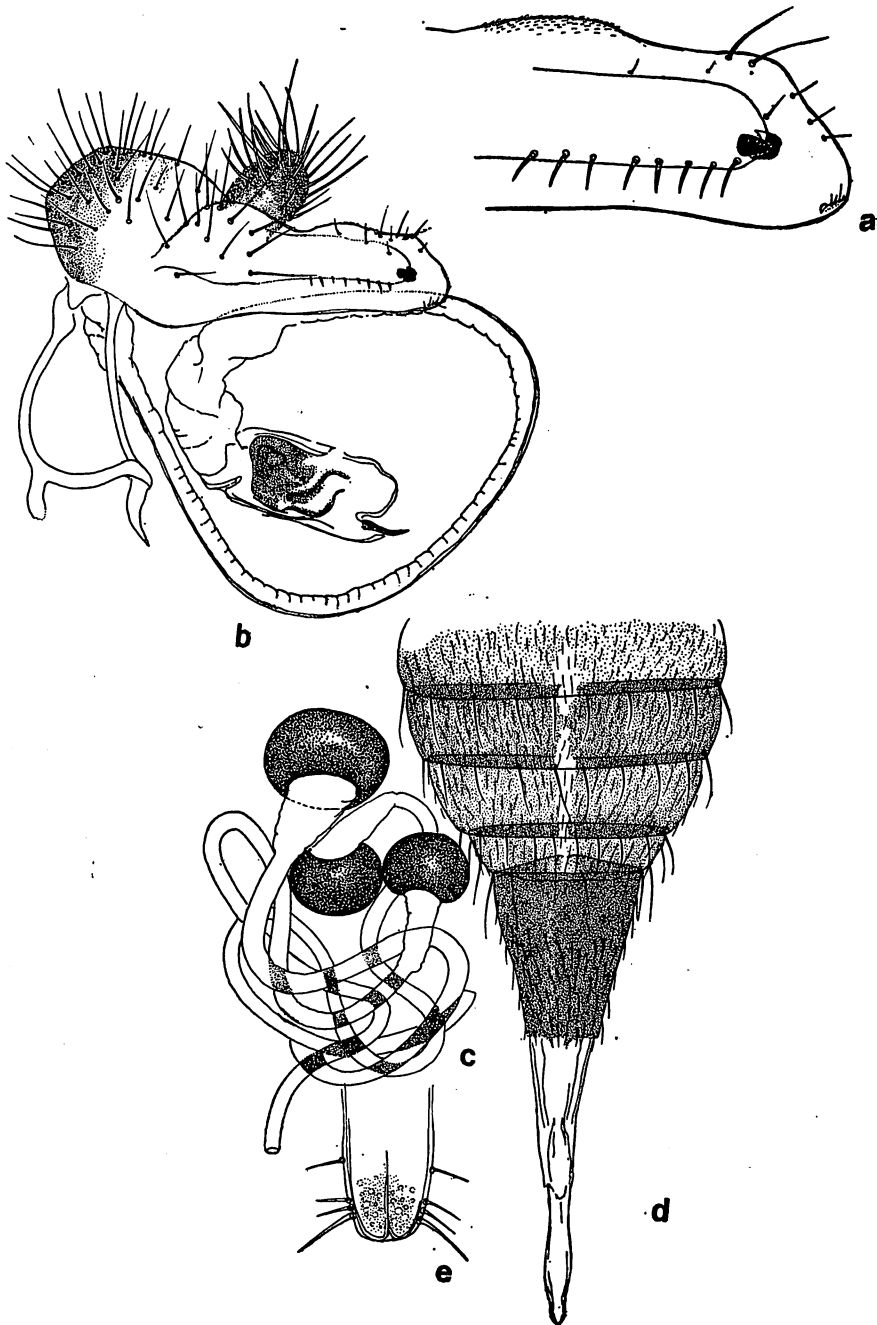


Fig. 36. *A. fuscipennis* Macquart. a. ♂ surstylus and 10th sternum; b. ♂ genitalia; c. ♀ spermathecae; d. ovipositor; e. apex of piercer.



fig. 36 a-b. The ejaculatory apodeme is very narrow, not expanded (specimen probably teneral). Sixth tergum of ♀ less than 1/2 the length of 5th. Basal segment of ovipositor dark brown, as seen from above about equal in length to terga 2-5. Measured on the venter, the basal segment is 1.15 mm in length. Piercer rather thick and blunt at apex (fig. 36e), measuring 1.0 mm. Extended ovipositor (fig. 36d) measures 3.0 mm.

Length: Body and wings, 5.0-6.0 mm.

Five specimens on hand from THAILAND: Trang Prov., Khaophappa, Khaochang, 200-400 m, 20.I.1964, G. A. Samuelson.

***Acanthonevra hemileina* Hering** Pl. 3, fig. 21.

*Acanthonevra hemileina* Hering, 1939, *Verh. VII Intern. Kongr. Ent.* 1938, 1: 173, fig. 7. Type-locality: Trichinopolis, India. Type ♀ in the Museum National d'Histoire Naturelle, Paris. I have studied and photographed the type.

This species is readily differentiated from all known *Acanthonevra* by its remarkably *Hemilea*-like wings, with the anterior 2/3 predominantly dark brown and the entire posterior margin broadly hyaline (pl. 3, fig. 21). The ♂ has not been previously described and the species has not been recorded since the original description.

Head similar in most respects to other *Acanthonevra*. Front with numerous fine hairs on lower portion. Thorax predominantly yellow, with 4 rather faint brown vittae extending down mesonotum. Pleura entirely yellow, tinged with brown along upper margins of propleura and mesopleura and on lower edge of each humerus, also tinged with brown on upper portions of metapleura, over the pleuroterga and metanotum. Postscutellum reddish brown. Scutellum yellow. Secondary scutellars strong. Dorsocentral bristles situated about 1/2 the distance between supraalar and postalar bristles. Legs entirely pale yellow. Front femora densely covered with long, pale cilia over ventral and anterior surfaces. Front tibia with long ventral cilia on apical 1/3 of segment. Wings rather elongate, nearly 3 × longer than wide. With anterior 2/3 to below vein  $M_{1+2}$  dark brown, except for the hyaline subcostal cell, a hyaline spot in cell  $R_1$  just beyond vein  $R_1$  and the hyaline margin of 2nd costal cell. Hind margin of wing broadly hyaline. Vein  $R_{4+5}$  setose almost the entire length, only extreme apical portion bare. Abdomen polished black, tinged with rufous on base. Rather densely black setose and with prominent black bristles on hind and lateral margins of terga. Sterna yellow, tinged with brown. Epandrium dark brown to black. Surstyli yellow, tapered to a rather sharp point at apices. Ejaculatory apodeme broadly expanded. ♀ with 2 basal segment predominantly yellow and a yellow mark in middle of 3rd tergum. Sixth tergum about 1/2 to 3/5 as long as the 5th. Basal segment of ovipositor dark reddish brown, tinged with black apically. As seen from dorsal view the base is almost equal to terga 4-6. Measured on the venter the basal segment is 2.0 mm. Piercer 2.0 mm in length, blunt at apex. Extended ovipositor 5.8 mm.

Length: Body, 7.0 mm; wings, 8.0 mm long by 3.0 mm wide.

Six specimens on hand from VIETNAM: Fyan, 1200 m, 11.VII.-9.VIII.1961, N. R. Spencer.

***Acanthonevra marginata* Hardy, new species** Fig. 37a-b

This is a borderline species appearing to fit *Acanthonevra* except that the secondary scutellars are not developed. There is an indication of rudimentary setae having been present on each side in the position of the secondary scutellar bristles, these are both broken on the specimen at hand and only the sockets of the setae are evident. This is not too unlike the specimens of *fuscipennis* on hand; in this case they are also

rudimentary. *A. marginata* fits in the complex of species which have vein  $R_{2+3}$  straight or nearly so and fits very near *solita* (Bezzi) from India and Thailand. It differs from *solita* by lacking the complete hyaline band across wing in area between r-m and m crossveins and by having complete submedian longitudinal brown vittae on mesonotum. The wing markings somewhat resemble those of *scutellopunctata* Hering, from Borneo, but the markings on the thorax and abdomen are entirely different in the 2.

♀. *Head*: Slightly higher than long with the face gently concave as seen in direct lateral view (fig. 37b). Entirely yellow except for a tinge of brown on sides of upper occiput and on extreme lateral margins of face; also with a tinge of brown on upper portion of each gena. Front about 1/2 longer than wide. Frontal bristles typical of this genus with 1 pair of strong inferior fronto-orbitals and with rather numerous setae over the middle and sides of the front, some of these in line with the inferior fronto-orbitals and may be confused with rudimentary bristles. Antennae entirely yellow, 3rd segment 2 × longer than wide, broadly rounded at apex. Arista moderately long plumose. Palpi yellow, each with a moderately strong apical bristle, this is 4/5 as long as genal bristle. *Thorax*: Yellow except for the prominent dark brown to black mark-

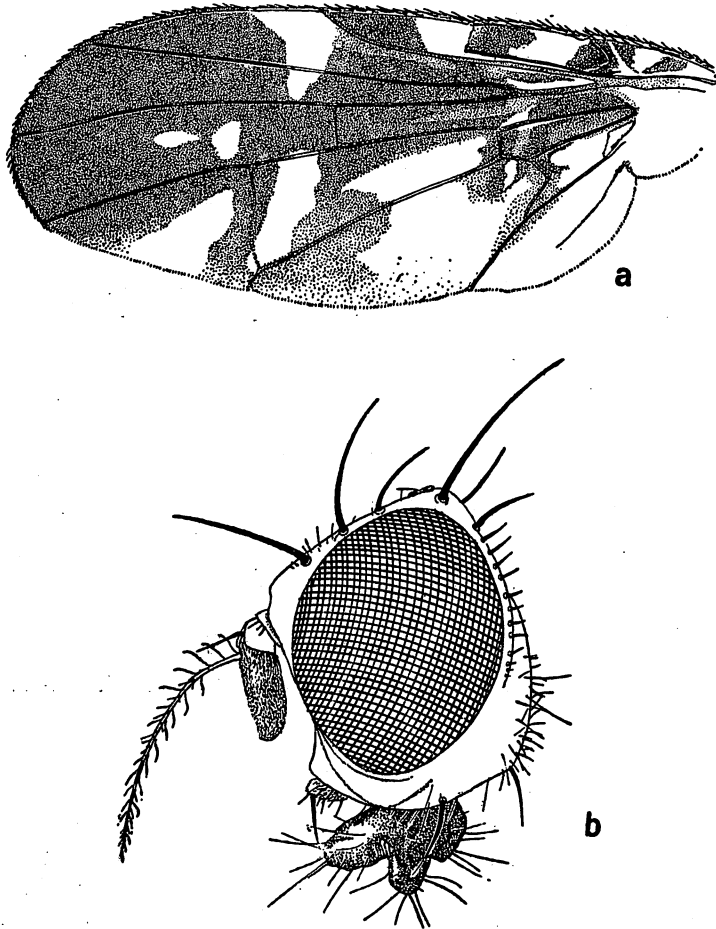


Fig. 37. *A. marginata* n. sp. a. wing; b. head.

ings. Hind margin of mesonotum polished black and with this mark extending anteriorly on each side to a level almost opposite posterior notopleural bristles. Also with a pair of submedian brown vittae extending from dorsocentral bristles to anterior margin; a broad dark brown to black vitta on each side of mesonotum above humerus to wing base and another on upper edge of each pleuron from propleuron to hind margin of mesopleuron. Postscutellum yellow, metanotum shining dark brown to black. Metanotum and most of pleuroterga dark brown to black. Halteres pale yellow. Dorsocentral bristles situated just slightly behind a line drawn between anterior supraalar. Scutellum entirely yellow, almost bare of setae, and with 4 strong bristles. *Legs*: Entirely yellow, femora slender. *Wings*: With venation and markings as in fig. 37 a. First and 2nd costal cell each with 2 brown marks, leaving a hyaline area between. Subcostal cell hyaline on basal 2/5, apical portion dark brown to black. The hyaline spot in 2nd costal cell not extending beyond the cell. The basal portion of cell  $R_1$  largely brown. Cell R entirely dark brown. Cells M and Cu chiefly subhyaline, brown at apices and along edges. The hyaline wedge in cell  $R_1$ , just beyond vein  $R_1$  extends to vein  $R_{4+5}$ . Apex of wing boardly brown and cell  $R_5$  brown except for a pair of irregular spots in the area above and beyond a level with m crossvein (fig. 37 a). A hyaline wedge present at apex of cell 2nd  $M_2$  extending almost full length of the cell, and a straight-sided hyaline mark extends across cell 1st  $M_2$  from apicobasal portion to vein  $M_{1+2}$ . The r-m crossvein situated near apical 2/3 of cell 1st  $M_2$ . Vein  $R_{4+5}$  setose to a level with apex of vein  $R_{2+3}$ . *Abdomen*: Polished black on sides, pale yellow on median portion to apex of 5th tergum. Sixth tergum yellow, basomedianly, black on sides and hind margin. Sixth tergum short, about 1/3 as long as 5th. Basal segment of ovipositor shining dark brown to black, as seen from dorsal view approximately equal in length to terga 3-5 and measured on the venter approximately 0.2 mm. The piercer has not been extended for study; the tip is visible on the specimen at hand and it is rounded and contains 2 pairs of prominent setae on each side of apex.

Length: Body and wings, 5.75-6.0mm.

♂. Unknown.

Holotype ♀ (BISHOP 9951), THAILAND: Pak Chong, 100 m, NE of Bangkok, 3.XII. 1957, J. L. Gressitt. Type returned to the B. P. Bishop Museum.

***Acanthonevra ochroleura*** Hering Fig. 38a-e; pl. 3, fig. 22.

*Acanthonevra ochroleura* Hering, 1951, *Siruma Seva* 7: 4, fig. 5. Type-locality: Burma. Type ♂ in the British Museum (Natural History).

This species is characterized by having the thorax predominantly pale yellow to rufous; the basal portion of the wing lacking dark brown markings; vein  $R_{2+3}$  distinctively undulated; and front femur of ♂ densely black setose ventrally. The markings on the mesonotum show some variation in the series on hand from Burma and Thailand; in some the mesonotum has 2 incomplete, pale brown, longitudinal vittae; in others the thorax is entirely pale colored (I am keying this in 2 different sections).

Fitting near *ultima* Hering, from Burma, but differs by the characters given in the above key. It also shows relationship to *gravelyi* Munro, from north India, but differs by having a secondary inferior fronto-orbital bristle fairly well developed; antennae and palpi yellow, not blackened dorsally and palpi broadly black at apices; thorax pale yellow to rufous, sometimes with faint indications of brown vittae down mesonotum, not with thorax entirely yellow-brown; face tinged with brown above epistoma, rather than all yellow; wing with the hyaline mark through cell 2nd  $M_2$  continuous into middle of cell  $R_5$ , not with an isolate brown spot in middle of cell  $R_5$  (compare fig. 5, Munro 1935b: 24 with pl. 3, fig. 22).

Predominantly yellow to rufous species. Head yellow, opaque golden in middle of front and tinged with brown on lower face above epistoma. Head distinctly higher than long with face concave as seen in direct lateral view. Occiput slightly swollen on lower portion, at widest point approximately  $1/3$  the eye width. Width of gena approximately  $1/5$  eye height. Front, measured from lower ocellus to margin of frontal suture, approximately as wide as long, rather thickly

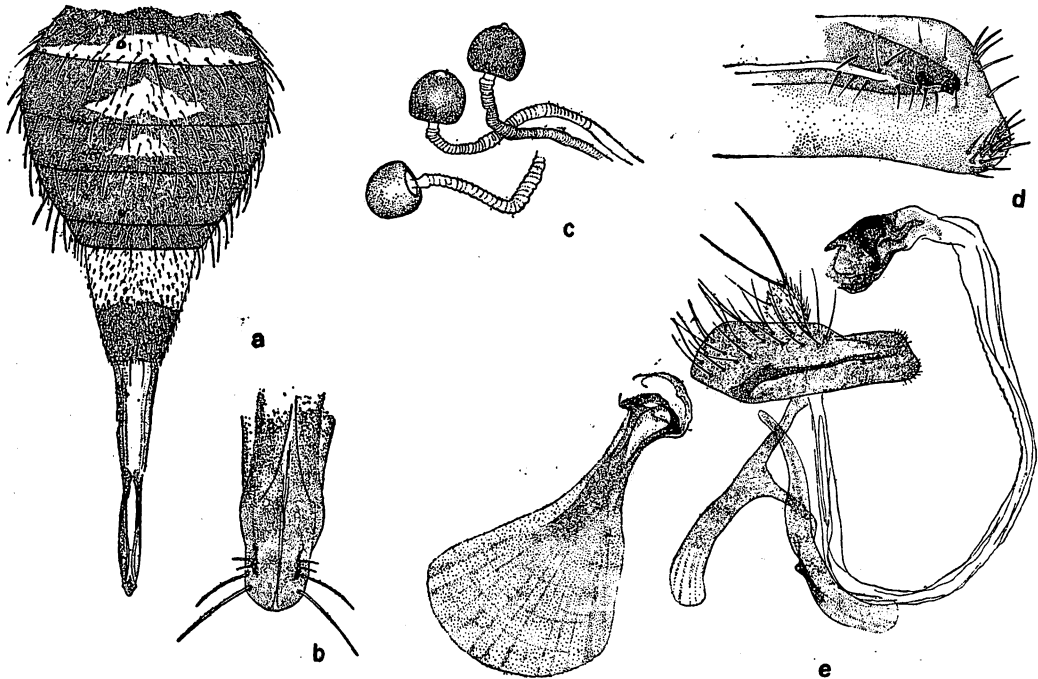


Fig. 38. *A. ochropleura* Hering. a. ♀ abdomen and ovipositor; b. apex of piercer; c. ♀ spermathecae; d. ♂ surstylus and 10th sternum; e. ♂ genitalia.

setose and with 2 pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals. The lower inferior fronto-orbitals are comparatively weak, approximately  $3/5$  as long as upper. Ocellar bristles rudimentary, approximately  $2 \times$  longer than frontal setae. Antennae situated at approximately middle of eye height, entirely yellow with a faint tinge of brown on 3rd segment. Third segment approximately  $2 \frac{1}{2} \times$  longer than wide, rounded at apex. Arista long plumose. Palpi pale yellow with numerous black setae around margins. Genal bristle well developed, equal in size to upper inferior fronto-orbital. Also with a prominent black bristle on each side on lower median portion of occiput. Thorax mostly yellow, in some specimens with a pale brown longitudinal mark behind each humerus and with a pair of faint brownish submedian vittae situated just inside the dorsocentral rows, extending from a line connecting anterior notopleural bristles to posterior margin of mesonotum and fused along entire posterior margin so that the pre-scutellar bristles are in the light brown field. Also usually with a pale brown streak along upper margin of each mesopleuron and with metascutellum and metanotum reddish brown on sides, yellow down median portions. Scutellum rufous on disc, pale yellow around margin and on venter. Halteres yellow. Pteropleural bristle rather well developed. Four strong scutellars and 2 rather weak intermediate bristles, the latter are scarcely over  $1/3$  as long as other bristles. Disc of scutellum almost bare and with few scattered pale brown setae on margin. Legs entirely

yellow, front femur densely bristled and short setose on posteroventral surface and with 1 or more rows of densely placed, short, black setae on anteroventral surface. Front tibia with 2 irregular rows of short, black, erect setae extending entire length on ventral surface. Middle tibia with 1 prominent apical spur. Hind tibia with a row of about a dozen short, erect, bristle-like anterodorsal setae extending through median portion and with 2-4 anteroventral setae in middle portion. Wing marked as in pl. 3, fig. 22. Third costal section equal in length to 2nd section and r-m crossvein situated near apical  $2/3$  to  $3/4$  of cell 1st M. Vein  $R_{4+5}$  setose almost its entire length. Abdomen 1st tergum yellow, 2nd black on basal portion, yellow at apex. Third and 4th terga broadly black at bases, yellow at apices and extreme lateral margins, and with yellow marking of apical portions extending to bases in the middle interrupting the black basal bands. Fifth tergum shining black. The genitalia have not been dissected for study. ♀ with visible portion of 6th tergum approximately  $1/3$  as long as 5th. Basal segment of ovipositor yellow on basal  $3/5$ , brown apically. As seen from above the basal segment is approximately equal in length to terga 4-5 and measured on venter is 1.3 mm long. Piercer blunt, broadly rounded at apex and with 2 prominent preapical setae on each side (fig. 38b), measuring 1.3 mm. Extended ovipositor (fig. 38a) measures 3.7 mm. Three mushroom-shaped spermathecae (fig. 38c).

Length: Body, 7.5-8.0 mm; wings, 7.75-8.5 mm.

Five specimens on hand from: BURMA: Mt Victoria, Chin Hills, 500 m, III. 1938 G. Heinrich, and THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

***Acanthonevra siamensis* Hardy, new species** Pl. 3, fig. 23.

Closely related to *A. polyxena* Osten Sacken, from Java. It should be noted that *A. batata* Enderlein was placed as a variety of *polyxena* by de Meijere (1924: 61). I have confirmed this synonymy (**new synonymy**) based upon study of type of *batata* from Sumatra, in Zoological Institute, Warsaw, with specimens which are typical of *polyxena* from Java. The presence or absence of a hyaline spot in cell  $R_5$  before the r-m crossvein is a variable character. *A. siamensis* is differentiated by having the brown coloring of the wing field extending broadly along vein  $R_{4+5}$  to apex of wing, leaving a hyaline spot at upper apex of cell  $R_3$  and a subhyaline mark at apex of cell  $R_5$ ; also by having middle portion of 2nd costal cell entirely subhyaline. In *polyxena* the entire wing apex is hyaline and a brown mark extends to middle of 2nd costal cell.

♂. Head, thorax, and legs entirely yellow except for reddish brown eyes, a faint tinge of golden brown in middle of front, the black ocellar triangle, and a tinge of brown on each side of of metanotum. Fitting typical *Acanthonevra* in most details. Dorsocentral bristles situated approximately halfway between anterior supraalar and postalar. Front femur slender, with 1 or 2 strong, black posteroventral bristles near apical  $2/3$  of segment and with 3 to 5 slender yellow-brown hairlike bristles continuing down posteroventral surface to base of the segment. Front tibia lacking erect ventral setae. *Wings*: Predominantly brown, including basal portion. The basal sections of cells  $R_1$ , R and M almost entirely brown. Cell Cu brown along upper margin, otherwise subhyaline. Second costal cell brown at apex and base, subhyaline medianly. A rather small hyaline spot present at base of cell Sc, confined to cell. Hyaline wedge just beyond apex of vein  $R_1$  extending only  $2/3$  the distance through cell  $R_5$ . Other hyaline marks as in pl. 3, fig. 23, with the spot in cell  $R_5$  before r-m crossvein tiny in ♂ and more pronounced in ♀. Vein  $R_{2+3}$  strongly undulate, curved upward at its apex so the 4th costal section is about equal to 5th in the ♂ and just slightly longer in the ♀. *Abdomen*: First 2 terga yellow-white. Remainder of abdomen polished black except for a white median vitta extending over posterior  $2/3$  of 3rd tergum. The genitalia have not been dissected for study.

Length: Body and wings, 6.0 mm.

♀. Fitting the description of the ♂ except for differences in the wing; i.e., the hyaline mark in cell R<sub>2</sub> before r-m crossvein is prominent and the 4th costal section is longer. Apical portion of 2nd tergum tinged with black and no apparent vitta present on 3rd tergum. Basal segment of ovipositor black, tinged with rufous in ground color; as viewed from above it is approximately equal in length to terga 5-6 and measured on the venter is approximately 0.8 mm. The ovipositor has not been relaxed for study and the piercer has not been seen. Sixth tergum short, about 1/4 as long as 5th. Sterna entirely yellow.

Length: Body, excluding ovipositor, 5.6 mm; wings, 6.0 mm.

Holotype ♂ (BISHOP 9952) and allotype ♀, THAILAND: Chiangmai Prov., Fang, 500 m, 15.IV.1958, T. C. Maa. Type and allotype returned to the B. P. Bishop Museum.

**Acanthonevra soluta** (Bezzi) Fig. 39a-d; pl. 3, fig. 24.

*Rioxa soluta* Bezzi, 1913, *Mem. Ind. Mus.* 3: 114, pl. 9, fig. 26. Type-locality: Tenasserim, Lower Burma. Type possibly in the Zoological Survey of India collection, although I did not find it there.

One specimen on hand from Thailand seems to fit Bezzi's description and figure except that Bezzi makes no mention of the hind margin of mesonotum being polished black. It should also be noted that Bezzi's type was headless.

The following description is based upon the ♂ specimen at hand. A predominantly yellow species with prominent shining black markings on sides and posterior margin of mesonotum. Head entirely yellow except for a brown mark along lower edge of each gena. Front rather narrow, nearly 2 × longer than wide. One pair of strong inferior fronto-orbitals, equal in size to inner vertical bristles, and 2 pairs of superior fronto-orbitals. Ocellar bristles thin, rather hair-like, about 3/4 as long as postocellar bristles. Antennae entirely yellow. Third segment nearly 2 × longer than wide, broadly rounded at apex (fig. 39a). Arista rather long plumose on the dorsal surface, short plumose ventrally with the apical 1/2 bare. Palpi and mouthparts entirely yellow, each palpus with 1 strong, curved, black, apical bristle and numerous black hairs around the margin. Genal bristle well developed, black, almost equal in size to outer vertical bristles. Thorax entirely pale yellow, except for a dark brown to black shining mark extending from above each humerus over notopleura almost to wing base; another narrower dark brown line extending from propleuron beneath humerus to mesopleural bristles. Also with hind margin of mesonotum broadly polished black; this mark extends anteriorly to a level almost opposite notopleural bristle in line with outer corners of scutellum. Postscutellum bright yellow, metanotum polished black with a narrow yellow line extending down median portion. Pleurotergon and posterior portion of each hypopleuron also shining brown, tinged with rufous. Halteres pale yellow on knobs, tinged with rufous on stems. Dorsocentral bristles situated just slightly behind anterior supraalar. All scutellars are broken off the specimen at hand; there are obviously 4 strong and 2 weaker bristles. Legs entirely yellow, except for the last 2 tarsomeres of middle leg. Legs very slender, front femur with 3-4 black posteroventral bristles on apical 1/2 and with 3 or 4 thin yellow bristles on basal 1/2; ventral surface lacking bristly hairs. Dorsal surface of front femur densely covered with erect, fine, yellow hairs. Middle tibia with 1 long black apical spine. Last 3 tarsomeres of middle leg covered with black scale-like setae (fig. 39c). Wings marked as in fig. 39b and pl. 3, fig. 24, with a broad hyaline mark in middle of 2nd costal cell and another filling basal 1/2 of subcostal cell. The hyaline wedge in cell R<sub>3</sub>, beyond tip of vein R<sub>1</sub>, extends all the way across wing through apex of cell 2nd M<sub>2</sub>. Two hyaline marks are situated in cell R<sub>5</sub> beyond the cross-band. Vein R<sub>2+3</sub> straight. Abdomen bright yellow, shining black on lateral margins of terga and with apex of 5th tergum black. The 5th sternum of ♂ very well developed, quadrate in shape, straight on hind margin, and subequal in width and length to 5th tergum. ♂ genitalia con-

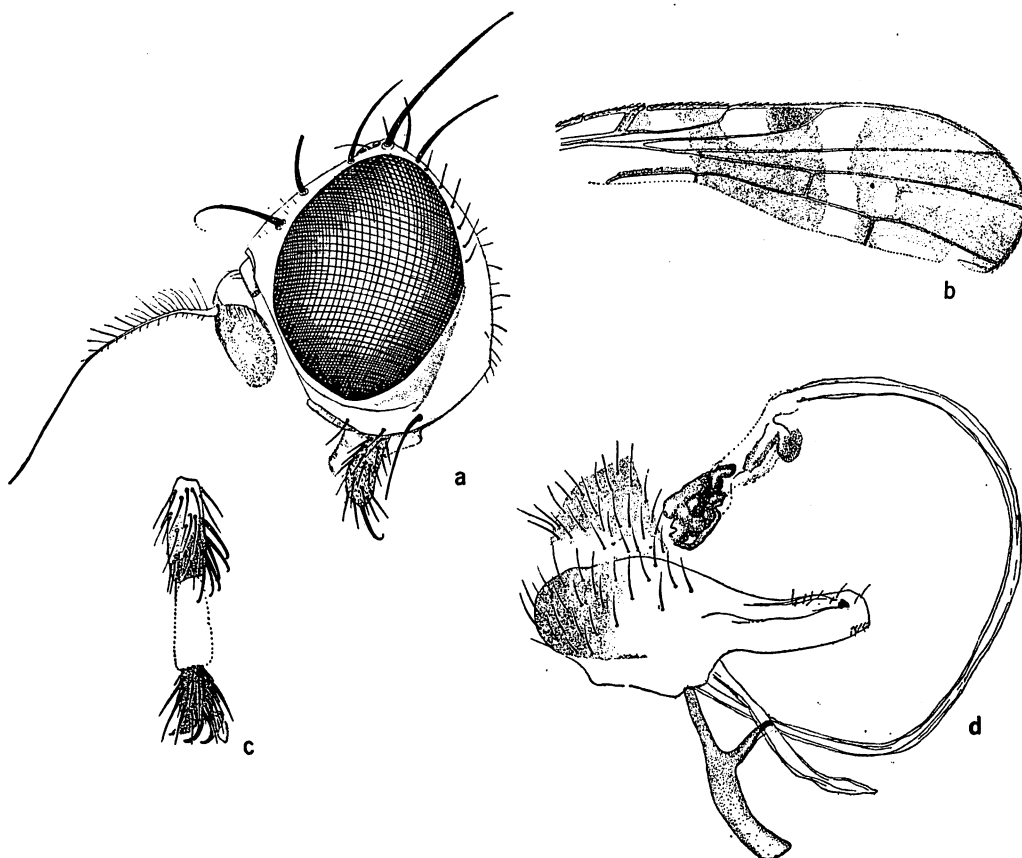


Fig. 39. *A. soluta* (Bezzi). a. head; b. wing; c. last 3 tarsomeres of middle leg; d. ♂ genitalia.

spicuous, upper portion of epandrium dark brown to black and anal lobes brown; the latter rather triangular in shape. Surstyli broad, blunt, almost truncate at apices, and hiding 10th sternum as seen from lateral view (fig. 39d).

Length: Body, 6.2 mm; wings, 5.75 mm. Bezzi measured the type as 5.5 mm for body length.

♀. Unknown.

One ♂ on hand, THAILAND: Chiangmai Prov., Doi Suthep, 1278 m, 29.III.-4.IV. 1958, T. C. Maa.

***Acanthonevra vaga* (Wiedemann), new combination** Fig. 40a-g; pl. 3, fig. 25.

*Trypeta vaga* Wiedemann, 1830, *Auss. Zweifl.* 2: 490. Type-locality: Bengal, India. I have not been able to locate Wiedemann's type.

*Rioxa vaga*: Bezzi, 1913, *Mem. Ind. Mus.* 3: 112, pl. 8, fig. 22.

*Trypeta mutyca* Walker, 1849, *List Spec. Dipt. Ins. Coll. Brit. Mus.* 4: 1036. Ref. Hardy (1959: 217). Type-locality: East Indies. Type ♂ in British Museum (Natural History).

A predominantly yellow species, lacking vittae on the mesonotum. Head shaped as in fig. 40a.

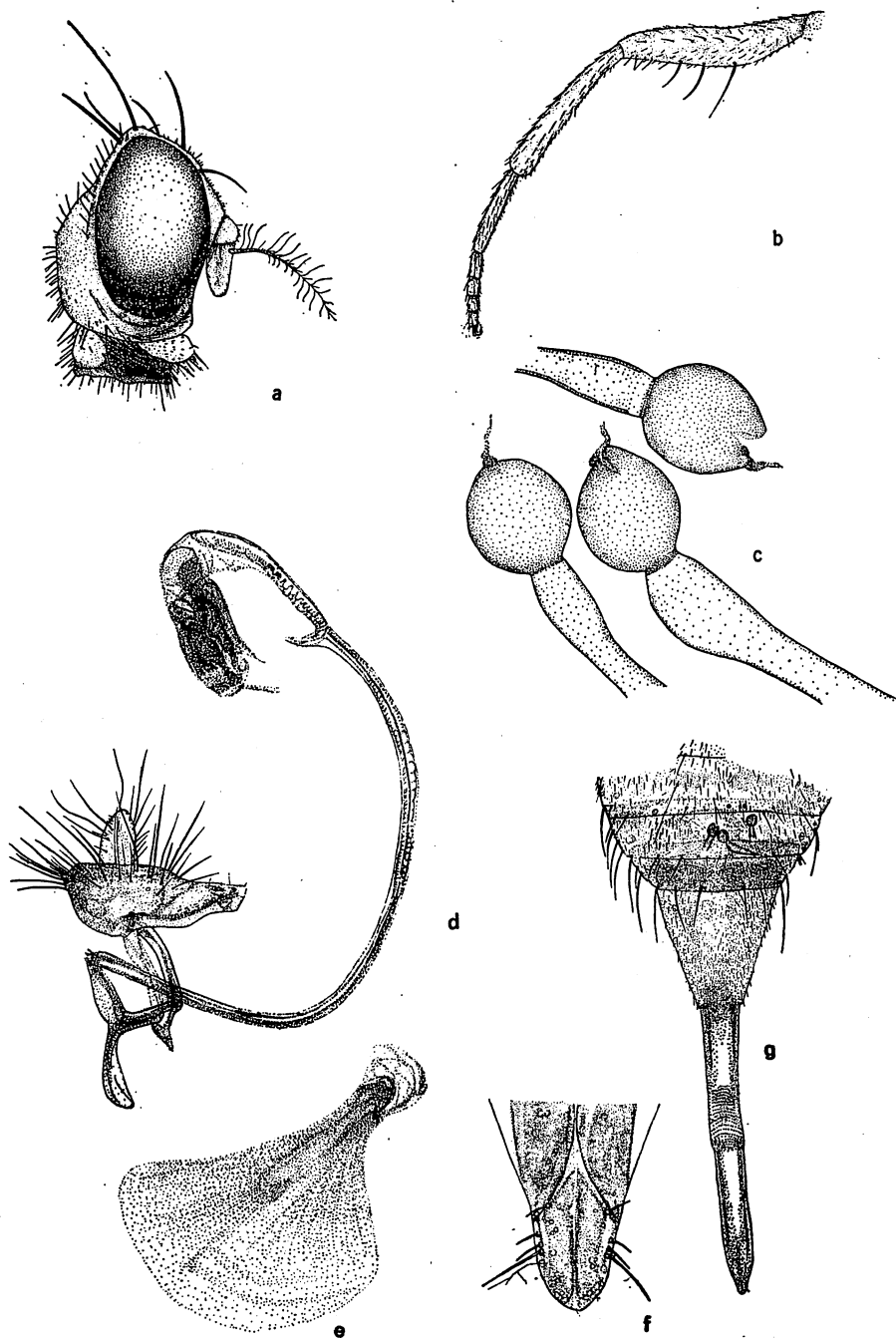


Fig. 40. *A. vaga* (Wiedemann). a. head; b. front leg; c. ♀ spermathecae; d. ♂ genitalia; e. ♂ ejaculatory apodeme; f. apex of piercer; g. ovipositor.



Compound eyes oblong, distinctly higher than long. Inferior fronto-orbital bristles situated at about lower 3/5 of the front. All head bristles black. Ocellars rudimentary, rather hair-like, about 2 × larger than frontal setae. Entire front rather thickly setose and covered with golden pollen. Antennae yellow, 3rd segment rounded, scarcely over 2 × longer than wide. Arista long plumose, the longest rays are greater in length than the width of 3rd segment. Thorax and legs entirely yellow. Sternopleural bristles strong. Front legs not ornate. Wings as in pl. 3, fig. 25. Subcosta equal in length to 2nd costal cell, vein R<sub>1</sub> ends just slightly beyond r-m crossvein. The r-m crossvein situated near apical 2/3 of cell 1st M<sub>2</sub>. Vein R<sub>2+3</sub> slightly curved. Vein M<sub>3+4</sub> and basal section of Cu<sub>1</sub> bare. Lobe of cubital cell about 4/5 as long as vein Cu<sub>1</sub>+1st A. Postscutellum and metanotum yellow, tinged with brown. First 2 terga of abdomen yellow, except for a narrow faint streak of brown along each basal margin of the 2nd. Third and 4th terga narrowly yellow at bases, broadly so at apices, and yellow through median portions and on extreme lateral margins, isolating a large brown spot on each side. Fifth tergum brown on sides, yellow on median portion. In ♀ the 6th tergum is brown except for a narrow yellow basal margin. The base of ovipositor is dark brown, about equal in length to segments 4+5. The basal segment of ovipositor measures 1.25 mm in length. The piercer is blunt at apex, shaped as in fig. 40f. Three spermathecae are present; these are round with a narrow twisted appendage at apex, the duct is thickened, lightly sclerotized just below spermatheca (fig. 40c). Fifth sternum of ♂ 2 × wider than long, concave on posterior margin and with 4 to 6 bristles on each side of hind margin. ♂ genitalia as in fig. 40d. Epandrium and anal plates rather elongate. Ejaculatory apodeme slender, narrow, scarcely expanded distally (possibly teneral).

Length: Body and wings. 6.5–6.75 mm.

A widespread species, having been recorded from India, Burma through Indonesia. A large series of specimens are on hand from the following localities in THAILAND: Khao Yai, 11.IV.1963; Phu Kae, 12.VIII.1963; Chiangmai Prov., Chiangdao, 450 m, 5–11.IV.1958, T. C. Maa; Chiangmai Prov., 55 km S of Fang, 500–600 m, 4.V.1969, J. J. S. Burton; Chiangmai Prov., Fang, 500 m, 12.IV.1958, T. C. Maa; Banna, Na Khon, 108 m, 5–10.V. 1958, T. C. Maa; Chiangmai Prov., Doi Suthep, 1278 m, 4.IV.1958, T. C. Maa. S VIETNAM: Dalat, 6 km S, 1400–1500 m, 9.VI.–7.VII.1961, N. R. Spencer. Also, 1 specimen from BURMA: Mt Victoria, Chin Hills, 1000 m, III.1938, G. Heinrich.

#### Genus *Diarrhagma* Bezzi

*Diarrhagma* Bezzi, 1913, *Mem. Ind. Mus.* 3: 108. Type-species: *Dacus modestus* Fabricius by original designation.

This is an Acanthonevrini readily differentiated by having the wings predominantly brown with hyaline wedges on the margins (fig. 41e); by the rudimentary ocellar bristles; by having the r-m crossvein near apical 2/3 of cell 1st M<sub>2</sub>; the subcostal cell short, scarcely 1/2 as long as 2nd costal cell; middle tibia with 2 large apical spurs; and in the typical species with the scutellum and hind portion of mesonotum covered with a large white spot. In the typical species, the face is vertical, not at all concave. A 2nd species *D. unicolor* Shiraki, from Formosa, has been placed in this genus, but has the face distinctly concave and also the markings of the mesonotum and pleura are different. The latter may represent a distinct genus.

***Diarrhagma modestum* (Fabricius)** Fig. 41a-h.

*Dacus modestus* Fabricius, 1805, *Syst. Antl.*, p. 278. Type-locality: Bengal, India. Lectotype ♂ in the Universitetets Zoologiske Museum, Copenhagen.

*Trypeta incisa* Wiedemann, 1824, *Anal. Ent.* p. 55. Type-locality: Bengal, India.

*Tephritis paritii* Doleschall, 1865, *Tijdschr. Ned. Ind.* 10: 412, pl. 1, fig. 2. Type-locality: Amboina. Lectotype ♂ in Hungarian National Museum.

Differing strikingly from *unicolor* Shiraki, from Formosa, by the prominent white markings on the mesonotum and pleura; by having a hyaline wedge into cell  $R_3$  just beyond apex of vein  $R_{3+4}$  and the face not concave in middle.

The head is distinctly higher than long, front entirely yellow except for the dark reddish brown compound eyes and for some brown markings on median portion of occiput. Two pairs inferior and 2 pairs superior fronto-orbital bristles present. Ocellar bristles represented by tiny setae scarcely larger than the scattered setae on eye orbits. Face almost vertical, very slightly indented just below middle as seen in direct lateral view (fig. 41a), not distinctly concave. Thorax with scutellum and hind portion of mesonotum up to dorsocentral bristles white (fig. 41b); also humeri, propleura, metanotum, a narrow portion along each suture, and posterodorsal portion of each mesopleuron white, tinged faintly with yellow. A large shining black spot is present on each side behind humerus and another large black spot is present behind suture in supraalar area,

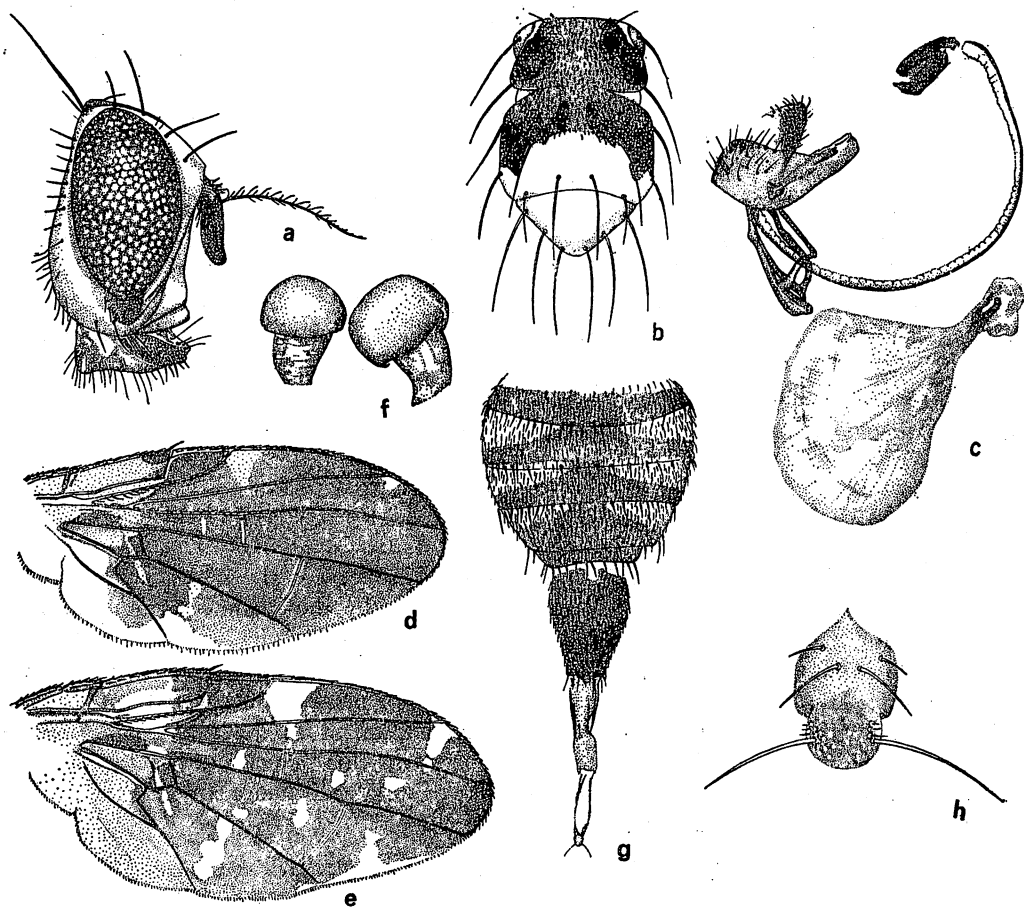


Fig. 41. *Diarrhagma modestum* (Fabricius). a. head; b. thorax; c. ♂ genitalia; d. ♂ wing; e. ♀ wing; f. ♀ spermathecae; g. ♀ abdomen and ovipositor; h. apex of piercer.

extending transversely over the middle of mesonotum in front of dorsocentral bristles. This is often interrupted in the middle. The median portion of mesonotum, opposite the suture is rufous. Except for the white mark mentioned above, the pleura are shining dark brown to black. Postscutellum white in median portion, dark brown to black on sides. Metanotum polished black. Legs entirely yellow in the ♂. In 1 ♀ specimen, the hind coxae and trochanters and bases of femora are black; this is probably aberrant. It does not show in the 2nd specimen on hand. Wings as in fig. 41d-e. With a prominent hyaline spot in cell 1st M. before m crossvein in ♀ and 2 small hyaline spots in cell R, beyond r-m crossvein (fig. 41e). The ♂ wing is much more uniformly brown, the hyaline spots in middle of wing are very faint or may be completely lacking (fig. 41d). The abdomen of the ♂ is predominantly yellow, broadly brown to black along posterior border of 2nd tergum and with a large brown spot in middle of 3rd tergum. In the ♀, the abdomen is predominantly shining brown to black, with 1st tergum entirely yellow and anterolateral margins of terga 2-5 yellow (fig. 41g). Fifth sternum of ♂ about 2 × wider than long, with a broadly V-shaped concavity on posterior margin and with about 6 black bristles on each side of this margin. Remainder of sternum densely setose. Genitalia yellow. Anal plates rather small, not as long as epandrium. Genitalia as in fig. 41c. The ejaculatory apodeme large, broadly fan-shaped, equal in size to remainder of the genitalia (fig. 41c). Base of ovipositor approximately equal in length to segments 4+5 and about 1.9 mm long. Base entirely shining black. Piercer rather short, straight sided, blunt at apex, 0.9 mm in length and shaped as in fig. 41h. ♀ spermathecae as in fig. 41f.

Length: ♂ body and wings, 5.5-5.7 mm; ♀ body and wings, 5.0 mm.

Widespread from India through Indonesia and the Philippines. Five specimens are on hand from the following localities in THAILAND: Prachuabkirikhan, 16.VII.1963; Phu Kae, 26.IX.1965; Nakhon Sawan, 3.VI.1963, R. Kawasaki; Phuket Is., 25.VII.1963, R. Kawasaki.

#### Genus *Dirioxa* Hendel

*Rioxa* (*Dirioxa*) Hendel, 1928, *Ent. Mitt.* 17:(5): 353. Type-species: *Trypeta musae* Froggatt, 1899, by original designation [= *pornia* (Walker, 1849.)].

This genus is differentiated from *Rioxa* and related genera by having the subcostal cell rather short, shorter than 2nd costal cell; front with 2 pairs inferior fronto-orbitals and 2 pairs of superior fronto-orbitals and disc of scutellum bare or nearly so, with only sparse, scattered setae usually on the margins. The secondary bristles are well developed. Arista with hairs on dorsal and anterior surfaces and bare on the ventral surface in all of the known species of *Dirioxa*, except for a new species on hand from Vietnam. To date, 4 species have been described from Australia and 1 from New Guinea. One species on hand from Vietnam apparently belongs here and fits none of the described species.

#### *Dirioxa quatei* Hardy, new species Fig. 42a-d.

This species is differentiated from other *Dirioxa* by having ventral hairs on the arista. Other known species have long hairs on the dorsal surface and short hairs along the anterior surface of the arista. It is similar to *D. pornia* (Walker) and *confusa* (Hardy) from Australia but differs by having the base of 2nd costal cell brown and by the upper mesopleura, the pteropleura and sides of postscutellum and metanotum tinged with brown; also with a brown mark above each humerus. In the other species the thorax is entirely pale yellow and the subcostal cell entirely brown. Also the hyaline spots in cell R<sub>5</sub> are comparatively small (fig. 42a), compare with fig. 31a and 32a, Hardy

1951: 184-85.

♂. *Head*: About  $1/4$  higher than long with face distinctly concave as seen in direct lateral view and epistoma projecting. Eyes oval. Occiput moderately swollen on lower portion, at widest point about  $1/3$  the width of compound eye. Entirely yellow except for dark brown eyes. Front about  $1/3$  longer than wide, with 2 pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals and with median portion rather thickly covered with short black setae. Ocellar bristles small, only about  $2 \times$  longer than the frontal setae. Postocellar bristles strong, about equal in size to upper inferior fronto-orbitals. Genal bristle well developed. Palpi with numerous black setae around the margins. Third antennal segment broadest at base, very slightly tapered toward the broadly rounded apex. Arista plumose, also very numerous short setae on anterior margin.

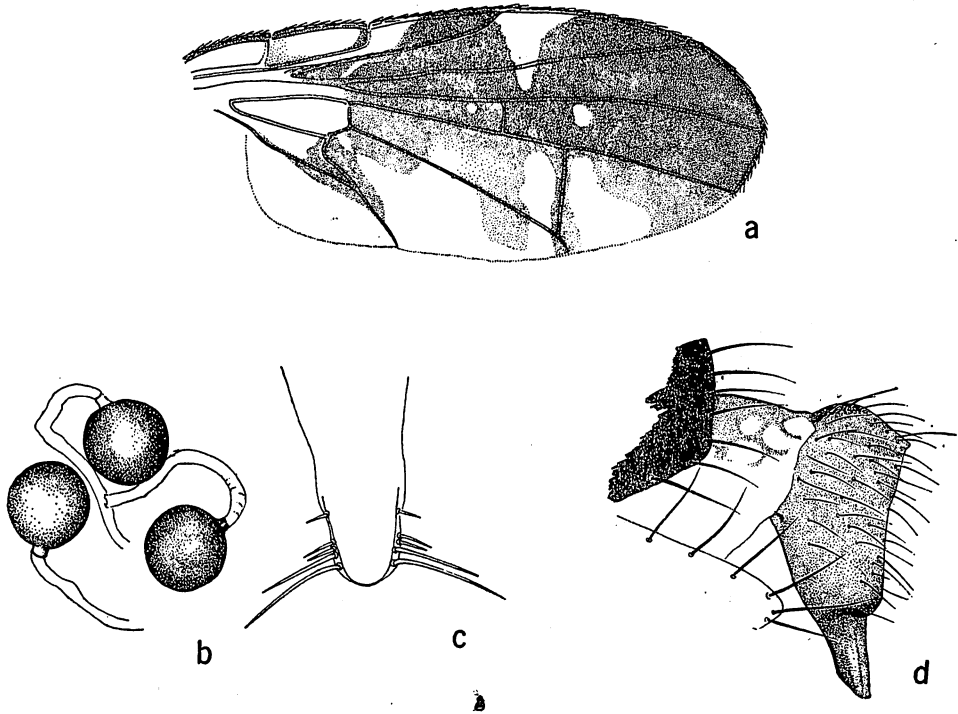


Fig. 42. *Dirioxa quatei* n. sp. a. wing; b. ♀ spermathecae; c. ♀ apex of piercer; d. ♂ genitalia.

*Thorax*: Predominantly yellow prescutellar area tinged with brown and with 5 rather faint longitudinal vittae extending down mesonotum, the 3 median vittae extend anteriorly to about level with presutural bristles and the lateral vittae extend from behind suture slightly beyond postalars. Mesonotum also with a distinct brown mark on each side above humerus. Extreme lower margin of humerus and upper edge of each propleuron, also upper margin of mesopleuron and pleurotergon, and sides of postscutellum and metanotum tinged with brown. Intermediate scutellar bristles strong, at least  $1/2$  as long as other bristles. Dorsocentral bristles situated slightly nearer to the postalars than to the supraalars. *Legs*: Entirely yellow, middle tibia with 1 strong apical spur. Front femur with 3-5 posteroventral bristles on apical  $1/2$  of segment. *Wings*: Markings and venation as in fig. 42a. *Abdomen*: With 1st tergum entirely yellow, the 2nd yellow except for a rather narrow black band across basal portion, the 3rd with a large posteromedian yellow

mark and the 4th with a small posteromedian yellow mark; otherwise polished black on dorsum and rather thickly black setose. The sterna are entirely yellow. The genitalia are yellow except for a tinge of brown over dorsal portion of epandrium. The genitalia have not been dissected for study. As seen in situ the surstyli are distinctly narrower than the epandrium and broadly rounded at apices (fig. 42d).

Length: Body, 7.3 mm; wings, 7.7 mm.

♀. Fitting the description of the ♂ in most respects. The wing drawing has been made from the allotype. Sixth tergum about 1/2 as long as 5th as seen in dorsal view and basal segment of ovipositor predominantly yellow, tinged with brown apically and from above about equal in length to terga 5-6. Measured on venter the basal segment is 1.25 mm long. Piercer short and thick, blunt at apex and bearing 2 strong preapical bristles (fig. 42c), piercer 1.25 mm long. Extended ovipositor 3.75 mm. Three round spermathecae present (fig. 42b).

Holotype ♂ (BISHOP 9953) and allotype ♀, S. VIETNAM: Ban Me Thuot, 500 m, 16-18.V.1960, L. W. Quate.

Type and allotype returned to the B. P. Bishop Museum.

It is a pleasure to name this species after Dr L. W. Quate who has made many outstanding contributions to our knowledge of the Psychodidae.

#### Genus *Ectopomyia* Hardy, new genus

Because of the bristling of the head this would fit near *Hexacimia* Hendel by having 2 pairs of inferior fronto-orbital bristles situated very close together with the lower bristle incurved and the upper bristle reclinate. It is readily differentiated by lacking the bristle in the lower median portion of the mesopleuron, which is characteristic of *Hexacimia*; by having the wings normal in shape and with large hyaline spots at apex and on hind margin (pl. 3, fig. 27), rather than having numerous hyaline spots around margin and in the field as in *Hexacimia* (pl. 3, fig. 28); also by the unusual development of the ♂ genitalia (fig. 43f), folding under the venter of abdomen and plainly visible in situ; and by the development of a subbasal appendage on the front femur of the ♂ (fig. 43h).

Inferior fronto-orbital bristle situated on lower 1/4 of front, directed as in fig. 43a. Ocellar bristles rudimentary, reduced to small hairs scarcely larger than the setae in the interfrontal area. *Head*: Approximately as long as high, front flat, slightly sloping as seen in lateral view, almost as wide as long and approximately equal in width to 1 eye as seen from direct dorsal view. Face short, slightly concave in median portion with epistomal margin produced. Lower 2/3 of occiput swollen, upper portion sharply narrowed as seen in direct lateral view (fig. 43a). Oral margin with a few yellow-brown setae in front and rather densely yellow setose along hind portion over genae and lower occiput. Posteroventral margin of occiput with a dense clump of mixed yellow and brown hairs; also with a dense clump of dark brown hairs on posterodorsal margin of occiput immediately above cervix. Third antennal segment rounded at apex, arista plumose; the longest plumes are slightly less than the width of the 3rd segment. *Thorax*: With the usual complement of bristles. Dorsocentrals in line with anterior supraalar. Secondary scutellars approximately 1/3 as long as other scutellar bristles. *Wings*: With subcostal cell about 3/4 as long as 2nd costal. Vein  $R_{2+3}$  almost straight. The r-m crossvein situated at about apical 2/3 of cell 1st  $M_2$  and lobe of cubital cell rather short, 1/4 to 1/5 as long as vein  $Cu_1$ +1st A. Wings marked as in pl. 3, fig. 27, in the ♂, and as in pl. 3, fig. 26, in the ♀, with considerable dimorphism between the sexes. Also, ♂ of the species at hand with a large ventral appendage on the front femur and with the surstyli greatly produced, plainly visible in situ folded over the 5th sternum. ♀ with 3 spermathecae and with the piercer short and blunt (fig. 43b).

Type of genus: *E. baculigera*, n.sp.

***Ectopomyia baculigera* Hardy, new species** Fig. 43a-h; pl. 3, fig. 26-27.

Differentiated from known Tephritidae by the generic characters given above, and especially by the development of the front legs (fig. 43h) and genitalia of the ♂ (fig. 43f), as well as, by wing markings and coloration.

♂. *Head*: As described above and as in fig. 43a. At the widest point the occiput is approximately 1/2 the width of the eye. Palpi pale yellow, sparsely pale setose around margin. Labella fleshy, with numerous rather long pale hairs on mentum. Head principally pale yellow, with an opaque brown mark extending from ocellar triangle down median portion about 2/3 length of front, remainder of front golden pollinose, clear yellow along eye orbits. Face entirely yellow, concave as seen in lateral view, slightly raised down median portion and with epistomal margin rather strongly produced. Genae and lower 2/3 of occiput pale yellow, upper occiput shining dark brown to black on sides, yellow in median portion and over vertex. *Thorax*: Largely subshining dark brown to black on dorsum, very lightly brown pollinose with pronotum, and extreme anterior margin of mesonotum pale yellow. Also with a yellow streak covering most of each humerus, extending along each side of the mesonotum and with a yellow vitta, rather indistinct in some cases, extending down each dorsocentral line almost to dorsocentral bristle. Posteromedian portion of mesonotum clear yellow between prescutellar bristles; this stripe is continuous over middle part of scutellum and the hind margin and venter are pale yellow. Pleura yellow except for brown spots along upper margins of promeso-, ptero-, and metapleura. Also with a small spot on the hypopleuron. Metanotum and postscutellum brown except for a yellow to rufous mark down the median portion. *Legs*: Entirely pale yellow. Front femur with a strong ventral appendage as in fig. 43h, this is densely setose at apex; also, with abundant cilia along ventral margin of the appendage extending to base of femur. Front femur also with strong anteroventral bristles extending from the appendage to apex of segment. Middle tibia with 1 strong apical spur. Front tibia slightly swollen ventrally and with numerous yellow cilia along ventral margin. Tarsus densely setose ventrally with 2nd tarsomere short, flat, about 1/3 as long as basitarsus (fig. 43h). *Wings*: Entirely covered with microtrichia and predominantly brown through basal cells, with hyaline marks along the margin and in the field (pl. 3, fig. 26-27). Vein  $R_{4+5}$  setose over most its length, the seta extending well beyond a level with m crossvein. *Abdomen*: Mostly shining dark brown to black with a rufous vitta extending down median portion from base to apex of 4th tergum. The sterna are yellow except for brown lateral margins. The 5th sternum is just slightly wider than long, concave on posteromedian portion and with 4 or more strong bristles on hind margin (fig. 43g). Genitalia dark brown to black except for the elongate, pale yellow anal plates. Epandrium reduced to a very narrow rim basad of anal plates and possessing a prominent dorsal bristle on each side. Surstyli very large, elongate, straight-sided, blunt at apices, plainly visible in situ, folded over 5th sternum. Tenth sternum not visible from direct lateral view. Other aspects of genitalia as in fig. 43f.

Length: Body, 4.75 mm; wings, 5.0 mm.

♀. Fitting description of ♂ except that the front legs are not modified and the wing markings are distinctly different (pl. 3, fig. 26). The very large hyaline spots at apex and on posterior margin are lacking in the ♀, replaced by smaller spots; also the ♂ wing only has 3 or 4 hyaline spots isolated in the field, whereas the ♀ wing has approximately 8 small spots. The body markings are as in the ♂. Sixth tergum about 3/4 as long 5th. Base of ovipositor dark brown, about equal in length to terga 3-5 and about 1.2 mm long as seen from direct dorsal view. Entire ovipositor about 2.7 mm long. Piercer short, blunt at apex (fig. 43b), 0.65 mm long.

Length: Same as in ♂.

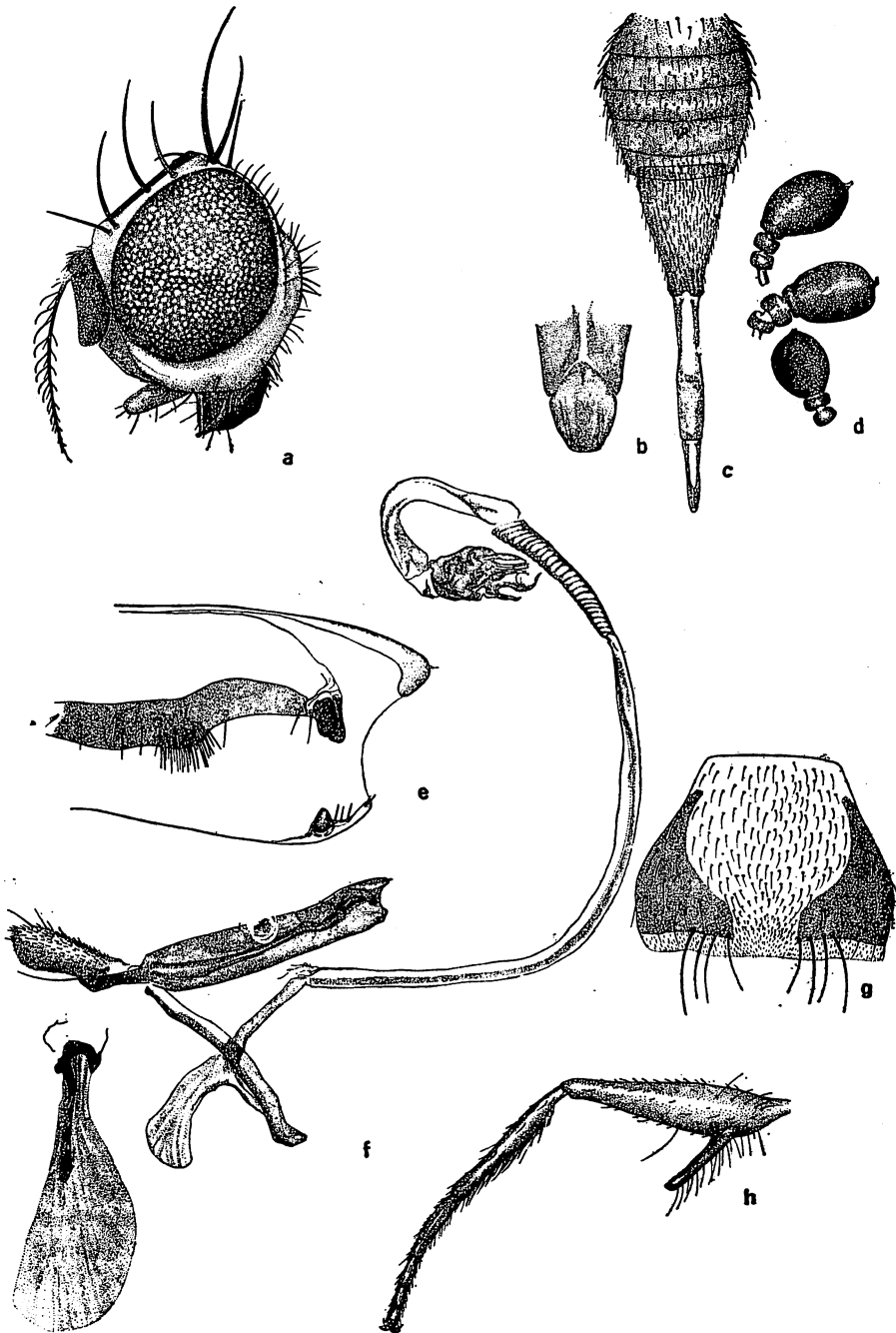


Fig. 43. *Ectopomyia baculigera* n. sp. a. head; b. apex of piercer; c. ♀ abdomen; d. ♀ spermathecae; e. ♂ surstylus and 10th sternum; f. ♂ ejaculatory apodeme; g. ♂ 5th sternum; h. front leg.

Holotype ♂ (BISHOP 9954) LAOS: Sedone Prov., Muong Paksong, 39 km E of Pakse, 980 m, 7.IX.1967, collected in secondary woods, F. G. Howarth. Allotype ♀ and 11 paratypes, 8 ♂♂, 3 ♀♀, same data as type.

Type, allotype and some paratypes in the B. P. Bishop Museum, the remainder of the paratypes in the collections of the U.S. National Museum, British Museum (Natural History) and the University of Hawaii.

#### Genus *Hexacinia* Hendel

*Hexacinia* Hendel, 1914, *Wien. Ent. Zeit.* **33**: 82; 1915, *Ann. Mus. Nat. Hung.* **13**: 459. Type-species: *Acinia stellata* Macquart (1851, not 1843), by original designation, [= *radiosa* (Rondani)].

This genus is readily differentiated from other Acanthonevrini by having a well developed bristle near lower central margin of each mesopleuron; wings broad, *Platensina*-like, about 2 × longer than wide and predominantly brown, with hyaline spots around the margin and scattered over the field. The head has 2 pairs inferior fronto-orbitals situated near lower edge of front, lower bristles incurved and upper bristle reclinate, rather widely separated from superior fronto-orbital bristles; the anterior of these is situated near the middle of front (fig. 44a).

I recognize 4 species in this genus, sens. str., plus 1, *palpata* Hendel, type of *Parahexacinia* Chen. These range over Southeast Asia through New Guinea and the Bismarcks; these will be keyed and reviewed in a monograph being prepared on the Philippine Tephritidae.

#### *Hexacinia radiosa* (Rondani) Fig. 44a-f; pl. 3, fig. 28.

*Acinia radiosa* Rondani, 1868, *Ann. Soc. Nat. Hist. Modena* **3**: 31. Replacement name for *stellata* Macquart, 1851, nec 1843.

*Acinia stellata* Macquart, 1851, *Mem. Soc. Lille* **1851**: 266, pl. 17, fig. 7. Type-locality: Manila. Type ♀ in Bigot collection, Oxford.

*Hexacinia nigroantennata* Hering, 1956, *Verh. Naturf. Ges., Basel* **67** (1): 70, fig. 4. New synonymy based upon a study of the type ♀ from Ceylon, in the Natural History Museum, Basel, and the type ♀ of *stellata* from Manila, at Oxford, and with other specimens from the Philippines and Southeast Asia.

The species fits closest to *stelligennis* (Walker), from the Philippines and Indonesia and is differentiated by having the apical 1/2 of the antenna brown to black, rather than entirely yellow; by having a prominent brown to black spot present on each side of posterior margin of mesonotum, immediately in line with dorsocentral bristles; by having marginal wing spots enlarged, rather quadrate, scarcely longer than wide, and the spot at apex of cell R<sub>5</sub> not filling the cell (pl. 3, fig. 28). In *stelligennis* the marginal wing spots are small, mostly triangular in shape and the mark at apex of cell R<sub>5</sub> is narrow, 3 to 4 × wider than long and usually filling all of the apex of cell. The spot on each side of hind margin of mesonotum is small and inconspicuous.

A predominantly yellow species with a small dark brown to black spot on each side of the face. Thorax with a brown spot immediately above humerus and with a brown spot on lower edge of humerus extending to upper portion of propleuron. Lateral cervical sclerites dark brown to black on lower margins. A small brown spot is present just before suture behind presutural bristle, 2 small spots on metanotum and 1 brown spot on mesonotum at wing base in addition to the prominent brown marks on posterolateral portions of mesonotum behind and between



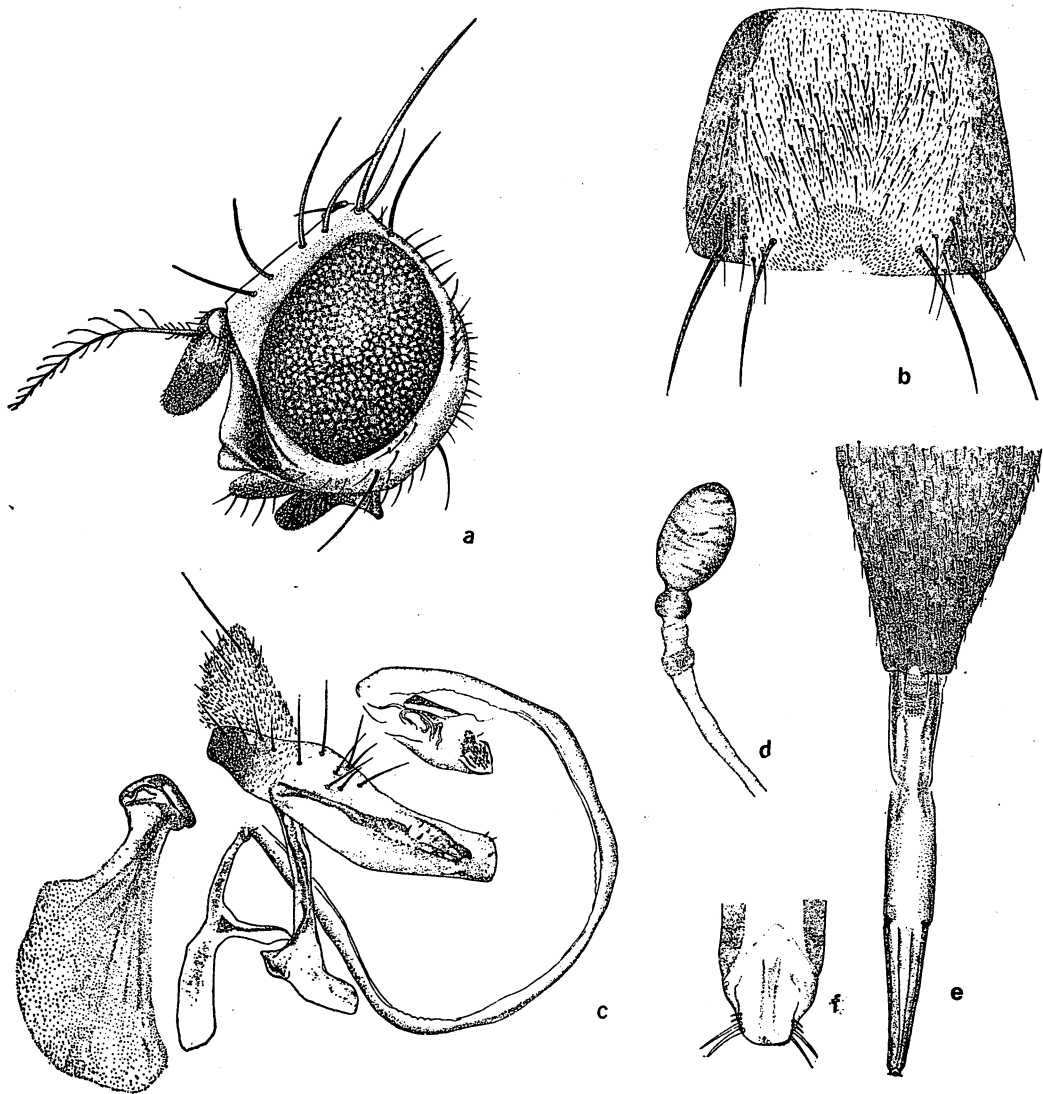


Fig. 44. *Hexacimia radiosa* (Rondani). a. head; b. ♂ 5th sternum; c. ♂ genitalia; d. ♀ spermatheca; e. ovipositor; f. apex of piercer.

prescutellars and posterior supraalar. Five or 6 brown spots present in a line along upper edge of each pleuron, 1 on propleuron, 2 on mesopleuron, 1 on pteropleuron, and a spot on anterodorsal and 1 near posterodorsal margins of sternopleuron, also a brown spot in middle of hypopleuron. Sides of metanotum and postscutellum brown, median portion yellow. Legs yellow, middle and hind femora each with a brown ventral spot, near apical 3/4. Wings as in pl. 3, fig. 28. Abdomen largely yellow to rufous, yellow-gray pollinose, dark brown to black on extreme lateral margins and with a pair of submedian brown spots on terga 2-4, and a pair of submedian brown to black spots on apex of 5. ♀ with the submedian spots on all of the terga except the 1st. The sterna of

both the sexes are yellow, except for brown on lateral margins. The 5th sternum of ♂ is about as long as wide with a U-shaped cleft in middle of hind margin and with a membranous area connecting the 2 lateral lobes; this is densely setose (fig. 44b). Epandrium slender, scarcely broader than the surstyli which are blunt almost truncate at apices, and completely hide the 10th sternum from lateral view. The anal plates are small, longer than wide, the other characters of the genitalia are as in fig. 44c. Three spermathecae are present in the ♀; these are shaped as in fig. 44d. Basal section of ovipositor dark brown, approximately equal in length to terga 4-6, and 1.3 mm in length. Piercer rather blunt, shaped as in fig. 44f.

Length: Body, 5.6-5.8 mm; wings, 50-5.2 mm long by 2.5 mm wide.

Seven specimens are on hand from following localities in THAILAND: Nan, 10. VII.1963, collected on *Eugenia malaccensis*; R. Kawasaki. Chiangmai Prov., Fang, 500 m, 12.IV.1958, T. C. Maa; Chiangmai Prov., Doi Suthep, 1-5.IV.1958, T. C. Maa; and Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa. Also 3 from S.VIETNAM: Dai Lanh, N of Nha Trang, 30.XI.-5.XII.1960, C.M. Yoshimoto. Bezzi (1913: 115, pl. 11, fig. 28) recorded *stellata* from Burma.

#### Genus *Mimosophira* Hardy, new genus

A new species on hand from Vietnam fits near *Sophira* by having 6 scutellar bristles and lacking sternopleural bristles. It differs strikingly from *Sophira* by having the arista pubescent rather than long plumose; by having cubital cell pointed, acute at lower apex but not with a well developed lobe; by the short subcostal cell, 1/2 as long as 2nd costal rather than subcostal cell elongate, equal or longer than 2nd costal; by having vein  $R_{4+5}$  almost bare with only a few, about 5, scattered setae before r-m crossvein, rather than having vein abundantly setose over most of its length. Also the wing markings are very different in the 2 (fig. 45a); *Mimosophira* has the wings predominantly hyaline with a large brown spot extending to vein  $M_{1+2}$  from the subcostal cell, the entire apex of the wing dark brown to a level with the middle of 4th costal section, and with a streak of brown over the m crossvein (fig. 45a). *Sophira* typically has the wings subhyaline to yellowish, usually with dark markings along the costa and along some of the veins.

Type-species: *M. rubra*, n. sp.

#### *Mimosophira rubra* Hardy, new species Fig. 45a-b.

♀. Predominantly yellow to rufous. *Head*: Slightly higher than long with the occiput moderately developed and face concave as seen in direct lateral view (fig. 45b). Genae almost 1/4 the height of the compound eyes. Eyes oval, slightly higher than long. Front sloping as seen from direct lateral view with antennae situated near upper 2/3 of head. Front as wide as long and almost equal in width to 1 eye. Two pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals present. Ocellars rather weak, only about 2× longer than the setae over middle of front. Postocellars approximately equal in size to upper superior fronto-orbitals. Margin of gena with fine inconspicuous hairs. Antennae entirely yellow, 3rd segment 1/3 to 1/2 longer than wide, broadly rounded at apex and arista pubescent or very short plumose. Palpi yellow, rather thickly black setose on margins and on ventral surfaces. *Thorax*: Polished yellow to rufous, all bristles black and well developed except for lack of sternopleurals. Dorsocentral bristles situated in line with or slightly in front of supraalars. Six scutellar bristles present, the intermediate bristles are 2/5 to 1/3 as long as subbasal scutellars. Halteres pale yellow. *Legs*: Entirely yellow to rufous. Only 2 prominent black posteroventral bristles on front femur situated near apical 1/3 of segment, this

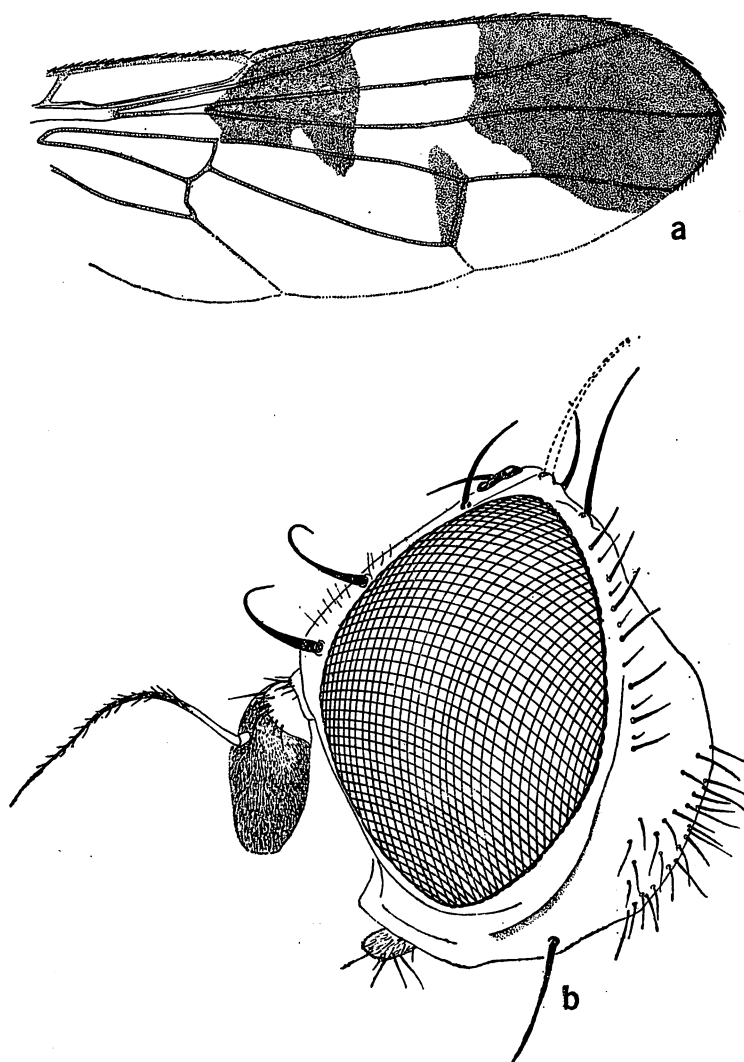


Fig. 45. *Mimosophira rubra* n. sp. a. wing; b. head.

surface otherwise with yellow-brown to pale yellow setae or hair-like bristles. Middle tibia with 1 strong apical spur. *Wings*: Slender, 3× longer than wide with markings and venation as in fig. 45a. *Abdomen*: Predominantly rufous with terga 4-6 brown, tinged with rufous. Basal segment of ovipositor reddish brown about equal in length to remainder of abdomen. Basal segment, measured on the venter, 1.5 mm long. The ovipositor has not been relaxed for study.

Length: Body, excluding ovipositor, 4.5-4.7 mm; wings, 5.0 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9955), S VIETNAM: Dalat, 1550 m, 11.IX.1960, J. L. Gressitt. Type in the B. P. Bishop Museum.

### Genus *Platystomopsis* Hering

*Platystomopsis* Hering, 1939, *Verh. VII Intern. Kongr. Ent.* 1938, 1: 172. Type-species: *clathrata* Hering, by original designation.

An Acanthonevrini very close to *Xarnuta* Walker. From Hering's original description it would appear to differ by having vein  $R_{2+3}$  wavy; vein  $R_{4+5}$  setose almost to its tip, and the r-m crossvein situated slightly beyond middle of cell 1st  $M_2$ .

#### *Platystomopsis clathrata* Hering

*Platystomopsis clathrata* Hering, 1939, *Verh. VII Intern. Kongr. Ent.* 1938, 1: 172, fig. 6.

This species is known only from the type ♀, from Tonkin (North Vietnam). The type is in the Museum National d'Histoire Naturelle, Paris.

It is differentiated by the generic characters pointed out above and by the markings of the wing as shown in Hering's figure. It has not been recorded from Thailand but may possibly occur there. For a description of this species refer to the original.

### Genus *Rioxa* Walker

*Rioxa* Walker, 1857, *J. Linn. Soc. Lond.*, Zool. 1: 35. Type-species: *lanceolata* Walker, by monotypy. *Ptilonina* Enderlein, 1911, *Zool. Jahrb. (Syst.)* 31: 447. Type-species: *Ptilona sexmaculata* van der Wulp, by original designation.

An Acanthonevrini, the concept of which is considerably confused in the literature. Approximately a dozen Oriental species have been placed under this combination but it is obvious that many of these do not properly belong here. Based upon the type of the genus, *R. lanceolata* Walker, the genus is differentiated from related groups by having the subcostal vein arcuate and the apex of subcosta slanted gradually into the costa; by having the subcostal cell elongate, with vein  $R_1$  ending approximately opposite the m crossvein;  $R_1$  is especially long in the ♂ and ends nearer the tip of  $R_{2+3}$  than in ♀; 2 pairs of inferior fronto-orbitals and 2 pairs of superior fronto-orbitals; ocellar bristles rudimentary, seta-like and postocellar bristles yellow. In *lanceolata* the head bristles are black except for the postocellars; based on 1 specimen in my collection, not upon the type. Hering (1952: 273) said the specimen he had on hand from Java had a black upper superior fronto-orbital bristle on the left side (intimating the right bristle was yellow). The thorax is distinctly elongate, about 1/3 longer than wide, not counting scutellum. Also the scutellum is bare, devoid of setae and the 2nd pair of scutellars are distinctly shorter than the others.

#### KEY TO KNOWN RIOXA FROM THAILAND AND SURROUNDING COUNTRIES

1. Wings lacking large hyaline wedges from anterior margin through cell Sc, lacking hyaline spots in cell  $R_5$  and with costal cells brown. ....2  
 Wings with a large hyaline mark in each of the costal cells, 2 large wedges filling most of Sc and extending to or beyond vein  $R_{2+3}$ , and 2 round hyaline spots in cell  $R_5$  (fig. 47a). Cambodia.....**vinnula**, n.sp.
- 2 (1). Wings with 5 or 6 hyaline marks along margin; 1 each in apices of cells  $R_1$ ,  $R_3$ ,  $R_5$ , 2nd  $M_2$ , and  $M_4$ ; and often 1 in Sc. Fourth costal section of ♂, between apices of

veins  $R_1$  and  $R_{2+3}$ , almost equal to 5th costal section. Lower lateral margins of face (protruded area) shining black. Burma, Thailand, Indonesia, Philippines, Vietnam.

.....**sexmaculata** (van der Wulp)  
 Only 4 marginal hyaline spots. No spots present in cell  $R_1$  or in Sc (pl. 3, fig. 29);  
 4th costal section of  $\sigma$  1/2 as long as 5th. Lower lateral margin of face yellow.  
 Indonesia, Ceylon, Thailand. ....**parvipunctata** de Meijere

**Rioxa parvipunctata** de Meijere Pl. 3, fig. 29.

*Rioxa sexmaculata* var. *parvipunctata* de Meijere, 1911, *Tijdschr. Ent.* **54**: 381. Type-locality: Java. Type probably in the Zoölogisch Museum, Amsterdam.

*Rioxa infirma* Hering, 1941, *Siruna Seva* **3**: 24, fig. 14. **New synonymy** based upon comparison of specimens from Java and Ceylon. Type-locality: Ceylon. Type in the Zoologisches Museum, Berlin.

This species is similar in wing and body markings to *sexmaculata* (van der Wulp) but differs by having only 4<sup>+</sup> marginal hyaline spots on the wing, having no spots present in cell  $R_1$  or in Sc. Also by having the 4th costal section of  $\sigma$  very short, about 1/2 as long as 5th (pl. 3, fig. 29). In *sexmaculata* the wing margin has 5 or 6 hyaline spots, and the 4th costal section of  $\sigma$  is almost equal in length to 5th. Also the lower lateral margins of the face of *parvipunctata* are yellow, whereas in *sexmaculata* a shining dark brown to black spot is present in the swollen portion on each lateral margin. I find no other diagnostic features to separate these 2 species. The  $\sigma$  genitalia appear to be identical with those of *sexmaculata* and the  $\text{♀}$  ovipositors have not been compared.

One specimen on hand: THAILAND: Chiangmai Prov., 55 km S of Fang, 500-550m, 4.V.1969, J. J. S. Burton.

**Rioxa sexmaculata** (van der Wulp) Fig. 46 a-g.

*Ptilona sexmaculata* van der Wulp, 1880, *Tijdschr. Ent.* **23**: 185; 1886, Dipt. Sumatra, p. 51, pl. 3, fig. 7-11. Type-locality: Sumatra.

*Rioxa sexmaculata* van der Wulp, 1899, *Tijdschr. Ent.* **42**: 56.

*Rioxa sumatrana* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 449, fig. U. Type-locality: Sumatra. In Zoological Institute, Warsaw. I have studied both of the above types and have confirmed this synonymy.

*Rioxa quinque maculata* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 115, pl. IX, fig. 27. **New synonymy.** Type-locality: Tenasserim, Lower Burma. Type in Zoological Survey of India collection.

Bezzi's description and figure fits my concept of *sexmaculata*. The presence or absence of a hyaline spot in subcostal cell is apparently variable and not diagnostic in this case. Also Bezzi said the pleura are not vittate in *quinque maculata*. I believe his type was teneral; all mature specimens I have seen have longitudinal brown vittae on the pleura.

The following description is based on specimens from Thailand. This species is differentiated from other *Rioxa* by the wing markings as shown in fig. 46a, in combination with the markings on the thorax. A predominantly yellow species with 2 narrow brown vittae extending entire length of mesonotum in line with dorsocentral bristles, continuing on sides of scutellum to apical bristles. Also, with 2 brown vittae extending longitudinally the full length of pleura, 1 over upper portion of mesopleuron, continuing from propleuron to pleurotergon and another along upper edge of sternopleuron continuing over hypopleuron. The upper superior fronto-orbital bristles yellow. Face yellow, except for a prominent subshining dark brown to black spot on each

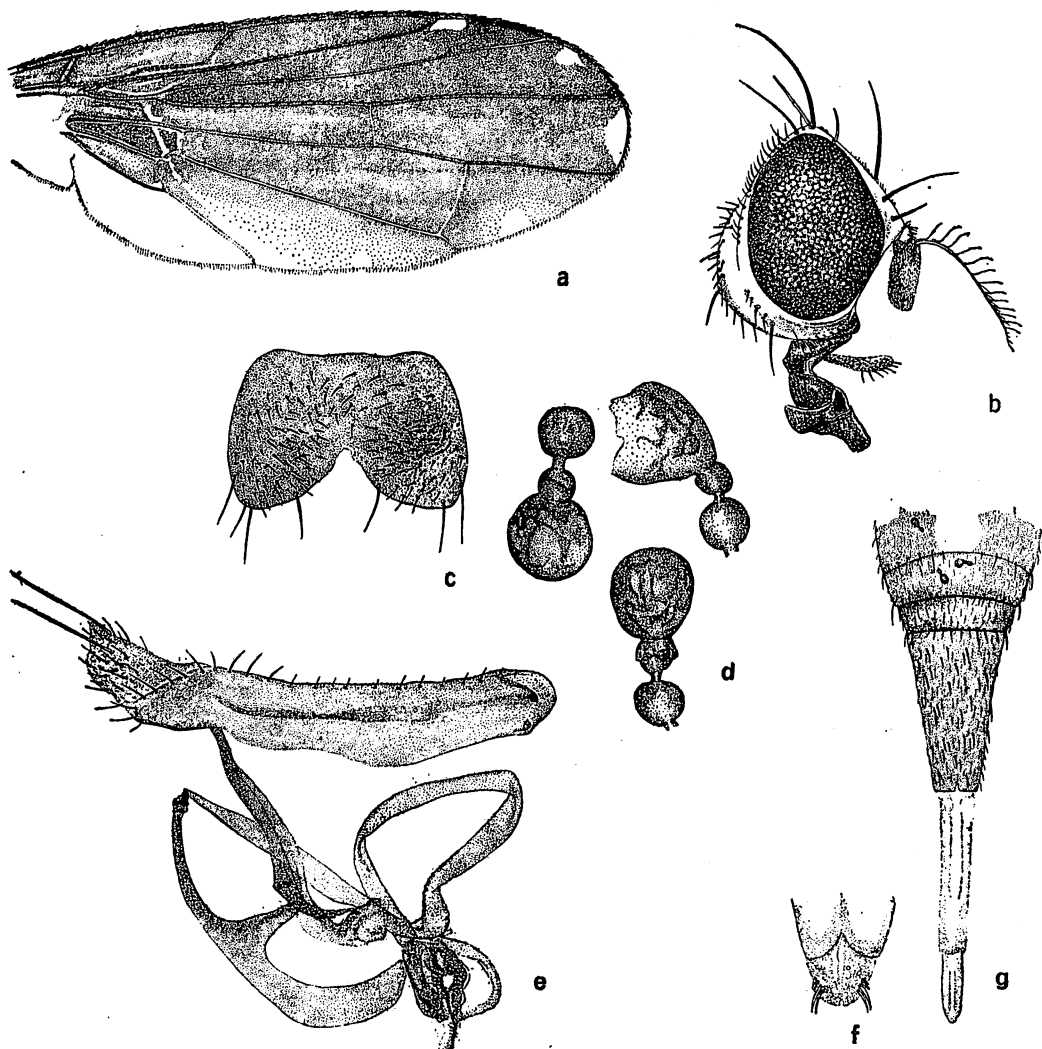


Fig. 46. *Rioxa sexmaculata* (van der Wulp). a. wing; b. head; c. ♂ 5th sternum; d. ♀ spermathecae; e. ♂ genitalia; f. apex of piercer; g. ovipositor.

side and a faint brown discoloration on lower median portion. Head as in fig. 46b. Hind femur with 2 prominent preapical dorsal bristles. Wings predominantly brown with a hyaline spot in cell  $R_1$  just beyond vein  $R_1$ , a small spot in apical portion of cell  $R_3$  just beyond  $R_{2+3}$ ; apical portion of cell  $R_5$  hyaline; a small hyaline spot on the apex of cell 2nd  $M_2$  and also at apex of cell  $M_4$ . Subcostal cell with a small hyaline spot in some specimens approximately  $1/2$  longer than 2nd costal, with vein  $R_1$  ending about opposite m crossvein. Crossvein r-m situated near apical  $3/4$  of cell 1st  $M_2$ . Lobe of cubital cell short, acutely pointed, the apical margin of the cell formed by a straight line leading to vein  $Cu_1 + 1st A$  (fig. 46a, note the specimen drawn is slightly teneral and the faint longitudinal streaks are abnormal). Setae of vein  $R_1$  continuing a short way onto the node and  $R_{4+5}$  setose the greater part of its length, to a point slightly beyond apex of vein  $R_{2+3}$ . Abdomen brown, with a broad median band extending from base over 5th tergum down

the middle. Sixth tergum brown, tinged with yellow at base. Fifth sternum and genitalia of ♂ as in fig. 46c and 46e. Base of ovipositor brown, rather elongate, slightly longer than segments 3-5, measuring 2.0 mm in length. Piercer blunt at apex as in fig. 46f. Three spermathecae, each rather elongate, with a swollen node beyond the neck (fig. 46d).

Two ♂♂ and 2 ♀♀ on hand from the following localities in THAILAND: Nakorn-Nayok, 14.V.1963; Trong I., I-II.1899, W. L. Abbott; Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa; Chanthaburi Prov., 45 m, 24.IV-1.V.1958, T. C. Maa. Also 3 ♀♀ from S VIETNAM: M'Drak, E of Ban Me Thuot, 4-600 m, 18-19.XII.1960, C. M. Yoshimoto.

***Rioxa vinnula* Hardy, new species** Fig. 47a.

The species at hand fits the genus *Rioxa* because of the wing venation, chaetotaxy of head, and lack of setae on vein  $M_{1+2}$  or  $Cu_1$ . The thorax, however, is rather broad compared to its length, not so slender, straight-sided as is typical of *Rioxa* and only 4 scutellar bristles are present on the specimens at hand. In regard to the shape of the thorax and the apparent 4 scutellar bristles this would seem to fit *Gastrozonini*; the wing markings and venation, however, are *Acanthonevrini*-like. It will be necessary to examine the ♀ spermathecae (3 in *Acanthonevrini* and 2 in *Gastrozonini*) to be sure that this is correctly in *Rioxa*.

This species is readily differentiated from all known species of *Rioxa*, or other similar genera by having vein  $R_1$  broadly concave beyond the sharp upward bend of subcostal vein, also vein  $R_{2+3}$  strongly concave and undulated, ending in costa a rather short distance beyond  $R_1$  so that the 4th costal section is scarcely over 1/4 as long as 5th (fig. 47 a). Also by having 2 large hyaline wedges on anterior margin of wing through subcostal cell and 2 hyaline wedges on posterior margin through cell 2nd  $M_2$  (fig. 47a). Also the predominantly yellow to rufous thorax with the pleura dark brown to black on posterior 1/3 and scutellum pale yellow on apical 1/2, yellow-brown on basal 1/2 will differentiate this species.

*Head*: Distinctly higher than long with eyes oval and face concave as seen in direct lateral view and with the epistomal margin distinctly produced. As seen from direct frontal view the

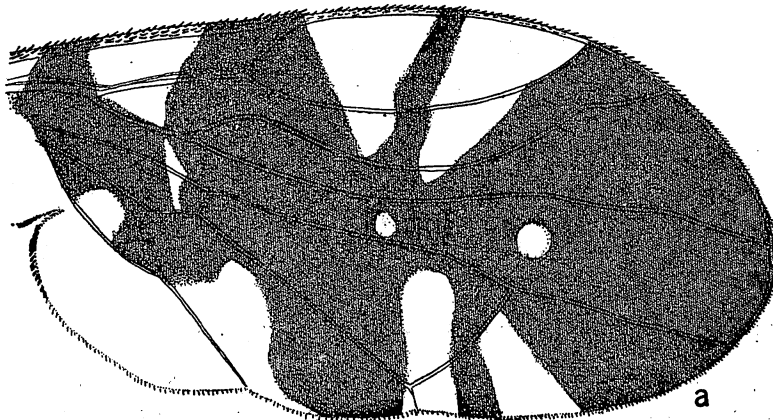


Fig. 47. *R. vinnula* n. sp. a. wing.

antennal furrows are very prominent and the median portion of face is raised in a broad, flat ridge. Head and appendages yellow. Front just slightly longer than wide, with 2 pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals. Ocellar bristles rather small, subequal in length to postocellars. *Thorax*: As noted above predominantly yellow with pteropleura, hypopleura, metapleura, pleuroterga, sides of metanotum and hind margins of sternopleura dark brown, tinged with black. Also with basal 1/2 of scutellum tinged with brown. Postscutellum and median portion of metanotum yellow. Dorsocentrals situated about 1/3 the distance from postalar to supraalar bristles. *Legs*: Yellow with a tinge of brown at bases of hind and middle tibiae. Middle tibia with a strong apical spine. Front femora each with 3 thin, black, posteroventral bristles on apical 1/2 and with thin brownish yellow bristles extending on basal 1/2 of posteroventral surface. *Wings*: Venation and markings as in fig. 47a. Veins  $R_1$  and  $R_{4+5}$  setose over most of their lengths. *Abdomen*: Terga 1 and 2 pale yellow, 3-5 polished black. The genitalia have not been studied.

Length: Body, 6.0 mm; wings, 6.5 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9956), CAMBODIA: Kiri Rom, 700 m, 31.III-7.IV.1961, N. R. Spencer. Type returned to the B. P. Bishop Museum.

#### Genus *Themara* Walker

*Themara* Walker, 1857, *Proc. Linn. Soc. Lond.*, Zool. 1: 33. Type-species: *Themara ampla* Walker, by monotypy.

An Acanthonevrini which is differentiated by having vein  $M_{3+4}$  and the straight portion of vein  $Cu_1$  setose above; vein  $R_{2+3}$  distinctly undulated; wings predominantly brown with hyaline wedges from the margin (fig. 48a); r-m crossvein situated at outer 2/3 to 3/4 of cell 1st  $M_2$ ; and head very broad, in ♂♂ the eyes are usually borne on long stalks. One pair inferior fronto-orbital and 2 pairs superior fronto-orbital bristles present, the lower superior fronto-orbitals situated at about middle of front. Ocellar bristles rudimentary, represented by small setae. Third antennal segment round at apex. Arista long plumose, the longest rays are greater in length than the width of 3rd antennal segment.

About a dozen species have been treated under this genus. A key to the known *Themara* will be presented in a monograph of the Philippine Tephritidae being prepared.

#### *Themara* n.sp. rel. to *alkestis* (Osten-Sacken)

This species is common over Mindanao in the Philippines and is described in a monograph of that fauna (Hardy, in press). It is readily differentiated from other known *Themara* which have the entire apex of wing tinged with yellow, by having 4 longitudinal brown vittae on mesonotum, and by lacking stalk eyes in the ♂; the head is broad but not drawn out into eye stalks as in most species of *Themara*.

One ♀ specimen is on hand from CAMBODIA: Kiri Rom, 700 m, 31.III-7.IV.1961, N. R. Spencer.

#### *Themara hirtipes* Rondani Fig. 48 a-f; pl. 3, fig. 30.

*Themara hirtipes* Rondani, 1875, *Ann. Mus. Genova* 7: 435. Type-locality: Borneo.

This has been treated by Bezzi (1913: 73) and Perkins (1938a: 405) as an *Acanthoneura*. The synonymy under this species will be discussed in the monograph of the



Philippine species which is being prepared.

This species is differentiated from other known *Themara* by having median portion of mesonotum broadly yellow, lacking a brown vitta; by the pleura being predominantly yellow; and by having a prominent hyaline spot in cell  $R_5$  almost directly above m cross-vein.

A predominantly pale-colored species with the eyes of the ♂ borne on moderately long to long stalks (fig. 48b). Specimens on hand from Thailand and Borneo show a considerable range of variation in the length of the eye stalks. In some they are shorter than the thorax and in others the stalks are almost as long as the thorax and abdomen combined. Head yellow except for compound eyes and dark ocellar triangle. Ocellar bristles tiny, poorly developed. Thorax with 4 narrow brown vittae, the 2 lateral are interrupted by the suture. The median portion of

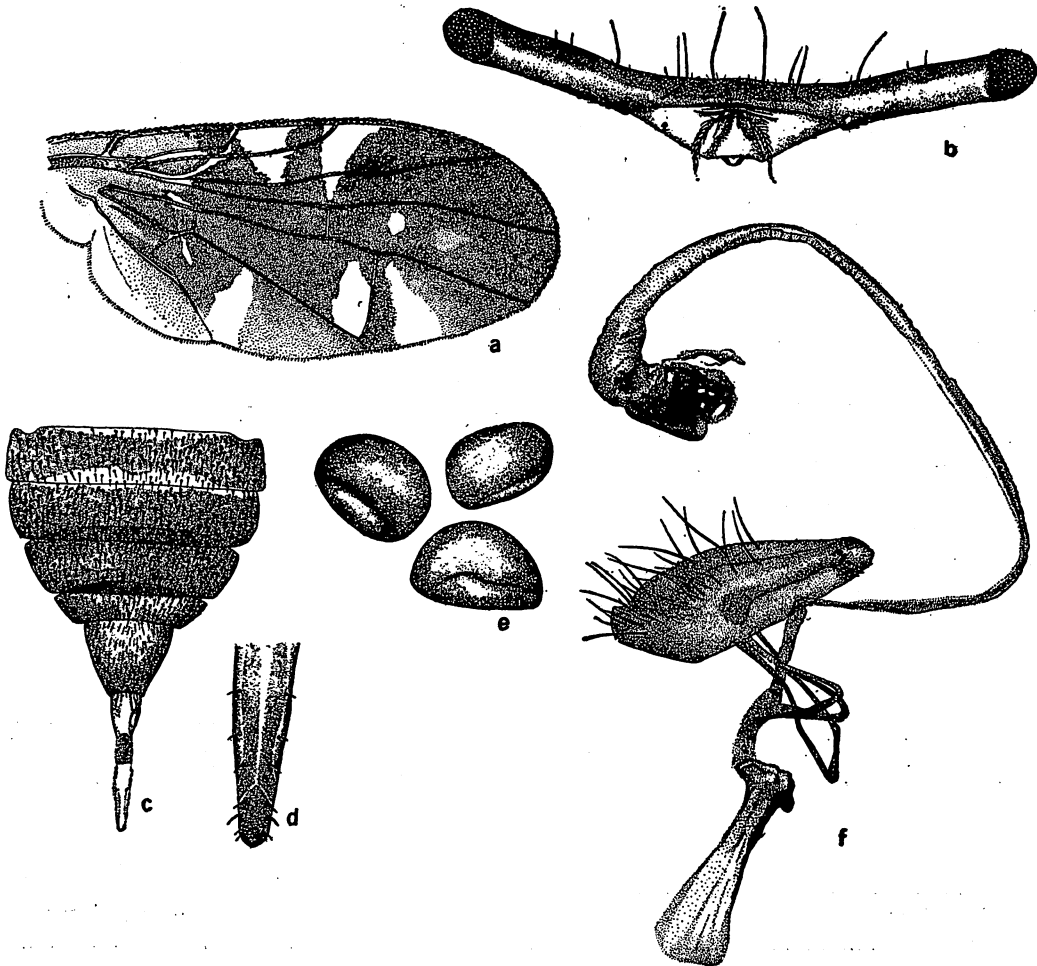


Fig. 48. *Themara hirtipes* Rondani. a. wing; b. face; c. ♀ abdomen; d. apex of piercer; e. ♀ spermathecae; f. ♂ genitalia.

the mesonotum is broadly yellow. Scutellum yellow on margin, brown at base. Pleura yellow, except for a brown mark across upper portion of each mesopleuron and 1 over metapleuron and pleurotergon. Postscutellum yellow in middle, brown on sides. Metanotum yellow in middle, polished black on sides. Dorsocentral bristles situated distinctly behind anterior supraalars. Six strong scutellar bristles present. Legs entirely yellow. Wings as in fig. 48a; pl. 3, fig. 30. Abdomen black except for a narrow yellow apical margin on each of terga 2 and 3. ♂ genitalia as in fig. 48f. Ovipositor yellow, short and thick, the basal portion is shorter than abdominal segments 5+6, approximately 0.8 mm long, and with 4 prominent bristles at apex. The piercer is blunt, rounded at apex, shaped as in fig. 48d. Three small round spermathecae present.

Length: Body and wings, 6.5-6.75 mm.

I have seen specimens of *hirtipes* from Sumatra, Philippine Islands, Borneo (Sarawak), and Burma.

Seven specimens on hand from following localities in THAILAND: Phu Kae, 2.IX.1965; Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa; Chiangmai, Doi Suthep, 1278 m, 28.III-4.V.1958, T. C. Maa; 1 specimen from S. BURMA: Tenasserim, Sukla, X. 1934, R. Malaise; and 1 from LAOS: Ban Van Heue, 20 km E of Phou-Kow-Kuei (Phou Khao Khouai), 1-15.V.1965, J. A. Rondon.

#### Genus *Tritaeniopteron* de Meijere

*Tritaeniopteron* de Meijere, 1914, *Tijdschr. Ent.* 57: 209. Type-species: *eburneum* de Meijere, by monotypy.

An Acanthonevrini characterized by being predominantly yellow with black markings on thorax and abdomen; all head and body bristles yellow; and wings characteristically marked as in fig. 50b, and pl. 4, fig. 36. This has previously been treated as a synonym of *Sophira* Walker (Hendel 1915: 441, Shiraki 1933: 320). Hering, in his personal unpublished catalogue, treated this as a subgenus of *Sophira*. I have discussed the status of this (Hardy 1957: 377) and am convinced that *Tritaeniopteron* is a good genus, differing from *Sophira* by the short subcostal cell, scarcely over 1/2 as long as 2nd costal cell; by the presence of strong sternopleural bristles; and the presence of 2 brown oblique bands extending from wing margin, 1 over crossvein r-m and 1 over m crossvein (fig. 50b; pl. 4, fig. 36).

Three species have been previously recognized in this genus. I am adding 2 new species from Thailand.

#### KEY TO KNOWN SPECIES OF TRITAENIOPTERON

1. Face with a prominent black spot in the middle. ....2  
Face entirely yellow. ....3
2. Abdominal terga 3-5, each with a black band across the base. Java. ....*eburneum* de Meijere  
A black basal mark present on each side of terga 3-5 in ♀, and 4-5 in ♂. An extra pale brown spot present on the inner side of each lateral vitta on thorax and the lateral vittae straight-sided, almost L-shaped, posteriorly. Ceylon. ....  
.....*punctatipleura* (Senior-White)
3. Terga 3 and 4, with a large black spot on each side. Tergum 5 with 2 to 4 large black spots. ....4  
Tergum 3 all yellow, terga 4 and 5 with 4 small brown spots along hind margins. Thailand. ....*elachispilotum*, n. sp.
4. Tergum 5 with a single black mark on each side. Formosa. ....*excellens* (Hendel)  
Tergum 5 with 4 black spots, the lateral spots extend almost to apex of segment (fig.

50e). Thailand. .... *tetraspilotum*, n. sp.

***Tritaenipteron elachispilotum* Hardy, new species** Fig. 49a.

This species is closely related to *tetraspilotum*, n.sp. and is differentiated by having the 3rd tergum of ♂ entirely yellow and by having 4 small brown to black spots along

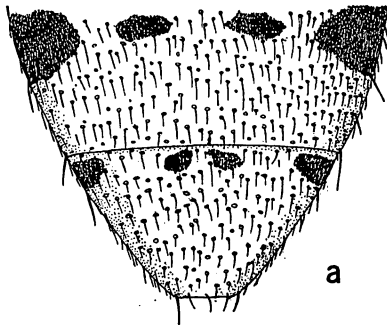


Fig. 49. *Tritaenipteron elachispilotum* n. sp. a. ♀ tip of abdomen.

anterior edges of terga 4 and 5 (fig. 49a). In other details fitting the description of *tetraspilotum* n.sp.; the genitalia have not, however, been dissected for study.

Length: body, 5.9 mm; wings, 5.7 mm.

♀. Unknown.

Holotype ♂, THAILAND: Nakorn-patom, 4.X.1962, no collector given.

Type deposited in the Department of Agriculture collection, Bangkok. This had been received from Kasetsart University.

***Tritaenipteron tetraspilotum* Hardy, new species** Fig. 50a-i; pl. 4, fig. 36.

Fitting near *excellens* (Hendel), from Formosa, but differing by having 4 large black spots along anterior margin of 5th tergum of ♂ and by having median portions of sternopleura and hypopleura shining black.

♂. *Head*: Higher than long (fig. 50a), entirely yellow except for dark reddish brown eyes. Face nearly vertical. Two inferior fronto-orbital bristles and 2 prominent bristle-like setae between upper inferior fronto-orbital and lower superior fronto-orbital, these are 1/3 to 1/2 the size of other frontal bristles. Ocellar bristles very small, scarcely larger than the setae along orbits. Third antennal segment rounded at apex, arista long plumose, the longest rays are greater in length than width of 3rd segment. *Thorax*: With mesonotum marked as in fig. 50g. With a large black spot covering the dorsoanterior 2/3 of each mesopleuron and with a large black spot covering median portions of sternopleuron and hypopleuron. Also with a black spot at lower edge of each metapleuron extending onto pleurotergon. Metanotum polished black on sides, yellow down middle. Postscutellum yellow. A small black spot present just above each wing base. *Legs*: Entirely yellow. Middle tibia with 1 strong apical spur. *Wings*: As in fig. 50b, the markings typical of the genus. Subcostal cell about 1/2 as long as 2nd costal cell. Crossvein r-m situated slightly beyond middle of cell 1st M<sub>2</sub>. Lobe of cubital cell rather short, scarcely longer than portion of vein Cu from base of cubital lobe to junction with m-cu crossvein. *Abdomen*: Fifth tergum with 4 large black spots as in fig. 50e. The lateral spots extend over 2/3 to 3/4 of the segment. Fifth sternum about 2 × longer than wide and densely setose (fig. 50f). Genitalia as in fig. 50h, the bulbous apical portion of aedeagus extremely large by comparison, equal to or

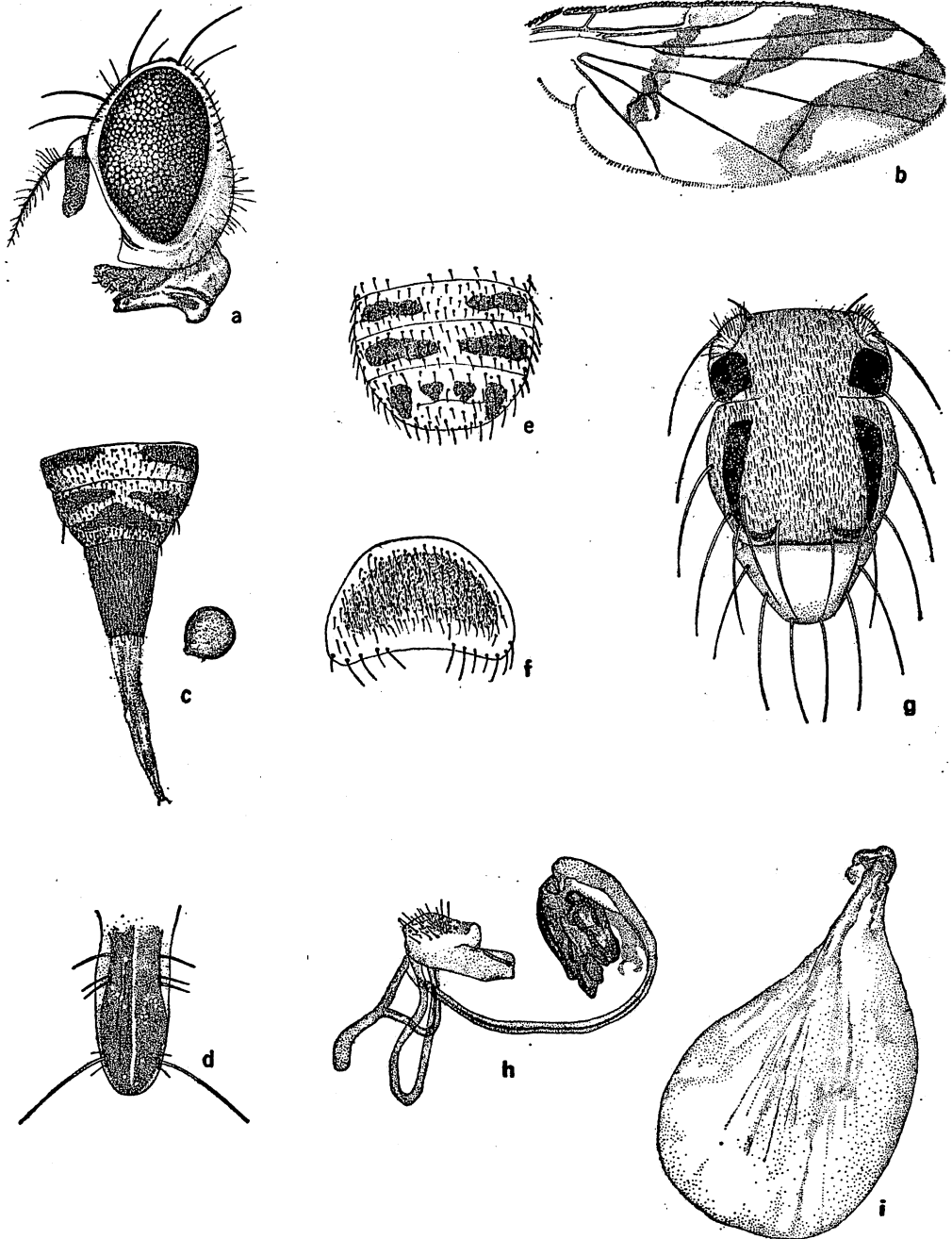


Fig. 50. *T. tetraspilotum* n. sp. a. head; b. wing; c. ovipositor; d. apex of piercer; e. ♀ tip of abdomen; f. ♂ 5th sternum; g. thorax; h. ♂ genitalia; i. ♂ ejaculatory apodeme.

greater than 9th tergum (epandrium) and anal region. Also ejaculatory apodeme extremely large (fig. 50i), greater in size than the entire remaining genitalia and filling almost 1/2 of the abdomen.

Length: Body and wings, 6.0-6.2 mm.

♀. Fitting the description of the ♂ except that the 5th tergum has a single elongate spot on each side. Basal segment of ovipositor dark brown, about equal in length to last 3 abdominal segments and approximately 1.15 mm in length. Piercer slender, but blunt at apex, shaped as in fig. 50d; approximately 1.0 mm in length.

Length: Body and wings, 5.75 mm.

Holotype ♂ (BISHOP 9957), THAILAND: Nan, 10.VIII.1963, collected on *Eugenia malaccensis*, R. Kawasaki. Allotype ♀, Thailand: Donburi, 28.VII.1963, collected on *Plumeria acutifolia*, R. Kawasaki. Three paratypes, 2 ♂♂ and 1 ♀, 1 same data as allotype, spelled "Dhonburi," 28.VII.1956, Department of Agriculture lot #2092; 1, Bangkok, 7.IX.1964, no collector given; and 1, Nakhon Si Thammarat Prov., Thung Song Dist., ca 8 km E of town, 100 m, 1.IV.1969, J. J. S. Burton.

Type and allotype in B. P. Bishop Museum. One paratype returned to the Department of Agriculture, Bangkok [note: this was received from the British Museum (Natural History)], 1 in B. P. Bishop Museum, and 1 paratype in the University of Hawaii collection.

#### **Tritaeniopteron**, n.sp. ?

♀. One specimen on hand from THAILAND: Ranong Prov., Kra Buri Dist., Kraburi, nr sea level, 11.VI.1969, J. J. S. Burton appears to be undescribed; it fits very near *tetraspilotum*, n.sp. but differs by having the polished black bands at bases of terga 4 and 5 continuous, also the black polished mark on each side of mesonotum behind humerus is continuous with the black mark over median portion of mesopleuron, the black submedian postsutural marks are connected along hind margin of mesonotum and basal segment of ovipositor seems longer than in *tetraspilotum*; it is slightly longer than terga 4-6. Further specimens, including ♂♂, will have to be examined before this species can be properly placed.

The specimen is in the B. P. Bishop Museum.

#### Genus **Xarnuta** Walker

*Xarnuta* Walker, 1857, *J. Proc. Linn. Soc. Lond.* 1: 28. Type-species: *leucotelus* Walker, by monotypy.

This genus is easily differentiated from other Acanthonevrini by the flat, coarsely setose scutellum bearing 8 or more strong black marginal bristles. Also, by having the wings predominantly brown (pl. 4, fig. 31). Dorsocentral bristles situated much nearer to the prescutellars than to a line drawn between the supraalars. One or 2 propleural bristles, also 2 mesopleurals, 1 pteropleural and 1 sternopleural. Middle tibia with 2 strong apical spurs; these are subequal. Arista very short plumose. Three pairs inferior fronto-orbital bristles and 2 pairs of superior fronto-orbitals. Ocellar bristles small, scarcely 2 × larger than frontal setae. Three slender spermathecae in ♀ and piercer of ovipositor bifid laterally at apex (fig. 51b).

Seven species are presently known in this genus. Five of these are from Indonesia, New Guinea, Solomon Islands, Malaya and Thailand and 2 (*inopinata* Hering and *fen-*

*estellata* Hering) are from the Talysch region, Caspian Sea.

KEY TO KNOWN SPECIES OF *XARNUTA* EXCEPT FOR PALAEARCTIC SPECIES

1. Wings with hyaline markings on anterior margin in 1 or both of cells  $R_1$  and  $R_3$ , a large hyaline spot on margin in cell 2nd  $M_1$ ; and a small hyaline mark at apex of vein  $M_{1+2}$ , with apex of cell  $R_5$  predominantly brown. ....2  
Lacking hyaline marks on anterior or posterior margins, and with apex of cell  $R_5$  hyaline or subhyaline. ....3
- 2(1). Cell  $R_1$  with a prominent hyaline mark in middle, only 1 hyaline spot in cell  $R_3$ . Hyaline mark from margin in 2nd  $M_2$  extending through 2/3 of cell  $R_5$ . No hyaline mark across cells 1st  $M_2$  and  $R_5$  between r-m and m crossveins (fig. 32, pl. 16, Hardy 1959). Celebes. ....**lativentris** (Walker)  
Lacking hyaline mark in  $R_1$  and with 3 hyaline marks in cell  $R_3$ . Spot in 2nd  $M_2$  not extending over halfway across cell. A hyaline streak present across cell 1st  $M_2$  and  $R_5$  between crossveins (fig. 10, pl. 5, de Meijere 1914). Java. ....**obsoleta** (Wiedemann)  
*X. morosa* de Meijere is a **new synonym** based upon a study of the types of both species: *X. morosa* ♂, in Amsterdam, and *obsoleta* ♀ in Copenhagen.
- 3(2). Wings with numerous small hyaline spots scattered over the field (refer to fig. 4, Hering 1941a: 57). New Guinea. ....**cribralis** Hering  
Not as above. ....4
- 4(3). Wings dark brown, except for hyaline apices, somewhat paler on posterobasal portion. Indonesia, Malaya, Philippines, Ceylon and Thailand. ....**leucotelus** Walker  
Wings predominantly pale brownish yellow with brown transverse streaks. Solomon and Bismarck Islands, and Queensland, Australia. ....**confusa** Malloch

***Xarnuta leucotelus* Walker** Fig. 51a-b; pl. 4, fig. 31.

*Xarnuta leucotelus* Walker, 1857, *J. Proc. Linn. Soc. Lond.* 1: 28. Type-locality: Singapore. Type ♂ in the British Museum (Natural History). I have studied the type.

*Oxyphora malaica* Schiner, 1868, *Dipt. Novara Reise*, p. 274. Synonymy by Bezzi, 1913, *Mem. Ind. Mus.* 3: 75, and de Meijere, 1914, *Tijdschr. Ent.* 57: 199. Type-locality: Ceylon.

Distribution: Recorded from Malaya, Indonesia, Ceylon, and Thailand.

This species is like most *Xarnuta* in general characteristics and is differentiated by the uniformly dark brown wing with only the apex hyaline and the posterobasal portion subhyaline to brownish tinged.

An entirely yellow to rufous species except for a faint indication of 3 narrow brownish vittae extending down mesonotum and a small spot of brown across top of each humerus, also postscutellum brown on sides. Wings as in pl. 4, fig. 31. Vein  $R_{1+5}$  setose almost to a level with m crossvein. Sixth tergum of ♀ almost as long as 5th. Basal segment of ♀ ovipositor yellow except for tinge of brown at apex, short and thick as seen from dorsal view, the basal segment is not quite as long as terga 5-6; measured on the venter it is 1.25 mm long. Piercer about 1.0 mm long, bifid laterally at apex (fig. 51b). The inversion membrane has not been extruded; the extended ovipositor probably would measure about 2.6 mm. Three long oval spermathecae present. Length: Body, 7.4 mm; wings, 6.5 mm.

One specimen on hand from THAILAND: Chiangmai Prov., Fang, 500 m, 12-19. IV.1958, T. C. Maa, and 1 ♀ from LAOS: Vientiane Prov., Ban Van Eue, 30.VI.1967, native collector.

Genus and sp. new? near ***Ectopomyia***, n. genus

One ♀ specimen is on hand from LAOS: Vientiane Prov., Muong Vang Vieng, elev.

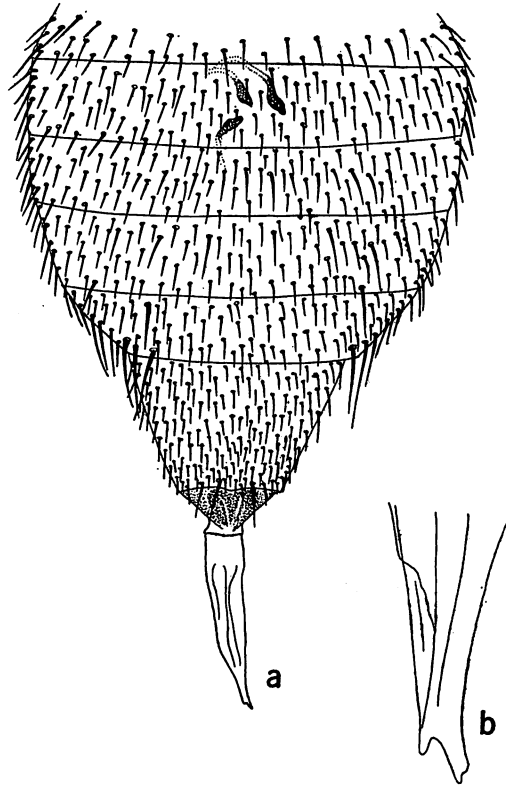


Fig. 51. *Xarnuta leucotelus* Walker. a. ♀ abdomen; b. apex of piercer.

350 m, 17.II.1968, F. G. Howarth which apparently represents a new genus and species near *Ectopomyia*. The specimen is, however, teneral, and even though all of the structures are clearly visible and the diagnostic features are evident, it is not being described until further specimens can be obtained.

This species would run in my key to *Ectopomyia* n. gen. except that the wing markings differ and it is unlikely that the ♂ characters would be the same. It differs by having the head extremely narrow, at least  $2 \times$  higher than long with the occiput scarcely produced beyond eye margin as seen in lateral view (since the specimen is teneral, however, it may be possible that the occiput is completely collapsed on this specimen).

The face is prominent with a distinct carina extending down middle and vertical as seen in lateral view, lacking a median concavity. Third antennal segment very short, scarcely longer than wide. Wings predominantly smoky brown, with basal cells mostly hyaline except for a brown spot at base of 2nd costal cell and another in basal portion of cell R above base of median vein. A large quadrate hyaline spot is present in cell  $R_1$  immediately beyond vein  $R_1$ , occupying basal  $1/5$  to  $1/4$  of 4th costal cell. Cell  $R_3$  entirely gray-brown as is cell  $R_5$  except for an oblong hyaline spot beyond r-m crossvein slightly in front of a line drawn above m crossvein, and another smaller hyaline spot before r-m crossvein approximately in line with end of vein  $R_1$ . Cell 1st  $M_2$  entirely gray-brown, cell 2nd  $M_2$  has a hyaline mark extending through median portion from

wing margin. Also, a hyaline wedge extends across median portion of cell  $M_1$  from wing margin almost to vein  $M_{3+4}$ . The r-m crossvein is situated near apical 2/3 of cell 1st  $M_2$ . Lobe of cubital cell short, acute. Veins  $R_1$  and  $R_{4+5}$  have long, prominent setae on upper margins. Thorax almost entirely yellow to rufous with a faint streak of brown down each side of mesonotum approximately in line with dorsocentral bristles and with a small dark brown to black spot present on each anterolateral margin of mesonotum. Bristles of mesonotum and scutellum yellow-brown, those of pleura yellow. Also, the frontal and vertical bristles of head yellow-brown and genal bristles yellow.

### Tribe ACIURINI

As interpreted here the members of this Tribe are differentiated from other Trypetinae by having the wings predominantly dark brown with hyaline wedges on anterior and posterior margins (pl. 4, fig. 32), in combination with the thorax and abdomen shiny black and the postocular setae thin, pointed, and brown to black.

This is a most artificial grouping, Hering (1947: 14) and others treated it as a subfamily. The status of the genera with this combination of characters needs a thorough review.

Only 1 genus and 2 species occur in Southeast Asia.

### Genus *Sphaeniscus* Becker

*Sphaeniscus* Becker, 1908, *Mitt. Berl. Zool. Mus.* 4: 138. Type-species: *brevicauda* Becker, by monotypy (= *Aciura filiola* Loew).

*Spheniscomyia* Bezzi, 1913, *Mem. Ind. Mus.* 3: 146. Invalid emendation of *Sphaeniscus* Becker. Bezzi was in error in designating *Trypeta quadrincisa* Wiedemann as the type.

This genus is readily recognized by its all shining black body, lightly gray pollinose on mesonotum; by the predominantly dark brown wings, with the base hyaline and with a hyaline wedge in middle of anterior margin, and 4 hyaline wedges on posterior margin of wing (pl. 4, fig. 32); having arista short pubescent; no scapular bristles; also by having vein  $R_{4+5}$  bare except for a few setae on the basal portion. The cubital cell is acute at apex, not drawn out into a distinct lobe and the r-m crossvein is situated very near apex of cell 1st  $M_2$ .

In Hering's key to subfamilies and tribes (1947) this fits in Aciurinae, Aciurini by having the body all black, the wing markings of an "aciuroid" pattern and the occipital setae thin, black, sharply pointed. Munro (1947: 89) in his comprehensive treatment of the genera intermediate between Trypetinae and Tephritinae placed *Sphaeniscus* (as *Spheniscomyia*) in group 5 of his series A (*Aciura* - *Platensina* series) and did not assign this to a definite tribe but placed it in a group of Trypetinae which have no scapular bristles.

### *Sphaeniscus atilius* (Walker) Fig. 52a-d; pl. 4, fig. 32.

*Trypeta atilius* Walker, 1849, *List Dipt. Ins. Brit. Mus.* 4: 1021. Type-locality: Foochow, China.

Type ♂ in the British Museum (Natural History). I have examined the type which is in good condition.

*Trypeta melaleuca* Walker, 1864, *Proc. Linn. Soc. Lond.* 7: 238. Type-locality: Ceram.

*Trypeta sexincisa* Thomson, 1868, *K. Sven. Freg. Eug. Resa, Zool.*, 579. Type-locality: China.

*Trypeta formosana* Enderlein, 1911, *Zool. Jahrb. (Syst.)* 31 (3): 427. Type-locality: Akau, Formosa.



*Sphenisomyia sexmaculata* Bezzi (nec Macquart), 1913, *Mem. Ind. Mus.* 3: 148. Also other authors.  
*Sphaeniscus sexmaculatus atilius*: Hardy, 1955, *Pacif. Sci.* 9(1): 78.

Hosts: These flies infest the flowerheads of an assortment of species of Labiatae and Compositae.

Distribution: Widespread over the Oriental and Pacific Regions.

This has previously been treated as a subspecies of the African *sexmaculatus* but I am now following Munro (1938: 36) in treating it as a distinct species. Munro differentiates these by the following characteristics: "hind tibiae yellow, dorsum of thorax more

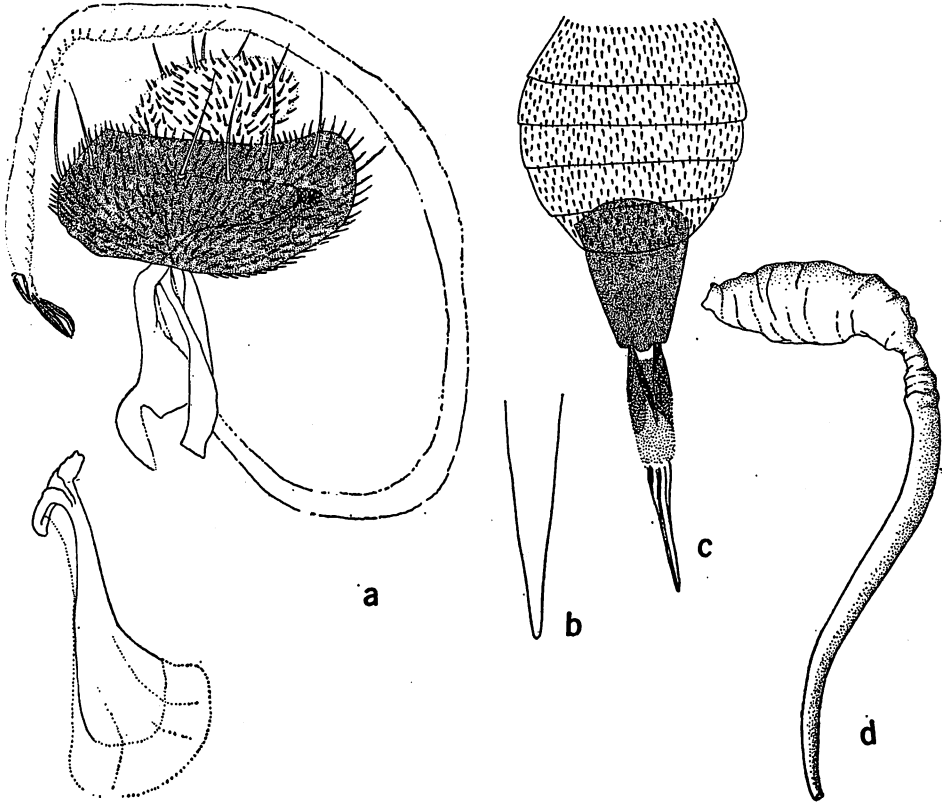


Fig. 52. *Sphaeniscus atilius* (Walker). a. ♂ genitalia; b. apex of piercer; c. ♀ abdomen; d. ♀ spermatheca.

strongly yellow-dusted and the first hyaline indentation from base of wing narrower... *atilius* (Walker). Hind tibiae black, only yellow distally, dorsum of thorax thinly dusted, showing as a rule three bare stripes, first hyaline indentation broader.....*sexmaculata* Macquart."

The species is easily differentiated from all other known fruitflies from Southeast Asia by having the wing predominantly dark brown with the base hyaline, 1 hyaline wedge on anterior margin in middle of wing and 4 hyaline wedges on posterior margin of wing (pl. 4, fig. 32). Vein  $R_{4+5}$  is bare and the r-m crossvein is situated about its own

length from the m crossvein. The ♂ genitalia are as in fig. 52a. The surstylus is broad, equal in width to the epandrium and completely hides the 10th sternum as seen in lateral view. The aedeagus is only slightly expanded at apex. Fifth sternum of ♂ as wide as long with hind margin straight. Sixth tergum of ♀ distinctly shorter than 5th and basal segment of ovipositor approximately equal in length to terga 5+6, as seen from direct dorsal view. Basal segment of ovipositor 0.7 mm long. Piercer thickened at base, sharply tapered to apex (fig. 52b), approximately 0.5 mm long. Extended ovipositor (fig. 52c), 1.8 mm. The spermathecae are weakly sclerotized, very difficult to see except under high power; 2 are present, these are elongate, slender as in fig. 52d.

Three specimens on hand from CAMBODIA: Kiri Rom, 700 m, 31.III-7.IV.1961, N. R. Spencer. Two from LAOS: Borikhane Prov., Paksane, 3.XII.1965, native collector; Nogtevada, 7.XII.1965, native collector.

This species should be common in flowerheads of Compositae throughout Southeast Asia.

**Sphaeniscus quadrincisus** (Wiedemann) Fig. 53a-c; pl. 4, fig. 37.

*Trypeta quadrincisa* Wiedemann, 1824, *Anal. Ent.*, p. 55. Type-locality: "Ost Indien." Type in the Universitetets Zoologiske Museum, Copenhagen.

*Trypeta tucia* Walker, 1849, *List Spec. Dipt. Ins. Coll. Brit. Mus.* 4: 1021. Type-locality: Bengal, India. Type ♀ in the British Museum (Natural History).

*Euxesta? parvula* van der Wulp, 1897, *Termesz. Füzet.* 20: 141, pl. 3, fig. 2. Type-locality: Ceylon.

This species is widespread throughout Southeast Asia. It has been adequately described by Bezzi (1913: 147, pl. 10, fig. 52).

*S. quadrincisus* is very close to *filiolus* (Loew) from southern Europe and Africa, but the hyaline basal mark on the wing is not as extensive, extending only over about 2/5 of the 2nd costal cell rather than over the entire cell, etc. Hendel (1927: 106) gives the characteristics for separating these 2 species.

This species is readily differentiated from other *Sphaeniscus* from Southeast Asia by having only 3 hyaline wedges extending across the wing from the hind margin (pl. 4, fig. 37). The genitalia of both sexes are as in fig. 53a and 53b-c.

Three specimens are on hand from the following localities in THAILAND: Bangkok, VII-VIII.1963; Prachuabkarikhan, 16.VII.1963, also 1 from S VIETNAM: M'Drak, E. of Ban Me Thuot, 4-600 m, 8-19.XII.1960, C. M. Yoshimoto.

Tribe ADRAMINI

This group has previously been treated as a tribe under Dacinae because of the reduced chaetotaxy of the head and thorax: lacking sternopleural, dorsocentral, presutural, ocellar, postocellar and usually humeral bristles. Also by having the postocular setae small, inconspicuous. The characteristics of the wings, the general facies of the body, presence of 3 spermathecae in the ♀, and presence of erect fine hairs over pleuroterga in some genera would indicate close relationship to *Euphranta* Loew and related genera (Euphrantini) and I feel it is much more logical to treat this as a tribe under Trypetinae, differentiated from other tribes by the reduced chaetotaxy.

The biology and habits of Adramini are unknown. These are predominantly Oriental and Australasian flies. Five genera are recognized from the area being studied.

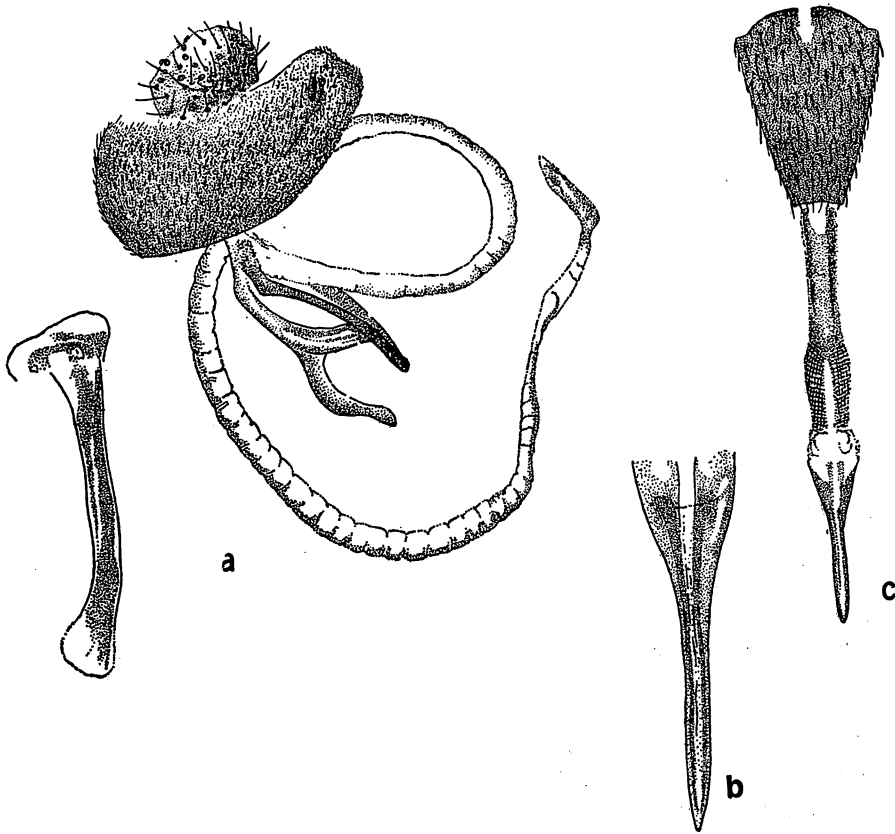


Fig. 53. *S. quadrincisus* (Wiedemann). a. ♂ genitalia; b. apex of piercer; c. ovipositor.

#### Genus *Adrama* Walker

*Adrama* Walker, 1859, *J. Proc. Linn. Soc. Lond.* 3: 117. Type-species: *selecta* Walker, by monotypy. (*Enicoptera rufiventris* Walker, 1861, and *Psila cruciata* Walker, 1865 are synonyms).

This genus is differentiated from other Adramini which have the pleuroterga haired and at least the middle and hind femora with stout ventral spines, by having the subcostal cell short, usually less than  $1/2$  as long as 2nd costal cell; by having short black setae extending along radial vein almost to its base; arista plumose; antenna much shorter than face; cubital cell distinctly lobate; apex of wing beyond m crossvein brown; with a brown mark extending over r-m crossvein to the costa; and lower median portion of front slightly gibbose. Humeral and sternopleural bristles lacking. Scutellum usually with 4 bristles, rarely with only the apical bristles present. The basal segment of the ♀ ovipositor is well developed, rather elongate, cylindrical, tapered to apex. Three oblong spermathecae are present (except in *Ichneumonopsis*, n. gen.)

A key to all of the known species of *Adrama* will be presented in a study of the tribe Adramini. Three species occur in the area being treated.

***Adrama apicalis* Shiraki**

*Adrama apicalis* Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imper. Univ.* **8**: 44, text-fig. 15, pl. 1, fig. 2. Type-locality: Koshun, Formosa. Type in the Entomological Museum, Taiwan University, Taipei.

This species has been recorded from Formosa, Burma and N. India.

Three specimens on hand from Laos, 1 ♂, 2 ♀♀, in rather poor condition appear to belong here; they fit all of the characteristics of Shiraki's description and compare with a specimen I have examined from the Hering collection in the British Museum (Natural History) from Sikkim, northern India. The species is very similar in appearance to *A. determinata* (Walker) but differs by having the brown transverse band which extends from the wing margin in middle of cell  $R_1$  over the r-m crossvein ending at vein  $M_{1+2}$ , not extending into cell  $M_2$ . Also terga 4 and 5 are shining black. The original description by Shiraki is very adequate.

The specimens on hand are from LAOS: Vientiane Prov. Ban Van Eue, 15.III.1966, Malaise trap, native collector.

***Adrama determinata* (Walker)** Fig. 54a-c; pl. 4, fig. 33.

*Dacus determinatus* Walker, 1857, *J. Proc. Linn. Soc. Lond.* **1**: 133. Type-locality: Sarawak, Borneo. Type ♂ (poor condition) in the British Museum (Natural History).

*Adrama austeni* Hendel, 1912, *Wien. Ent. Ztg.* **33**: 12. Type-locality: Ceylon. Type ♂ in the British Museum (Natural History).

This species has been recorded from Borneo, Java, Philippines, Malaya, Thailand, Burma, Ceylon and India.

It belongs in a complex of *Adrama* which have a black spot on lower median portion of face; a black spot on lower median front; mesonotum predominantly black; scutellum black over disc, yellow on sides; and pleura with glossy black markings on mesopleura and sternopleura and over metapleura and hypopleura. It differs by having the brown band from wing margin at level with r-m crossvein extending into the middle of cell 1st  $M_2$ . Also, by having the 1st tergum of abdomen and base of 2nd entirely black, except for narrow yellow lateral margins and by having a median black vitta extending the full length of 2nd tergum. The ♀ ovipositor is peculiar in shape (fig. 54a).

Wings markings are as in pl. 4, fig. 33. Vein  $R_{2+3}$  straight or nearly so and ending almost opposite m crossvein so that the 5th costal section is almost as long as 4th. ♂ genitalia as in fig. 54c. The species will be described in detail and figured in a monograph on the Philippine species which is being prepared.

Specimens are on hand from THAILAND: Trang Prov., Khaochang, Khaophappa, 200-400 m, 11.I.1964, G. A. Samuelson; Patani Prov., Biserat, 24.X.1901, H. C. Robinson & N. Annandale. LAOS: trail to Ban Ky Sok, 30 km N Muong Vang Vieng, 700 m, II.1968, F. G. Howarth; Ban Van Heue, 20 km E of Phou-Kow Kuei (Phou Khao Khouai), 1-15.V.1965, Malaise trap, J. A. Rondon. W MALAYSIA: Selangor, 12.VIII.1963, collected on *Eugenia malaccensis*, R. Kawasaki. SINGAPORE: III.1907, F. Muir. I have previously recorded this from Thailand (Hardy 1959: 168).

Seven specimens on hand collected 15 km SE of Bang Phra, Chotburi Prov., Thailand, 6.III.1968, D. E. Hardy & M. Delfinado appear to fit *determinata* but they differ from the specimens on hand from Malaya and Java by having the entire upper median

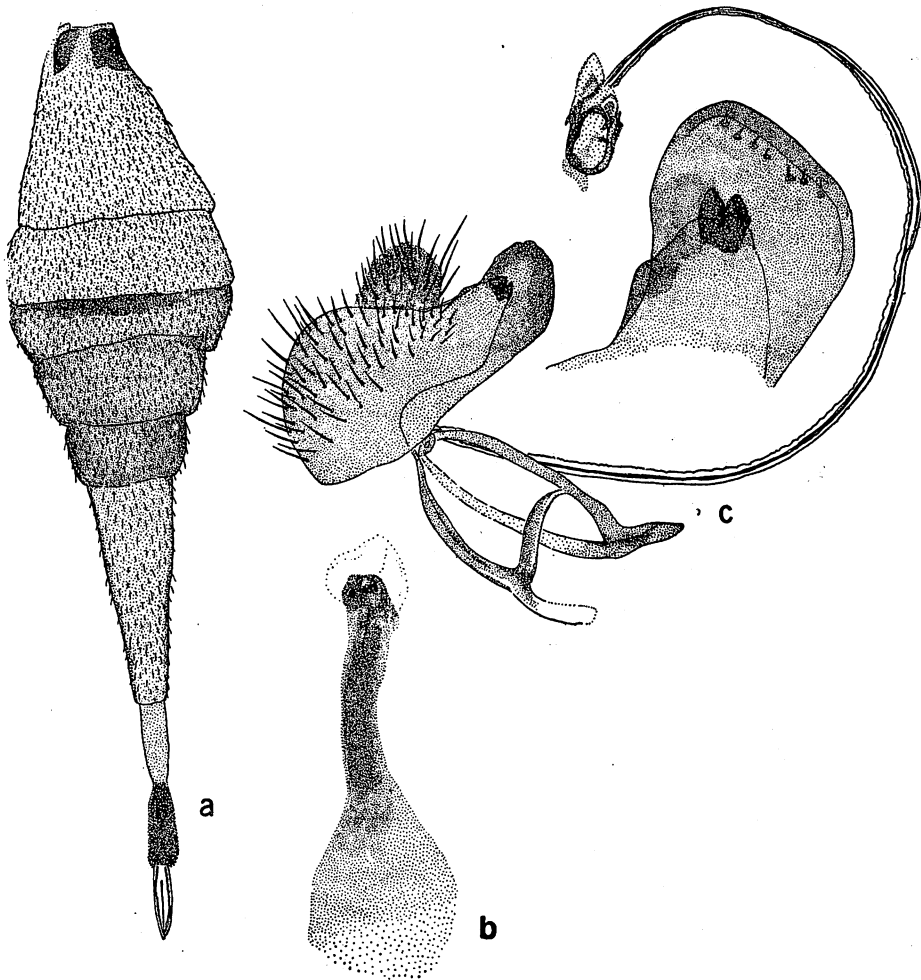


Fig. 54. *Adrama determinata* (Walker). a. ♀ abdomen; b. ♂ ejaculatory apodeme; c. ♂ genitalia.

portion of occiput polished black and with a continuous black streak on each side of upper front over area occupied by superior fronto-orbital bristles. In the specimens from other areas the upper portion of occiput has a rather small dark brown to black spot immediately behind ocellar triangle occupying only about  $1/2$  the area between inner vertical bristles. Also, in the specimens from Thailand, terga 4 and 5 are black and in the ♀ the 6th tergum is black on the sides. In specimens from other areas, terga 4-6 are rufous. The shape of the yellow mark on the mesopleuron also appears distinctive in the specimens from Thailand. The black marking extends along the anepisternal suture for a considerable distance, about  $2/5$  the length of that suture, so the yellow marking is distinctly angulate on its anterior margin. In other specimens of *determinata*, the anterior margin of the yellow mark is gently curved and extends in

front of the suture almost to its base. These may possibly be distinct species.

**Adrama nigrifrons** Hardy, new species      Fig. 55a-c.

By having only 2 scutellar bristles, this species would fit near *biseta* Malloch from North Queensland. It is readily differentiated from *biseta* by the large velvety black spot in middle of front; by having polished black markings on the pleura; the mesonotum predominantly black; the abdomen with the sterna entirely black, the 1st, 4th and 5th terga in ♂ black and with the 1st, and 4th to 6th black in ♀. *A. biseta* differs by having the front, pleura and abdomen entirely rufous, also with the mesonotum predominantly rufous. I am appending a note below to clarify the status of *biseta*.

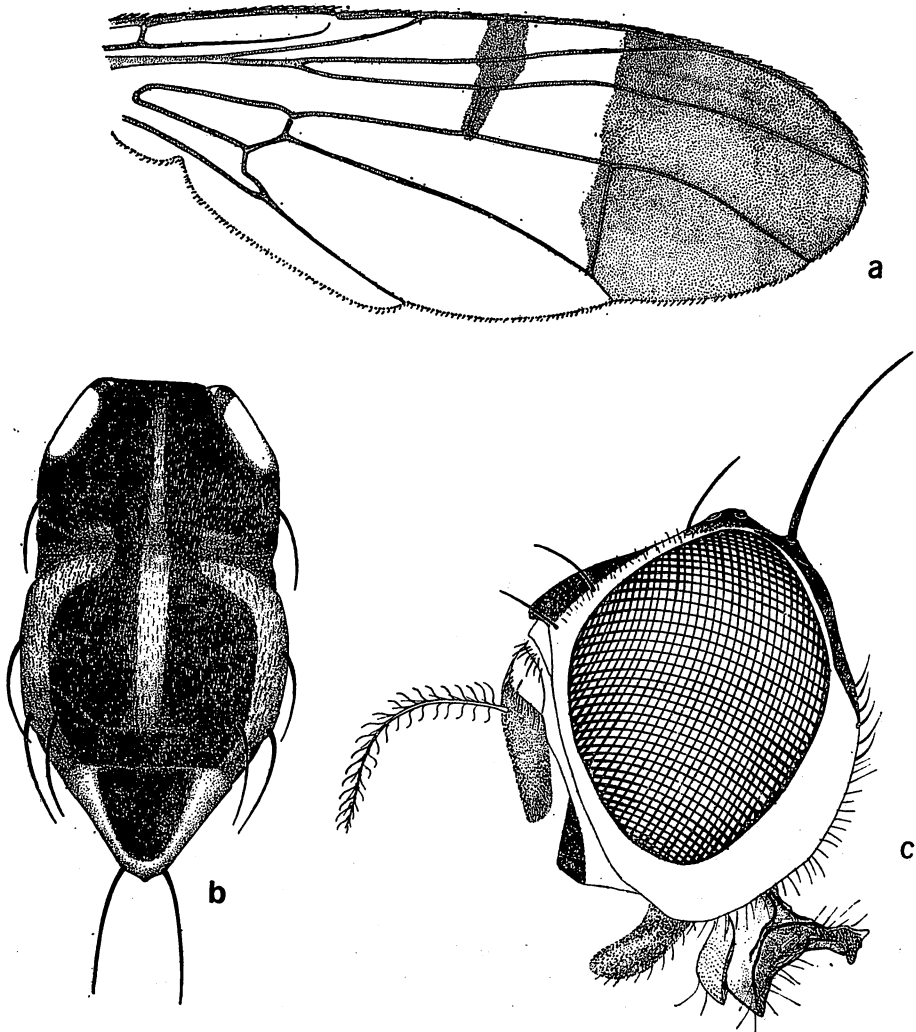


Fig. 55. *A. nigrifrons* n. sp. a. wing; b. thorax; c. head.

♂. *Head*: Almost as wide as high, with the occiput slightly swollen, at broadest point nearly 1/2 the width of eye. Face gently concave. Front distinctly gibbose in anteromedian portion (fig. 55c), this portion occupied by a large velvety spot. Front otherwise yellow except for a brown discoloration from median ocellus leading to the black velvety spot, and except for a polished black mark on each side from vertex to superior fronto-orbital bristle. Vertex, ocellar triangle and upper median portion of occiput polished black, occiput otherwise yellow. Genae and face pale yellow except for a large shining black spot on lower median margin of face. Two inferior fronto-orbitals and 1 superior fronto-orbital as shown in fig. 55c. Third antennal segment yellow, tinged faintly with brown and nearly 4 × longer than wide. Arista plumose. Palpus yellow, 4 × longer than wide, rather thickly short setose around margin. *Thorax*: Largely yellow on sides, polished black on dorsum and densely covered with short yellow setae. Anteroventral margins of sternopleura, also the mesosterna, pteropleura, hypopleura and metasterna polished black; the latter densely covered with gray pubescence. Pleuroterga and postscutellum black, covered with gray pubescence. Metanotum polished black, gray pubescent on sides. Scutellum yellow on venter and margins with a large black triangular-shaped mark on disc. Only apical scutellar bristles developed. Humeri yellow except for a black mark along anterior margins. Mesonotum black with the following yellow marks: a narrow median vitta extending the entire length, a mark from each suture extending along lateral margins to base of scutellum (fig. 55b). *Legs*: Largely yellow, with brown to black markings on hind trochanter and coxae and with a brown streak along anteromedian and posteromedian portions of hind femora. The front tibiae and tarsi are dark brown except for narrow yellow bases of the former, and the hind tibiae are tinged with brown through median portions. The middle tibia has 1 long apical spur, this is at least 1/2 as long as basitarsus. Front femur with 1 prominent posteroventral spine at apical 3/4. Middle femur with 6 or 7 anteroventral and 6 or 7 posteroventral spines on about apical 1/2 of segment and hind femur with 1 or 2 anteroventral and 3 posteroventral spines at apical 1/4 of segment. *Wings*: As in fig. 55a. With the brown mark from costa at level with r-m crossvein ending at vein  $M_{1+2}$ . Vein  $R_{4+5}$  setose to just slightly beyond r-m. *Abdomen*: Rufous on lateral margins of the 1st tergum, over all of terga 2-4, otherwise polished black except for the conjunctiva; rather densely covered with short dark-colored setae. The genitalia have not been relaxed for study. The epandrium and anal plates are yellow. The epandrium is obviously well developed.

Length: Body, 9.25 mm; wings, 7.8 mm.

♀. Fitting description of ♂ except that the median yellow vitta on mesonotum ends slightly anterior to suture. Abdominal terga 4-6 are black, except for a very narrow rim of rufous and a small basal median mark on 4th tergum. Sixth tergum about 3/4 as long as 5th. Ovipositor base rufous approximately equal in length to terga 4-5 and 1.75 mm long as seen from direct dorsal view. The base is tubular, tapered. The piercer has not been studied.

Length: Body, 7.3 mm; wings, 7.0 mm.

Holotype ♂ (BISHOP 9958) and allotype ♀ collected in copula, LAOS: Sedone Prov., Muong Paksong, 39 km E of Pakse, 980 m, 7.IX.1967, in secondary woods, F. G. Howarth. Paratype ♂, S VIETNAM: Fyan, 1200 m, 11.VII-9.VIII.1961, N. R. Spencer.

Type in the B. P. Bishop Museum. Allotype in the collection of the University of Hawaii. Paratype in the B. P. Bishop Museum.

Notes on *Adrama biseta* Malloch (1939, *Proc. Linn. Soc. N. S. Wales* 44(3-4): 332, fig. 1). Described from 1 ♂, Cairns, N. Queensland. Type in the School of Public Health and Tropical Medicine, University of Sydney.

Malloch characterized this species by having only 2 scutellar bristles. The original description states that the mesonotum has "two broad, black shiny vittae that are interrupted or almost so at the suture" and with "an entire yellow central vitta," also the

metanotum is shining black. I have studied a series of 34 specimens from Claudie R. near Mt Lamond, N. Queensland, 29.V-5.VI.1966, D. K. McAlpine, from the Australian Museum collection, which have only 2 scutellars and which because of their predominantly rufous thorax were thought to represent a new species. After studying the series in detail it became obvious that this is *biseta*, that the coloration of the thorax is probably variable in this species, and that Malloch's type may be an atypical (dark) specimen. In the series studied, 1 ♂ fits Malloch's description, except for a tinge of rufous in the ground color of the metanotum. Another ♂ fits it rather closely, except that the mesonotum is entirely reddish black except for the yellow-white postsutural median mark; the median portion is not pale beyond this mark. Others in the series have black or brown markings behind the suture at sides of median yellow-white mark; some have just a small spot of black on each side of posterior margin and the majority of the specimens have the mesonotum entirely rufous except for the median yellow-white vitta. The metanotum varies from predominantly black to predominantly rufous. Malloch's description is otherwise adequate. It should be noted, however, that his figure shows the apical 1/4 of the wing as being uniformly brown; actually the apical portions of cells  $R_5$  and 2nd  $M_2$  are subhyaline. The presence of black setae at apex of 5th tergum of ♂, which Malloch cites as a specific character, is of questionable value since almost all species of *Adrama* have this.

#### Genus *Adramoides* Hardy, new genus

Resembling *Adrama* Walker but immediately differentiated by having humeral bristles; the pleuroterga bare; cubital cell extending rather near hind margin of wing but not lobate at apex, shaped as in pl. 4, fig. 38; as well as by other differences. Only the middle femora have ventral spines. In Hering's key to the Adramini (1941d: 4), this would run imperfectly near *Pseudosophira* Malloch; although the middle femora do have short ventral spines, the wing venation, markings, head bristle, and other details differ.

*Adramoides* differs from *Pseudosophira* by having 2 pairs of inferior fronto-orbital bristles, rather than only 1; by having the outer vertical bristles present, rather than lacking; by having humeral bristles, rather than lacking; by lacking the long hair-like inner scapular bristles which are characteristic of *Pseudosophira*; by having 2 rows of stout, black ventral spines on middle femora; vein  $R_{2+3}$  straight, rather than undulated. It is similar to *Pseudosophira* in having the cubital cell not lobate.

I am treating this name as feminine based upon the gender of *Adrama*. The gender of the derivative -*oides* is determined by that of the governing noun.

Type of genus: *A. picta*, n. sp.

***Adramoides picta* Hardy, new species** Fig. 56a-e; pl. 4, fig. 38.

Differentiated by the generic characters given above.

♂. A predominantly yellow, conspicuously marked species. *Head*: Pale yellow with a prominent polished black triangular spot on lower median portion of face extending from oral margin about 3/5 to 2/3 length of face. Also with a small brown to black median spot on lower edge of front just above lunule. Slightly higher than long, the occiput gently swollen, at its widest point about 2/5 the width of eye. Face very slightly concave as seen in direct lateral view. Front



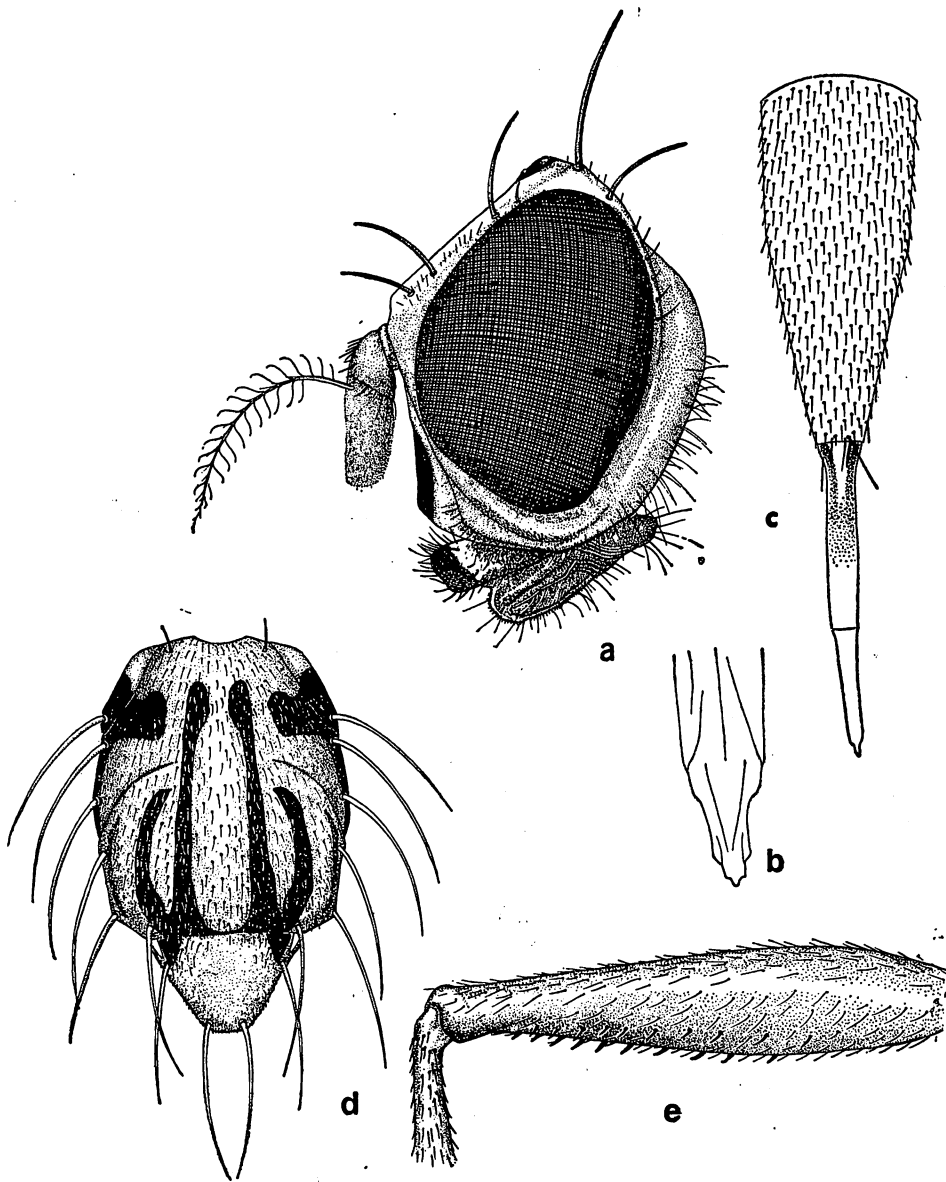


Fig. 56. *Adramoides picta* n. sp. a. head; b. apex of piercer; c. ovipositor; d. thorax; e. middle femur.

sloping gradually, with antennae situated near upper  $2/5$  of head height. Genae rather narrow, the width is less than  $1/5$  the eye height (fig. 56a). Front rather narrow, measured from lower ocellus to the lunule about  $2/3$  longer than wide. Two pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals, the upper superior fronto-orbitals small, rather hair-like and pale yellow in color. Other head bristles yellow-brown. Genal bristle lacking, not differentiable from the

fine hair on genae. Antennae pale yellow, 3rd segment about  $3\times$  longer than wide and rounded at apex. Arista plumose, the longest rays are  $3/4$  to  $4/5$  the width of 3rd segment. Palpi nearly  $4\times$  longer than wide, black and rather thickly setose at apices. Labella yellow, densely haired. *Thorax*: Pale yellow except for the following polished black markings: the hind portion of each humerus, extending ventrally over upper edge of the pleuron immediately in front of mesothoracic spiracle and extending dorsally as a rounded spot on anterolateral portions of mesonotum, and also extending posteriorly as a thin line along each lateral margin of mesonotum; mesonotum with a pair of submedian vittae extending from about opposite humeral bristles to posterior margin, each expanding laterally and connected with a short vitta which extends anteriorly to about opposite posterior notopleural bristles, in line with outer scapulars (fig. 56d). Also scutellum with a black basal spot on each side; metapleura, pleuroterga, metanotum and postscutellum entirely polished black and bare except for a patch of pubescence on lower edge of each metapleuron. Thorax subshining, very lightly pollinose and thickly yellow setose. Halteres pale yellow. *Legs*: Yellow, except for a brown posterior spot on each front femur near apical  $2/3$ . A dark brown streak extends along posterior surface of front tibia from apex almost to base and with basal  $1/3$  to  $1/2$  of each hind tibia tinged with brown. Middle tibia with 1 strong apical spur. Middle femur with 9-12 short, black spines extending down each anteroventral and posteroventral surface from about basal  $1/3$  to near apex of segment (fig. 56e). *Wings*: Basal  $2/3$  hyaline except for a small brown mark over r-m crossvein, apical portion brown (pl. 4, fig. 38) except for the yellow or faintly tinged with brown subcostal cell and a small brown mark over r-m crossvein. Subcostal cell short, less than  $1/2$  as long as 2nd costal. Basal cells bare, devoid of microtrichia. Vein  $R_{2+3}$  straight. The r-m crossvein situated near apical  $2/3$  of cell 1st  $M_2$ . The portion of vein  $Cu_1$  before joining with 1st A is oblique so that the lower apex of cubital cell is pointed but not lobate. Vein  $Cu + 1st A$  is short, equal or slightly shorter than the section of vein  $Cu_1$  closing off cubital cell (pl. 4, fig. 38). Vein  $R_{4+5}$  setose almost to its apex. *Abdomen*: Largely shining black with a broad rufous band extending the entire length down median portion; this is narrowed over 5th tergum, also the extreme lateral margins of 5th and 4th terga are rufous. The genitalia have not been relaxed for study. The visible portions are black, covered with yellow setae. The abdomen is densely yellow setose.

Length: Body, 6.0 mm; wings, 5.0 mm.

♀. Fitting the description of the ♂ except for a faint marking of yellow-brown in cell  $R_1$  above r-m crossvein (pl. 4, fig. 38), and except that the 1st and 6th terga are entirely yellow to rufous and the broad median band is straight-sided over entire length of dorsum. The sterna are entirely yellow. Three semicircular, mushroom-shaped spermathecae are present. Sixth tergum approximately  $2/3$  as long as 5th. Base of ovipositor polished black, equal in length to abdominal segments 3-5, approximately 1.6 mm long as seen directly from above and evenly tapered from base to apex (fig. 56c). Piercer long and slender, sharply pointed (fig. 56b).

Length: Body, excluding ovipositor, 5.4 mm; wings, 5.0 mm.

Holotype ♂ (BISHOP 9959), THAILAND: Songkhla Prov., Hat Yai, 21.VII.1963, collected on *Eugenia malaccensis*, R. Kawasaki. Allotype ♀, Thailand: Lana, Suan, 17.VII.1963, R. Kawasaki. Two ♀ paratypes, 1 same data as allotype and 1 from Thailand: Thap Sakae, 15.VI.1963, R. Kawasaki.

Type deposited in B. P. Bishop Mussum, allotype in the University of Hawaii collection, paratypes in the collections of the U.S. National Museum, the B. P. Bishop Museum and the National Institute of Agricultural Sciences, Tokyo.

#### Genus *Heterosophira* Hardy, new genus

This genus belongs in the tribe Adramini and fits nearest to *Adramoides*, new genus, but differs by having the femora slender, lacking ventral spines; by the cubital

cell being distinctly lobate at apex, rather than lacking an apical lobe (fig. 57a); by having only 1 pair of inferior fronto-orbital bristles; and by having the prescutellar and inner scapular bristles well developed. Also the details of the wing markings and venation are distinctive as shown in fig. 57a. In Hering's key to the genera of Adramini (1941d: 4), it would run to *Pseudosophira* Malloch but this is not correctly placed in Hering's key. He treats it as having humeral bristles; actually these are lacking in *Pseudosophira* and this genus would run to *Cyclopsia* Malloch in Hering's key. These 2 are not related; *Cyclopsia* has the pleuroterga haired and differs in many other respects.

Type of genus: *H. decora*, n. sp.

***Heterosophira decora* Hardy, new species** Fig. 57a-c.

This species is differentiated from other known Adramini by the characters given above, also the wing markings are distinctive, as in fig. 57a.

♀. *Head*: Slightly higher than long with the occiput distinctly swollen below and at its broadest point almost 1/2 as wide as eye. Eyes oval, slightly higher than long. Face very gently concave as seen from direct lateral view with the epistomal margin slightly protruding (fig. 57c). Head yellow except for a black transverse mark on each side across upper median portion of occiput, the black ocellar triangle, and a streak of brown extending down middle of front. Measured from median ocellus to anterior median margin the front is about 1/3 longer than wide. One pair of strong inferior fronto-orbital bristles present and 1 strong pair of superior fronto-orbitals, the latter located near middle of front. Also with a hair-like seta located about 3/5 the distance between inner vertical bristle and the strong superior fronto-orbital; this evidently represents an upper superior fronto-orbital. It is scarcely larger than the scattered setae along eye margins. Face silvery pollinose; this is especially distinct on sides and also on genae below eye margins. Antennae entirely yellow, 3rd segment about 2.5× longer than wide broadly rounded at apex and arista long plumose. Palpi dark reddish brown, rather sparsely setose. *Thorax*: With 4 polished black vittae extending entire length of mesonotum, these are joined along posterior margin of mesonotum and each pair is joined on the anterior margin on each side above humerus. Humerus yellow; notopleural callus yellow-white above, dark brown below. Each mesopleuron with a polished black band extending from spiracle across mesopleuron, all of propleuron, and most of middle portion of mesopleuron. All of propleuron, and most of sternopleuron pale yellow. Metapleura, pteropleura, hypopleura, pleuroterga, metanotum and postscutellum polished black. Halteres yellow, scutellum with 4 strong bristles and with scattered yellow setae over disc. *Legs*: Yellow except for basal 1/2 to 2/3 of hind tibiae. Middle tibia with 1 strong apical spur. Femora slender, lacking bristles or spines. *Wings*: With venation as in fig. 57a. Vein R<sub>4+5</sub> setose to a level slightly beyond m crossvein. *Abdomen*: Predominantly polished black with median yellow vitta extending from apex of 6th tergum to base of 3rd tergum. Sixth tergum short, as seen from dorsal view scarcely over 1/4 as long as 5th. Basal segment of ovipositor yellow, tinged faintly with brown at its apex. Measured on venter the basal segment is 1.5 mm in length. The piercer has not been extruded for study. It is partially extended and appears to be 1.0 mm in length, gradually tapered, subacute at apex with 2 preapical yellow setae (fig. 57b).

Length: Body and wings, 6.0 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9960), THAILAND: Trang Prov., Khaochang, Khaophappa, 200-400 m, 11.I.1964, in light trap, G. A. Samuelson.

Type returned to the B. P. Bishop Museum.

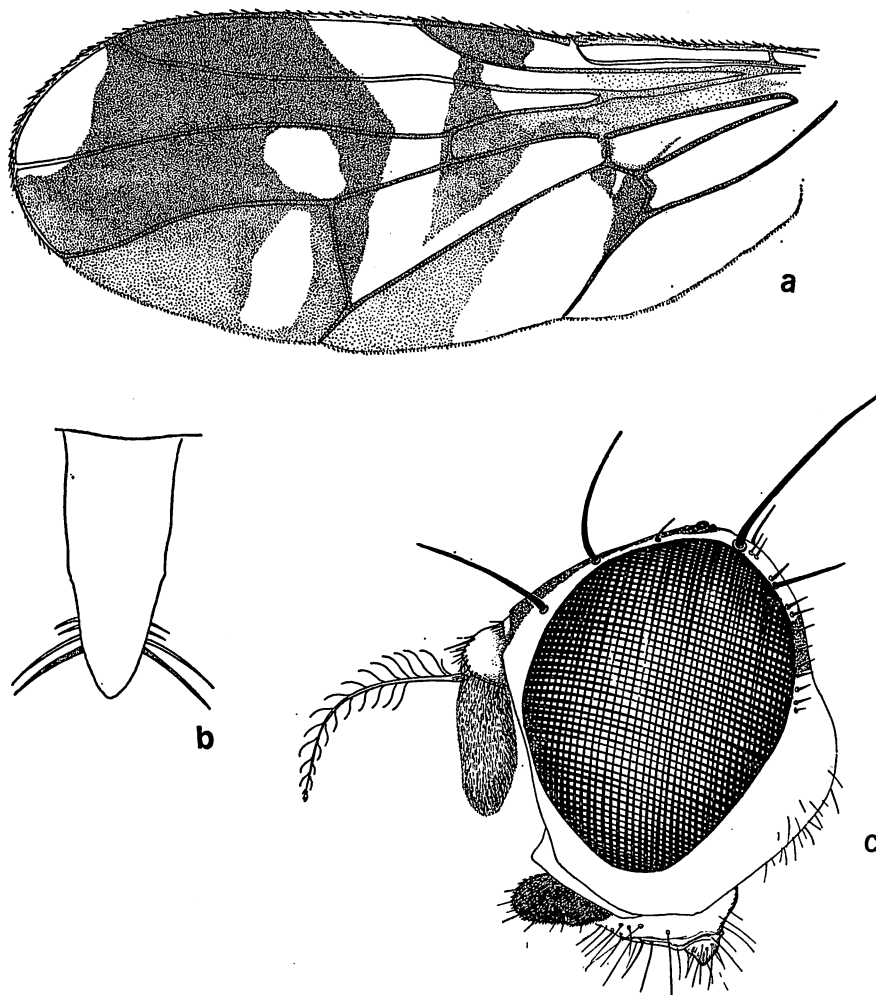


Fig. 57. *Heterosophira decora* n. sp. a. wing; b. apex of piercer; c. head.

#### Genus *Ichneumonopsis* Hardy, new genus

Fitting in Adramini because of the reduction of head and thoracic bristles. Because of the presence of 2 scutellar bristles, and the body and wing coloration and shape, it resembles the genera *Ichneumonosoma* de Meijere and *Soita* Walker. It differs from these by having the pleuroterga bare; front femora with strong ventral spines; humeral, dorsocentral, etc. bristles lacking and no inferior fronto-orbital bristles; also by the elongate antennae and different head shape (fig. 58a-b). These actually belong in different subfamilies and the resemblance is only superficial. In Hering's key to Adramini (1941d: 4) it runs near *Meracanthomyia* Hendel because of the elongate antennae, spinose femora, and the presence of only 2 scutellar bristles. It differs from *Meracanthomyia* by having the head higher than long, with the face elongate, equal in length to the eye

and equal in length to 3rd antennal segment (fig. 58a), rather than head equal or longer than high, with face about  $1/3$  as long as eye height and 3rd antennal segment 2 to  $3\times$  longer than face (fig. 58a); by having no inferior fronto-orbital bristles and only 1 superior fronto-orbital, rather than 3 inferior fronto-orbitals; by having only front femora spinose ventrally, rather than all femora; by the scutellar bristles being situated on sides, not at apex; and 3rd costal section subapical to 2nd and cell Cu long lobate, rather than 3rd costal section being very short and lobe of cubital cell not over  $1/4$  as long as vein  $Cu_1+1st\ A$  (fig. 58d). Two small round spermathecae present in ♀.

Type-species: *I. burmensis*, n. sp.

***Ichneumonopsis burmensis* Hardy, new species** Fig. 58a-e.

Differing from other known Tephritidae by the generic characters given above.

♂. *Head*: Distinctly higher than long with face vertical and very elongate, equal or longer than compound eye and with front gently sloping so that the antennae are situated near upper  $1/4$  of head height (fig. 58a). Occiput moderately swollen, at its widest point  $2/3$  to  $3/4$  the width of compound eye. Head yellow except for the reddish brown eyes, a streak of brown extending vertically through middle of occiput on each side, an elongate brown spot on each gena, a brown

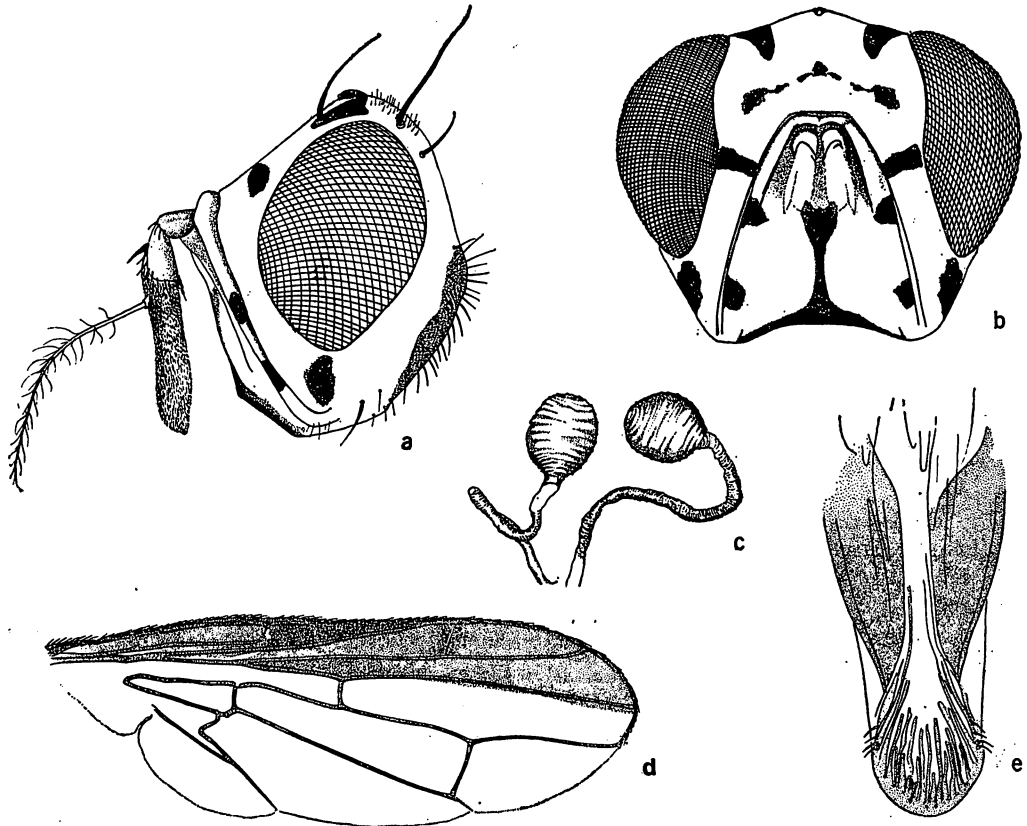


Fig. 58. *Ichneumonopsis burmensis* n. sp. a. head; b. head, front view; c. ♀ spermathecae; d. wing; e. apex of piercer.

to black streak down middle of face and with narrow epistomal markings brown to black. Two brown to black spots on each side of face by frontal suture and 1 spot on eye margin below antennae (fig. 58b), also with ocellar triangle and vertical plates polished black and front with 3 irregular reddish brown to black spots arranged transversely across lower 1/4. Front broad, wider than long and slightly wider than eye. Only 1 frontal bristle; this is a superior fronto-orbital, and is situated near lower portion of each frontal plate. Ocellars and postocellars absent, inner vertical bristles moderately developed, outer verticals small. Genal bristle present. Genae broad, 2/5 to 1/2 the eye height. First 2 antennal segments yellow, 3rd segment brown, tinged with black and elongate, 3rd segment equal in length to face but extending well beyond oral margin (fig. 58a). Palpi and mouthparts yellow, no prominent bristles on palpi. *Thorax*: Predominantly yellow with 3 brown vittae on mesonotum, the lateral pair extending from behind humeri to posterior margin, with slight interruption at suture and joined on hind margin into a narrow brown band extending across mesonotum. Median vitta narrow, extending from anterior margin to about opposite supraalar bristles. Pleura with 5 irregular, vertical, brown marks extending over propleura, anterior portion of mesopleura, posterior margin of mesopleura, over hypopleura and over metasternum. Postscutellum black; metanotum brown on sides; thorax otherwise yellow. Sides of metanotum, notopleural area above humeri, basal lateral margins of scutellum, also around wing base and along the sutures of the pleura colored magenta. Halteres yellow, tinged with brown on their knobs. Following bristles present: 4 scapulars, 2 notopleurals, 1 supraalar, 1 postalar, 2 scutellars, 2 mesopleurals. *Legs*: Predominantly yellow, tinged with brown on tibiae, hind femora and on apicoventral 1/3 of middle femora. Middle tibia with 1 strong apical spur. Each front femur with 4 stout posteroventral spines beyond middle of segment. *Wings*: Predominantly subhyaline, faintly tinged with yellow and with a distinct brownish yellow tinge along anterior margin extending through cell  $R_3$  into upper margin of cell  $R_5$ . Third costal section about 3/4 to 4/5 as long as 2nd section. Vein  $R_{1+3}$  almost straight and with a spurious crossvein extending almost to wing margin in about basal 1/3 of 4th costal section (fig. 58d) (note, drawn from a ♀ specimen). Crossvein r-m situated at about middle of cell 1st  $M_2$ , and lobe of cubital cell almost equal in length to vein  $Cu_1+1st A$ . Vein  $R_{4+5}$  setose to about level with m crossvein. *Abdomen*: Clavate, distinctly narrowed at base of 2nd segment and broadened posteriorly, widest at 5th segment. First tergum yellow, with a pair of brown submedian vittae extending almost entire length and meeting on posterior boarder. Second tergum with a brown mark beginning from base of segment and extending posteriorly in the form of a broad-armed Y, leaving lateral, posterior and posteromedian portions yellow. Third and 4th terga broadly brown at bases, yellow at apices. Fifth tergum yellow-brown, with a narrow yellow apex. The genitalia have not been dissected for study, the surstyli are very long and slender.

Length: Body, 11.0 mm; wings, 9.0 mm.

♀. Fitting description of ♂ except that the magenta markings on the thorax are not quite so distinct, also the lobe of cubital cell is shorter, about 2/3 as long as  $Cu_1+1st A$  (fig. 58d). The basal segment of ovipositor rufous, tinged faintly with brown, elongate, 1/3 longer than abdomen, measuring 6.2 mm. Piercer straight-sided, blunt at apex, 4.5 mm long (fig. 58e). Two small round spermathecae present.

Length: Body, not including ovipositor, 11.5 mm; wings, 10.8 mm.

Holotype ♂ and allotype ♀ from BURMA: Mt Victoria, Chin Hills, 1400 m, IV. 1938, G. Heinrich. Type and allotype returned to the British Museum (Natural History).

### Genus *Meracanthomyia* Hendel

*Meracanthomyia* Hendel, 1910, *Wien. Ent. Zeit.* 29: 107. Change of name for *Meracantha* Macquart, 1851, *Mem. Soc. Sci. Lille*, 1850: 285, pl. 26, fig. 9. Preoccupied by Kirby, 1837, in *Tenebrioni-*

dae. Type-species: *Meracantha maculipennis* Macquart, by monotypy.

This genus is differentiated from other Adramini by its elongate antennae (fig. 59a); by having the postantennal region (lunule) well developed; vein  $R_{4+5}$  bare; subcostal cell very short,  $1/3$  to  $1/4$  as long as 2nd costal; the transverse suture on mesonotum complete or nearly so, with lateral sutures connected by a distinct furrow; and with only 2 scutellar bristles. ♀ ovipositor flattened laterally, very distinctive from all other Tephritidae which I have studied. Three small round, minutely roughened spermathecae.

Five species have previously been recorded, 4 from the Orient and 1 from Africa. Four new species are on hand from Southeast Asia and India.

#### KEY TO KNOWN SPECIES OF MERACANTHOMYIA

1. Abdomen black and thorax with at least the pleura predominantly black and with black markings on anterior portion of mesonotum; front and face with black marks.....2  
Entirely yellow to rufous species. Africa. ....**antennata** Hendel
- 2 (1). Wings with brown markings only on apical  $1/4$ , excepting the brown stigma and sometimes faint tinge of brown at lower edge of r-m crossvein.....3  
Wings with a dark brown band along costal margin from apex of vein Sc to apex of vein  $R_{4+5}$  and with a brown spot over m crossvein. India. ...**maculipennis** (Macquart)
- 3 (2). Veins  $R_{4+5}$  and  $M_{1+2}$  approximately parallel,  $R_{2+3}$  gently curved upward. Fourth costal section (between tips of veins  $R_1$  and  $R_{2+3}$ ) approximately  $2 \times$  longer than 5th. Sixth costal section not longer than m crossvein. ....4  
Veins  $R_{4+5}$  and  $M_{1+2}$  divergent,  $M_{1+2}$  curves sharply downward and  $R_{2+3}$  curves sharply upward so that the 4th costal section is only  $1/2$  longer than 5th. Sixth section longer than m crossvein. Wing markings consisting of a narrow brown band along costa beyond apex of vein  $R_{2+3}$ , a broad transverse band across wing at level of m crossvein forking into another band extending to margin in upper apex of cell 2nd  $M_2$ . Ceylon. ....**gamma** Hendel
- 4 (3). Mesonotum and disc of scutellum largely shining black. ....5  
Mesonotum predominantly rufous, usually entirely rufous behind suture. Scutellum yellow. ....6
- 5 (4). Anterior supraalar bristles absent. Upper  $1/2$  of front velvety black, or yellow in ground color and densely silvery pubescent, especially in ♂♂. ....8  
Supraalars well developed. Front yellow except for postantennal region, almost bare of pile or pubescence. Apical  $1/2$  of femora brown to black. Apical portion of wing almost entirely brown beyond m crossvein (pl. 5, fig. 41). Burma. ....  
.....**nigrofemorata**, n.sp.
- 6 (4). Wing with a narrow band extending along margin from apex of vein  $R_{2+3}$  into upper portion of cell  $R_5$ , with cells  $R_3$  and  $R_4$  largely hyaline apically (fig. 63a). ♀ piercer large, spearhead-like and lacking serrations on ventral margin and with a tiny preapical indentation on dorsal edge (fig. 63b). Vietnam. ....  
.....**spenceri**, n.sp.  
Wings not marked as above (fig. 62a and pl. 4, fig. 40). Piercer not enlarged at apex, evenly tapered and with a prominent indentation on ventral edge (fig. 59c, 62d). ....7
- 7 (6). A hyaline spot present in apices of cells  $R_5$  and 2nd  $M_2$  (pl. 4, fig. 40). Mesonotum usually marked with black before suture. ♀ piercer with a prominent preapical notch on venter but lacking serrations on this edge (fig. 59c). India. ....  
.....**intermedia**, n.sp.

- Wing brown on m crossvein except for subhyaline apex of cell  $R_3$  (fig. 62a). Piercer with 3 minute preapical serrations on venter and with a less prominent notch (fig. 62d). Burma. .... **rufithorax**, n.sp.
- (8). Upper 1/2 of front velvety black. Femora yellow except for a black dorsoapical spot on hind pair. With a broad hyaline mark extending transversely through apices of cells  $R_3$  and  $R_5$  and with apex of cell 2nd  $M_2$  entirely hyaline. (Ref. Shiraki, 1933, pl. 1, fig. 1). Formosa. .... **arisana** Shiraki
- Front yellow in ground color, densely silvery pubescent, especially in ♂. Femora polished black except for yellow bases. Apex of wing largely brown (pl. 4, fig. 39). Arista moderately plumose (fig. 60a). India, Burma. .... **kotiensis** Kapoor

**Meracanthomyia intermedia** Hardy, new species      Fig. 59a-c; pl. 4, fig. 40.

Fitting near *spenceri*, n. sp. and *rufithorax*, n. sp. but differing by the wing markings (pl. 4, fig. 40) and by the shape of the ♀ piercer (fig. 59c).

♂. Fitting most of the details of *rufithorax*. In the type the mesonotum is predominantly

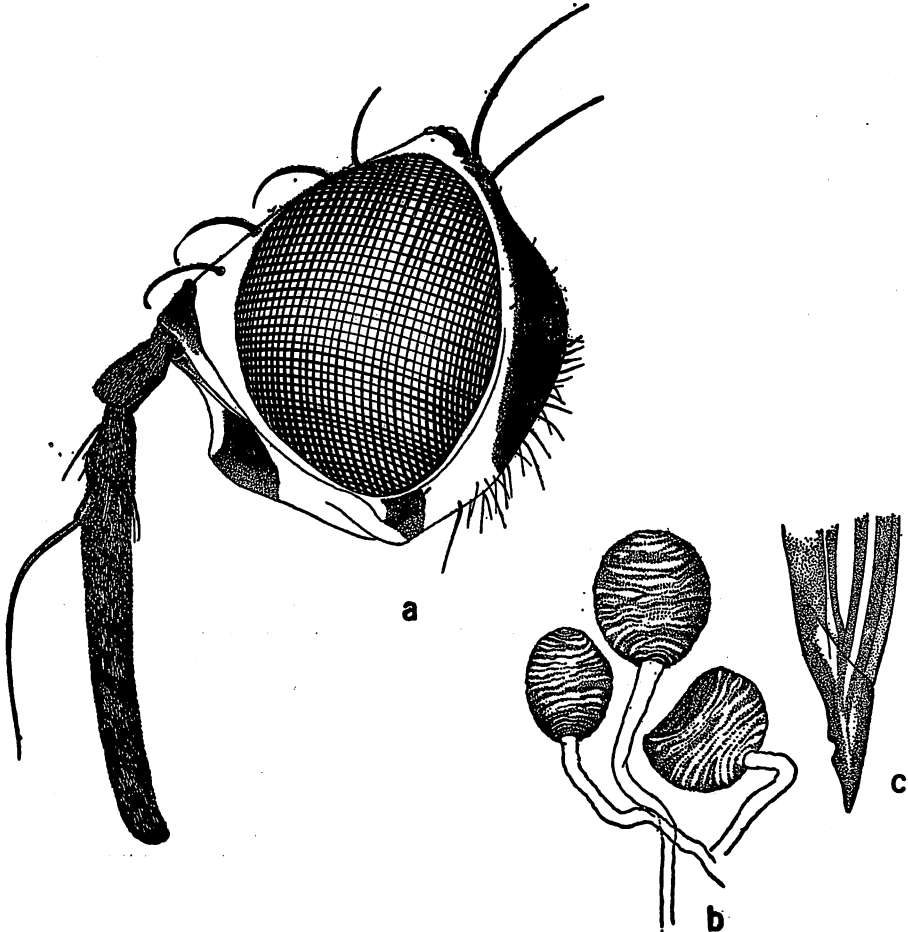


Fig. 59. *Meracanthomyia intermedia* n. sp. a. head; b. ♀ spermathecae; c. apex of piercer.



black with a prominent rufous vitta extending down median portion, with the suture and lateral margins of mesonotum behind suture broadly yellow and with other yellow markings as in *rufithorax*. *Head*: As in fig. 59a. With 3 pairs of widely spaced inferior fronto-orbitals and 1 pair of superior fronto-orbitals. *Legs*: Entirely yellow except for the brown bases of middle tibiae. Wings marked as in pl. 4, fig. 40, with a hyaline spot in each of apices of cells R<sub>3</sub> and 2nd M<sub>2</sub>. *Abdomen*: Entirely polished black, covered with pale setae and lightly gray pollinose on basal 1/2 to 2/3 of terga. The genitalia have not been relaxed for study.

Length: Body and wings, 7.2-7.5 mm.

♀. Fitting description of ♂ except that in 1 specimen the area behind suture is entirely rufous, very similar to *rufithorax* in this regard; in other specimens the area behind suture is discolored with black. Also the legs are entirely yellow. The piercer is shaped as in fig. 59c, the apical portion lacks the preapical serrations characteristic of *spenceri* and a much more prominent preapical notch is present (fig. 59c). The length of the basal segment of ovipositor, the inversion membrane and the piercer are approximately the same in *intermedia*, *spenceri*, and *rufithorax*.

Holotype ♂ (BISHOP 9961), INDIA: Uttar Pradesh, Ranikhet, 8.IV.1949, I. M. Newell. Allotype ♀ and 1 ♀ paratype, same data, 9.VI.1949; also 1 ♀ paratype, 21.V.1949.

Type and allotype presented to B. P. Bishop Museum. Paratypes in the University of Hawaii collection.

***Meracanthomyia kotiensis* Kapoor** Fig. 60a; pl. 4, fig. 39.

*Meracanthomyia kotiensis* Kapoor, 1971, *Oriental Ins.* 5(4): 483, fig. 1-6. Type-locality: Koti, Himachal Pradesh, India. Type ♂ in National Pusa Collection, New Delhi.

By lacking supraalar bristles this would appear to fit near *arisana* Shiraki from Formosa. It differs, however, by having the front yellow in ground color, densely silvery pubescent, especially in the ♂, rather than upper 1/2 of front velvety black; femora polished black except for yellow apices, rather than yellow except for black dorsoapical spot on hind pair; apex of wing largely brown (pl. 4, fig. 39), rather than with the apex hyaline (reference Shiraki, 1933, pl. 1, fig. 1); and arista moderately plumose (fig. 60a), rather than short pubescent.

♂ Comparatively large species. Head almost as long as high, distinctly pointed at bases of antennae. Front and lateral margins of face along orbits, densely silvery pubescent. The sides of the front are distinctly divergent anteriorly. Three pairs rather weak inferior fronto-orbitals and 1 pair of weak superior fronto-orbitals. Face yellow-white, except for a polished black spot on each side just anterior of antennal furrows. Genae yellow except for a shining black spot immediately below eye. Occiput polished black except for a narrow yellow margin. Clypeus black, palpi and mouthparts rufous, tinged with brown. Antennae mostly black, narrowly yellow on dorsoapical portion of 2nd segment and with the arista shorter than 3rd segment and moderately long plumose (fig. 60a). Thorax predominantly polished black, yellow over humeri, notopleural calli and the broad margins and the venter of the scutellum also with a yellow-white transverse band extending over posterior portion of each mesopleuron. Mesonotum with a dense gray, pubescent, median vitta extending the entire length and marked with gray pubescence behind humeri and along lateral margins. Only outer postalar bristles present and supraalars completely lacking. Propleura rather densely covered with moderately long, erect, yellow-white hairs. Halteres yellow. Front coxae and trochanters yellow except for a polished spot at upper basal portion of the former, and the femora mostly polished black with broad yellow bases. Front and middle tibiae yellow except for a streak of brown to black along posterior margins, and hind

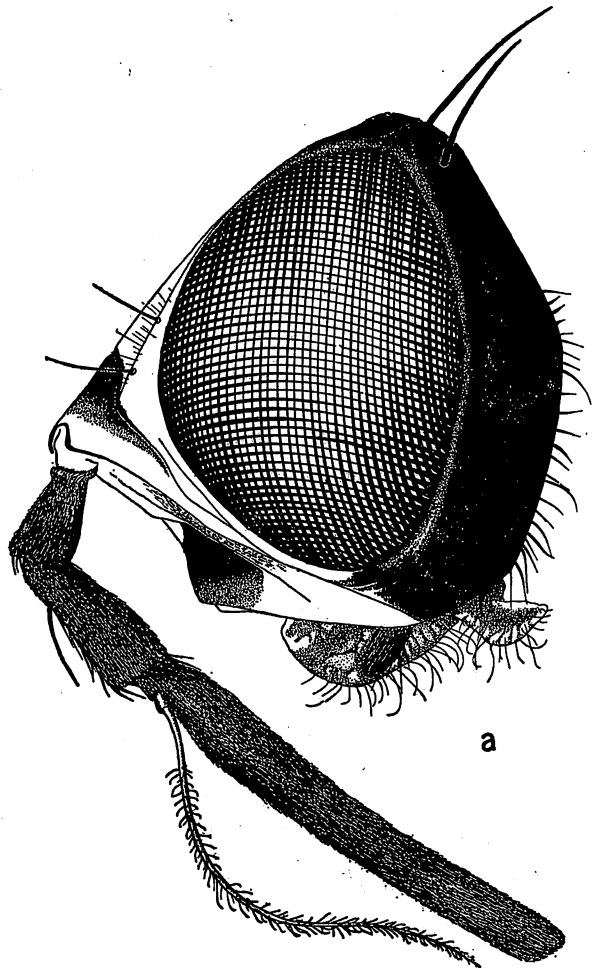


Fig. 60. *M. kotiensis* Kapoor. a. head.

tibiae entirely dark brown to black except for narrow yellow apices and bases. Tarsi entirely yellow. All femora with strong basal spines. Wings predominantly hyaline, brown over apical 1/4, with brown coloration extending slightly basad of m crossvein (pl. 4, fig. 39). Subcostal cell very short, almost obscured by the proximity of veins Sc and R<sub>1</sub>. Vein R<sub>2+3</sub> curved gently upward, almost straight. Crossvein r-m situated at middle of cell 1st M<sub>2</sub> and veins R<sub>4+5</sub> and apical portion of M<sub>1+2</sub> almost parallel. Cell Cu with a short pointed lobe at apex. Abdomen entirely polished black, long, slender, almost straight-sided as is typical of members of this genus. The genitalia have not been dissected for study; the visible parts are rufous. See fig. 6a-c, Kapoor (1971: 486).

Length: Body, 10.5 mm; wings, 9.25 mm.

♀. Fitting description of ♂ except that the front is not so distinctly silvery pubescent and the entire lower portion of the face is polished black. Basal segment of ovipositor polished black, slightly longer than terga 5+6. The piercer has not been extruded for study; the apical portion is sharp-pointed.

Length: body, 9.25 mm; wings, 8.5 mm.

Ten specimens on hand from NE BURMA: Kambaiti, 2000 m, V-VI.1934, R. Malaise.

***Meracanthomyia nigrofemorata* Hardy, new species** Fig. 61a; pl. 5, fig. 41.

This species fits nearest to *arisana* Shiraki from Formosa but differs by having supraalar bristles, the front yellow except for a polished black band just below the frontal suture; also it is differentiated by having femora black on apical 1/2 and the entire apical portion of wing brown (pl. 5, fig. 41).

♀. *Head*: Approximately as long as high, front gradually sloping so that the antennae are situated at about middle of head as seen from direct lateral view (fig. 61a). Face vertical, very slightly raised down median portion and occiput moderately swollen on lower portion, at widest part approximately 1/2 the width of 1 eye. Occiput shining black except for the yellow lateral margins. Genae yellow with a brown spot at lower margin of each compound eye. Face yellow

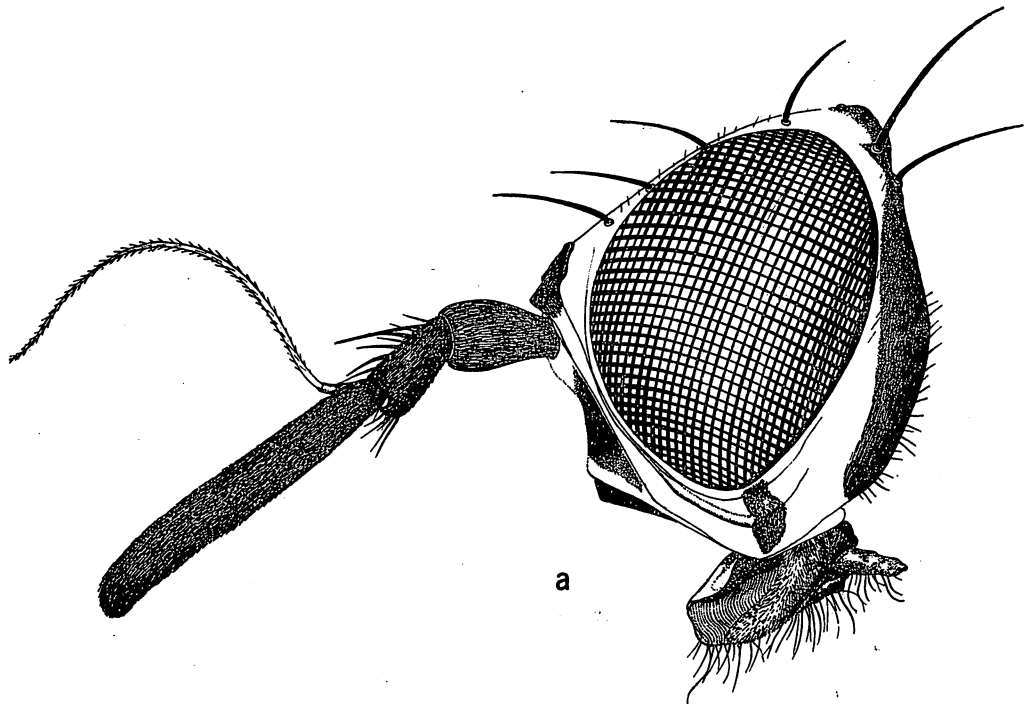


Fig. 61. *M. nigrofemorata* n. sp. a. head.

except for a large dark brown to black spot on each side. Postantennal region well-developed, polished black except for narrow yellow anterior margin. Front above suture entirely yellow, approximately 2 × longer than wide and with 3 or 4 pairs of widely spaced inferior fronto-orbital bristles and only 1 pair of superior fronto-orbitals. Ocellars and postocellars absent. Antennae brown, tinged with red, the 3rd segment tinged with black and approximately 2 × longer than remainder of antenna, about equal in length to arista and over 2 × longer than face (fig. 61a). *Thorax*: Polished black except for the following yellow-white markings: posterior 1/2 of each humerus, extending over posterior margin of propleuron and anterior margin of mesopleuron; the area immediately surrounding spiracle; the area of suture over notopleural callus extending as a

narrow band across posterior portion of mesopleuron over vertical suture to base of sclerite; extreme lateral margin of mesonotum behind suture; and broad margins and venter of scutellum. Mesonotum with gray pollinose vittae extending down median portion and with irregular gray pollinosity on sides. One anterior supraalar and 1 postalar bristle present. Halteres pale yellow. *Legs*: Mostly yellow, femora broadly brown to black on apical 1/2; hind tibiae brown except for yellow apices; middle tibiae, brown on their bases. One strong apical bristle present on middle tibia. All femora bearing prominent ventral spines. *Wings*: Hyaline on basal 5/8, except for the faintly yellow subcostal cell; apical portion of wing brown; apex of cell  $R_5$  subhyaline, lightly tinged with brown. Subcostal cell about 1/3 as long as 2nd costal cell. Crossvein r-m at about middle of cell 1st  $M_2$ . One seta present on the node at base of vein  $R_{4+5}$ . *Abdomen*: Polished black, lightly gray pollinose and rather thickly covered with yellow setae. Sixth tergum 3/4 to 4/5 as long as 5th. Basal segment of ovipositor shining black, tinged lightly with rufous in the ground color of the apical portion; as seen from dorsal view about equal in length to terga 5+6. Basal segment of ovipositor measured on venter about 1.2 mm. The ovipositor has not been extended for study. Length: Body, excluding ovipositor, 6.8 mm; wings, 6.0 mm.

♂. Unknown.

Holotype ♀ and 1 paratype, with the abdomen broken off, from BURMA: Mishmi Hills, Lohit River, 14.III.1935, M. Steele.

Type returned to the British Museum (Natural History). Paratype in the University of Hawaii collection.

***Meracanthomyia rufithorax* Hardy, new species** Fig. 62a-d.

This species is differentiated from all known *Meracanthomyia* by having the mesonotum predominantly rufous, the scutellum entirely yellow, in combination with the predominantly black pleura, metanotum, and anterior margin of mesonotum. It shows relationship with *spenceri*, n.sp. from Vietnam, but the wing markings and ovipositor are very different (fig. 62a and 62b).

♂. *Head*: Mostly yellow except for a large polished spot on each side of face, the black postantennal region, dark brown to black median portion of humerus, a brown mark extending below ocellar triangle to about opposite upper inferior fronto-orbitals, and a brown to black spot on each gena below eye margin. Two pairs inferior fronto-orbitals and 1 pair superior fronto-orbital bristles. *Thorax*: With the yellow-white markings on humeri, notopleural calli, and pleura similar to those of *nigrofemorata* but with the posterior portion of mesonotum entirely rufous and with the rufous marking extending to median portion almost to anterior margin. Anterior portion of mesonotum in front of and behind the humerus shining black. Mesonotum with a gray pollinose vitta down median portion and with scattered gray pollen on sides. Scutellum entirely pale yellow, bristles close together, at extreme apex; 1 supraalar and 1 postalar bristle. *Legs*: Yellow with hind femora brown on apical 1/4 and with middle femora brown ventrally on apical 1/2. Hind coxae black, hind tibiae and trochanters brown. Middle femora distinctly swollen, 2× thicker than hind pair. *Wings*: As in fig. 62a, very similar to those of *nigrofemorata*. Two setae present on node at base of  $R_{2+3}$ . *Abdomen*: Entirely shining black, thickly covered with pale setae and distinctly clavate, broadest at junction of terga 4 and 5. The visible genitalia are entirely black. These have not been dissected for study; the surstyli are long and slender.

Length: Body, 8.8 mm; wings, 7.8 mm.

♀. Fitting description of ♂ except for sexual differences. Abdomen almost straight-sided, 6th tergum as long as 5th. Basal segment of ovipositor polished black, about equal in length to terga 5+6. Measured on the venter the basal segment is about 1.25 mm long. Piercer flattened laterally at the apex, tapered to a sharp point; as seen under high magnification with 3 small preapical serrations and 1 small indentation on ventral margin as in fig. 62d. Three small, round, black

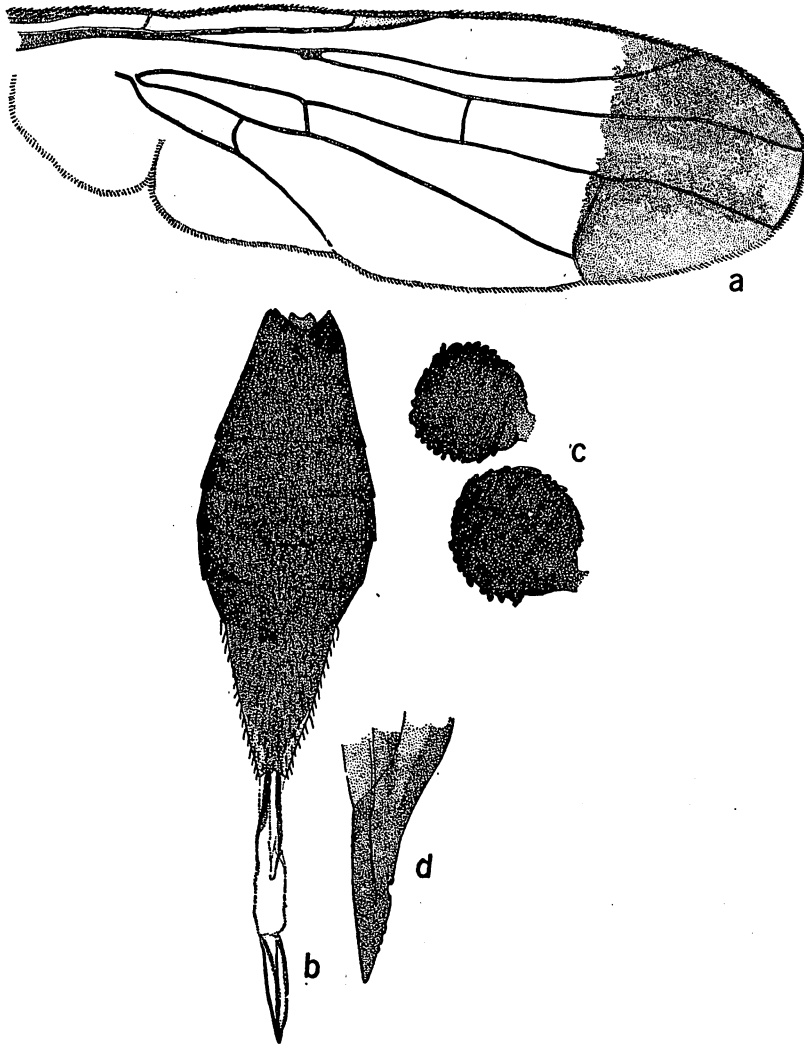


Fig. 62. *M. rufithorax* n. sp. a. wing; b. ♀ abdomen; c. ♀ spermathecae; d. apex of piercer.

spermathecae present. Piercer 1.3 mm in length. Extended ovipositor (fig. 62b) approximately 5.0 mm.

Holotype ♂ and allotype ♀, BURMA: Mt Victoria, Chin Hills, 1400 m, IV.1938, G. Heinrich. Type and allotype returned to the British Museum (Natural History).

***Meracanthomyia spenceri* Hardy, new species** Fig. 63a-b.

Fitting near *rufithorax*, n.sp. from Burma, and *intermedia*, n.sp. from northern India, but differing by the wing markings and the characteristics of the piercer of the ♀ ovipositor. Compare fig. 62a, and 63a. The wing has a narrow brown band extending from apex of

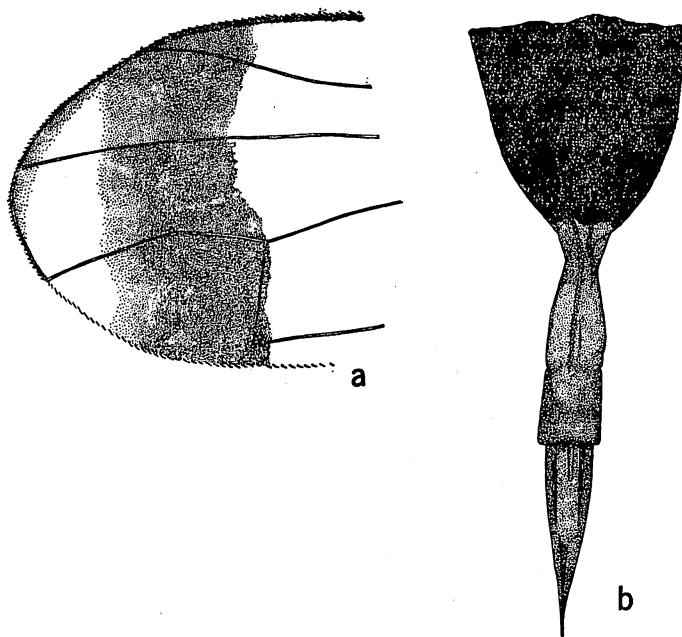


Fig. 63. *M. spenceri* n. sp. a. wing; b. ovipositor.

vein  $R_{2+3}$  to upper apical portion of cell  $R_5$  and the apices of cells  $R_3$  and  $R_5$  are predominantly hyaline (fig. 63a). The ♀ picercer is broadly flattened at apex and seen as in lateral view (fig. 63b). *Legs*: All yellow with faint tinge of brown at bases of middle tibiae and on apices of middle femora. Otherwise fitting description of *rufithorax*.

♂. Unknown.

Length: Body, excluding ovipositor, 6.5 mm.; wings, 6.7mm.

Holotype ♀ (BISHOP 9962), VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer.

Type returned to the B. P. Bishop Museum.

#### Tribe EUPHRANTINI

Differing from other Trypetinae which have the major head and thoracic bristles by having fine erect hairs on the pleurotergon (the area between metanotum and metapleuron, above the spiracle), except in *Felderimyia* Hendel; presutural bristles absent, except in 1 African genus (*Celiodacus* Hendel) which Hering has placed here and in *Soita* Walker, from Salawati Island, Indonesia (ref. Hardy 1959: 197); also ♀ with 3 spermathecae in the genera which have been studied.

As presently defined the tribe includes approximately 2 dozen genera from over the tropics of the world, largely confined to Southeast Asia and Africa. It is obviously not a sound grouping and the entire concept needs thorough study. Euphrantini and Adramini appear to have arisen from the same stem and the development of 3 spermathecae in the ♀ in the species which have been studied, haired pleuroterga, etc., indicate they

are closely related.

### Genus *Dimeringophrys* Enderlein

*Dimeringophrys* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 452. Type-species: *ortalina* Enderlein, by original designation = synonym of *bilineata* (Walker).

An Euphrantini which is readily characterized by having only 1 pair of frontal bristles, these are incurved and are located near lower margin of front; also by having the dorsocentral bristles rudimentary, reduced to just a tiny seta on each side located about 1/3 the distance between inner postalar and supraalar and by having the ocellar bristles rudimentary, seta-like. Prescutellar bristles are present; these are about 2/5 to 1/2 as long as inner postalar bristles. The known species both have a broad yellow stripe extending the entire length of the mesonotum and continuous down abdomen.

Moderately large species with the wings predominantly hyaline. The subcosta subequal to 2nd costal cell; the r-m crossvein situated at middle of cell 1st  $M_2$  and the lobe of the cubital cell rather short, about 1/4 as long as vein  $Cu_1 + 1stA$  (fig. 64a). The ♀♀ have 3 spermathecae; these are peculiar in shape (fig. 64d).

Previously known only from the type-species. One new species is on hand from Thailand.

*Dimeringophrys* closely resembles *Tetrameringophrys*, n. gen. and is differentiated by the characters pointed out under the description of that genus.

#### *Dimeringophrys bilineata* (Walker) Pl. 7, fig. 70.

*Dacus bilineatus* Walker, 1860, *J. Proc. Linn. Soc. Lond.* **4**: 150. Type-locality: Celebes. Type ♀ in British Museum (Natural History).

*Dimeringophrys ortalina* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 452, fig. W. Type-locality: Sumatra. Type ♀ in Institute of Zoology, Warsaw.

*Dimeringophrys bilineata*: Hardy, 1959, *Bull. Brit. Mus. (Nat. Hist.) Ent.* **3**(5): 165 and 234, pl. 11, fig. 5.

I have studied both types.

The species is apparently widespread over a large part of the Oriental region. I have seen specimens from Tawitawi, southern Philippines and a series in the University Zoological Museum, Helsinki from Laos.

This species is related to *pallidipennis*, n.sp. and is differentiated by the characters given under the description of that species. The wing markings are very different in the 2. *D. bilineata* is characterized by having a broad yellow to brownish yellow band extending from base of wing, filling all of 2nd costal cell, to upper apical portion of cell  $R_5$ ; also by having a large brown mark on posterior margin of wing covering m crossvein and apical portions of cells 1st  $M_2$  and  $M_4$  (pl. 7, fig. 70).

#### *Dimeringophrys pallidipennis* Hardy, new species Fig. 64a-e.

This species differs from *bilineata* (Walker) from Sumatra, Celebes, Laos and southern Philippines, by having the wing entirely hyaline except for a very narrow marking of brown along costal margin from upper apex of cell  $R_5$  to apex of vein  $R_1$ , and with the subcostal cell yellow. In *bilineata* the 2nd costal and the basal cells are yellow, a broad pale brown to yellow band extends around the wing margin just beyond

tip of vein  $R_{4+5}$ , filling all of cell  $R_1$  and apical portion of cell  $R_3$ ; and a broad, pale brown marking extends over m crossvein and along apical portion of vein  $M_{3+4}$ . Also, the basitarsi are yellow, and in *bilineata* they are brown to black.

♀. *Head*: Approximately as high as long, with the face distinctly concave in median portion and the occiput moderately swollen; at widest point, the occiput is about 1/2 as wide as eye. Head yellow except for the dark compound eyes and except for a large polished black spot on each side of occiput extending from eye margin just inside outer vertical bristles to lower portion of occiput but evanescing before the margin. The lower 3/5 of occiput yellow along each eye margin. A pale brown longitudinal mark extends down middle 2/3 to 3/4 the length of front below ocelli. The lower median portion of face is very faintly tinged with brown in ground color. Front about 4/5 the width of 1 eye and slightly depressed down median portion. Inferior fronto-orbital bristles incurved and situated near lower margin of front (fig. 64b). The ocellar bristles are represented by tiny setae about equal in size to the setae on the front. Inner vertical bristles strong, 3 × longer than postocellar bristles and about 1/3 longer than outer verticals. One prominent genal bristle. Antennae yellow, brown on apex and on apical 2/3 of the outside surface. Second antennal segment with a semicircle of long yellow hairs around ventral portion (fig. 64b). Third segment slender, 3 × longer than wide, gradually tapered but rounded at apex. Arista long plumose, the longest rays are greater in length than the width of 3rd segment. *Thorax*: Mesonotum with a broad yellow stripe extending down median portion occupying the area just beyond inner scapular and prescutellar bristles, the median portion is densely gray pubescent. Submedian area of mesonotum dark brown to shiny black, yellow on notopleura, over suture, and on lateral margins behind suture. Humeri, propleura, lower 2/3 of sternopleura, hind margins of mesopleura and front margins of pteropleura pale yellow. Remainder of pleura polished black, gray pubescent on hind portions of mesopleura and upper hind portions of sternopleura. Pleuroterga rather thickly covered with erect fine hairs. Scutellum yellow, flat, with 4 strong bristles and rather sparsely setose. Postscutellum and metanotum black. *Legs*: Coxae, trochanters, femora and basitarsi yellow with a brown spot near apical 2/3 of posterior surface of front femur and another brown spot on this surface at base. Also with a large brown spot on anterior surface of middle femur at base, and with hind femur brown on basal 1/2 on anterior and dorsal surfaces, and at extreme base of segment on posterior and ventral surfaces. Tibiae black except for narrow bases of anterior pair. Front basitarsus tinged with brown at apex. One strong ventral spur at apex of ventral tibia. *Wings*: Hyaline except for a yellow mark in subcostal cell and with a narrow brown mark extending along costa from end of cell  $R_1$  to just beyond tip of cell  $R_{1+5}$  (fig. 64a). The r-m crossvein situated at middle of cell 1st  $M_2$ . The setae along vein  $R_1$  extend basad on radial vein almost to its base. The setae on vein  $R_{4+5}$  extend about 2/3 the distance between r-m and m crossvein. *Abdomen*: Shining black with a broad yellow longitudinal vitta down middle and with narrow lateral margins of terga 1, 5 and 6 yellow. No bristles are present on apices of abdominal terga; the 6th tergum has short, thick setae around posterior margins. Three spermathecae, very distinctive in appearance, each consisting of a long slender tube-like structure as seen in fig. 64d. Base of ovipositor rather slender, about equal in length to segments 4 to 6 and about 1.6 mm in length. Piercer greatly reduced, shortened, represented by only a small sclerotized apical portion as in fig. 64e. The sclerotized portion is only about 0.3 mm in length. It is the most peculiar piercer I have seen in the Tephritidae.

Length: Body, without ovipositor, and wings, 7.0–7.3 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9963), THAILAND: Nan, 10.VII.1963, collected on *Averrhoa carambola*, R. Kawasaki.

Type deposited in B. P. Bishop Museum, Honolulu.



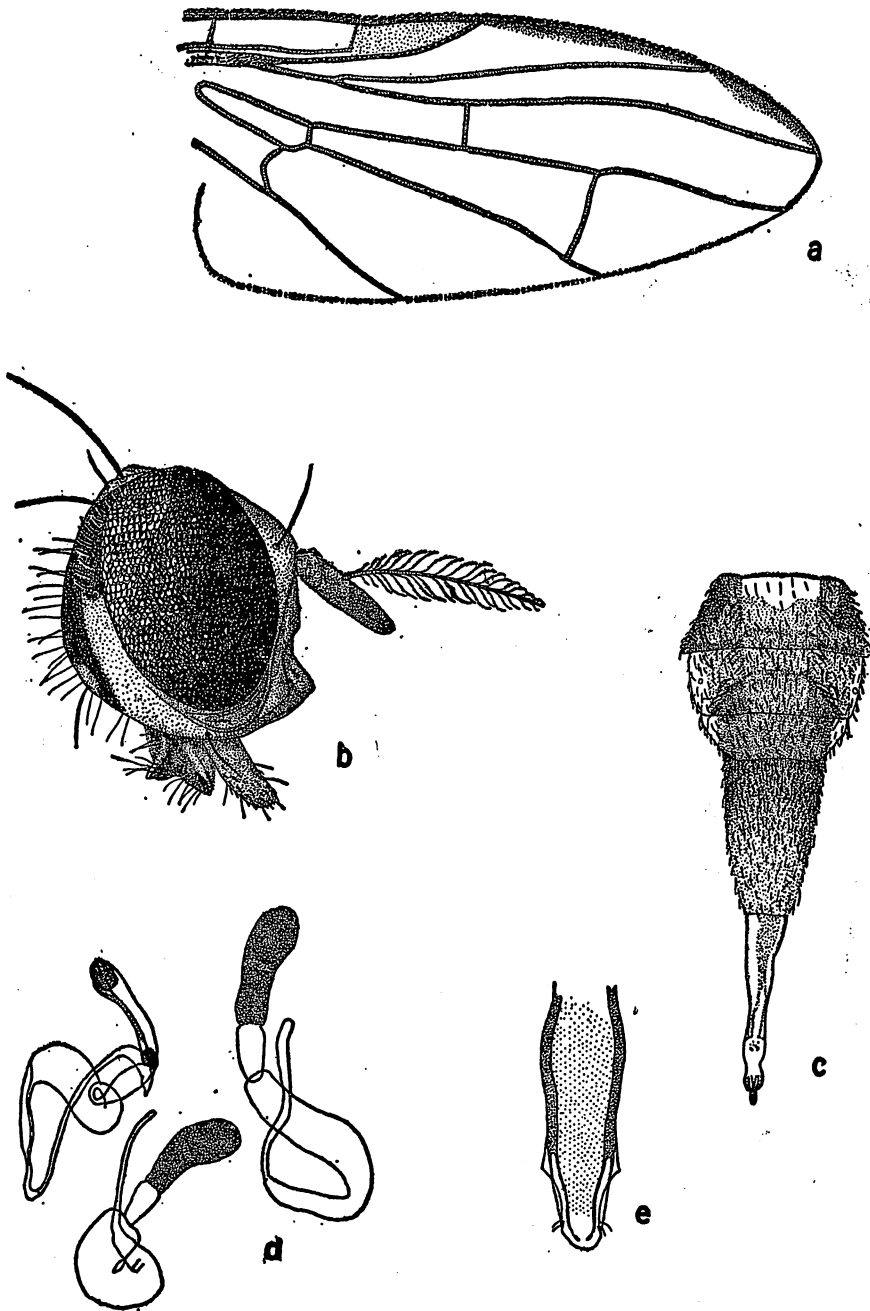


Fig. 64. *Dimeringophrys pallidipennis* n. sp. a. wing; b. head; c. ♀ abdomen; d. ♀ spermathecae; e. apex of piercer.

Genus *Euphranta* Loew

*Euphranta* Loew, 1862, Die Europ. Bohrtl., p. 28. Type-species: *Musca connexa* Fabricius, by monotypy.

*Mosina* Rondani, 1871, *Prodr. Dipt. Ital.* 7: 180; nec Robineau-Desvoidy, 1830.

*Lagarosia* van der Wulp, 1891, *Tijdschr. Ent.* 34: 210. Type-species: *lacteata* van der Wulp, by subsequent designation (Hendel 1914: 78). Synonymy by Malloch (1939a: 442).

*Euphranta* are differentiated from other Euphrantini by lacking presutural bristles, by possessing sternopleurals, humeral and dorsocentral bristles, with the latter somewhat variable in position. Two or 3 inferior fronto-orbital and 1 pair superior fronto-orbital bristles present. Arista plumose, except in *presignis*, n.sp. from Thailand. Three spermathecae are present; these are elongate to tubular. Typical *Euphranta* lack prescutellar bristles; these are present in the subgenus *Staurella* Bezzi.

## KEY TO EUPHRANTA KNOWN FROM THAILAND AND SURROUNDING COUNTRIES

1. With prescutellar bristles (*Staurella* Bezzi). .....2
- Lacking prescutellar bristles (*Euphranta* Loew). .....7
- 2(1). Wings not having 4 or 5 transverse brown bands. ....3
- Wings with 4 or 5 transverse bands (fig. 67a, 68a). ....6
- 3(2). Wings lacking a complete, isolated, brown band over r-m crossvein. Mesonotum yellow with a pair of faint, incomplete, submedian, brown vittae or entirely or predominantly black, lacking yellow vittae. ....4
- Wings with a complete, yellow transverse band extending over r-m crossvein (pl. 8, fig. 74). Mesonotum with 5 yellow longitudinal vittae. Burma and Thailand. ....
- .....*apicalis* Hendel
- 4(3). Wings with a broad hyaline area extending between the crossveins. Mesonotum predominantly or entirely black. ....5
- Mesonotum yellow, with not more than a faint indication of submedian brown vittae. Wings as in fig. 69b and 70a. ....8
- 5(4). Entire thorax shining black except for broad margins of scutellum which are yellow. Face all yellow. Wings as in fig. 72a. Malaya. ....*ornei*, n.sp.
- Thorax with humeri, notopleural calli, hind portions of mesopleura, and a large prescutellar spot on mesonotum bordered by dorsocentral and prescutellar bristles yellow. Scutellum yellow, with a broad black base. Face with a large, polished black mark above lower margin. Wings as in fig. 71b. Sumatra, Burma and Thailand. ....
- .....*maculifemur* (de Meijere)
- 6(2). Wing with 4 complete crossbands (fig. 68a). Lobe of cell Cu longer than m-cu crossvein. Vein R<sub>4+5</sub> setose on both sides to r-m crossvein. Mesonotum with 2 broad, black, longitudinal vittae, the area between is rufous and hind margin of mesonotum black. Java — Thailand. ....*corticicola* (Hering)
- Wing with 5 irregular crossbands (fig. 67a). Lobe of Cu much shorter than m-cu. Vein R<sub>4+5</sub> with only a few setae at base above. Mesonotum largely reddish brown, lacking vittae and with a large yellow mark covering posterior median portion. Thailand. ...
- .....*burtoni*, n.sp.
- 7(1). Wings with a large preapical brown spot and an oblique, narrow brown band through apex as pl. 8, fig. 73. Thorax black, head and legs predominantly dark brown to black. Indonesia, Philippines, India, probably Thailand and bordering countries. ....
- .....*striatella* (van der Wulp)
- Wing not as above, with a narrow transverse band at level of m crossvein (fig. 65b). Mesonotum polished black, with 3 yellow vittae. Head and legs yellow. Thailand

- and Vietnam ..... **presignis**, n.sp.  
 8(4). With a complete hyaline crossband at basal 2/5 of wing (fig. 69b). Face and mesonotum entirely yellow. Laos ..... **laosica**, n.sp.  
 With a large hyaline wedge extending through about 1/2 of wing from margin in cell  $R_1$  and an isolated brown streak in middle of this area extending from costa to vein  $R_{4+5}$ . Face with a pair of brown spots on margin and with a pair of indistinct submedian brown vittae on mesonotum. Thailand. .... **maculifacies**, n.sp.

#### Subgenus **Euphranta** Loew

#### **Euphranta (Euphranta) presignis** Hardy, new species      Fig. 65a-b.

An unusual species which may possibly belong to a new genus but because of the obvious close relationship is placed under this combination until further information is available. It differs from all known *Euphranta* by having the arista short pubescent (fig. 65a), by having the r-m crossvein situated well beyond apex of vein  $R_1$  and near apical 2/3 of cell 1st  $M_2$ ; in the latter regard it somewhat resembles *lacteata* (van der Wulp) and *striatella* (van der Wulp), but in these the r-m crossvein is situated distinctly beyond middle of cell  $R_1$  and cell  $R_3$  is elongate, 2/3 as long as cell  $R_1$ . In the species at hand the r-m crossvein is situated at basal 1/4 of cell  $R_1$  (measured on costal margin) and cell  $R_3$  is scarcely 1/3 as long as  $R_1$  (fig. 65b). The wing markings are distinctive from any known species in the entire Tribe Euphrantini.

♂. **Head:** Slightly higher than long, with face gently concave as seen in direct lateral view. Only 2 pairs inferior fronto-orbital bristles, 1 near lower 1/5 of front, and the other just slightly below the lower superior fronto-orbital (fig. 65a). Only 1 superior fronto-orbital. Ocellars and postocellar bristles lacking, both inner and outer verticals moderately developed. Genal bristle black, moderately well developed. Head predominantly yellow, upper 1/2 to 2/3 of occiput polished black. Front flat, subshining, thinly pollinose on lower 1/3 and almost completely devoid of setae. Antennae entirely yellow, 3rd segment rather elongate, nearly 4× longer than wide and rounded at apex. Arista short pubescent. Palpi and mouthparts yellow, palps with short black setae around margins. **Thorax:** Rather elongate, typical of Euphrantini in shape, and predominantly polished black with a pale yellow band extending from humerus over upper portion of mesopleuron and pteropleuron. A yellow, slightly curved, band on each side of mesonotum from suture to hind margin in line with inner postalar bristle and a median yellow band on mesonotum extending from just in front of suture to hind margin. Also, a yellow mark extends along upper edge of hypopleuron. Scutellum entirely pale yellow, approximately as long as wide, almost triangular in shape and with just a few short setae around margin. Dorsocentral bristles situated about halfway between anterior supraalars and postalar bristles. Halteres pale yellow. **Legs:** Yellow, middle tibia with 1 strong apical spur. **Wings:** Three times longer than wide, predominantly hyaline with the subcostal cell entirely brown, with a short brown transverse vitta extending across r-m crossvein to wing margin, and with a transverse brown band extending over wing at level with m crossvein, extending on around apex to vein  $R_{4+5}$  (fig. 65b). Vein  $R_{4+5}$  sparsely setose from base almost to m crossvein. The r-m crossvein situated near apical 2/3 of cell 1st  $M_2$  and well beyond apex of vein  $R_1$ . Lobe of cubital cell acute as in fig. 65b. **Abdomen:** Polished, rufous over the first 2 terga and over most of the 3rd with a streak of brown to black on each side of 3rd tergum. Terga 4 and 5 polished black. The genitalia have not been relaxed for study.

Length: Body, 4.8 mm; wings, 4.25 mm.

♀. Fitting description of ♂. Terga 4-6 polished black, the 6th tergum very short, from dorsal view approximately 1/5 as long as 5th. Base of ovipositor polished black, cylindrical, approximately equal in length to terga 4+5 and 1.0 mm long as viewed from above. The ovipositor has

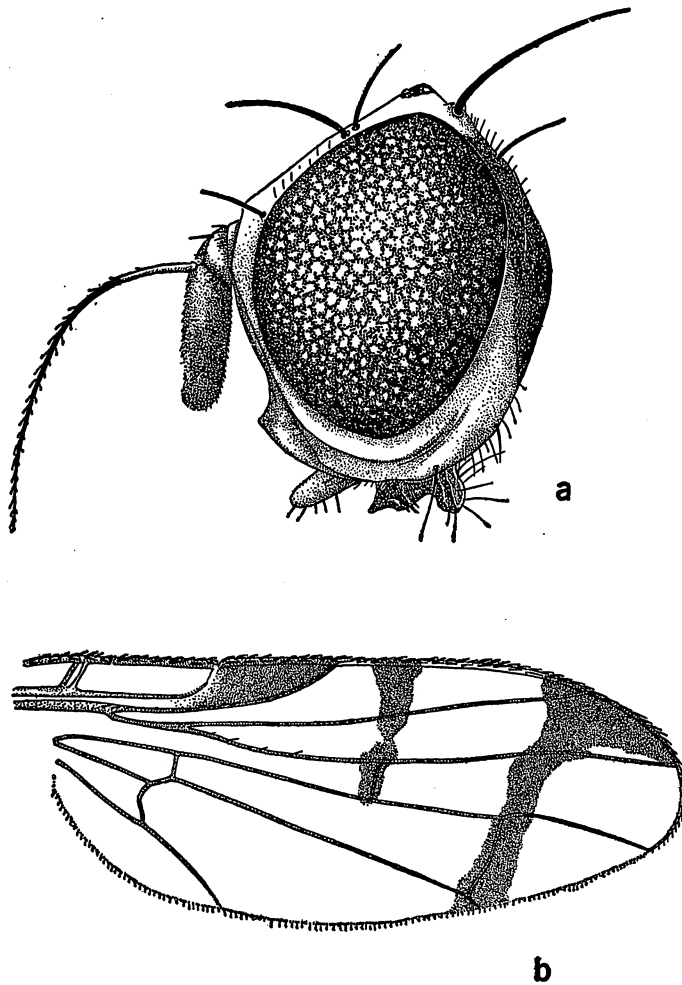


Fig. 65. *Euphranta (Euphranta) presignis* n. sp. a. head; b. wing.

not been relaxed for study and the piercer has not been seen.

Length: Body, excluding ovipositor, 5.0 mm; wings, 4.75 mm.

Holotype ♂ (BISHOP 9964), THAILAND: Songkhla, 19.VII.1963, collected on *Ficus maltissima*, R. Kawasaki. Allotype ♀, same data as type, collected 20.VII.1963.

Type deposited in B. P. Bishop Museum, Honolulu. Allotype in the University of Hawaii collection.

***Euphranta (Euphranta) striatella* (van der Wulp) Pl. 8, fig. 73.**

*Lagarosia striatella* van der Wulp, 1891, *Tijdschr. Ent.* **34**: 213, pl. 10, fig. 14. Type-locality: Java.

Type ♀ in Zoological Museum, Amsterdam.

*Euphranta nigra* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 439, fig. Q. Type-locality: Sumatra.

Type ♂ in Zoological Institute, Warsaw. I have studied the type.

This species occurs from India through Indonesia and the Philippines and very probably occurs in Thailand and surrounding countries. To date it has not been recorded here but is being included in this study.

The species is readily differentiated by the unusual wing markings; the large preapical brown spot covering r-m and m crossveins and the presence of a narrow oblique band extending across apical portion of wing as in pl. 8, fig. 73. The species is almost totally dark brown to black, and typically 2 short, black, posteroventral spines are present on each front femur. For a detailed description and figures refer to the monograph of Philippine Tephritidae (Hardy, in press).

#### Subgenus *Staurella* Bezzi

*Staurella* Bezzi, 1913, *Mem. Ind. Mus.* 3: 121. Type-species: *Musca crux* Fabricius, by original designation.

*Euphranta* (*Staurella*): Hardy, 1955, *Pacif. Sci.* 9(1): 82.

Members of this subgenus are differentiated from typical *Euphranta* by possessing prescutellar bristles. Zia (1937: 125) separates *Staurella* by having vein  $R_{4+5}$  entirely bare, and *Euphranta* by having this vein bristled at least basally. This character is of no value.

Approximately 28 species occur throughout Asia and the Pacific.

#### *Euphranta* (*Staurella*) *apicalis* Hendel Fig. 66a-c; pl. 8, fig. 74.

*Euphranta apicalis* Hendel, 1915, *Ann. Mus. Nat. Hung.* 8: 440, pl. 8, fig. 1. Type-locality: Formosa. Type ♂ in Hungarian National Museum, Budapest. I have studied the type.

Distribution: Formosa, Lower Burma (Hering 1938: 26). One specimen is on hand from Vietnam.

Host: Reared from stem of *Aeginetia indica* L. in Formosa (Shiraki 1933: 338).

This species is differentiated from others known from this region by the wing markings (pl. 8, fig. 74); by having a narrow crossband over wing at r-m crossvein; an incomplete band across wing from subcostal cell to base of cell  $M_4$ ; a large brown mark covering most of apical 1/3 of wing; a large hyaline spot covering apex of cell  $R_5$  and lower apex of  $R_3$ ; and a tiny hyaline spot in extreme apex of cell  $R_1$  (pl. 8, fig. 74).

The following notes are based upon the ♀ specimen at hand. Head mostly yellow. Front tinged with brown in median position, upper median portion of occiput brown and face with 2 large black spots on lower margin. Antennae yellow, 3rd segment rounded at apex. Arista long plumose. Two pairs widely spaced inferior fronto-orbital bristles and 1 pair superior fronto-orbitals, the latter placed near upper inferior fronto-orbitals. Mesonotum largely black, with a narrow yellow median vitta extending the entire length and with posterior margin yellow. A pair of submedian yellow vittae extend in line with anterior dorsocentral bristles from a level with about hind margins of humeri to posterior margin of mesonotum. Also the area around the suture is broadly yellow and with a yellow vitta extending posteriorly at level with inner postalar bristles. Sternopleura, propleura and anterior and posterior margins of mesopleura yellow. Pleura otherwise shining black in ground color. Scutellum yellow, postscutellum and metanotum polished black. Legs entirely yellow. Wings as noted above and as in pl. 8, fig. 74. Abdomen brown, tinged with yellow in ground color and rather densely black setose. Sixth tergum almost as long as 5th. Base of ovipositor short and thick, densely black setose, apical 2/3 yellow, basal portion brown. As seen from above, basal segment approximately equal

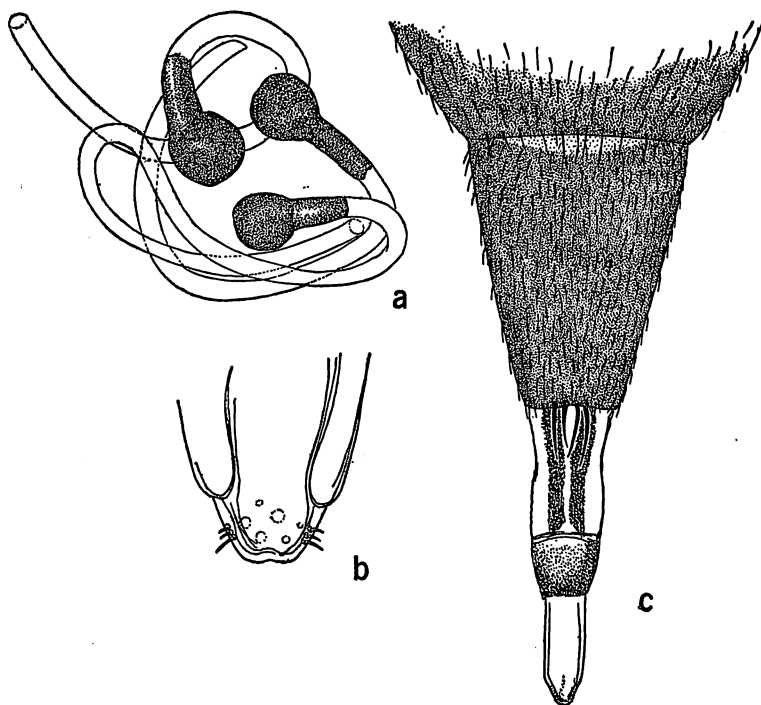


Fig. 66. *E. (Staurella) apicalis* Hendel. a. ♀ spermathecae; b. apex of piercer; c. ovipositor.

to terga 5+6. Measured on ventral margin the basal segment is 1.2 mm (fig. 66c). The piercer has not been extruded for study; it is obviously very short, weakly sclerotized, appearing to be about 0.3 mm in length. Inversion membrane covered with very thick, large scales. Three elongate oval spermathecae present (fig. 66a); under high power these appear microscopically pubescent.

Length (of specimen at hand): Body, 5.75 mm excluding ovipositor; wing, 5.0 mm.

Specimen on hand from S VIETNAM: Fyan, 1200 m, 11.VII-9.VIII.1961, N. R. Spencer.

**Euphranta (Staurella) burtoni** Hardy, new species      Fig. 67a.

Fitting near *corticicola* (Hering) but differs by having 5 irregular crossbands over the wing, rather than with 4 complete transverse brown bands; by having the lobe of cubital cell much shorter than m-cu crossvein, rather than distinctly longer; by vein  $R_{4+5}$  being setose on both sides to r-m crossvein; mesonotum largely reddish brown, lacking vittae and with a large yellow mark covering posteromedian portion, rather than with 2 complete broad black longitudinal vittae on mesonotum and hind margin black.

♂. Typical of *Staurella* in most respects, general facies, chaetotaxy, etc. *Head*: Just slightly higher than long with a prominent concavity in middle of face as seen from direct lateral view, the occiput is very slightly swollen. Eyes almost round; in the type they are deep purple in ground color with longitudinal stripes of green. Head mostly pale yellow with a pair of large submedian spots near upper portion of occiput connecting with a large spot extending to eye

margin on each side in lower portion of occiput. Each gena with a prominent dark brown to black spot on lower margin. Face white, tinged with yellow; front yellow-white on sides, yellow tinged with golden or slightly brown down median portion. Front rather broad, measured from median ocellus to suture it is scarcely longer than wide. Head bristles strong except for rather weak ocellars, these are approximately 2× larger than the setae on sides of front. Two pairs inferior and 1 pair superior fronto-orbitals, the latter situated almost opposite the upper pair of inferior fronto-orbitals. Antennae yellow, tinged faintly with brown at apex of 3rd segment; 3rd

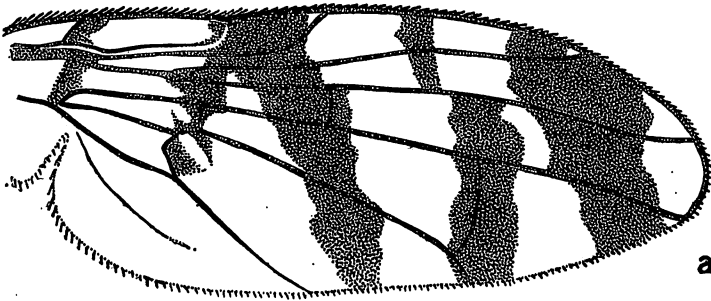


Fig. 67. *E. (S.) burtoni* n. sp. a. wing.

segment 4× longer than wide, the apex rounded. Arista with moderately long plumosity, the longest hairs almost equal to width of 3rd antennal segment. Palpi yellow with numerous stout black setae around apex and along anterior 1/2 of posterior margin and with the basal portion covered with moderately long yellow setae. Mouthparts yellow. **Thorax:** Mostly reddish brown on dorsum, tinged with black in ground color of anteromedian portion of mesonotum and with mesonotum rather densely gray pubescent and thickly covered with short yellow setae. The postero-medial portion of mesonotum yellow in area bounded by dorsocentral bristles. Humeri and notopleural calli yellow. Pleura black in ground color, densely gray pubescent. Postscutellum and metanotum polished black in ground color, densely pubescent except for lower median portion of metanotum. Pleuroterga and propleura densely covered with long erect yellow hairs. Dorsocentral bristles situated slightly behind a line drawn between supraalar. Prescutellar bristles strong, equal in size to dorsocentrals. Scutellar bristles all approximately equal in length. Halteres pale yellow. **Legs:** Front legs entirely yellow except for a tinge of brown to black over dorsal surfaces of femora. All tarsi and trochanters yellow, middle and hind coxae yellow, tinged with brown. Middle and hind femora predominantly black, narrowly yellow at apices and bases and middle and hind tibiae tinged brown to black on basal 2/3 to 3/4, yellow at apices. **Wings:** With markings as in fig. 67a, the subbasal dark brown to black transverse band situated at a level just beyond humeral crossvein is diagnostic and also the broken band across wing at level of m crossvein interrupted at vein  $R_{4+5}$  and then continuing through cells  $R_5$  and  $R_1$  to costa is also characteristic. Vein  $R_{4+5}$  bare except for a few dorsal setae near base. Subcostal cell comparatively short, approximately 2/3 as long as 2nd costal and r-m crossvein situated near middle of cell 1st  $M_2$ . **Abdomen:** Predominantly black with a large yellow spot covering entire median portion of 2nd tergum and extending narrowly along entire apical margin. Third tergum broadly yellow down median portion and 5th tergum with a yellow apical median spot. Abdomen with pale setae over first 2 terga, otherwise thickly black setose and with a ring of black bristles at apex of 5th tergum. The genitalia have not been relaxed for study. The epandrium is polished black and oval in shape, thickly covered with yellow hairs. The cerci are yellow, long, slender, straight-sided extending 1/2 to 2/3 longer than epandrium, and the surstyli are very long and slender, 2 or more times longer than the epandrium, straight-sided; extending beyond base of 5th sternum.

Length: Body, 5.5 mm; wings, 5.0 mm.

Holotype ♂ (BISHOP 9965), THAILAND: Bangkok, nr sea level, 2.VII.1969, J. J. S. Burton.

Type in B. P. Bishop Museum.

**Euphranta (Staurella) corticicola (Hering)?** Fig. 68a-d.

*Staurella corticicola* Hering, 1952, *Treubia* 21(2): 269, fig. 3. Type-locality: Java. Type ♀ in the Natural History Museum, Leiden.

One ♀ specimen on hand from Thap-Sakae, Thailand, 15.VI.1963, collected on

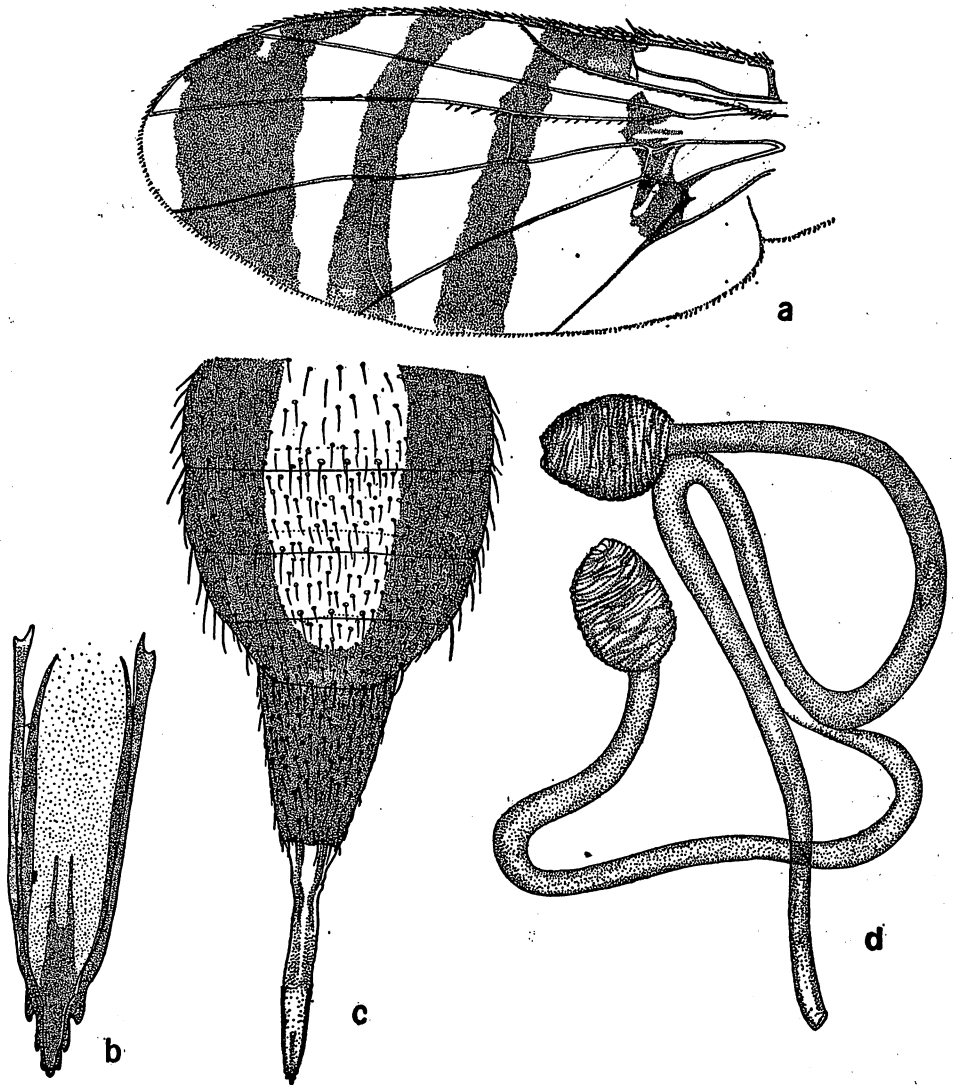


Fig. 68. *E. corticicola* (Hering). a. wing; b. apex of piercer; c. ♀ abdomen; d. ♀ spermathecae.



*Citrus aurantium* f. *sekkan*, R. Kawasaki appears to fit here. I see no way to differentiate it except that a pair of dark brown to black spots are present on the lower margin of the face, and in typical *corticicola* the face is entirely yellow; also the wings of the specimen at hand measure 6.2 mm; Hering recorded the wing measurement of the type as 9.5 mm.

From the descriptions I see no way to separate *corticicola* from *oshimensis* "forma *separata*" (Ito) [see Ito 1949a: 47]. I have not, however, studied specimens of *separata* (from Japan) but have seen the type of *corticicola*. Hering indicated that *corticicola* was much larger; he measured the wing length as 9.5 mm, whereas Ito measured *separata* as 8.5 mm; this is not significant. Also, the differences in wing markings pointed out by Hering are not at all evident. I have compared Hering's figure and a photograph of his type with drawings made of *separata* and see no differences.

The specimen at hand is readily differentiated from other *Euphranta* known from this area by having 4 brown bands across the wing as in fig. 68a. Mesonotum predominantly dark brown to black in ground color, covered with grayish pollen, with the anterior and lateral margins and also a narrow median vitta yellow. The median vitta expands on posterior portion of mesonotum between dorsocentral bristles and extends just slightly beyond prescutellar bristles. The dorsocentrals are located on the dark background, the prescutellars are at the edge of the yellow. Hering in his description said that the prescutellars and dorsocentrals were located on the yellow background. Scutellum yellow with a dark brown to black mark on anteromedian edge. Hering in the original of *corticicola* said, scutellum with a triangular-shaped black basal spot. The head bristles are as described for *maculifacies* except that the upper inferior fronto-orbital is just slightly below the lower superior fronto-orbital. Wings as in fig. 68a. The setae on vein  $R_{4+5}$  extend just slightly beyond r-m crossvein. Abdomen with a broad median rufous band extending from base to apex of 5th tergum, otherwise dark brown. Sixth tergum about 2/3 as long as 5th, and entirely dark brown except for a rufous median mark at base. Base of ovipositor dark brown to black, tinged with rufous, about equal in length to terga 5+6, and about 1 mm in length as viewed from above. Only 2 spermathecae can be found on the specimen studied (3 probably should be present); these are pale, rather weakly sclerotized, long-oval with short necks. Ovipositor as in fig. 68c.

Length of specimen at hand, body and wings, 6.2 mm.

### ***Euphranta* (*Staurella*) *laosica* Hardy, new species      Fig. 69a-b.**

This species runs near *maculifacies*, n.sp. from northern Thailand but the wing markings are very different (fig. 69b and 70a). It is readily separated by having a complete hyaline band over middle of wing; face all yellow; lacking black spots; mesonotum entirely yellow, lacking indications of brown vittae; and dorsocentral bristles situated well behind supraalars, rather than approximately in line with these bristles. The wing markings are similar to those of *maculifrons* de Meijere from Java, but the thorax and legs are all yellow except for the dark brown to black metanotum, rather than having thorax predominantly black and legs conspicuously marked with black; also the apical wing spot is confined to cell  $R_5$  rather than extending to apical portions of cells  $R_3$  and  $2nd M_2$ , etc.

♀. *Head*: Similar in shape to most *Euphranta*, with 3 pairs of inferior fronto-orbitals and 2 pairs superior fronto-orbitals. Entirely yellow except for compound eyes and black ocellar triangle. Third antennal segment about 3× longer than wide, rounded at apex; yellow to rufous with a faint tinge of brown around apical margin. Hairs of arista equal in length to about 2/3 to 3/4

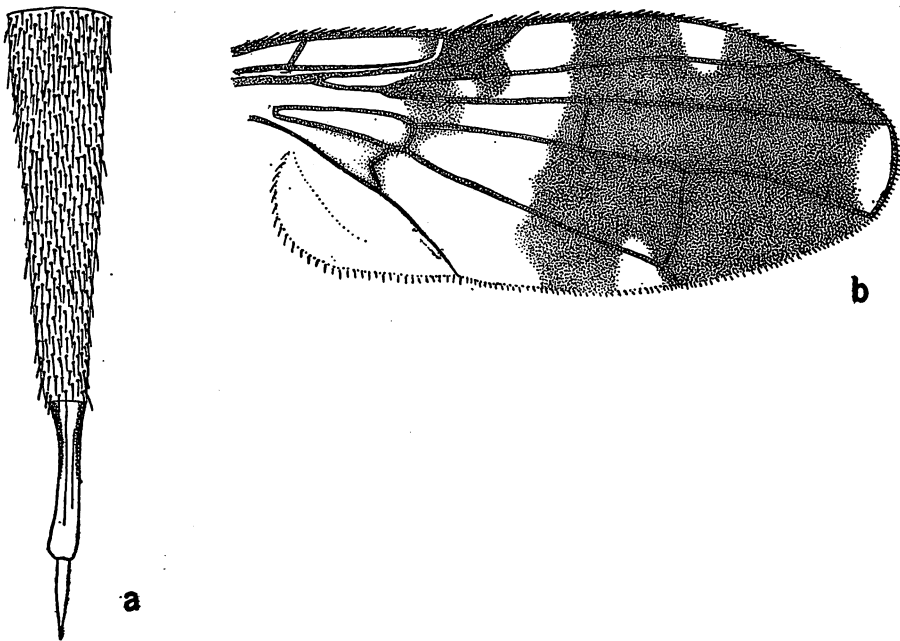


Fig. 69. *E. (S.) laosica* n. sp. a. ovipositor; b. wing.

the width of 3rd antennal segment. Palpi and mouthparts entirely yellow, the former with strong black setae around margin. *Thorax*: Entirely yellow except for dark brown to black metanotum. Dorsocentral bristles situated well behind anterior supraalars, almost  $1/2$  the distance to postalars. Entire dorsum shining. Scutellum flat, rather sparsely covered with strong erect yellow-brown setae and with 4 strong marginal scutellars. *Legs*: Entirely yellow, middle tibia with 1 strong apicoventral spur which is equal to  $2/5$  the length of basitarsus. *Wings*: Markings as in fig. 69b. Abdomen predominantly shining dark brown to black, mostly yellow over first 2 terga. Basal segment of ovipositor elongate, tubular,  $1/2$  longer than remainder of abdomen and measuring 3.1 mm in length. The piercer has not been completely extruded; the apex is visible and is tapered to a long slender point (fig. 69a). The extended ovipositor would probably measure 8-9 mm.

Length: Body, excluding ovipositor, 5.6 mm; wings, 6.0 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9966), LAOS: Vientiane Prov., Ban Van Eue, 20.VI.1966, "native collector," for Rondon & Gressitt.

Type in B. P. Bishop Museum.

***Euphranta (Staurella) maculifacies* Hardy, new species** Fig. 70.

This species closely resembles *lemniscata* (Enderlein) from Formosa, and *rivulosa* Bezzi from Fiji Islands. The wing markings are similar in these (refer to Enderlein 1911: 427, fig. g and Bezzi 1928: 109, fig. 31). It is readily differentiated by having a pair of black spots at lower part of face, rather than having face entirely yellow; by having the thorax almost entirely yellow with only slight indications of brown to black submedian vittae extending partway down anterior portion of mesonotum, rather than

with mesonotum predominantly black in ground color, densely gray pollinose, with 2 broad black vittae in ground color extending entire length of mesonotum; by having dorsocentral bristles situated opposite anterior supraalars, rather than distinctly behind a line drawn between these bristles; by having a hyaline wedge from wing margin near

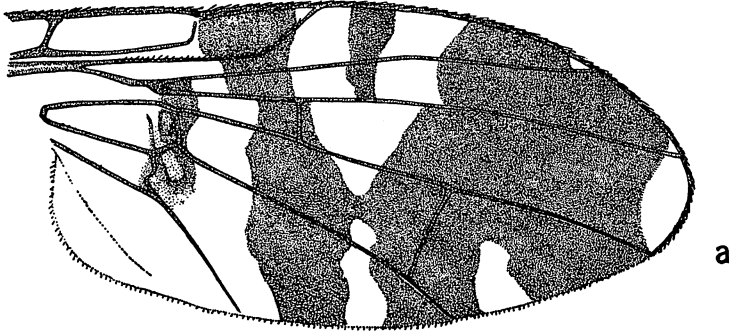


Fig. 70. *E. (S.) maculifacies* n. sp. a. wing.

apex of cell  $M_4$ , extending to posterior portion of cell 1st  $M_2$ , rather than lacking this mark; by having the hyaline mark from anterior margin near middle of wing extending only into upper portion of cell 1st  $M_2$  (fig. 70), rather than extending entirely through this cell as in *lemniscata* or halfway through and with an additional white mark as in *rivulosa*; also lacking a preapical hyaline spot in cell  $R_5$ . The abdominal markings are also different; in both *lemniscata* and *rivulosa* the abdominal terga are largely black on hind margins with a narrow rufous median line extending longitudinally down middle. In *maculifacies* the first 4 terga (♀) are predominantly rufous, brown to black only on the posterolateral margins.

♀. *Head*: Shaped as in other *Euphranta* with the face very slightly concave as seen in direct lateral view. The front sloping, with antennae situated near the middle of head. Three pairs of inferior fronto-orbital bristles, the 2 lower pairs situated near lower 1/3 of front and with upper pair widely spaced and situated opposite or very slightly above lower superior fronto-orbitals. Ocellar bristles lacking (probably hairlike — evidently missing on the specimen at hand). Median portion of front with numerous erect black setae. *Thorax*: Almost entirely yellow. Mesonotum with a pair of submedian dark brown vittae extending in line with prescutellar bristles from anterior margin to suture, then slightly interrupted by continuing faintly beyond suture to a level almost opposite dorsocentral bristles. Scutellum yellow, sparsely setose around margin. Pleura yellow, except for a brown marking over lower portion of each metapleuron, extending across pteropleuron, and with metanotum and postscutellum reddish brown, paler, more rufous down median portion. *Legs*: Entirely yellow, thickly black setose, with 1 strong apical bristles on middle tibia. *Wings*: As in fig. 70a. Subcostal cell about 3/4 to 4/5 as long as 2nd costal, brown except for extreme apex. The r-m crossvein situated distinctly before middle, near basal 2/5, of cell 1st  $M_2$ . Lobe of cubital cell short, 1/4 to 1/5 as long as  $Cu_1 + 1st A$ . *Abdomen*: Dark brown to black on sides, broadly rufous over median portion to 4th tergum. Fifth tergum brown, tinged with rufous, 6th dark brown to black and about 2/3 to 3/4 as long as 5th. Base of ovipositor black, about equal in length to terga 5+6, measuring approximately 0.9 mm as seen in direct dorsal view. The ovipositor has not been relaxed for study.

Length: Body, 5.5 mm; wings, 5.0 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9967), THAILAND: Chiangmai, 4. VII.1963, T. Hamada.  
Type deposited in B. P. Bishop Museum, Honolulu.

**Euphranta (Staurella) maculifemur** (de Meijere) Fig. 71a-d.

*Staurella maculifemur* de Meijere, 1924, *Tijdschr. Ent.* **67**, suppl., p. 39, fig. 9. Type ♀ from Sumatra, in the Zoölogisch Museum, Amsterdam.

*Staurella maculifemur* de Meijere, Hering, 1941, *Ark. Zool.* **33B** (11): 5. Description of the ♂ from Burma.

This species is differentiated from other known *Staurella* by the distinctive wing markings (fig. 71b); by the predominantly shining black body, with a yellow prescutellar spot on mesonotum; the apical 2/3 of scutellum yellow; and by having a yellow median band down abdomen from the 1st over 4th terga.

♂. Head shaped as in fig. 71c. Front with a large shining black spot extending down median portion from ocellar triangle between superior fronto-orbital bristles and expanding to eye margins in area between superior fronto-orbitals and upper inferior fronto-orbitals. Lower margin of front and upper sides and vertex yellow. Occiput yellow with a large polished black spot on each side, extending from eye margin about 3/4 to 4/5 the length of back of head. Genae yellow, face yellow except for a prominent black spot in middle, on lower margin. Antennae yellow, tinged faintly with brown at apex of 3rd segment. Arista long plumose. Thorax predominantly black with a prominent yellow prescutellar spot extending from scutellar bristles almost to a level with anterior supraalar and bordered on sides by dorsocentrals. Humeri yellow, notopleura, and the suture on each side, yellow. A pale yellow spot is also present on upper hind portion of each mesopleuron. The thorax is otherwise polished black in ground color, covered with black setae and gray pubescence. Front legs entirely yellow. Front basitarsus broad, rather flat (fig. 71a), greater in width than tibia and concave on posterior surface. Middle and hind trochanters and femora entirely yellow. Mid tibiae brown to black on basal 1/2, yellow apically. Hind tibiae black except for yellow apices. Tarsi yellow, tinged with brown, mid and hind tarsi yellow, tinged with brown. One long plus 1 short spine on middle tibia. Wings as in fig. 71b. Subcostal cell about 2/3 as long as 2nd costal. The r-m crossvein situated slightly before middle of cell 1st M<sub>2</sub>. Lobe of anal cell rather short, about 1/6 as long as vein Cu<sub>1</sub>+1st A. Abdomen polished black, yellow down middle of terga 1-4, and on lateral margins of 1st tergum. Fifth sternum of ♂ as wide as long, concave on posterior margin. ♂ genitalia as in fig. 71d; the epandrium is black, almost globose; the surstyli (the lobes of epandrium) are yellow, long, slender, parallel-sided (fig. 71d). The anal lobes are yellow, elongate (fig. 71d).

Length of specimen on hand: Body, 7.5 mm; wings, 6.5 mm.

The ♂ specimen at hand was collected in northeast Thailand (definite locality not recorded).

**Euphranta (Staurella) ormei** Hardy, new species Fig. 72a.

This species is closely related to *maculifemur* (de Meijere) from Sumatra, but differs by lacking a prominent hyaline spot in the brown marking through apex of cell R<sub>1</sub> opposite m crossvein; by having the thorax entirely black except for a small presutural median yellow spot, and except for the broad yellow border on scutellum. *E. maculifemur* has a yellow spot on upper border of each mesopleuron, has the suture yellow, and has a yellow mark extending down middle of mesonotum. *E. ormei* is very similar in appearance to *E. (Euphranta) flavoscutellata* Hardy from Balabac Island, southwest Philippines; the wing markings are much alike. These belong in different subgenera,

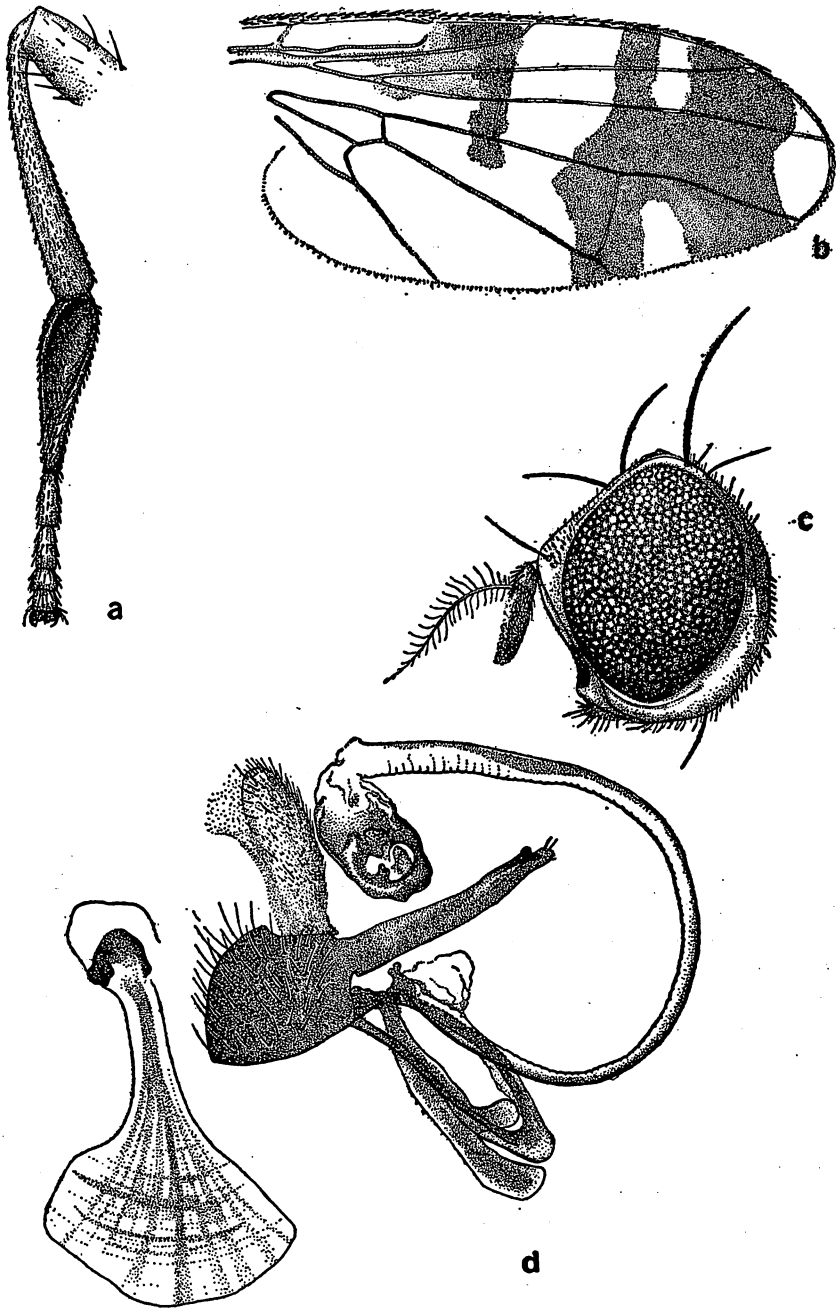


Fig. 71. *E. (S.) maculifemur* (de Meijere). a. front leg; b. wing; c. head; d. ♂ genitalia.

however, and the leg and body markings are different.

♀. *Head*: Occiput entirely dark brown to black, except for a narrow yellow margin along each side above gena. Gena, face, lower margins and sides of front to upper inferior fronto-orbitals yellow. Remainder of front dark brown to black. Two pairs inferior fronto-orbitals; these are widely spaced, the uppers are located just below superior fronto-orbitals. Face concave medianly. Antennae yellow, 3rd segment 3× longer than wide. Aristae long plumose, the longest hairs are equal to the width of the 3rd segment. Palpi yellow, with short black setae around apices. *Thorax*:

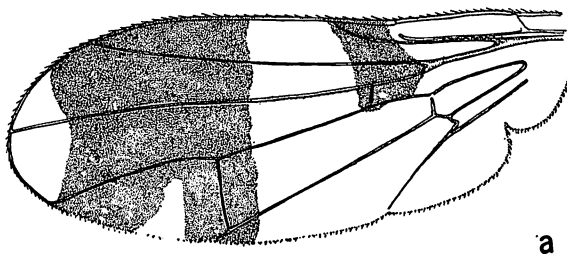


Fig. 72. *E. (S.) ormei* n. sp. a. wing.

Entirely shining black, lightly gray pubescent and short yellow pilose. Mesonotum with a yellow prescutellar spot bordered by the prescutellar bristles and dorsocentral bristles. Scutellum with a triangular dark brown mark in the middle and with border broadly yellow. Halteres pale yellow. Legs yellow except for dark brown to black middle and hind tibiae and a prominent brown posterior spot on each front and middle tibia situated at about apical 1/3 of segment. Middle tibia with 1 strong apical spur. *Wings*: Largely hyaline with a prominent dark brown spot extending from subcostal cell to vein  $M_{1+2}$  enclosing r-m crossvein. Also with a large brown preapical mark over wing from just basad of m crossvein, extending to apex of cell 2nd  $M_2$  but with apical portions of cells  $R_5$  and  $R_3$  hyaline. This brown marking is interrupted by a tiny hyaline spot at apex of cell  $R_1$  and a subhyaline wedge from margin near middle of cell 2nd  $M_2$  (fig. 72a). Subcostal cell almost 2/3 as long as 2nd costal. The r-m crossvein situated near basal 1/4 of cell 1st  $M_2$  and cubital cell with a very short, pointed lobe at apex. *Abdomen*: Predominantly dark brown to black with 3rd tergum yellow. Basal segment of ovipositor, as seen from dorsal view, approximately equal to terga 4+5, about 0.85 mm long. Abdomen densely black setose. The piercer has not been extended for study.

Length: Body, 4.8 mm; wings, 4.3 mm

♂. Unknown.

Holotype ♀, W MALAYSIA: Tai Ping, W. B. Orme, B. M. 1911-181. Type returned to the British Museum.

### Genus *Felderimyia* Hendel

*Felderimyia* Hendel, 1914, *Wien. Ent. Zeit.* **33**: 81. Type-species: *fuscipennis* Hendel, by original designation.

This genus fits Hering's concept for Euphrantini by lacking the presutural bristles. It differs from other genera of this tribe which I have seen from Southeast Asia by lacking the long fine hairs on the pleuroterga. The thoracic shape and other details appear similar to other Euphrantini and the spermathecae of the ♀ are 3 in number. This genus is readily differentiated from other Southeast Asian Tephritidae by having the wings entirely dark brown to black except for a narrow hyaline hind margin, very similar to the wing markings of *Hemilea* Loew but other characteristics are entirely dif-

ferent and the resemblance is only superficial; they fit in entirely different tribes. Also differing by lacking presutural bristles; having only 1 strong inferior fronto-orbital and 1 superior fronto-orbital; vein  $M_{1+2}$  bearing setae above; also by being large, predominantly dark brown to black species with a prominent yellow-white median vitta extending the entire length of thorax on dorsum. Three round spermathecae present in ♀.

Only 1 species is known in this genus.

**Felderimyia fuscipennis** Hendel Fig. 73a-c; pl. 8, fig. 77.

*Felderimyia fuscipennis* Hendel, 1915, *Ann. Mus. Nat. Hung.* **13**: 431. Type-locality: "Ost-Indien." Type in the Naturhistorisches Museum, Vienna. I have studied the type ♀.

The species is readily differentiated by the generic characters given above and by the wing markings (pl. 8, fig. 77).

The head is higher than long, the face slightly gibbose on the upper portion. Head yellow except for brown genae, a dark brown to black band across lower  $2/5$  of face and a faint tinge of brown in antennal furrows. Antennae yellow, 3rd segment scarcely over  $1/2$  longer than wide

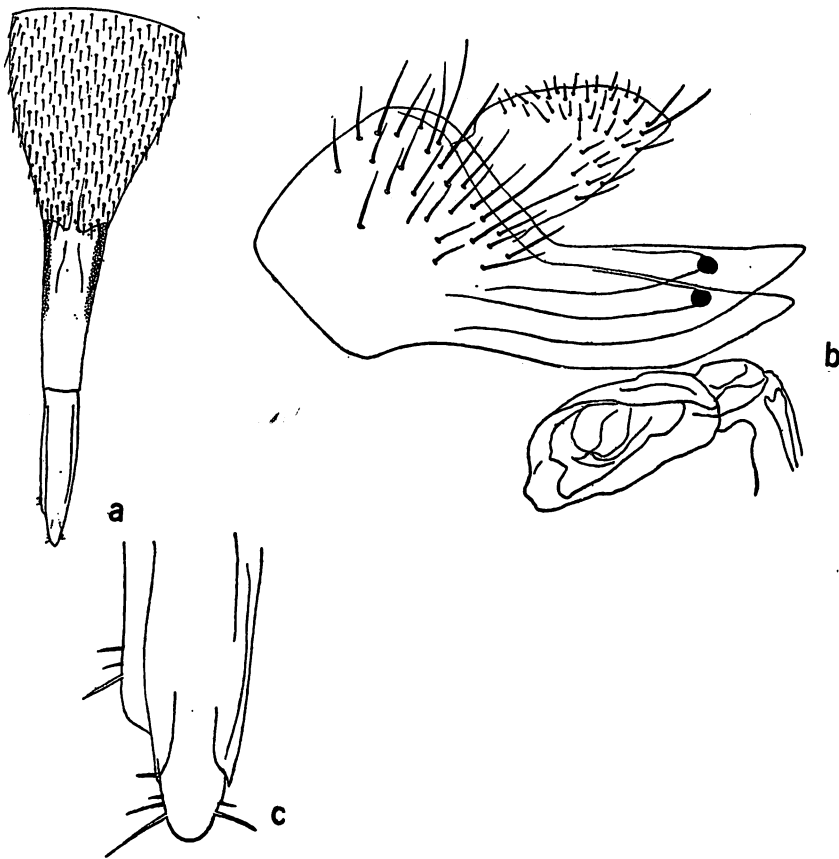


Fig. 73. *Felderimyia fuscipennis* Hendel. a. ovipositor; b. ♂ genitalia; c. ♀ apex of piercer.

and rounded at apex. Arista long plumose. Thorax predominantly dark brown to black with a yellow-white median vitta down middle of dorsum; with a yellow-white mark extending along the sides from humerus to wing base; and with the sides of the mesonotum behind the suture and the lower 1/2 of the pleura yellow, tinged faintly with brown. Mesopleura, propleura, upper portion of sternopleura, metapleura and pleuroterga polished black. Metanotum yellow-brown. Dorsocentral bristles situated almost in line with postalar bristles. Prescutellar and presutural bristles lacking. Legs yellow, tinged with brown on ventral margins of femora; tibiae tinged with brown on basal 2/3 and with the tarsi brown to black except the basal 2/3 of basitarsi which are yellow. Wings as in pl. 8, fig. 77. Abdomen polished black. Fifth sternum of ♂ nearly 2× wider than long, with a V-shaped concavity in middle of hind margin. ♂ genitalia as in fig. 73b, with the surstyli pointed. Sixth tergum of ♀ subequal to 5th. Basal segment of ovipositor black, about equal in length to terga 5+6; measured on the venter 1.4 mm. Piercer 1.05 mm long, blunt at apex (fig. 73c). Extended ovipositor (fig. 73a) 3.6 mm long. Three black, round spermathecae, each with a short apical appendage.

Length: Body, 10.0 mm; wings, 11.0 mm.

Distribution: India, Burma, Laos, Thailand.

Also refer to redescription by Hering (1940b: 29, fig. 5).

Five specimens on hand from the following localities: THAILAND: Mae Hong Son Prov., Mae Sariang Dist., area W of Mae Sariang, 210 m, 12.V.1969, J. J. S. Burton; LAOS: Vientiane Prov., Tha Ngone, 3.I.1966, native collector; BURMA: Mt Victoria, Chin Hills, 1400 m, IV.1938, G. Heinrich; and "Burma" coll. pres. E. Y. Watson, B. M. 1894.4.

#### Genus *Ptilona* van der Wulp

*Ptilona* van der Wulp, 1880, *Tijdschr. Ent.* **23**: 183. Type-species: *brevicornis* van der Wulp, by subsequent designation (Bezzi 1913: 68), equals synonym of *Rioxa confinis* Walker.

This is a Euphrantini characterized by having only 1 inferior fronto-orbital and 1 superior fronto-orbital bristle; these are placed close together below middle of front (fig. 74b). Dorsocentral bristles situated just slightly in front of a line drawn between inner postalars. Prescutellar bristles absent and ocellar bristles tiny, represented by small setae about equal in size to those in middle of front. Third antennal segment comparatively short, about 2× longer than wide, rounded at apex. Arista long plumose. Front femur of ♂ with a row of strong posteroventral bristles and ventral surface densely setose. Wings predominantly brown with hyaline wedges from the margin and a few hyaline spots in the middle (fig. 74a). Pleuroterga with rather numerous erect hairs. Crossvein r-m situated near apical 2/3 of cell 1st M<sub>2</sub> and lobe of cubital cell rather short, about 1/3 as long as Cu<sub>1</sub>+1st A. For further descriptive details refer to Bezzi (1913: 109), and Shiraki (1933: 323). Three small round spermathecae present in ♀.

Approximately a dozen species have been treated under *Ptilona*. Some of these have been removed to other generic combinations and several others are obvious synonyms. I recognize 6 apparently valid species. Much confusion has been caused by the variability in the shapes and distribution of the hyaline spots in the wing. The following key is somewhat tentative. There is probably still more synonymy involved.

#### KEY TO RECOGNIZED PTILONA SPECIES

1. Hyaline wedge from costal margin of wing beyond end of vein R<sub>1</sub> ending at or slightly before vein R<sub>4+5</sub> (fig. 74a) .....2



- Hyaline mark from costa extending through cell  $R_5$ , almost to the m crossvein (fig. 76a).  
.....5
2. Hyaline mark in cell  $R_5$  not extending across the entire cell and situated about opposite m crossvein. Cell  $M_4$  predominantly brown. .... 3  
Hyaline mark in  $R_5$  extending transversely across entire cell and situated beyond m crossvein. Cell  $M_4$  subhyaline, faintly brownish tinged. Burma. .... **dolorosa** Hering
3. A transverse hyaline streak extending over most of cell 1st  $M_2$  before m crossvein. ....4  
A small round or oblong spot present in cell 1st  $M_2$  (fig. 74a). Widespread throughout Asia and Southwest Pacific. .... **confinis** (Walker)
4. A small round spot in cell  $R_5$  opposite m crossvein and only a single isolated hyaline spot in apical part of cell  $M_4$  (fig. 55, Hering 1938: 52). Burma and possibly Thailand. .... **maligna** Hering  
A prominent oblong spot present in cell  $R_5$  and 3 spots in apical portion of  $M_4$ . Formosa. .... **persimilis** Hendel  
(These 2 are very similar and may be synonymous. I doubt that the above characters are reliable).
5. Wings with 3 isolated hyaline spots in posterior portion below vein  $M_{1+2}$  (ref. fig. 54, Hering 1938: 51). Head and appendages yellow. Legs pale yellow, marked with brownish black on outer surfaces of hind femora. Thorax with a pale yellow mark continuous from humerus over upper mesopleuron to wing base. Burma. .... **malaisei** Hering  
Hyaline mark from costa extending into upper portion of cell 1st  $M_2$  and with no hyaline spots in cell 2nd  $M_2$  or  $M_4$  (fig. 76a). Lower 1/2 of face, margin of gena, clypeus and mouthparts, except palpi, black, femora and tibiae mostly black, pleura all black. Vietnam. .... **nigrifacies**, n. sp.

### **Ptilona confinis** (Walker) Fig. 74a-f.

- Rioxa confinis* Walker, 1857, *J. Proc. Linn. Soc. Lond.* **1**: 132. Type-locality: Sarawak, Borneo. Type ♀ in British Museum (Natural History).
- Themara alboguttata* Doleschall, 1858, *Natuurk. Tijdschr. Nederl. Indie* **17**: 124. Type-locality: Amboina. Type ♂ in the Zoologisches Museum, Berlin. **New synonymy.**
- Rioxa* (?) *bimaculata* Walker, 1860, *J. Proc. Linn. Soc. Lond.* **4**: 164. Type-locality: Amboina. Type ♂ in British Museum (Natural History).
- Trypeta basifascia* Walker, 1860, *J. Proc. Linn. Soc. Lond.* **4**: 158. Type-locality: Makassar. Type ♀ in British Museum (Natural History).
- Ptilona brevicornis* van der Wulp, 1880, *Tijdschr. Ent.* **23**: 185, pl. 11, fig. 7. (This was designated as the type of the genus by Bezzi, 1913). Type-locality: Java. Lectotype ♀ in Zoölogisch Museum, Amsterdam.
- Ptilona nigriventris* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 110, pl. 8, fig. 20. Type-locality: Sylhet, India. Type probably in the Zoological Survey of India collection.
- Ptilona armatipes* Hering, 1953, *Siruma Sevá* **3**: 4, fig. 4. Type-locality: Kuantun, Fukien, China. Type ♂ in "J. Klapperich" collection, Bonn.

This is the common species throughout much of Asia and the southwest Pacific. It is differentiated from other *Ptilona* by the wing markings: by having an oblong hyaline spot in cell  $R_5$  immediately above m crossvein, another oblong spot near apical portion of cell 1st  $M_2$  and a pair of spots (often confluent) in lower median portion of cell  $M_4$  (fig. 74a). Wing markings and venation as in fig. 74a.

Head shaped as in fig. 74b. Thorax predominantly yellow in color, tinged with brown, with dark brown to black markings over pleura and metanotum, and mostly gray pubescent on me-

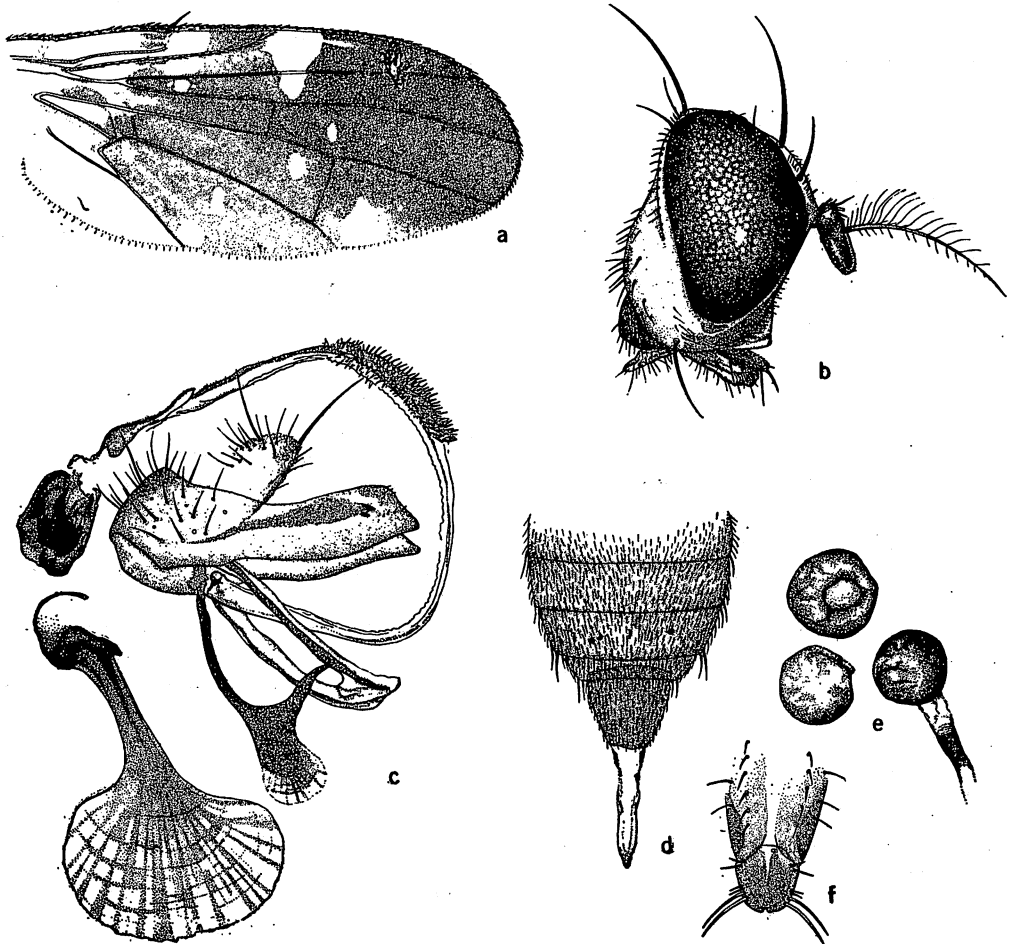


Fig. 74. *Ptilona confinis* (Walker). a. wing; b. head; c. ♂ genitalia; d. ♀ ovipositor; e. ♀ spermathecae; f. ♀ apex of piercer.

sonotum and scutellum. Scutellum entirely yellow. Legs yellow, tinged with brown on apices of middle and hind femora. In ♂ the brown discoloration appears more extensively over middle and hind femora than in ♀. Abdomen predominantly dark brown to black, the 1st tergum tinged with brown, the 2nd largely yellow and the 3rd tergum yellow at base and brown to black over remainder of segment. Remainder of abdomen black. Fifth sternum of ♂ narrow, nearly 4× wider than long and slightly concave on hind margin. ♂ genitalia as in fig. 74c. Sixth sternum of ♀ about 4× wider than long and densely covered with short black setae. Three spermathecae present; these are round. Base of ovipositor short, about equal to abdominal segments 5+6, and approximately 0.8 mm long. Piercer short, thick, blunt at apex, approximately equal in length to basal segment (fig. 74f).

Length: Body and wings, 6.0-7.0 mm.

Over 2 dozen specimens have been seen from the following localities: THAILAND: Pak Chong, 31.VIII,1936; Cholburi, 3.VII.1966; Bangkokhen, VIII.1963-30.IX 1965; Phu

Kae, 22.IX.1963; Chiangmai Prov., Pangmakampom (Pankampawny), nr Fang, 450 m, 15-16.XI.1957, J. L. Gressitt; Kanchanaburi, 10.VIII.1963, R. Kawasaki; Thapsakoe, 15.VI.1963, R. Kawasaki; Lamphang, 6.VIII.1939. LAOS: Vientiane Prov., Muong Vang Vieng, 17.III.1968, F. G. Howarth; Vientiane Prov., Muong Tourakom, 17.VII.1966, collected in bamboo thicket, F. G. Howarth; Sayaboury Prov., Muong Phieng, 400 m, 7.VII.1967, F. G. Howarth; Vientiane Prov., Ban Na Pheng, 190 m, 19.V.1968, F. G. Howarth. S VIETNAM: Fyan, 1200 m, 11.VII-9.VIII.1961, N. R. Spencer. Three specimens are in the Museum National d'Histoire Naturelle, Paris, from N VIETNAM: Tonkin, Hoa Binh.

***Ptilona maligna* Hering?** Fig. 75a-d.

*Ptilona maligna* Hering, 1938, *Ark. Zool.* 30A(25): 51, fig. 55.

Two specimens on hand may possibly be *maligna*. This species was described from Kambaiti, Burma, and is known only from the ♂. The wing markings on the specimen

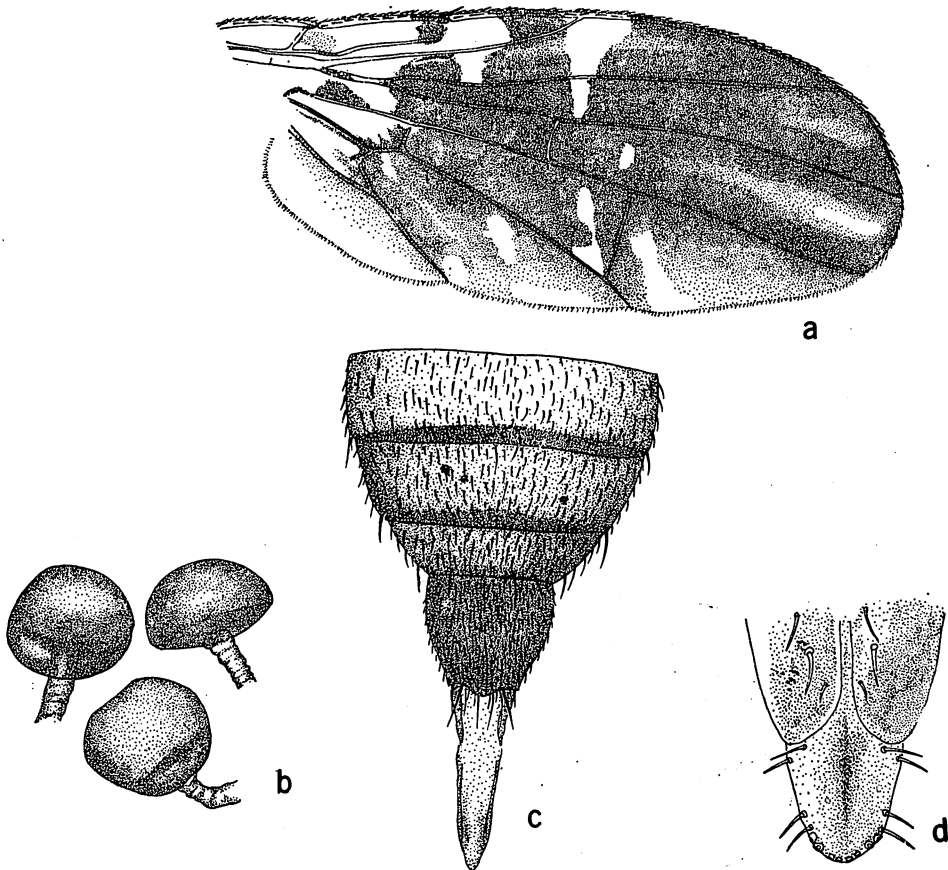


Fig. 75. *P. maligna* Hering? a. wing; b. ♀ spermathecae; c. ovipositor; d. ♀ apex of piercer.

at hand would, however, differ from Hering's figure of *maligna* by having the spot in  $R_5$  above  $m$  crossvein longer than wide, rather than round; the transverse mark in the apical portion of cell 1st  $M_2$  almost divided into 2 hyaline spots (fig. 75a), and 2 rather indistinct hyaline spots present on the wing margin in cell  $M_4$ . In the figure of *maligna* the spot at apex of cell 1st  $M_2$  is differently shaped and cell  $M_4$  has only 1 hyaline sub-apical mark. I suspect these are variable characters. Also, Hering indicates that the scutellum is brownish in *maligna*; in the specimen at hand, it is entirely yellow in ground color. It appears probable that *maligna* may be a synonym of *P. persimilis* Hendel, from Formosa; further material will have to be studied before this can be determined.

The specimen on hand would fit the description of *confinis* in most respects. All of the femora are tinged with brown. The sternopleura are predominantly yellow, brown on the upper portions. The wing of the specimen at hand is as in fig. 75a. The first 3 abdominal segments are predominantly yellow, tinged with brown especially on sides. ♀ ovipositor short, thick; piercer rounded at apex as in fig. 75d, very similar to that of *confinis*.

Length: Body and wings, 5.75-6.0 mm.

One ♀ specimen on hand, THAILAND: Chiangmai, 5.VII.1963, R. Kawasaki and 1 ♂, LAOS: Sayaboury Prov., Muong Phieng, 400 m, 7.VII.1967, F. G. Howarth.

***Ptilona nigrifacies* Hardy, new species** Fig. 76a

This species fits near *malaisei* Hering from Burma, but the body markings are very different and the wing lacks the 3 isolated hyaline spots in posterior portion which is characteristic of *malaisei* (refer to fig. 54, Hering 1938: 51). *P. malaisei* also has the head and appendages yellow; the legs yellow except for dark markings on hind femora and the thorax with a pale yellow mark continuous from humerus over upper mesopleuron to wing base. In *nigrifacies*, the lower 1/2 of face, margin of gena, clypeus and mouthparts, except palpi, black; femora and tibiae mostly black and pleura all black.

♀. *Head*: Slightly higher than long with the front gently sloping and the antennae situated at approximately the middle of head as seen from direct lateral view. With 1 strong inferior fronto-orbital situated at and just below middle of front. Ocellar bristles rudimentary, seta-like. Postocellars rather weak, equal in size to upper bristle of occipital row. Face slightly concave in middle, colored as noted above; antennal furrows shallow. Palpi yellow, with strong black bristles at apices and along outer margins. First 2 antennal segments yellow to rufous; 3rd segment brown,

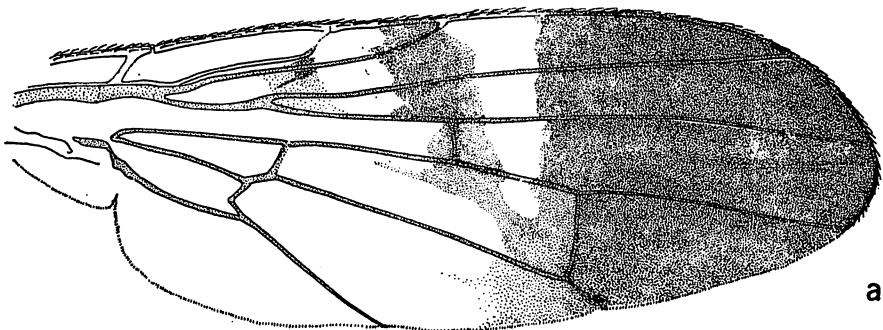


Fig. 76. *P. nigrifacies* n. sp. a. wing.

covered with gray pubescence; 3rd about 1/2 longer than wide, rounded at apex. Arista moderately long plumose. *Thorax*: Mesonotum mostly yellow with a large elongate median black mark extending from inner scapular bristles almost to dorsocentral bristles; this marking partially interrupted medianly by a narrow yellow vitta extending about 2/5 the distance through posterior portion and a narrow yellow median vitta through anterior 1/3. Also, with a postsutural narrow dark brown to black vitta extending posteriorly almost to a level with inner postalar bristles; and a large black spot extends behind each humerus to suture. Mesonotum densely gray pubescent. Humeri and notopleural calli yellow. Scutellum yellow except for a broad black mediobasal spot. Pleura entirely polished black in ground color, gray pubescent, except for a tiny spot of yellow at base of mesopleural bristle. Halteres pale yellow. Postscutellum and metanotum black, covered with gray pubescence. Dorsocentral bristles situated about 1/3 to 2/5 the distance between postalar and supraalar bristles. *Legs*: Mostly black, apices of femora and tibiae, also basal tarsomeres yellow, middle tibia with 1 strong apical spur. *Wings*: Long and slender, markings and venation as in fig. 76a. *Abdomen*: Entirely shining black, black setose. Base of ovipositor shining black, short and thick. As seen from dorsal view, the visible portion is shorter than 5th abdominal tergum; measured on the venter the basal segment is only about 0.6 mm long. The ovipositor has not been extruded for study. The tip is visible in the specimen at hand; it is blunt and rounded and contains 1 long subapical bristle on each side. Sixth tergum about 1/2 as long as 5th.

Length: Body and wings, 5.0 mm.

♂: Unknown.

Holotype ♀ (BISHOP 9968), S VIETNAM: Fyan, 1200 m, 11.VII.-9.VIII.1969, N. R. Spencer.

Type returned to the B. P. Bishop Museum collection.

#### Genus *Tetrameringophrys* Hardy, new genus

This genus is related to *Dimeringophrys* but is readily characterized by having a well developed superior fronto-orbital bristle and by having strong dorsocentral bristles. Otherwise fitting the diagnosis of that genus.

Type of genus: *T. parilis*, n.sp.

#### *Tetrameringophrys parilis* Hardy, new species Fig. 77a-e.

In most respects fitting the characteristics of species of *Dimeringophrys* but readily differentiated by the generic characters given above.

♀. *Head*: Approximately as long as high, shaped as in fig. 77c. The inferior fronto-orbital bristles are equal or slightly larger than genal bristles. The superior fronto-orbital bristles are strong, approximately equal to outer vertical bristles and situated at about the upper 2/3 to 3/4 of front. The posteromedian and posterodorsal portion of occiput is polished black on each side. A prominent black bristle present on each side of lower occiput. The median portion of front is brown for about 4/5 its length from ocellar triangle to anterior margin and the face is polished reddish brown in median portion, with a black spot on each side just above epistoma. Antennae yellow, with the 3rd segment tinged with brown and as in fig. 77c. Aristae long plumose. Palpi entirely yellow, rather broad, thickly covered with short black setae around apices. *Thorax*: Predominantly polished black in ground color on pleura, metanotum and postscutellum, predominantly dark brown, tinged with black on dorsum. Mesonotum rather densely gray pubescent especially down median portion and with a median yellow vitta extending the entire length; this is obscured by the gray pubescence. Humeri and propleura yellow, except for a brown spot on anterior margins. Notopleura clear yellow, also a narrow yellow mark along upper hind margin of each mesopleuron and along anterior margin of pteropleuron. Scutellum entirely yellow.

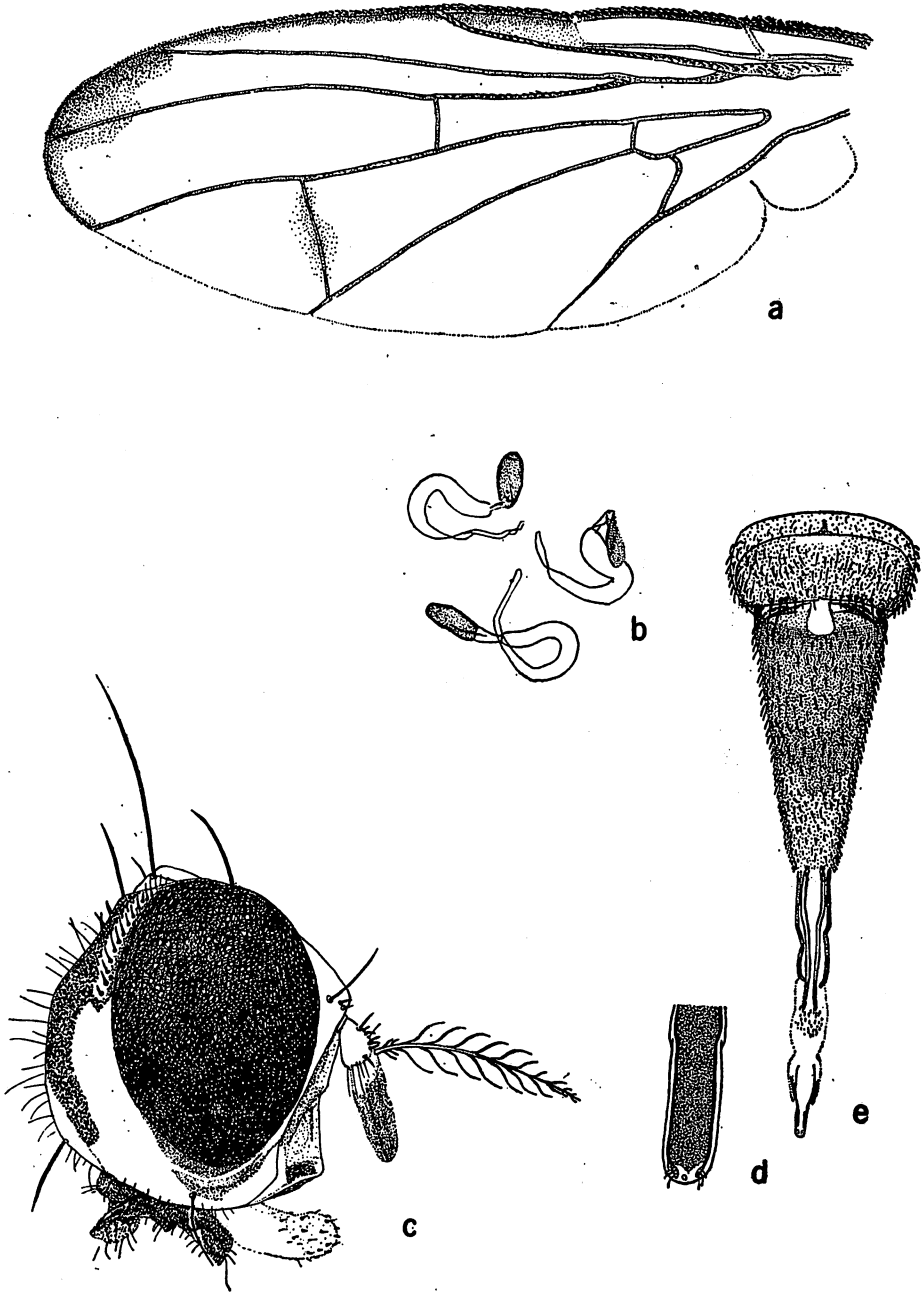


Fig. 77. *Tetrameringophrys parilis* n. sp. a. wing; b. ♀ spermathecae; c. head; d. apex of piercer; e. ovipositor.

Halteres pale yellow. Lateral margins of mesonotum predominantly brownish red. Pleuroterga thickly covered with erect pale hairs. Dorsocentral bristles well developed, equal in size to prescutellars and situated slightly in front of a line between postalars and prescutellars. *Legs*: Coxae, trochanters and most of femora yellow with a brown, preapical, posterior mark and a basal mark of brown on the front femur, the middle pair yellow except for brown on anterior surface at base. Hind femora brown on basal 1/3 to 1/2; this marking is more extensive on anterior surface. Basitarsi yellow, tinged faintly with brown, other tarsomeres brown to black. Spur of middle tibia long. *Wing*: Subhyaline, faintly infuscated, with subcostal cell pale brown, and with a narrow brown band extending along margin through apex of cell R, expanding to fill apical portion of cell R<sub>3</sub>, extending into cell R<sub>2</sub> and evanescing before vein M<sub>1+2</sub>. A faint brown mark present over m crossvein. Subcostal cell subequal to 2nd costal cell. The r-m crossvein situated at apical 3/5 of cell 1st M<sub>2</sub>, distinctly beyond middle; and lobe of cell Cu short, about 1/4 as long as vein Cu<sub>1</sub>+1stA (fig. 77a). The setae on vein R<sub>1</sub> extend almost to base of radial vein and those on vein R<sub>4+5</sub> extend just slightly beyond r-m crossvein. Three spermathecae are present (fig. 77b). These are very similar to those of *Dimeringophrys pallidipennis*. Base of ovipositor slender, rather long, approximately 1.75 mm. Basal 3/4 of base black, apical portion yellow. Piercer greatly reduced, very similar to that of *pallidipennis* and as in fig. 77d; the sclerotized portion is about 0.3 mm in length.

Length: Body and wings, 8.2-8.5 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9969), LAOS: Vientiane Prov., Ban Na Pheng, 190 m, 19 V.1968, F. G. Howarth. Type in the B. P. Bishop Museum

#### Tribe EURIBIINI

This group has been treated as a subfamily by Hering (1947: 13) and Aczél (1953: 100). I prefer to treat it as a tribe under Trypetinae. I do not see that the development of the apex of the cubital cell is of subfamily importance. Vein R<sub>4+5</sub> is naked or nearly so, and usually only 1 superior fronto-orbital bristle is present.

Only 1 known genus from Thailand fits here.

#### Genus *Cycasia* Malloch

*Cycasia* Malloch, 1942, *B. P. Bishop Mus. Bull.* **172**: 202. Type-species: *oculata* Malloch.

This would fit in the subfamily Trypetinae, tribe Euribiini, following Hendel's classification (1927: 17) but would differ in a number of characteristics from all known genera in this Tribe. The following features are diagnostic: Having a pair of large bullae on the 5th abdominal tergum. Three pairs of inferior fronto-orbital and 2 pairs of superior fronto-orbital bristles. Ocellar bristles lacking. Third antennal segment rounded at apex and arista short pubescent. Front markedly sloped with antennae situated at middle of head height. Mouthparts not geniculate. One long plus 1 medium-sized spur at apex of middle tibia. Anterior dorsocentral bristles situated about opposite anterior supraalars. Scutellum flat with 4 bristles. With row of moderately strong marginal bristles on the 4th tergum as well as by the wing markings as shown in fig. 78a and in Hardy & Adachi (1956: 14, fig. 6b). Vein R<sub>4+5</sub> with 3 or 4 setae at base above, otherwise bare.

Host: Bred from *Cycas circinalis* L., sago palm.

**Cycasia flava** Hardy, new species Fig. 78a-e.

This species is readily differentiated from the only other known species of this genus, *oculata* Malloch, by lacking an oblique brown band through subapical portion of wing (ref. fig. 1, Malloch 1942: 203 and Hardy & Adachi 1956: 14) and having a brown spot extending over almost entire apical portion of cell 2nd  $M_2$ , rather than having this portion of 2nd  $M_2$  entirely hyaline. Vein  $M_{1+2}$  curves rather sharply upward just beyond m crossvein, and in *oculata* this portion is straight. Also no black dot is present on each side in the postalar region of mesonotum as in *oculata*.

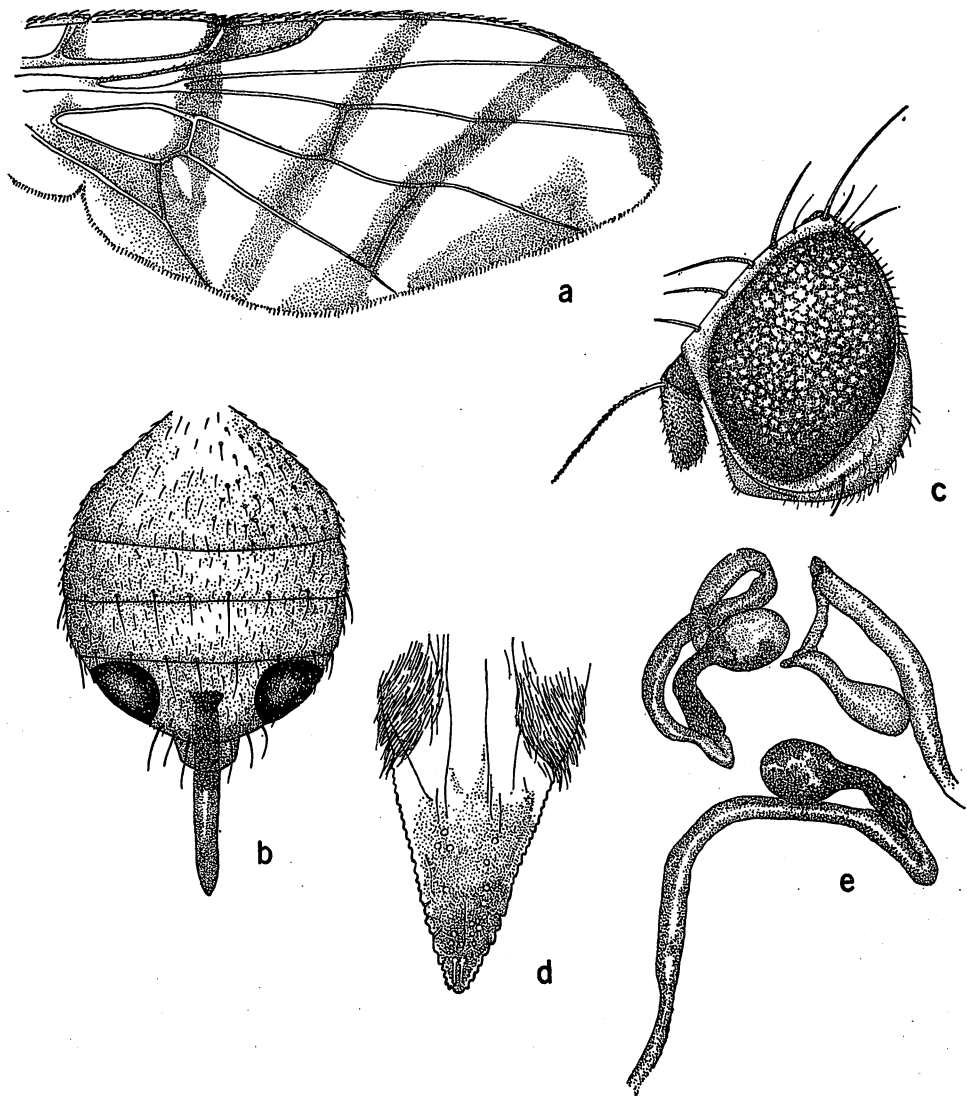


Fig. 78. *Cycasia flava* n. sp. a. wing; b. ♀ abdomen; c. head; d. apex of piercer; e. ♀ spermathecae.



♂. An almost all yellow species with a white border along upper edge of each pleuron extending over lower 1/2 of humerus. *Head*: Shaped as in fig. 78c. With rather numerous short yellow setae along orbits. Ocellar bristles entirely lacking. All head bristles yellow, very faintly tinged with brown. Upper superior fronto-orbitals about 1/2 as long as lower superior fronto-orbitals. Setae of occipital row yellow, sharp-pointed. Bristles of thorax and legs yellow, very faintly tinged with brown. *Thorax*: Mesonotum and scutellum concolorous. *Wings*: As in fig. 78a, with 4 yellow to yellow-brown crossbands: 1 rather faint at level of humeral crossvein, 1 at level of end of subcostal vein, 1 over r-m crossvein and 1 over m crossvein, the latter continuing as a marginal band around apex of wing into upper 1/3 of cell R<sub>5</sub>. Also with a gray-brown spot filling most of apex of cell 2nd M<sub>2</sub>. Subcostal cell entirely yellow, except for a dark brown transverse streak at base, and approximately 3/5 as long as 2nd costal cell. Only 1 short costal spine present. The r-m crossvein situated just beyond middle of cell 1st M<sub>2</sub>. Apex of cubital cell almost straight, slightly slanted on lower margin. *Abdomen*: Shining orange-yellow, slightly darker than thorax, covered with yellow setae and with prominent yellow bristles at apices of terga 4 and 5, and with prominent yellow setae at apices of terga 2 and 3. Fifth tergum 2× longer than 4th and with a pair of polished blue-black bullae as in fig. 78b. The genitalia have not been dissected for study.

Length: Body and wings, 4.0 mm.

♀. Fitting description of ♂ except that the gray marking in 2nd M<sub>2</sub> is confined to upper apex of cell. Sixth tergum poorly developed, not visible from dorsal view; the bullae on 5th well developed (fig. 78b). Three spermathecae; these are round with long thick necks. Basal segment of ovipositor yellow, short and thick about equal to 5th tergum; measuring 0.75 mm on venter. Piercer evenly tapered to a point at apex and 0.6 mm long (fig. 78d).

Holotype ♂ (BISHOP 9970), THAILAND: Phuket I., 26.VII.1963, collected on *Eugenia jambos*, R. Kawasaki. Allotype ♀, Thailand: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

Type and allotype in the B. P. Bishop Museum.

#### Tribe GASTROZONINI

Members of this tribe are differentiated from other Trypetinae which have 4 scutellar bristles, the scutellum flattened, and the wings lacking a prominent basal spot or black basal streaks by having the arista plumose, with the longest hairs usually equal in length to width of the 3rd antennal segment; also, the dorsal surface of the scutellum is distinctly setose. The ♀♀ all probably have only 2 spermathecae, at least in species known from Southeast Asia. The wings are never predominantly brown with hyaline wedges in the anterior and posterior margins.

Twelve genera are being treated for Thailand and bordering countries.

#### Genus *Acrotaeniostola* Hendel

*Acrotaeniostola* Hendel, 1914, *Wien. Ent. Zeit.* **33**: 80, 88. Type-species: *sexvittata* Hendel, by original designation.

A Gastrozonini characterized by the sharply-pointed 3rd antennal segment; only 1 strong spur on middle tibia; strong ocellar bristles, equal or longer than the lower superior fronto-orbitals; wings typically banded; and thorax unicolorous with scutellum, yellow to white. Chen (1948: 93) presented a key to the 10 species known by him. *A. quadrifasciata* (Enderlein) from Sumatra, and *extorris* Hering from India should be added to his list. I feel certain that *Acrotaeniostola antemata* Shiraki (1968: 49), describ-

ed from Okinawa, is a synonym of *flavoscutellata* Shiraki. This species was based on a slight difference which Shiraki saw in the shape of the dorsal surface of the 3rd antennal segment and upon having 2 genal bristles. I do not feel that these characters are of any importance and consider this a **new synonym** of *flavoscutellata*. I also agree with Hendel, Munro, and Chen in treating *scutellaris* Matsumura as a synonym of *sexvittata*. Shiraki maintained these as distinct and Ito (in press) has considered them distinct; I see no basis for this.

**Acrotaeniostola fuscinitum** Hering Fig. 79a-d; pl. 8, fig. 78.

*Acrotaeniostola fuscinitum* Hering, 1938, *Ark. Zool.* 30A(25): 16, fig. 15. Type-locality: Kambaiti, Burma. Type ♂ in University Zoological Museum, Helsinki, Finland.

Previously known only from the type. Two ♀ specimens on hand from Vietnam obviously belong here.

This species is differentiated from all known *Acrotaeniostola* by having a brown mark extending across the entire apex of the wing (pl. 8, fig. 78). The following notes are based upon the ♀ ♀ on hand.

Head yellow except for the dark-colored eyes and black ocellar triangle, and with a tinge of brown across median portion of front and in upper median portion of occiput. Two pairs each of inferior fronto-orbital and superior fronto-orbital bristles present. Ocellar bristles strong, equal in size to lower superior fronto-orbitals. Antennae rufous, tinged faintly with brown. Third segment terminating in a sharp point as in fig. 79d. Face gently concave, as seen in direct lateral view with the epistoma slightly protruding. A row of 5 or 6 black bristles present along each oral margin. Genal bristle well developed, about equal to upper superior fronto-orbital bristles. Thorax predominantly shining black with metapleura, pleuroterga, humeri and scutellum yellow-white; with a large yellow-white mark over posterior portion of each mesopleuron extending along upper margin, continuous with coloration of the humerus; coloration of the humerus continuous down each side to suture and over notopleural callus; also with a narrow postsutural yellow vitta on each side extending to inner postalar bristle. Anteromedian portion of mesonotum rufous in ground color to suture. Anterior dorsocentral bristles situated about opposite anterior supraalars. Halteres yellow. Legs yellow, except for black hind femora and dark brown to black apices of middle femora. One strong apical spur present on middle tibia and also with a row of prominent black posterodorsal bristles on middle tibia, and 3 or 4 black posteroventral bristles near base of middle femur. Hind tibia with a row of anterodorsal bristles and hind femur with 1 prominent ventral bristle near basal 1/4 of segment. Front femur with a row of strong posteroventral bristles extending entire length of segment. Wings with markings and venation as in pl. 8, fig. 78. Abdominal terga 3, 4 and basal 1/2 of 5, subshining black. Terga 1 and 2 rufous, tinged with brown. Apical 1/2 of 5th tergum and all of 6th yellow. Sixth tergum scarcely over 1/2 as long as 5th. Abdomen black setose, except for yellow setae on apical 1/2 of 5th tergum. Base of ovipositor predominantly black, tinged with rufous on apical portion. Basal segment as seen from dorsal view about equal in length to terga 3-6, 2.25 mm in length. Piercer broad, very distinctively shaped at apex (fig. 79c), and 2.25 mm in length. Extended ovipositor (fig. 79a) approximately 6.75 mm. Two spermathecae present; these are small, round, with a short thick, slightly bent neck.

Length: Body, 5.4 mm; wings, 6.0 mm.

Two ♀ ♀ on hand from following localities in S VIETNAM: Fyan, 1200 m, 11.VII.9.VIII.1961, N. R. Spencer; M'Drak, E of Ban Me Thuot, 400-600 m, 8-19.XII.1960, C. M. Yoshimoto.

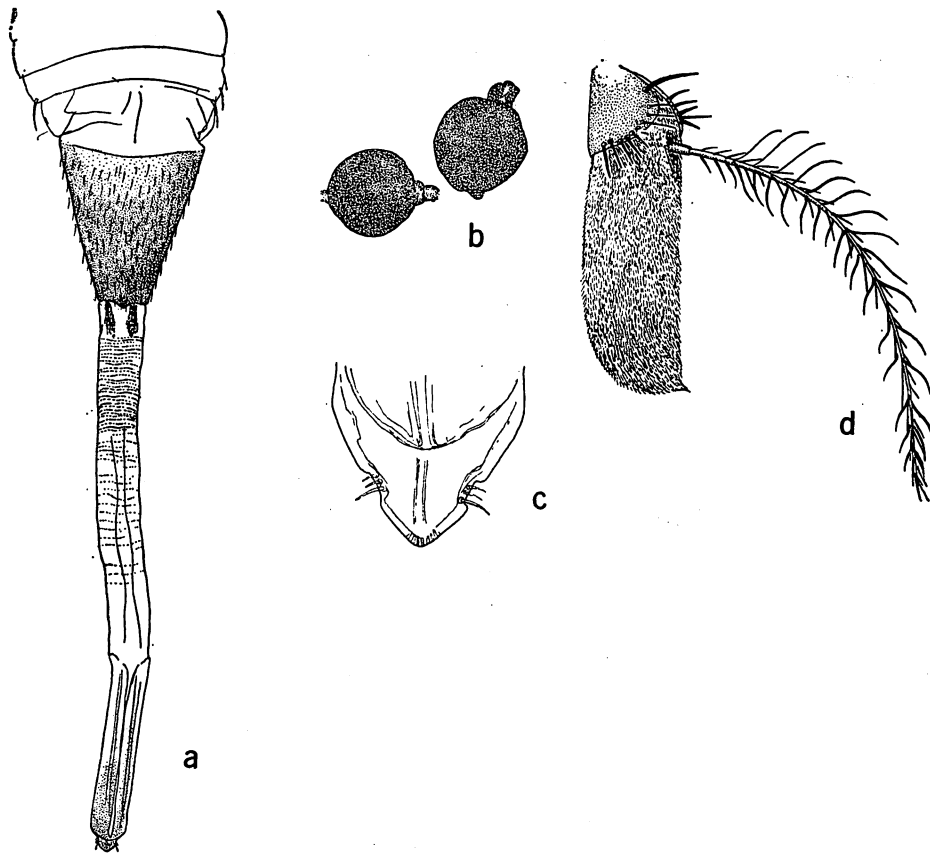


Fig. 79. *Acrotaeniostola fuscinotum* Hering. a. ovipositor; b. ♀ spermathecae; c. apex of piercer; d. antenna.

***Acrotaeniostola quadrifasciata* (Enderlein) Fig. 80a-h.**

*Spilograpta quadrifasciata* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 436. Type-locality: Sumatra.

Type ♀ in Zoological Institute, Warsaw.

*Acrotaeniostola rubra* Chen, 1948 *Sinensia* **18**: 95, fig. 6. **New synonymy**, based upon a comparison of Enderlein's type in the Zoological Institute, Warsaw, with the original description and figure of *rubra*. *A. rubra* was described from Tonkin, North Vietnam. The type is in Musée Heude.

This species is readily recognized because of the all yellow to rufous thorax and legs and the presence of 4 brown vertical bands across the wing (fig. 80a).

The head is yellow except for the red-brown compound eyes. The abdomen is brown to black, tinged with rufous. The 3rd antennal segment is shaped as in fig. 80b. The arista is short plumose; the longest rays are scarcely over 1/2 the width of the 3rd segment. Three pairs of inferior fronto-orbitals, 2 pairs of superior fronto-orbitals. Ocellar bristles approximately equal in size to lower superior fronto-orbitals. The 5th sternum of the ♂ is 2 × longer than wide

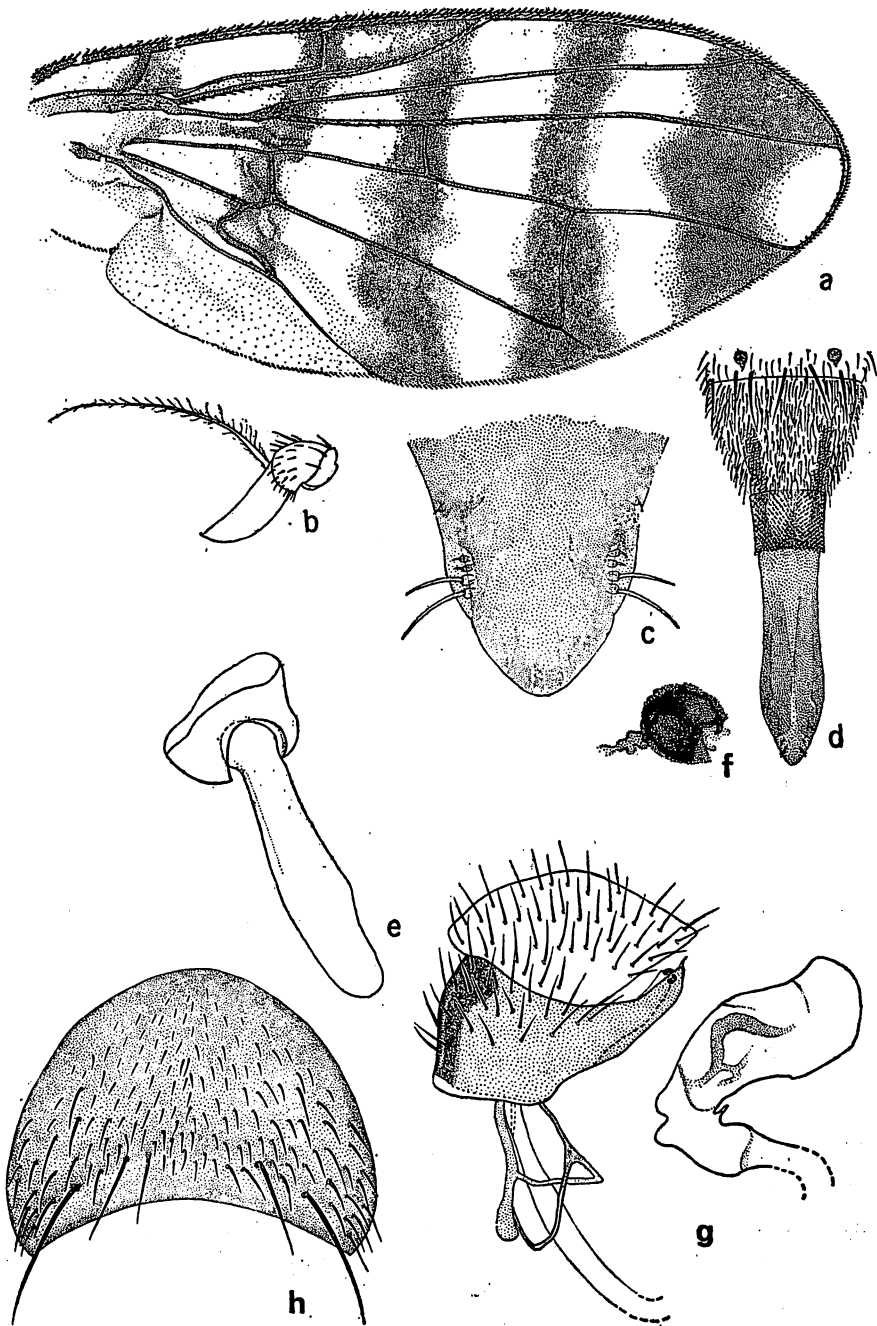


Fig. 30. *A. quadrifasciata* (Enderlein). a. wing; b. antenna; c. apex of piercer; d. ovipositor; e. ♂ ejaculatory apodeme; f. ♀ spermatheca; g. ♂ genitalia; h. ♂ 5th sternum.

and gently concave on posterior margin. The entire surface is densely setose (fig. 80h). The lobes (surstyli) of the 9th tergum (epandrium) are long and slender; each terminates in a prominent spine at apex. The 10th sternum has 2 blunt teeth at apex of each lobe. The anal plates are pointed ventrally (fig. 80g). The ovipositor is rather short and broad, the basal segment is very densely brown to black setose, and is scarcely longer than abdominal segment 5+6. The piercer is evenly tapered, broad at apex as in fig. 80c.

Length: Body and wings, 6.0 mm.

Distribution: Sumatra, Vietnam, Thailand.

Host: Bamboo; this has been reared from bamboo shoots at Bangkok.

Six adults, 3 teneral, plus 2 puparia, from THAILAND: Phukae, 19.IX.1965, and Bangkok, Klongsiv, 27.I.1967, reared ex bamboo. Also 3 specimens are in the British Museum (Natural History) from Malaya; 1 specimen is in the Paris Museum from Tonkin; and 1 from LAOS: Vientiane, 31.V.-3.VI.1960, S. Quate is in B. P. Bishop Museum.

### *Acrotaeniostola spiralis* Munro Fig 81a-d.

*Acrotaeniostola spiralis* Munro, 1935, *Rec. Ind. Mus.* **37**: 18, fig. 1. Type-locality: Bengal, India.

Type in the Zoological Survey of India collection, Calcutta. Based upon 1 ♀ specimen.

♂ specimens on hand from Laos are evidently this species although the mesonotum is black rather than brown as was described by Munro and the abdomen is predominantly black, yellow over first 2 terga and with a yellowish tinge down median portion of 5th tergum. The type was described as having the abdomen "yellowish-brown, more or less shining brownish-black on segments 4, 5 and 6 and on sides of third." The wing markings and other details seem to fit perfectly and I do not question but that this is *spiralis*. It is probable that this species also occurs in Thailand.

A very characteristic species readily recognized by the striking wing markings. The wing is predominantly hyaline with narrow brown costal band extending from apex of 2nd costal cell to wing tip at about middle of cell  $R_5$ ; this band is continuous as a transverse band across wing at apex of basal cell (cell M), curving obliquely through hind portion of cell  $M_4$  along vein  $Cu_1$  and vein  $Cu_1+1st A$  to wing margin; extending along wing margin to end of vein  $M_{3+4}$ , then extending along m crossvein and ending about  $3/4$  to  $4/5$  of the distance through middle portion of cell  $R_5$  (fig. 81a). A brown subbasal streak also extends across wing at a level with humeral crossvein. Vein  $R_1$  is setose throughout its length, vein  $R_{4+5}$  is setose to a level just slightly beyond apex of vein  $R_{2+3}$ . The basal portion of radial vein is rather thickly setose to a level below humeral crossvein. Vein  $R_{2+3}$  is very gently curved. Cell  $R_1$  is comparatively short, about  $2/3$  as long as 2nd costal cell. The r-m crossvein is situated at middle of cell 1st  $M_2$ . Cubital cell with a rather long lobe; this is equal in length to vein  $Cu_1+1st A$ . Three pairs of inferior fronto-orbital bristles are present. The ocellar bristles are equal in length to lower superior fronto-orbitals. The antennae are shaped as in fig. 81b. The hairs of the arista are slightly shorter than those of *Gastrozoma*; the longest rays are not quite equal to the width of 3rd antennal segment. The mesonotum of the specimen at hand is predominantly black, covered with short yellow-gray to blackish setae; the humeri and lateral margins of mesonotum are yellow. The anterior  $2/3$  of the pleura are yellow, the posterior portion is brown. The front and middle legs are yellow. The hind femora are blackened on their apical  $2/5$ , also the hind tibiae are tinged with brown. The scutellum is ivory white with rather sparse yellow setae. Munro described the type as having the scutellum yellow. The ♂ genitalia are as in fig. 81d. The lobes of 9th tergum (surstyli) are black ventrally and each is rounded at the apex. The 10th sternum (the outer claspers of Munro 1947: 75) are well developed, each terminates in a black blunt projection at apex (fig. 81d). There is no evidence of anal papillae. The 5th sternum is gently concave on posterior

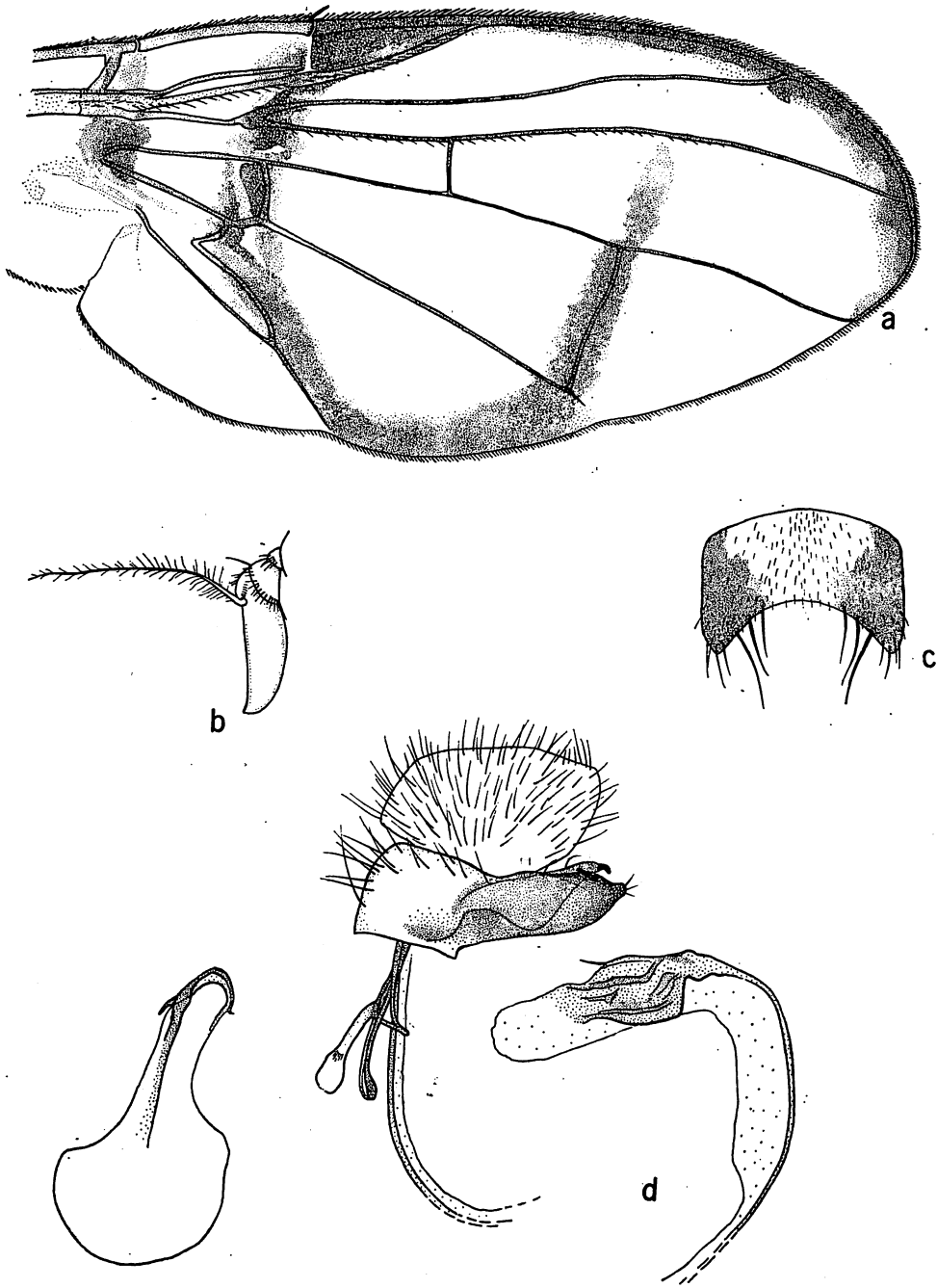


Fig. 81. *A. spiralis* Munro. a. wing; b. antenna; c. ♂ 5th sternum; d. ♂ genitalia.

margin. The sternum is brown on the sides, yellow on median portion. The anteromedian portion of 5th sternum is densely setose (fig. 81c).

Length of the specimens on hand, body and wings, 5.8-6.0 mm. Munro measured the type ♀ as 6.6 mm for the wing, and 7.1 mm for the body, apparently including the ovipositor base.

A specimen in the Frey collection, University Museum, Helsinki, from Laos, labeled as a n.sp. of *Chaetostoma* is *A. spiralis*. Also 1 from LAOS: Vientiane Prov., Ban Van Eue, 15.IX.1967, native collector, Bishop Museum.

#### *Acrotaeniostola* new species? poor condition

One ♂ specimen on hand from S VIETNAM: Fyan, 900-1000 m, 11.VII.-9.VIII.1961, N. R. Spencer apparently is undescribed, but is in poor condition.

An almost all yellow species characterized from other known *Acrotaeniostola* by having apical portion of wing predominantly brown, lacking a complete hyaline band across wing, distad of m crossvein. The wing markings are as follows: base of wing hyaline to apex of 2nd costal cell, with narrow streak of brown extending across wing to hind margin from near base of cell R at level with forking of veins  $R_{2+3}$  and across the fork of vein  $M_{1+2}$  and  $M_{3+4}$ . Subcostal cell dark brown to black and with a broad dark brown to black streak extending across entire wing mostly basad of r-m crossvein but enclosing the crossvein. A broad hyaline area across wing between r-m and m crossveins, another large hyaline mark extending from just before apex from cell  $R_1$  through cells  $R_3$  and  $R_5$  to vein  $M_{1+2}$  just above m crossvein. Apex of cell  $R_3$  hyaline and also a prominent hyaline spot in apex of cell 2nd  $M_2$ . Abdomen yellow except for a broad black band across base of 3rd tergum interrupted in middle of segment; also lateral margins of terga 4 and 5 broadly polished black.

The specimen has been returned to the B. P. Bishop Museum.

#### Genus *Callistomyia* Bezzi

*Callistomyia* Bezzi, 1913, *Mem. Ind. Mus.* 3: 124. Type-species: *pavonina* Bezzi, by original designation.

This genus is readily recognized by the presence of a row of short spine-like anteroventral and posteroventral bristles on apical portions of each middle and hind femur; by the presence of a strong, black, propleural bristle; by the distinctive wing markings, a large brown apical wing spot and a brown transverse band over wing at level with the r-m crossvein; also by lacking prescutellar and ocellar bristles.

Hering (1941d: 13) has treated this as an Euphrantini by having spines on the femora and "prsut" (presutural) bristles lacking. I am sure Hering meant that the prescutellar bristles are lacking, not presutural. I would doubt the placement in Euphrantini since the pleuroterga are not haired. It would appear to fit nearest to Gastrozonini, although the arista are very short haired. It should also be noted that Shiraki (1933: 292) stated that *Callistomyia* have no presutural or dorsocentral bristles; Chen (1948: 81) also stated "dorsocentral bristles wanting." This is not correct, the dorsocentrals are present but are posterior in position, situated just slightly in front of a line drawn between the postalar bristles. Malloch's description (1939a: 447) of this genus is correct.

Five species are presently known from the Oriental and Australasia Regions; these are keyed in the monograph of Philippine Tephritidae (Hardy, in press).

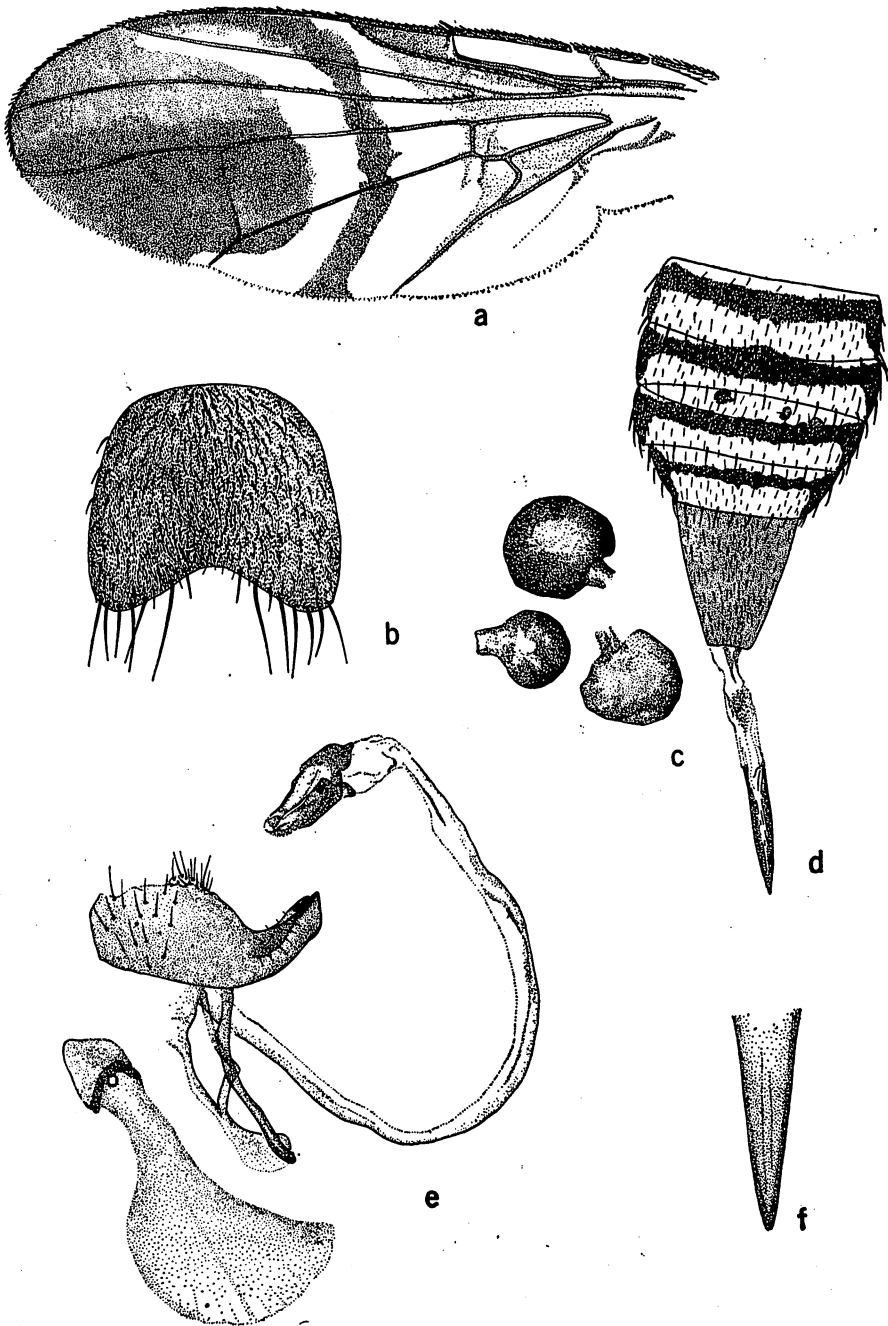


Fig. 82. *Callistomyia pavonina* Bezzi. a. wing; b. ♂ 5th sternum; c. ♀ spermathecae; d. ♀ abdomen; e. ♂ genitalia; f. apex of piercer.



**Callistomyia pavonina** Bezzi Fig. 82a-f.

*Callistomyia pavonina* Bezzi, 1913, *Mem. Ind. Mus.* 3: 125, pl. 9, fig. 36. Type-locality: Calcutta. Type in Zoological Survey of India collection.

This species is differentiated from other *Callistomyia* by having a prominent black spot on lower median portion of face, the abdominal terga with complete black bands on basal margins, and the apical brown spot in wing isolated by a hyaline band (fig. 82a). The wing markings and venation are as in fig. 82a. Fifth sternum of ♂ longer than wide, the hind margin gently concave (fig. 82b). The ♂ genitalia are as in fig. 82e, the 10th sternum is plainly visible from lateral view and the ejaculatory apodeme is very large. The ♀ has 3 spermathecae. The ovipositor is shaped as in fig. 82d. The piercer is slender, sharply pointed. This species has been adequately described by Bezzi and by Shiraki (1933: 293).

This has been recorded from India and Formosa. I also have specimens on hand from CHINA: Kwangtung Prov., Luichow Peninsula, and have seen specimens in the British Museum (Natural History), Museum National d'Histoire Naturelle, Paris and Zoologisches Museum, Berlin, from SUMATRA; N VIETNAM: Tonkin; LAOS: Sayaboury Prov., Sayaboury, 300 m, shaded wet woodland, 16.IV.1968, F. G. Howarth; and THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa. It is evidently widespread over much of Asia.

**Callistomyia flavilabris** Hering Fig. 83a-d.

*Callistomyia flavilabris* Hering, 1953, *Treubia* 21(3): 513, fig. 4. Type-locality: Fakal, Misool (Misol), New Guinea. Type ♂ in Natural History Museum, Leiden.

This species has been known only from the type ♂. Four specimens on hand from Malaysia appear to belong here, although they are somewhat darker in color especially on the pleura and black basal bands are present on all of the abdominal terga. It is possible that Hering's type may have been teneral or the specimens from Malaysia may represent a distinct species.

This species is differentiated from other *Callistomyia* by lacking black markings on the face. It is similar in most respects to *pavonina*. The wing markings (fig. 83a) and markings on thorax are the same in these 2. Other than as noted above, the specimens on hand would fit the original description. The ♂ genitalia (fig. 83d) are very similar to those of *pavonina*. The basal segment of the ♀ ovipositor (fig. 83c) is more elongate than in *pavonina*. It measures 1.85 mm compared to 1.35 mm. The 4 specimens on hand are from Trengganu, Malaysia, 11.IX.1963. "Dacu, Pomelo, Rambai," T. Hamada. Note the Malay names for 3 hosts listed on each label: duku=*Lansium domesticum* Corr.; pomelo=*Citrus grandis* Osbeck; rambai=*Baccaurea motleyana* Hook.

**Genus Chaetellipsis** Bezzi

*Chaetellipsis* Bezzi, 1913, *Mem. Ind. Mus.* 3: 126. Type-species: *paradoxa* Bezzi. Type ♂ in Zoological Survey of India collection.

*Poecillis* Bezzi, 1913, *Mem. Ind. Mus.* 3: 128. **New synonymy.** Type-species: *judicanda* Bezzi. Type ♀ in Zoological Survey of India collection.

This genus exhibits remarkable sexual dimorphism, accounting for Bezzi describing the 2 sexes as separate genera and species. The ♂♂ have no fronto-orbital bristles, and

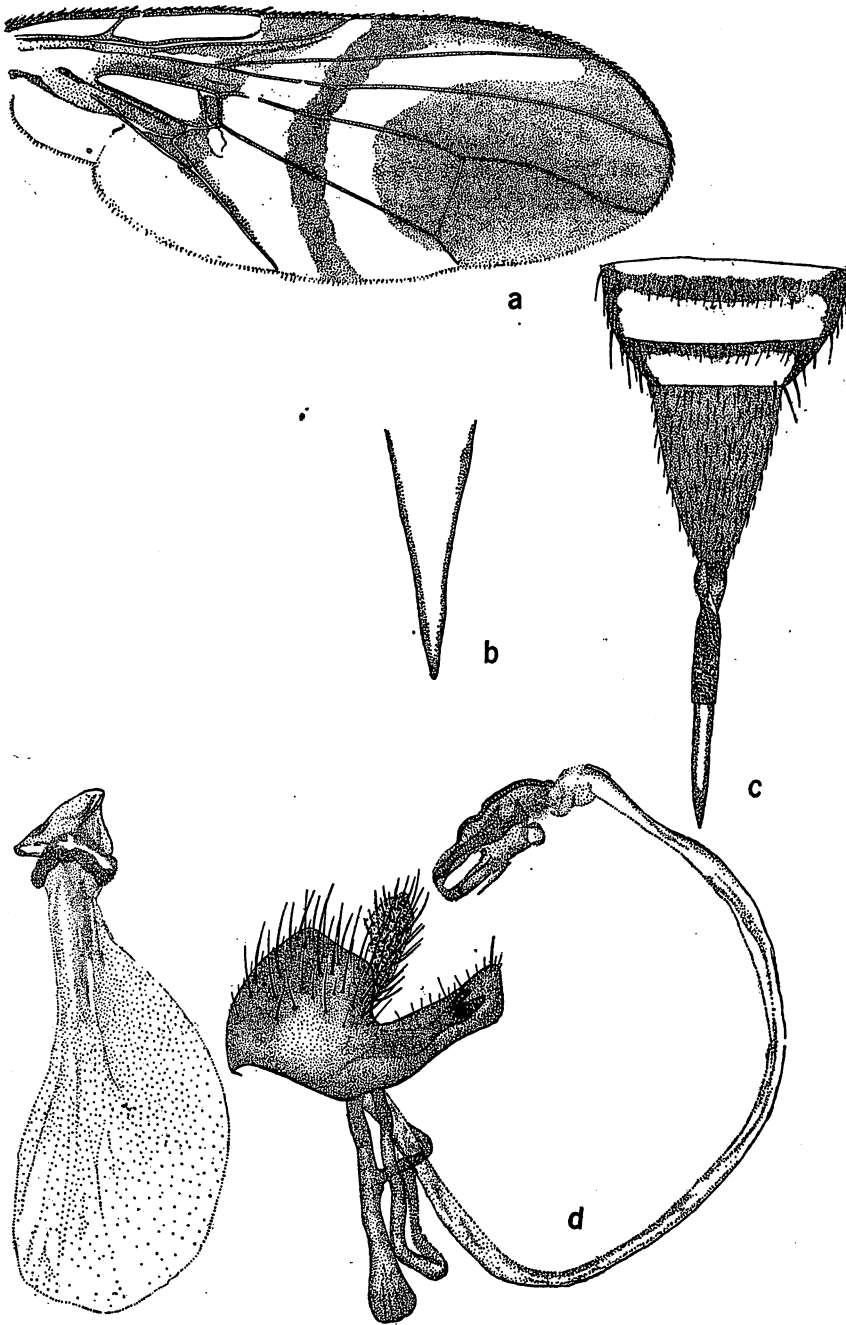


Fig. 83. *C. flavilabris* Hering. a. wing; b. apex of piercer; c. ovipositor; d. ♂ genitalia.

in the type species have the wing markings entirely yellow and the thorax lacking brown markings except at posterior corners of mesonotum and on metanotum. The ♀ has the head bristles well developed with 5 to 7 inferior fronto-orbital bristles and 2 superior fronto-orbitals, with the upper pair comparatively small, less than 1/2 as long as the lower. The wing markings are dark brown and the thorax is brown on lateral and posterior margins of mesonotum and on lower portions of pleura.

The genus is characterized by having no ocellar bristles, these are represented by a pair of small setae which are not larger than the setae on the front; by having the front rather thickly setose; arista pectinate, with moderately long rays only on the dorsal side. These are at least 3/4 as long as the width of 3rd antennal segment; 3rd antennal segment rounded; wing markings distinctive, characterized by a broad yellow (♂) or brown (♀) costal band extending to apex of wing, and except in ♂♂ of *dispilota*, n.sp. with a short subapical brown band extending obliquely to wing margin near apex of cell 2nd  $M_2$  and with a brown streak over m crossvein. Crossvein r-m situated distinctly beyond middle of 1st  $M_2$  and subcostal cell about 4/5 as long as 2nd costal cell. Scutellum flat or nearly so, sparsely setose. Dorsocentral bristles situated opposite anterior supraalar. The wing markings are totally different in the 2 sexes: in the ♀, the broad anterior margin is brown and a subapical oblique brown band and a brown spot over m crossvein are the only markings present on lower 1/2 of wing (fig. 84c). In the type of the genus, the ♂ has a broad yellow streak through posterior portion of wing from r-m crossvein and the mark across m joins to the transverse subapical band. In *dispilota*, the ♀ wing is similar to that of the type and the lower 1/2 of the ♂ wing is predominantly brown with hyaline spots as in fig. 84b.

Three species are now known in this genus.

#### KEY TO KNOWN SPECIES OF CHAETELLIPSIS

1. Scutellum yellow, except for a narrow brown to black line across base. ....2  
Scutellum with a pair of rather large, opaque black spots at base. India and Thailand. ...  
.....*dispilota*, n.sp.
2. Mesonotum mostly yellow to rufous, lacking a median vitta. Femora yellow to rufous.  
India, Burma, and Thailand. ....*paradoxa* Bezzi  
Mesonotum shining black on sides and posteriorly and with a black, median vitta extending  
the entire length. Apices of mid and hind femora blackened. Laos. ....*atrata*, n.sp.

#### *Chaetellipsis atrata* Hardy, new species

This species is differentiated from other known members of this genus by having the thorax predominately shining black, with a pair of submedian yellow vittae on mesonotum in line with dorsocentral bristles, extending posteriorly about 2/3 the distance between dorsocentrals and prescutellar bristles. It fits closest to *dispilota*, n.sp. and in some specimens of the latter the ♀♀ have a faint indication of a median vitta extending down mesonotum. It is differentiated by having the scutellum entirely yellow except for a very narrow black line along base, rather than having a pair of rather large basal, dark brown to black spots as in *dispilota*. Otherwise fitting the description of *dispilota* except for the blacker coloration of the thorax; also the front appears to be less densely setose. I see no differences in the wing markings and the details of the piercing structure of the ovipositor have not been compared. The basal segment of the ovipositor is about

1/3 longer than wide and measured on the venter is 1.7 mm in length. Piercer has not been studied.

Length: Body, excluding ovipositor, and wings, 6.0-6.2 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9971), LAOS: Vientiane Prov., Ban Van Eue, 15.VIII.1966, "native collector, Rondon." One paratype ♀, same locality as type, 15.IX.1967, native collector.

Type returned to B. P. Bishop Museum. Paratype in University of Hawaii collection.

**Chaetellipsis dispilota** Hardy, new species      Fig. 84a-h.

This species is closely related to *paradoxa* Bezzi and is readily differentiated by the presence of 2 rather large, opaque, black spots at base of scutellum in both sexes, rather than having scutellum entirely yellow except for a very narrow brown to black line across base. Both the ovipositor base and the piercer are distinctly longer in *dispilota*; the latter measures 4.45 mm compared to 3.5 mm for *paradoxa* and the piercer is more evenly tapered at apex, not so blunt as in *paradoxa*. *C. dispilota* ♀♀ also have at least an indication of a brown median vitta on anterior portion of mesonotum. In *paradoxa* the median portion of the mesonotum is entirely pale. The ♂♂ of the 2 species are strikingly different. The lower 1/2 of the wing in *dispilota* is predominantly dark brown with hyaline spots (fig. 84b); the front tibiae are very densely ciliated (fig. 84d) and the front basitarsi are distinctly swollen, equal in width to apices of tibiae. In *paradoxa* the ♂ wing lacks the brown markings, the front tibiae lack ciliation and the basitarsi are not swollen. The markings on the abdomen are entirely different. In *paradoxa* terga 3 and 5 are yellow except for a brown spot on each posterolateral margin. In *dispilota* terga 3-5 each have a broad shining black band across hind margin.

♂. *Head*: Entirely yellow except for the dark reddish brown eyes. Approximately as long as high, with front flat, completely devoid of bristles and very densely yellow pilose (fig. 84a). Outer verticals and postocellars weak, about equal in size to the small genal bristle. Occiput moderately swollen, at its widest point, about 2/3 to 3/4 as wide as the eye. Antennae situated at the middle of the head, face very slightly concave as seen in direct lateral view (fig. 84a). Antennae yellow, 3rd segment rounded (fig. 84a), arista pectinate with longest rays about 1/2 the width of 3rd antennal segment. *Thorax*: Predominantly yellow to rufous, dark brown to black on posterior border of mesonotum and on postscutellum, metanotum, and lower portions of metanotum and pleurotergon. Humeri, upper 2/3 of each mesopleuron, upper part of pteropleuron at wing base and upper portions of metapleuron and pleurotergon, also major portion of scutellum white, tinged faintly with yellow. Mesonotum faintly gray pubescent, but the rufous ground color is not obscured. *Legs*: Entirely yellow, front tibia and basitarsus densely yellow ciliated on dorsal surface (fig. 84d). Basitarsus distinctly swollen. *Wings*: As in fig. 84b. Anterior margin broadly yellow, tinged faintly with brown, posterior portion predominantly dark brown, with a hyaline spot in cell R<sub>5</sub> beyond the r-m crossvein. With 2 hyaline spots in cell 1st M<sub>2</sub> and with hyaline markings from the wing margin at apices of cells R<sub>5</sub>, M<sub>2</sub>, M<sub>4</sub> as in fig. 84b. *Abdomen*: Predominantly pale yellow with broad shining black bands at bases of terga 3 and 4, and with the 5th tergum largely shining black, yellow at the apex. The 5th sternum about 2 × wider than long, slightly concave on posterior margin and with a small dark brown to black spot at each hind corner. The 5th sternum about 2 × wider than long, slightly concave on posterior margin and with a small dark brown to black spot at each hind corner. The 5th sternum is

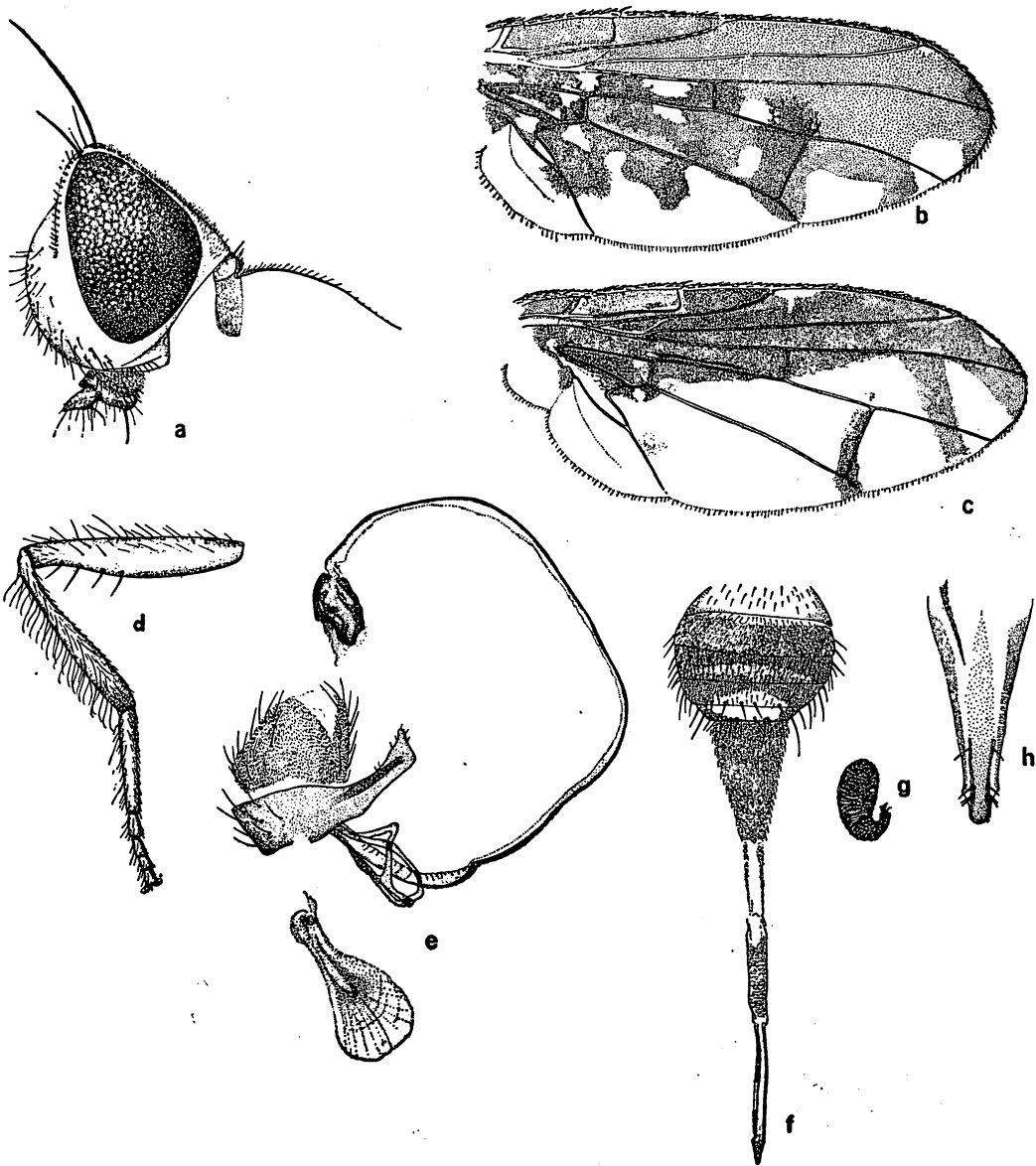


Fig. 84. *Chaetellipsis dispilota* n. sp. a. head; b. ♂ wing; c. ♀ wing; d. front leg; e. ♂ genitalia; f. ♀ abdomen; g. ♀ spermatheca; h. apex of piercer.

densely setose. ♂ genitalia as in fig. 84e. One very prominent rectal papilla extrudes from the anus (fig. 84e). In *paradoxa*, the papillae are very small, scarcely protruded beyond the membranous area.

Length: Body, 5.5–6.0 mm; wings, 6.0–6.75 mm.

♀. Differing strikingly from the ♂ as pointed out above, with the same pair of black basal

spots on scutellum, but with mesonotum considerably darker in color, brown to black on sides and posterior margin, and with at least an incomplete brown median vitta from anterior margin; in the allotype this extends approximately to suture. It should be noted that in the 2 specimens from Thailand the thoracic markings are darker than in the Indian specimens. The wing markings are as in fig. 84c. The middle and hind femora are brown at their apices, much darker in the specimens from Thailand. The abdomen has the first 2 terga entirely yellow-white, the 3rd polished dark brown to black, and the 4th and 5th black on bases and on sides, yellow-white apically. Sixth tergum yellow except for brown lateral margins. The basal segment of the ovipositor is equal to abdominal segments 3-5 and is approximately 1.7 mm in length. Piercer rather slender, evenly tapered at apex, but blunt at extreme tip (fig. 84h). Length of piercer 2.3 mm. Two oblong spermathecae with short, sharply curved necks.

Holotype ♂ (BISHOP 9972), INDIA: Uttar Pradesh, Ranikhet, VI.1950, F. A. Bianchi. Allotype ♀, same locality, VI.1949, I. M. Newell. Seventeen paratypes, 9 ♂♂, 8 ♀♀, from the following localities: India: same as type; 3 km SE of Ranikhet, 1373 m, 25.IV.1959, on *Ilex dipyrena*, Newell & Bianchi; Uttar Pradesh, nr Chaubartia, 22.VI.1949, F. A. Bianchi. THAILAND: Kanchanaburi, 31.V.1962, 2 ♀ specimens, Thailand Department of Agriculture lot 2824, received from the Commonwealth Institute of Entomology, London; Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

Type, allotype, and some paratypes in the B. P. Bishop Museum. Other paratypes in the collections of the U.S. National Museum, British Museum (Natural History), Department of Agriculture, Bangkok, Thailand, and the University of Hawaii.

### **Chaetellipsis paradoxa** Bezzi Fig. 85a-c.

*Chaetellipsis paradoxa* Bezzi, 1913, *Mem. Ind. Mus.* 3: 127, pl. 9, fig. 37. Type-locality: West Bengal, India. Type ♂ in Zoological Survey of India collection.

*Poecillia judicanda* Bezzi, 1913, *Mem. Ind. Mus.* 3: 128, pl. 9, fig. 38. **New synonymy.** Type-locality: West Bengal, India. Type ♀ in Zoological Survey of India collection.

*Gastrozona flavostriata* Hering, 1938, *Ark. Zool.* 30A(25): 12, fig. 10. **New synonymy.** Type-locality: Kambaiti, Burma. Type ♀ in Zoological Museum, Helsinki. Synonymy based upon a study of a large series of specimens of both sexes from India and comparison with the types. It should be noted that *flavostriata* was placed in the genus *Poecillia* Bezzi by Hering 1941c: 112.

It is readily differentiated by the predominantly yellow body and by the wing markings as shown in pl. 8, fig. 79 and 84b-c. The wing markings show much less dimorphism than in *dispilota*, n.sp. *C. paradoxa* is characterized by its all yellow scutellum and by having the abdomen yellow except for a narrow black band across 4th tergum, a small black spot on each side of 3rd and a large black spot on each side of 5th, also the 6th tergum of ♂ with a brown spot on each side.

In the ♀ the anterior borders of terga 3-5 are brown to black and the 6th tergum has a black spot on each side. The latter is very short, scarcely 1/3 as long as 5th. The abdominal markings are apparently variable; in some specimens the broad brown to black mark covering most of 3rd tergum is interrupted in the middle and the 4th tergum is yellow except for a black spot on each side. Ovipositor characters very similar to those of *dispilota* and as in fig. 85c. Two spermathecae present; these are oblong with a short, sharply curved neck. Sexual dimorphism of the head as in *dispilota*, ♀ with approximately 5 prominent inferior fronto-orbital bristles, 2 superior fronto-orbitals and with the ocellar bristles very weak. The entire front of the ♀ is rather thickly covered with short brownish yellow setae. The ♂ is devoid of frontal bristles and

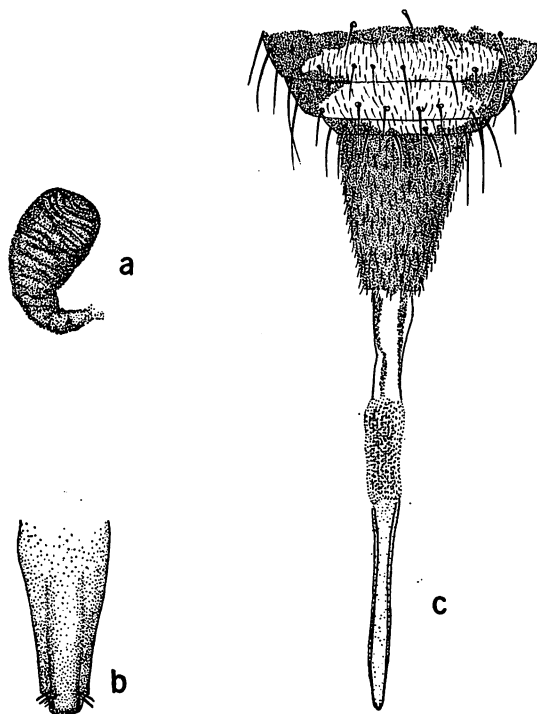


Fig. 85. *C. paradoxa* Bezzi. a. ♀ spermatheca; b. apex of piercer; c. ovipositor.

the front is densely covered with short yellow pile. Refer to pl. 8, fig. 79 for markings and venation. Bezzi's original description is adequate.

This species is common over the Indian subcontinent. I have a large series of specimens on hand from INDIA: Uttar Pradesh, Ranikhet and 1 ♂ specimen from THAILAND: Chiangmai Prov., Chiangdao, 5-11.IV.1958, T. C. Maa.

#### Genus *Dietheria* Hardy, new genus

This would seem to fit near *Ichneumonosoma* de Meijere by having only 2 scutellar bristles, but the 2 are totally unrelated and belong to different tribes. This is a Gastrozonini which rather closely resembles *Acrotaeniostola* Hendel, but is readily differentiated by having only 2 scutellar bristles; by having just 1 well developed inferior fronto-orbital bristle; and by the very large costal bristle.

Head almost quadrate, just slightly higher than long, shaped as in fig. 86a. Third antennal segment slightly pointed at upper apex. Occiput slightly swollen, about 1/2 as wide as eye. Eyes almost round. Face vertical, not concave. One pair inferior fronto-orbital bristles. A 2nd, lower bristle is represented on each side by a small, thin, black seta, usually scarcely larger than the few setae along eye orbits. Two strong pairs of superior fronto-orbitals. Ocellars very strong, longer than lower superior fronto-orbitals. Six to 8 prominent black setae along each vibrissal row. One moderately strong genal bristle. Palpus with about 8 strong black setae at apex and smaller setae along the outer margin. Humeral bristle well developed. Dorsocentral bristle situated opposite anterior supraalar. Other thoracic bristles well developed, all black, only the

lateral scutellars are present; these are very strong, about  $2/3$  longer than the prescutellar bristles. Scutellum flat or nearly so with scattered setae, these are more numerous on hind margin. Front femora and tibiae of male bristly on venter. Middle tibia with 1 large apical spur, this is about  $2/5$  the length of basitarsus. Wings banded as in fig. 86b. Subcostal cell about  $3/5$  as long as 2nd costal cell. Costal bristle very large, its length is nearly  $3/4$  the length of r-m crossvein. The r-m crossvein situated distinctly beyond middle of cell 1st M., and lobe of cubital cell approximately  $1/2$  as long as vein  $Cu_1+1st A$ . Vein  $R_{4+5}$  setose on upper side from base to a level just beyond m crossvein. Vein  $R_{2+3}$  straight.

Type of genus: *D. fasciata*, n.sp.

**Dietheria fasciata** Hardy, new species Fig. 86a-g.

♂. *Head*: As described above and as in fig. 86a. Entirely yellow, except for a streak of brown down the middle of front. Ocellar triangle and vertex immediately behind triangle black. A prominent brown to black spot is present on each side of upper occiput, behind vertical bristles. Antennae entirely yellow, 3rd segment nearly 3× longer than wide, slightly pointed at

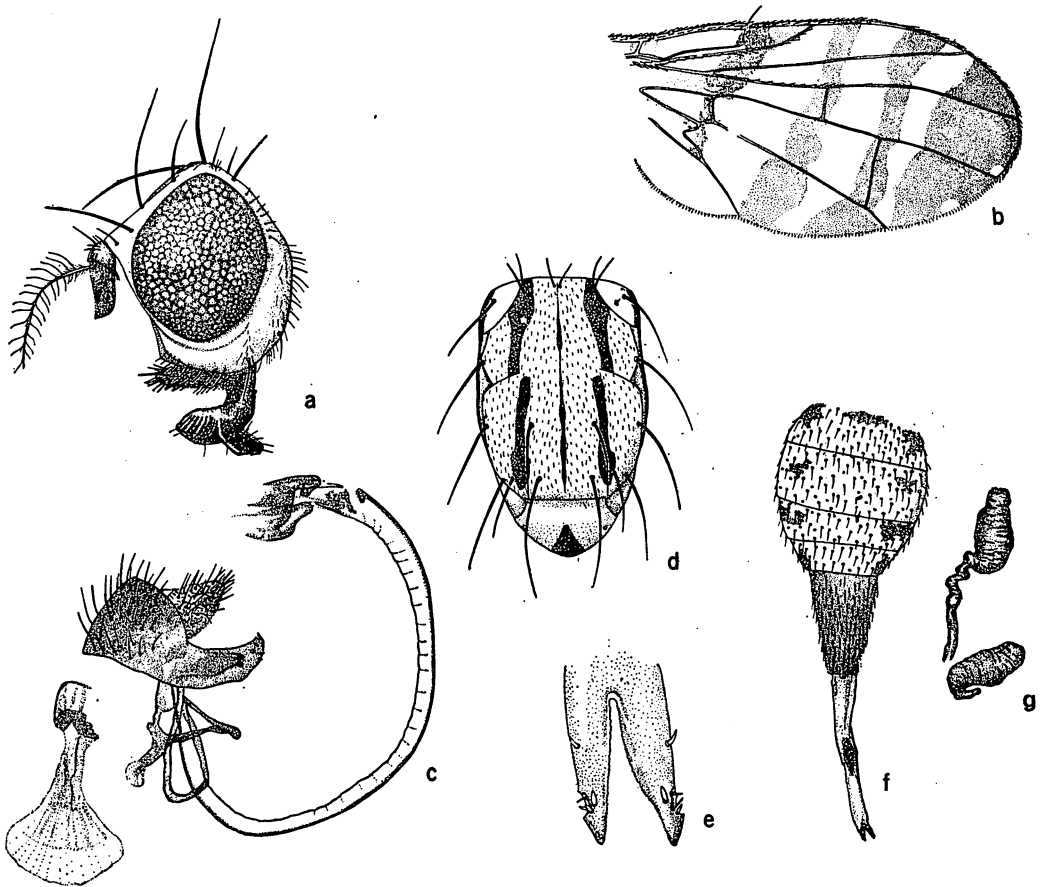


Fig. 86. *Dietheria fasciata* n. sp. a. head; b. wing; c. ♂ genitalia; d. thorax; e. apex of piercer; f. ♀ abdomen; g. ♀ spermathecae.



upper apex, but not drawn into a spine-like point. Arista long plumose, the longest rays are greater than width of 3rd segment. *Thorax*: Almost entirely yellow, with a narrow brown to black border on each side from lower part of each humerus along side of mesonotum through notopleural area to wing base; a pair of submedian black vitta in line with outer scapular bristles from near front margin of suture, interrupted slightly at suture and then extending to posterior portion of mesonotum just beyond posterior supraalar; also a very narrow, sometimes faint, brown vitta extends down middle of mesonotum (fig. 86d). Scutellum entirely yellow except for black spot at apex. Postscutellum yellow on upper margin, shining black below. Metanotum shining black. Metapleuron with a large shining black, densely gray pubescent spot occupying lower median portion. Thorax otherwise yellow. *Legs*: Entirely yellow, apical spur of middle tibia 2/5 as long as basitarsus. Front femora and tibia densely bristled ventrally; femur with a row of strong posteroventral bristles, about 3 irregular rows of smaller ventral bristles and 1 row of anteroventral bristles. Front tibia with dense covering of short black bristles on venter. *Wings*: With 4 dark brown to black transverse bands: 1 at level with lower 1/2 of subcostal cell, extending approximately to cubital cell; a 2nd and a 3rd band in line with r-m and m crossveins; and a broad band over apex of wing (fig. 86b). A tiny hyaline spot is present at apex of vein  $M_{1+2}$  and a small hyaline spot is present at apex of cell 2nd  $M_2$  in the type and most specimens. Other details of the wing markings and venation as in fig. 86b. *Abdomen*: Almost entirely yellow, rather thickly black setose. Brown to black over median portions of terga 1 and 2, and with basal portion of 2nd black. Third and 4th terga each with a dark brown to black mark on each basolateral margin and 3rd with a brown spot in middle at base of segment. Fifth tergum broadly polished black on sides with a narrow yellow vitta extending longitudinally down middle. Sterna yellow, 5th about as wide as long and densely setose; bearing 2 strong bristles on each side of hind margin. Epandrium black and highly arched as seen in side view. Remainder of genitalia yellow, shaped as in fig. 86c.

Length: Body, 5.3 mm; wings, 5.0 mm.

♀. Fitting the description of the type for the most part. Front femora and tibiae not bristly on venter. Apex of 1st tergum and bases of 2nd and 3rd black. Terga 4-6 with a brown spot on each side. Two spermathecae present; the necks are long, and coiled (fig. 86g). Base of ovipositor reddish anteriorly, black over the apical 2/3 to 3/4. Basal segment 1.2 mm in length, and slightly shorter than segments 4+5. Piercer 0.75 mm, bifid at apex, each lobe sharpened at tip and with a small subapical point on outer edge (fig. 86e). Extended ovipositor (fig. 86f) approximately 3.0 mm long.

Length: Body and wings (excluding ovipositor), 5.0 mm.

Holotype ♂ (BISHOP 9973) and allotype ♀, S VIETNAM: Ban Me Thout, 500 m, 16-18.V.1960, S. Quate. Paratypes, 23 ♂♂, 11 ♀♀, same data, S. & L. W. Quate. Also 3 paratypes, 1 ♂, 2 ♀♀, from the following localities in THAILAND (no collector given): Pak Chong, 22.VIII-19.IX.1964 and Bangkok, 15.IX.1963.

Type, allotype and a series of paratypes in the B. P. Bishop Museum. Paratypes deposited in the following collections: U. S. National Museum; British Museum; Kasetsart University, Bangkok; Applied Scientific Research Corp. of Thailand; and the University of Hawaii.

#### Genus *Gastrozona* Bezzi

*Gastrozona* Bezzi, 1913, *Mem. Ind. Mus.* 3: 105. Type-species: *Tephritis fasciventris* Macquart, by original designation.

This genus is closely related to *Taeniostola* Bezzi and there has been much disagreement in the literature concerning their status.

*Gastrozona* is differentiated from *Taeniostola* by having comparatively weak ocellar bristles, these are not larger than the lower inferior fronto-orbitals, also the wing markings are typically as in fig. 88a.

In previous literature, these genera have been separated by the nature of the bristling of the front and by the wing markings. As has been pointed out by Chen (1948: 96), some of these characters intergrade and are not of generic importance; the number of inferior fronto-orbitals is completely unreliable for separating these. I have done a complete review of all of the included species and have had an opportunity to study the types of most of these. It appears obvious that they do represent 2 distinct groups, and the most reliable single character which I find for separating them is that in all of the *Taeniostola* the ocellar bristles are very strong, equal in size to the lower superior fronto-orbital bristles. Also, the wing markings are distinctive in all but 2 of the species now included in *Taeniostola*: *limbata* Hendel from Formosa and India, and *melli* Hering from China, which have very strong ocellar bristles and have wing markings which are typical of *Gastrozona*. I have not had an opportunity to compare the genital characters in detail and they may provide reliable characteristics for separating these. Of the *Taeniostola*, I have studied the ♂ genitalia of only *limbata* and it has a very characteristic 5th abdominal sternum; this is quadrate in shape and densely setose. I have studied the ovipositors of 3 species and these are very broadly rounded at the apices. The 5th sternum of the ♂ of *Gastrozona* is as in fig. 88b and 90e, and the ♀ ovipositor is developed into a spear-like head at the apex, as in fig. 87b, 88c and 90b. The *Gastrozona*-*Taeniostola* are characterized from other Tephritidae by having a plumose arista; the dorsocentral bristles in line with the anterior supraalar; the r-m crossvein beyond middle of cell 1st M<sub>2</sub>; 3rd antennal segment rounded; scutellum setose, and bearing 4 strong bristles; 1 strong apical spine on middle tibia; wings usually banded and mesonotum often vittate; abdomen usually with 1 or more black bands on the terga; also the face is vertical, slightly produced just above the epistoma. The ♀ has 2 spermathecae in both genera. Under the present arrangement, the genus *Gastrozona* now contains 14 species and *Taeniostola* contains 10. These range from China through India, Formosa, Ryukyu Islands, Southeast Asia through Indonesia.

I am placing *Taeniostola tripunctata* Shiraki (1968: 52), Ryukyu Islands, under *Gastrozona*. This is a **new combination**. The ocellar bristles are about equal in size to the inferior fronto-orbitals in the drawing he presents. The wing is not *Taeniostola*-like and the markings are somewhat similar to those of *fasciata* (Walker).

Some species which have previously been assigned to 1 of these genera have been placed in other combinations. *Gastrozona capillata* Bezzi, *G. luteiseta* Bezzi, *G. bifasciata* de Meijere, and *G. albiscutellata* Enderlein have been moved to *Carpothorella* Hendel; *G. flavostriata* Hering is a new synonym of *Chaetellipsis paradoxa* Bezzi and *Spilographa quadri-fasciata* Enderlein is now under the combination *Acrotaeniostola* Hendel.

#### LIST OF SPECIES PRESENTLY PLACED IN *Gastrozona*

*apicemaculata* Hering, Burma; *balioptera* n.sp., Thailand; *fasciata* (Walker), Borneo; *fasciventris* (Macquart), India, Formosa, "Asia," China, Laos and Thailand (*appendiculata* Zia, *macquarti* Hendel, *melanista* Bezzi, *melanophila* Hering and *vittata* (Macquart) are synonyms); *fukienica* Hering, China; *hirtiventris* Chen, China; *isis*

Hering, Burma (poss. syn. of *fasciventris*); *montana* Bezzi, India; *orbata* Hering, Burma; *parviseta* n.sp., Thailand; *proterva* Hering, Burma, India; *solitaria* Hering, Burma; *soror* (Schiner), Indonesia, Thailand; *tripunctata* (Shiraki), **new combination**, Ryukyu Islands; and *vulgaris* Zia, China.

KEY TO KNOWN SPECIES OF GASTROZONA

1. Costa with a broad yellow to brown band continuous from near humeral crossvein to wing apex. ....2  
Costa lacking a continuous band (fig. 87a). ....3
- 2 (1). Costal band dark brown, very broad basally, extending over r-m crossvein. Mesonotum polished black. Indonesia. ....**fasciata** (Walker)  
Costal band yellow, tinged lightly with brown and with an oblique brown band extending over wing at level of r-m crossvein (ref. fig. 1, pl. 20, Shiraki 1968). Ryukyu Islands. ....**tripunctata** (Shiraki)
- 3 (1). Wing with at least a prominent brown mark on costa at middle of cell  $R_1$  (fig. 88a and 90a). ....4  
Cell  $R_1$  hyaline except for a brown spot at apex. A brown spot present at apex of vein  $R_{4+5}$ , a faint brown preapical streak on vein  $M_{1+2}$ , a pale brown mark over m crossvein and a faint band across most of hind margin from r-m crossvein (fig. 87a). Thailand. ....**balioptera**, n.sp.
- 4 (3). With a prominent oblique subapical streak of brown over apical portion of vein  $M_{1+2}$  (fig. 88a and 90a). ....5  
Wings lacking such a subapical streak, markings as in pl. 8, fig. 72. Thailand. ....**parviseta**, n.sp.
- 5 (4). Wing with a broad brown costal band extending to apex from about level of r-m crossvein, broken in middle only in *solitaria* Hering, from Burma. ....6  
Costal band broadly interrupted just beyond level of r-m crossvein. Anteroapical brown marking with 2 hyaline spots. The oblique band across wing at level of r-m crossvein is interrupted in cell 1st  $M_2$  (ref. fig. 11, Hering 1938: 13). Burma and India. ....**proterva** Hering
- 6 (5). Oblique band through apex of 2nd  $M_2$  not extending to costal band (fig. 90a). ....7  
Oblique band through 2nd  $M_2$  connected with costal band. ....10
- 7 (6). Thorax yellow-brown, sometimes with 3 black spots on posterior margin but not vittate. ....9  
Thorax with longitudinal brown to black vittae (2 in ♂, 3 in ♀). ....8
- 8 (7). Scutellum with a black apical spot in ♂ and black, yellow on sides in ♀. Indonesia, Thailand. ....**soror** (Schiner)  
Scutellum all yellow, narrowly black on base, costal band interrupted by hyaline area at apex of cell  $R_1$ . Burma. ....**solitaria** Hering
- 9 (7). Mesonotum with 3 large black spots on posterior margin, oblique band through apex of 2nd  $M_2$  not connected with band over m crossvein (fig. 7, Hering 1938: 11). Burma. ....**orbata** Hering  
Mesonotum lacking black spots. Marks over m crossvein and through apex of 2nd  $M_2$  joined in cell  $R_3$  (fig. 8, Hering 1938: 11). Burma. ....**apicemaculata** Hering
- 10 (6). Brown mark on m crossvein isolated or joined with the subapical band which extends through apex of cell 2nd  $M_2$ ; not joined with brown band over r-m crossvein (fig. 88a). ....11  
Brown band over m joined with the band which extends transversely over the wing at r-m crossvein (fig. 5, Hering 1953: 9). China. ....**fukienica** Hering

- 11 (10). Scutellum black over median portion (♀) or with a brown to black spot at apex (♂), wing as in fig. 88a. India, China, Formosa, Thailand, Laos. ....**fasciventris** (Macquart)  
Scutellum pale yellow, or black only basally. ....12
- 12 (11). Mesonotum with not more than 2 black vittae, sometimes lacking. Abdomen with entire black bands on at least some of the terga. ....13  
Mesonotum with 3 narrow black vittae on both sexes. Abdomen with a pair of black basal spots on each tergum. China. ....**vulgaris** Zia
- 13 (12). Oblique band over r-m crossvein continuous to hind margin of wing. ....14  
Not more than a short band of brown extending beyond r-m crossvein (ref. Hering 1938: 112, fig. 9). Burma. ....**isis** Hering
- 14 (13). Mesonotum with 2 longitudinal black vittae (♂). China (only ♂ known). ....**hirtiventris** Chen  
Mesonotum of ♂ lacking vittae, the notopleural mark is reduced to a small spot at the posterior notopleural bristle. India. ....**montana** Bezzi  
(I find no reliable characters for separating these and believe they are probably synonymous. Bezzi's ♂ may have been teneral).

**Gastrozona balioptera** Hardy, new species Fig. 87a-e.

This species is readily differentiated from other known *Gastrozona* by having the wing markings greatly reduced, represented by spots at apices of veins  $R_{2+3}$ ,  $R_{4+5}$  and  $M_{1+2}$  (fig. 87a); lacking a continuous oblique band from margin over wing at level with r-m crossvein; also the basal segment of the ovipositor is much larger than in other species of *Gastrozona* which I have studied, approximately equal in length to abdomen.

♂. A predominantly yellow species. *Head*: Entirely yellow except for the reddish brown eyes. Three (sometimes 4) pairs of inferior fronto-orbital bristles and 2 pairs of superior fronto-orbitals. Ocellar bristles slightly shorter than lower inferior fronto-orbitals. Face vertical, slightly produced on epistomal margin. Head rather quadrate in shape, about 1/5 to 1/4 higher than long. Occiput swollen, at its widest point about 2/3 as long as 1 eye (fig. 87c). Gena approximately 1/5 the height of eye. Compound eyes oblong, distinctly higher than long. Antenna entirely yellow, typical in shape for the genus. *Thorax*: Yellow with some brown markings on pleura, mesonotum and metanotum. Mesonotum pale except for brown posterior margin, also a faint line of brown extending anteriorly for a short distance, almost in line with each dorsocentral bristle. Pleura with a reddish brown spot on upper part of each pteropleuron, a brown mark along lower edge of hypopleuron, metapleuron and on pleurotergon. Metanotum black on sides, yellow down median portion. Scutellum entirely yellow, rather sparsely covered with erect yellow setae. *Legs*: Yellow, brown at extreme apices of mid and hind femora and on ventral surfaces of hind femora. One strong apical bristle present on middle tibia. *Wings*: Predominantly hyaline; subcostal cell brownish yellow on basal 2/3 and with a dark brown spot on apical portion; a brown spot at apices of veins  $R_{2+3}$  and  $R_{4+5}$ ; a narrow indistinct streak of brown extending just before apex of vein  $M_{1+2}$ ; a pale brown mark extending over m crossvein to wing margin and an indistinct pale band from r-m crossvein through posterior portion of wing (fig. 87a). The r-m crossvein situated at about apical 2/3 of cell 1st  $M_2$ . Details of wing venation as in fig. 87a. *Abdomen*: Yellow to rufous, dark brown to black markings on apical portion of 3rd tergum; this marking is more expanded on sides, and on extreme basal portion of 4th tergum and lateral margins of 5th. Often segments 3-5 are discolored with brown. Segments 3, 4 and basal 2/3 of 5 are densely gray pubescent. The 5th sternum is sclerotized, entirely black and has a V-shaped concavity on posterior margin. The ♂ genitalia are as in fig. 87e. The surstyli (lobes of the 9th tergum) are slender, elongate, curved upward, hook-like at apices (fig. 87e). A complexity of 8 elongate,

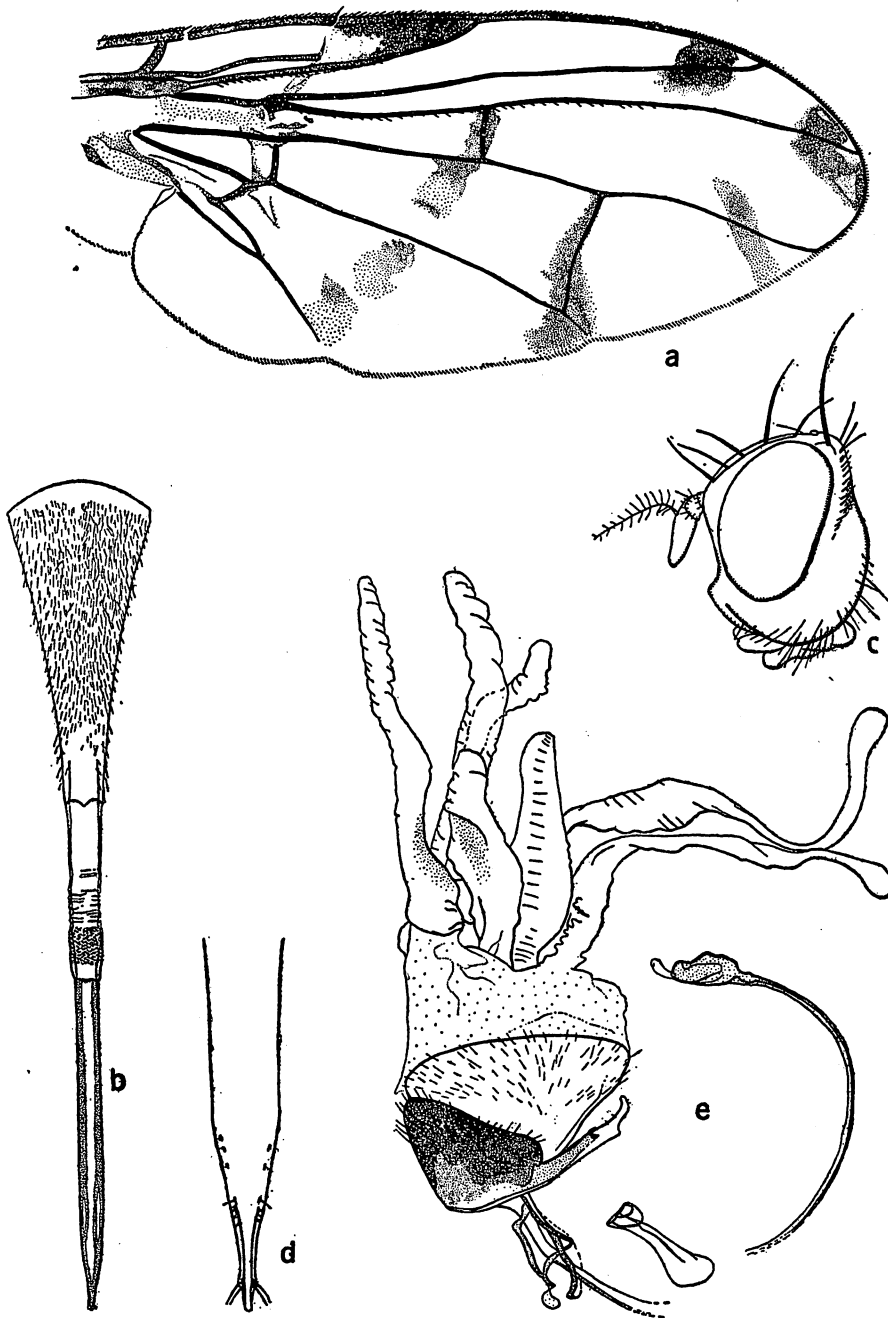


Fig. 87. *Gastrozona balioptera* n. sp. a. wing; b. ovipositor; c. head; d. apex of piercer; e. ♂ genitalia.

spiraled rectal papillae protrude from the anal region as in fig. 87e.

Length: Body, 8.3 mm; wing, 9.0 mm.

♀. Fitting description of ♂ in most respects. The 3rd tergum is broadly dark brown to black over sides, yellow in median portion. The 4th and 5th are almost entirely yellow, narrowly black on the posterior margins. Sixth tergum yellow, black on lateral margins. Ovipositor rufous, tinged with brown, verging into black at apex of basal segment; basal segment large, equal in length to remainder of abdomen. Ovipositor shaped as in fig. 87b. The piercer is slender, rather sharp-pointed at apex. Two spermathecae; these are oval with a long straight neck.

Length: Body, excluding ovipositor, 8.0 mm; wing, 8.7 mm. Basal segment of ovipositor, 3.7 mm.

Holotype ♂ and allotype ♀, THAILAND: Chiangmai Prov., Chiangdao, 6.IV.1958, lot 2409, Phon. Paratypes, 3 ♂♂, 6 ♀♀, from Thailand: same data as type; same locality as type, 5-11.IV.1958, T. C. Maa; and from BURMA: Mt Victoria, Chin Hills, 2400 m, IV.1938, G. Heinrich.

Type, allotype and 2 paratypes returned to the British Museum. Remainder of the paratypes returned to the Thailand Department of Agriculture, Bangkok and deposited in the B. P. Bishop Museum, U.S. National Museum, and the University of Hawaii collections.

#### **Gastrozona fasciventris** (Macquart) Fig. 88a-d.

*Tephritis fasciventris* Macquart, 1843, *Dipt. Exot.* 3: 382, pl. 31, fig. 2. Listed as *fusciventris* in the index, p. 459. Type-locality: India. Type ♂ in Museum National d'Histoire Naturelle, Paris.

*Tephritis vittata* Macquart, 1851, *Dipt. Exot.*, Suppl. 4: 263, pl. 21, fig. 1. **New synonymy.** Type-locality: Asia. Type ♀ in Museum National d'Histoire Naturelle, Paris. Synonymy based upon comparison of the type specimens in the Paris Museum. *G. fasciventris* was based upon a ♂ and *vittata* upon a ♀.

*Gastrozona macquarti* Hendel, 1913, *Ent. Mitteil.* 2(2): 38. **New synonymy.** Type-locality: Formosa. Type in Deutsches Entomologisches Institut, Eberswalde. Synonymy based upon a study of the type and a series of specimens from Formosa and India.

*Gastrozona melanistra* Bezzi, 1913, *Mem. Ind. Mus.* 3(3): 107, pl. 8, fig. 18. Synonymy by Shiraki (1933: 151). Type-locality: Calicut, Malabar Coast, India. Type ♀ in Zoological Survey of India collection. I have confirmed this synonymy by study of Bezzi's type and a large series of specimens from various parts of India.

*Gastrozona appendiculata* Zia, 1938, *Sinensia* 9(1-2): 22, text fig. 5; pl. 1, fig. 5. **New synonymy.** Type-locality: SE Kansu, China. Type ♂ in Musée Hoangho-Peiho, Tientsin, China. The ♂ described by Zia is clearly *fasciventris* (Macquart). Her specimen is slightly paler than usual, but in a large series of specimens on hand from India, ♂♂ are frequently seen which have no brown markings on the mesonotum.

*Gastrozona melanophila* Hering, 1940, *Siruna Seva* 1: 3. **New synonymy.** Type-locality: Formosa. Type ♂ in the British Museum (Natural History). Synonymy based upon a study of the type and comparison with specimens from throughout the range of this species.

It is also possible that *G. isis* Hering (1938, *Ark. Zool.* 30A(25): 12) may be a synonym of *fasciventris*.

Considerable sexual dimorphism is evidenced in the coloration of the thorax and abdomen, accounting for most of the above synonyms.

This species is readily characterized by having the oblique band extending through upper portions of cell 2nd  $M_2$  connected with the broad brown band at the wing margin, and a small indistinct hyaline spot present at apex of vein  $M_{3+4}$  (fig. 88a). Also, the ♀

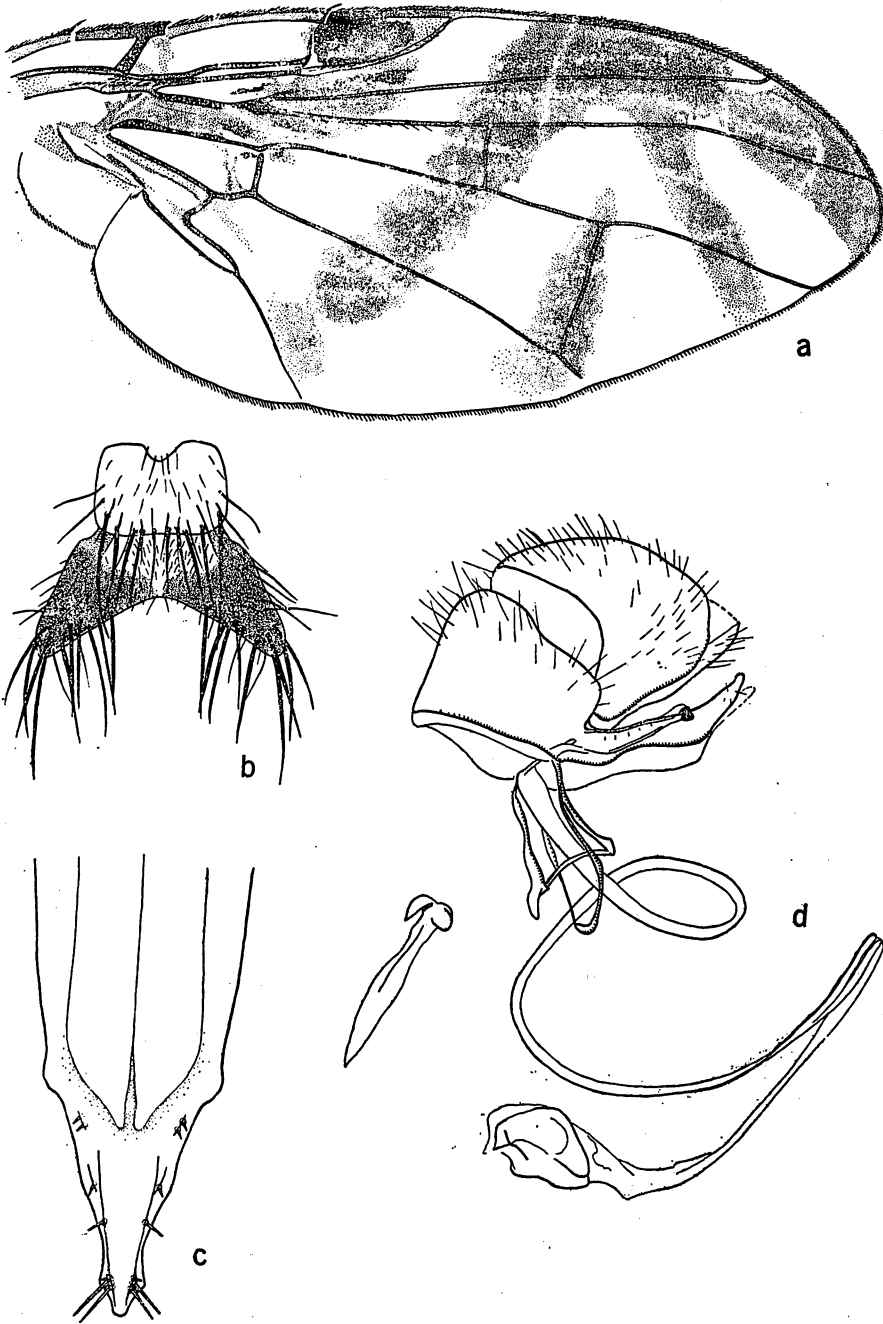


Fig. 88. *G. fasciventris* (Macquart). a, wing; b, ♂ 5th sternum; c, apex of piercer; d, ♂ genitalia.

has 3 black vittae down the mesonotum and the median portion of the scutellum is black, yellow on the sides. The ♂ typically has a pair of dark brown to black vittae on the mesonotum, 1 on each side extending from behind humerus to just slightly beyond the posterior supraalar bristle; these vittae are often interrupted at the suture and in some specimens may be lacking completely. Some ♂ specimens have a faint indication of a median vitta as in the ♀. The scutellum has an apical black spot in the ♂. The ♀ has the apical 1/2 of the 2nd tergum and the narrow basal portions of 3rd and 4th terga black. The piercer of the ovipositor is shaped as in fig. 88c. Two spermathecae are present. In the ♂, the 3rd tergum is dark brown to black and the narrow basal portion of the 4th is discolored with black. Also a black mark is present on each lateral margin of the 5th tergum of the ♂. No rectal papillae are evident on the specimens which have been relaxed for study. The markings on the mesonotum vary somewhat, depending upon the degree of tenerality of the specimen and some variations have also been seen in the markings on the wing especially the width of the oblique bands. The 5th sternum and genitalia of ♂ are as in fig. 88b and 88d.

**Distribution:** The species is widespread from Formosa through China, India, Laos and Thailand. It is also probably present in Burma and other areas of SE Asia. I have examined a large series of specimens from a wide range of localities.

**Hosts:** This species breeds in the shoots of bamboo. It has been reared from several species in Formosa (reference Shiraki 1933: 153); it has been bred from bamboo in Thailand.

I have studied over 3 dozen specimens from the following localities: THAILAND: Phra Nakhon Prov., Bangkhen, nr sea level, VI-IX.1965; Suraburi Prov., Ban Phu Khae, 15 km N of Saraburi, 50 m, IX.1965; Chiangmai Prov., 5 km NW of Chiangdao, 7.V.1969, J. J. S. Burton; Ratburi, X.1965; Kanchanaburi, V.1962 and IX.1965; Nakorn-Sithamrai, V.1963; Saraburi, IX.1964; Muak Lek, IX.1914; Nan, VII. 1963, R. Kawasaki; Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa; Chiangmai Prov., Doi Suthep, 29.III-4.V.1958, T. C. Maa; Chiangmai Prov., Fang, 500 m, 12-19.IV.1958, T. C. Maa; Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa. LAOS: Vientiane Prov., Muong Tourakom, 180 m, 17.VII.1966, collected in bamboo thicket, F. G. Howarth; Muong Sing, NW of Luang Prabang, 650 m, 6-10.VI.1960, L. W. Quate; Sayaboury Prov., Muong Phieng, 400 m, 20.VIII.1967, collected in bamboo thicket, F. G. Howarth; Hua Khong Prov., Ban Houei Sai, 365 m, 28.IX.1967, at light, F. G. Howarth. S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer; Dalat, 6 km S, 1400-1500 m, 9.VI.-7.VII.1961, N. R. Spencer.

**Gastrozona parviseta** Hardy, new species      Fig. 89a; pl. 8, fig. 72.

This species differs from other known *Gastrozona* by lacking the preapical oblique band through the wings, also lacking the basal transverse streak, and by having rudimentary ocellar bristles.

♂. **Head:** Slightly higher than long with the face almost vertical as seen in direct lateral view (fig. 89a). Head and appendages entirely yellow except for the dark compound eyes and ocellar triangle. Three pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals. Ocellar bristles very small, hair-like. Front very sparsely setose. Third antennal segment approximately 3 × longer than wide, rounded at apex. Arista moderately plumose. Palpus with black setae at



apex and around ventral margin. *Thorax*: Mostly yellow with a shining black vitta extending down each side in line with dorsocentral bristles from anterior margin above humeri to posterior margin of mesonotum. The 2 bands are joined together by a broad black band across hind margin of mesonotum; this also extends laterally over posterior corners behind postalar bristles to wing bases. Median portion of mesonotum tinged with rufous. Anterior portion of mesonotum, before suture, densely gray pubescent. Humeri yellow-white and a yellow-white band extends

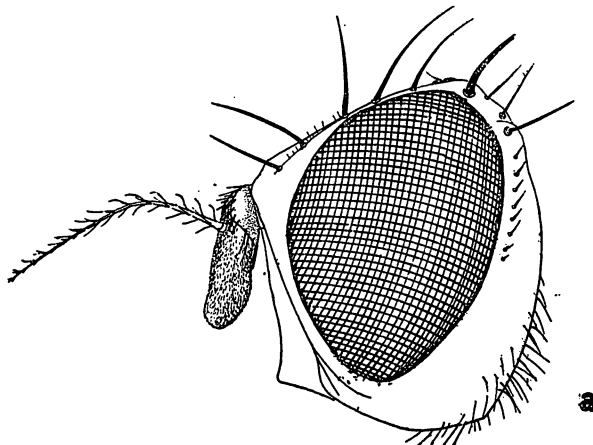


Fig. 89. *G. parviseta* n. sp. a. head.

down each side of mesonotum from humerus to just beyond postalar bristles; also posteromedian portion of mesonotum, bordered by dorsocentral and prescutellar bristles, yellow-white. Scutellum yellow-white with a black band across base. Postscutellum brown, tinged with black; metanotum black. Mesopleura almost entirely yellow-white, upper metapleura and pleuroterga yellow-white; remainder of pleura mostly rufous, tinged with brown. Halteres with yellow stems and brownish red knobs. *Legs*: Yellow except for the brown to black ventral surface of each hind femur. Middle tibia with 1 strong apical spur. *Wings*: With markings and venation as in pl. 8, fig. 72. Vein  $R_{4+5}$  setose to approximately r-m crossvein. *Abdomen*: Yellow to rufous except for a broad shining black band across apical 3/4 of 3rd tergum, a broad black band across base of 5th tergum, and narrow black lateral and apical margins of 5th tergum. The genitalia have not been relaxed for study.

Length: Body, 6.0 mm; wings, 6.5 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9974) and 1 paratype ♂, THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

Type returned to the B. P. Bishop Museum. Paratype in the University of Hawaii collection.

***Gastrozona soror* (Schiner) Fig. 90a-e.**

*Acidia soror* Schiner, 1868, Reise Novara, Dipt., p. 264. Type-locality: Batavia, Java. Type ♂ in Naturhistorisches Museum, Vienna.

*Gastrozona soror* (Schiner), Bezzi, 1926, *Boll. Lab. Portici* 18: 258, 262.

This species is readily differentiated from other *Gastrozona* from Southeast Asia by the wing markings. The oblique band extending across apex of cell 2nd  $M_2$  does not

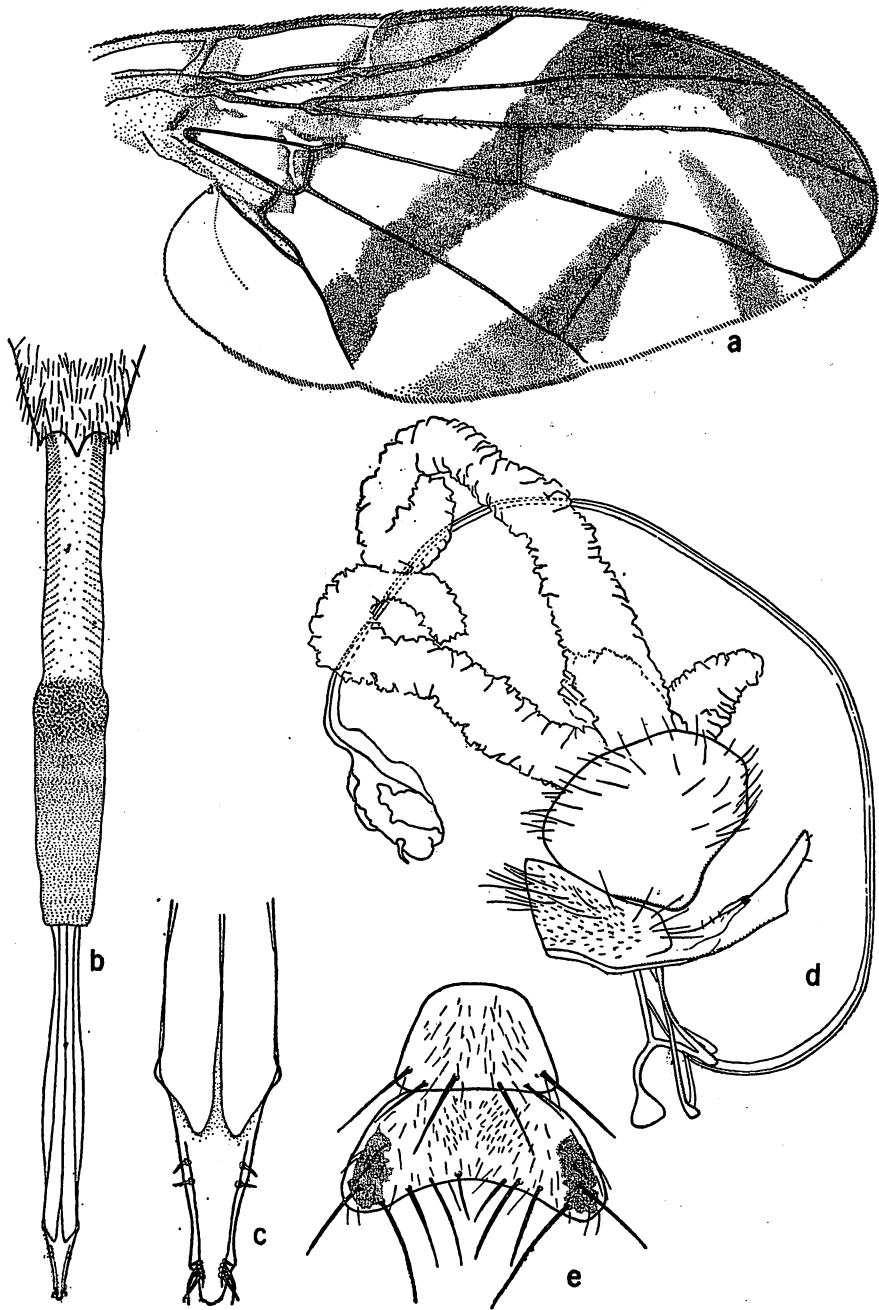


Fig. 90. *G. soror* (Schiner). a. wing; b. ovipositor; c. apex of piercer; d. ♂ genitalia; e. ♂ 4th and 5th sterna.

connect with the costal band or with the oblique band extending over m crossvein (fig. 90a). The thoracic markings show considerable sexual dimorphism. The ♀♀ have a broad median, black vitta extending the entire length of mesonotum, continuous over scutellum. In the ♂♂, the median portion of mesonotum is yellow, sometimes with a faint indication of brown vittae on the posterior portion, and scutellum is yellow with a dark brown to black spot on apex, and sometimes with a faint indication of brown discoloration over median portion. The ♀♀ have the 3rd tergum, narrow basal portion of 4th and basal 3/4 of 5th tergum shining black. In the ♂, the 3rd tergum and narrow lateral margins of 5th are black.

The head bristling is typical *Gastrozona*, 3 pairs of inferior fronto-orbital bristles and rather small ocellars, about equal in size to the lower inferior fronto-orbitals. The other details are similar to those of most *Gastrozona*. It should be noted that the dark brown to black lateral vittae on the mesonotum are broader, much more distinct in the ♀ and narrower in the ♂, sometimes interrupted at the suture in the ♂. For ♂ 5th sternum and genitalia and the ♀ ovipositor, refer to fig. 90d-e and 90b. Two long and 2 short rectal papillae are present (fig. 90d). It is apparent that Schiner's type, in the Natural History Museum in Vienna, is a ♂ specimen, even though the abdomen is broken off; the thoracic coloration would fit that of the ♂.

Length of wing: ♂, 5.6 mm; ♀, 6.3 mm.

Distribution: Previously recorded only from Indonesia.

Hosts: Specimen in British Museum reared from bamboo in Thailand (det. by Van Emden as *G. fasciventris* and recorded as this by Cantelo 1965: 10).

One ♀ specimen is in the British Museum collection from Bangkok. Eight specimens are on hand, 6 ♂♂ and 2 ♀♀ from the following localities in THAILAND: Nakorn sawan, 12.IX.1963; Bangkokhen, 10.IX.1963; Singburi, 7.VI.1965; Nakorn-Nayek, 14.V.1963; Thapsakae, 15.VI.1963, collected on *Citrus aurantium* f. *sekkan*, R. Kawasaki; and Kam Phaeng, Phet, 30.VI.1963, collected on jack fruit, R. Kawasaki.

#### Genus *Paraxarnuta* Hardy, new genus

This genus shows a strong resemblance to *Xarnuta* Walker because of the stout, densely setose body; the prominent lateral bristles on abdominal terga 3-5; and by having the entire surface of the wing densely covered with microtrichia. It differs by having only 4 scutellar bristles; the arista long plumose; the 3rd antennal segment terminating in a sharp point; and ocellar bristles strong. Because of these features, it would fit in the Tribe Gastrozonini, near the genus *Acrotaeniostola* Hendel. The 2 genera are not closely related, however, and *Paraxarnuta* is readily differentiated by the densely black setose mesonotum, scutellum and abdomen; by the prominent bristles on lateral margins of abdomen; having the wing membrane entirely covered with microtrichia; the arista long plumose; the r-m crossvein situated near apical 2/3 of cell 1st M<sub>2</sub>; wings lacking distinct crossbands, the markings as in pl. 8, fig. 75; also the stout bodies and other details will differentiate these.

*Head*: Higher than long, face almost vertical and occiput just slightly swollen, about 1/2 as wide as eye. Gena rather broad, about 1/4 the height of the compound eye. Front sloping, antennae situated at about upper 1/3 of head. Two pairs inferior fronto-orbitals and 2 pairs of superior fronto-orbital bristles. Ocellars strong, stronger than the other frontal bristles. Third antennal segment slender, 3× longer than wide and terminating in a sharp point above (fig. 92a).

Aristae long plumose. The longest rays are greater than width of 3rd antennal segment. Palpi sparsely setose. Mesonotum, scutellum and mesopleura densely black setose. Mesonotum as wide as long. Scutellum as in fig. 92c. Dorsocentral bristles just slightly behind a line drawn between the anterior supraalars. Middle tibia with only 1 long apical spur. *Wings*: Densely covered with microtrichia. Subcostal cell about  $3/4$  as long as 2nd costal cell. Crossvein r-m slightly oblique in position and situated near apical  $2/3$  of cell 1st M. Cubital cell slightly over  $1/2$  as long as vein  $Cu_1+1st A$ . The setae on vein  $R_1$  extend onto basal portion of radial vein, to a level slightly below humeral crossvein. The setae on the upper side of vein  $R_{4+5}$  extend almost to a level with apex of vein  $R_{2+3}$ . Wing markings as in pl. 8, fig. 75. *Abdomen*: Densely black setose with prominent bristles around lateral margins.

Type-species: *Paraxarnuta bambusae*, n. sp.

**Paraxarnuta anephelobasis** Hardy, new species      Fig. 91a; pl. 8. fig. 75.

This species differs from *bambusae* by having the basal portion of the wing subhyaline, lacking the distinct brown coloring of that species; by having the mesopleura yellow setose, lacking the dense covering of black setae, with only a few scattered dark setae on upper margin rather than over the entire sclerite; also the mesonotum predominantly brown, tinged with rufous, rather than yellow; and the front opaque brown to black, tinged faintly with rufous in ground color and with a pair of small rufous spots in median portion, also a yellow to rufous spot in middle of front margin. Otherwise fitting *bambusae* and obviously very closely related to this. *Wings*: As in pl. 8, fig. 75.

♂. Fitting description of *bambusae* in most regards, entirely yellow, except for a black spot on each posterolateral margin of 5th tergum, in both sexes, and epiandrium shining black. Densely black setose species as is characteristic of the genus with the chaetotaxy as in *bambusae*. The ♂ genitalia have not been relaxed for study; the cerci and surstyli are yellow.

♀. With a brown to black spot on each side of hind margin of 5th sternum. Sixth tergum short, as seen from dorsal view only  $1/3$  to  $1/4$  as long as 5th, with a black spot on each postero lateral margin. Basal segment of ovipositor dark brown to black at apex, short, rather thick, just slightly longer than terga 5+6 as seen from dorsal view. Measured on venter, the basal segment is 1.5 mm long. Piercer rather thick, gradually tapered to apex with extreme apex blunt, with strong preapical setae (fig. 91a) and 1.25 mm long. Two spermathecae; these consist of long tight set coils.

Length: Body and wings, 5.0-5.5 mm.

Holotype ♂ (B.SHOP 9975), THAILAND: Loei Prov., 12-15 km NW of Loei, 275

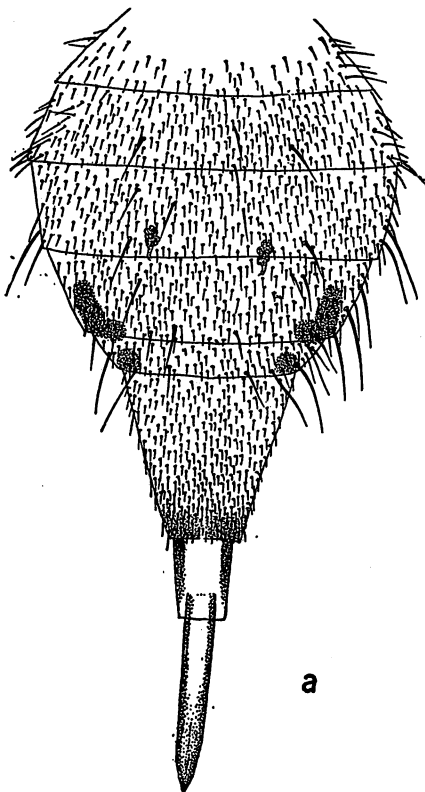


Fig. 91. *Paraxarnuta anephelobasis* n. sp. a. ♀ abdomen.

m, 14.IV.1969, J. J. S. Burton. Allotype ♀, Thailand: Nakhon Si Thammarat Prov., Thong Song Dist., 8 km E of town, 1.IV.1969, J. J. S. Burton. Two paratypes, 1 ♂, 1 ♀, 1 same as type and 1 Thailand: Ratburi, 10.IX.1966, no collector given.

Type and allotype in B. P. Bishop Museum. Paratypes in collections of Kasetsart University, Bangkok and the University of Hawaii.

**Paraxarnuta bambusae** Hardy, new species Fig. 92a-h

This species is readily differentiated from other known Tephritidae by the generic characters given above. The body shape, and the presence of a dense covering of black setae over the mesonotum and abdomen, also prominent bristles on sides of abdomen, would resemble various species of *Xarnuta*.

♂. Almost entirely yellow. *Head*: Shaped as in fig. 92a, and with the bristles and antennae as shown in this figure. The genal bristles are yellow. *Thorax*: Entirely yellow, mesonotum sometimes slightly tinged with brown and with a pale brown spot behind each humerus. All of the bristles are strong. The dorsocentrals are situated almost in line with the anterior supraalar. The dense covering of black setae extends over the mesonotum, scutellum and mesopleuron. The propleura, sternopleura and pteropleura are covered with yellow setae. The hypopleura, meta-pleura, and pleuroterga are bare. Scutellum as in fig. 92c. Postscutellum and metanotum yellow. *Legs*: Entirely yellow, all of the bristles are black. Femora black setose, tibiae and tarsi predominantly yellow to yellow-brown setose. Middle tibia with a strong apical spine plus 1 bristle which is approximately 1/2 longer than the other apical bristles. *Wings*: Basal 1/3 to about a level of apex of subcosta, pale brown. With a dark brown band filling most of subcostal cell and extending transversally across wing into median portion of cell  $M_4$ , evanescent before wing margin, and extending as a narrow band along vein  $M_{3+4}$  connecting with a transverse band over m crossvein which extends as a narrow line to vein  $R_{4+5}$ . Also, a narrow brown streak extends from wing margin in basal 1/3 of cell  $R_1$  to vein  $R_{4+5}$ . A faint yellow-brown mark is also present in apical portion of cell  $R_1$  (fig. 92b). Subcostal cell about 2/3 as long as 2nd costal cell. Crossvein r-m situated near apical 2/3 of cell 1st M. Lobe of cubital cell slightly over 1/2 as long as  $Cu + 1st A$ . In the paratype specimens, the 2 brown transverse streaks have a narrow connection in the lower portion of cell 1st  $M_2$  and just a faint indication of a connection along vein  $M_{3+4}$  (fig. 92b). *Abdomen*: Entirely yellow except for a triangular dark brown to black mark on each side of apex of tergum 5, densely setose and bristled as in fig. 92h. Fifth sternum approximately 3 × wider than long, gently concave on posterior surface, densely setose and with approximately 6 strong bristles along the hind margin. Genitalia as in fig. 92g, yellow except for the brown to black epandrium.

Length: Body, 5.9-6.2 mm; wings, 5.5-5.7 mm.

♀. Fitting description of ♂, except that the entire abdomen is yellow, tinged faintly with brown with the brown spots on sides of 5th tergum smaller in ♂; also with a small brown spot on each side of apex of 6th tergum. Sixth tergum about 1/2 as long as 5th. Base of ovipositor yellow except for apex which is dark brown to black. Base approximately equal to segments  $R_{4+5}$  and about 1.2 mm in length. Piercer short, rather thick and evenly tapered to apex (fig. 92e), 1.1 mm in length. Spermathecae coiled.

Length: Body and wings, 5.7 mm.

Holotype ♂ (BISHOP 9976), LAOS: Vientiane Prov., Muong Tourakom, 180 m, 17. VII. 1966, collected in bamboo thicket, F. G. Howarth. Allotype ♀, Laos: Xieng Khong, 23.IV.1920, R. Vitalis de Salvaza. Three ♂ paratypes same data as type; 1 ♂ paratype, Laos: Sayaboury Prov., Sayaboury, 2.III.1966, native collector. One ♂ paratype, THAILAND: Petchaboon, 30.V.1965, no collector given; 6 paratypes, Thailand: Chiang-

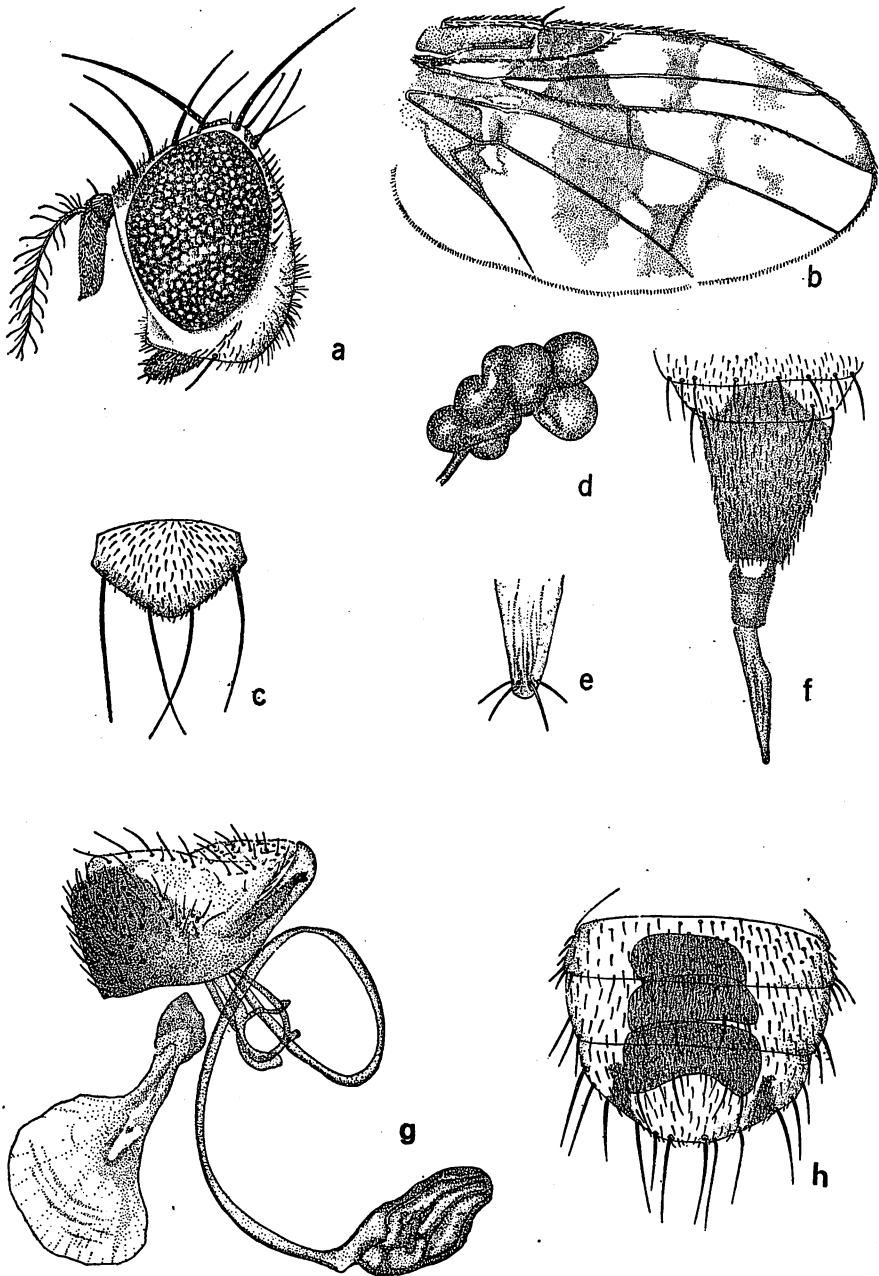


Fig. 92. *P. bambusae* n. sp. a. head; b. wing; c. scutellum; d. ♀ spermathecae; e. apex of piercer; f. ovipositor; g. ♂ genitalia; h. abdomen.

mai Prov., Chiangdao, 450 m, 29. III.-11.V.1958, T. C. Maa; and Chiangmai Prov., Fang, 500 m, 12-19.IV.1958, T. C. Maa. Also 1 ♂ paratype, S VIETNAM: 25 km SW of Peliku, 400 m, 12.V.1960, L. W. Quate.

Type in the B. P. Bishop Museum. Allotype in the Zoological Museum, University of Helsinki. Paratypes in the collections of the B. P. Bishop Museum, U. S. National Museum, and the University of Hawaii.

### Genus *Phaeospilodes* Hering

*Phaeospilodes* Hering, 1939, *Verh. VII Intern. Kong. Ent.* 1938, 1: 170. Type-species: *torquata* Hering, by original designation.

This genus fits in *Gastrozonini* because of the flattened scutellum, with 4 scutellar bristles; the long plumose arista; and spotted wings. In Hering's diagnosis, he says this runs to *Phaeospila* Bezzi but that genus differs by having 3 inferior fronto-orbital bristles, the r-m crossvein beyond the middle of cell 1st  $M_2$  and the wing markings very different. He also says it shows similarities to *Chelyophora* Rondani which he says differs by having 3 inferior fronto-orbital bristles and a swollen scutellum which is marked with black spots. He also says *Phaeospilodes* is similar to *Taeniostola* Bezzi but differs by not having crossbands on the wings. The principal characters which Hering uses for differentiating *Phaeospilodes* are that the front has 2 pairs of inferior fronto-orbital bristles; the 3rd antennal segment elongated and with a sharp point at upper apex; the aristae long plumose; the face weakly concave; the subcostal vein distinctly curved upward; the r-m crossvein situated at middle of cell 1st  $M_2$ ; the lobe of cubital cell well developed but not elongated, about 1/3 as long as vein  $Cu_1 + 1st A$ ; and middle tibiae each with 1 strong apical spine. The wing markings probably are one of the most distinctive features, being predominantly yellow-gray to brown in ground color, covered with hyaline spots over apical 1/2 to 2/3 (fig. 93c).

It is probable that species in this genus are breeders in shoots of bamboo. *P. bambusae* Hering has been bred from this host in India and *fritilla*, n. sp. has been collected on bamboo in Thailand.

The genus contains 5 species, the type *torquata* Hering from North Vietnam (Tonkin), *bambusae* Hering from India, *atrifacies* Hering from Indonesia, *poeciloptera* (Kertész) from China, and *fritilla*, n. sp. from Thailand.

***Phaeospilodes fritilla* Hardy, new species** Fig. 93a-e.

In Hering's key to species of *Phaeospilodes* (1941a: 49-50), *fritilla* would run near *bambusae* Hering from South India, by having the face yellow and the scutellum marked with black. It differs from this species by having 3 pairs of inferior fronto-orbitals, other *Phaeospilodes* have 2; 3 black spots at apex of scutellum, rather than 1 spot between apical scutellars; by having the legs entirely yellow, rather than the femora black and by having very different wing markings; compare figure with Hering's figure (1940a: 323).

♂. *Head*: As in other members of this genus, but with 3 pairs of inferior fronto-orbital bristles. Third antennal segment rather elongate, slender, as in fig. 93e. *Thorax*: The pattern of markings on the mesonotum is very similar to that of *Acroceratitis tomentosa*, n. sp. with the ground color predominantly black and as in fig. 93a, with the median vitta broadly connected

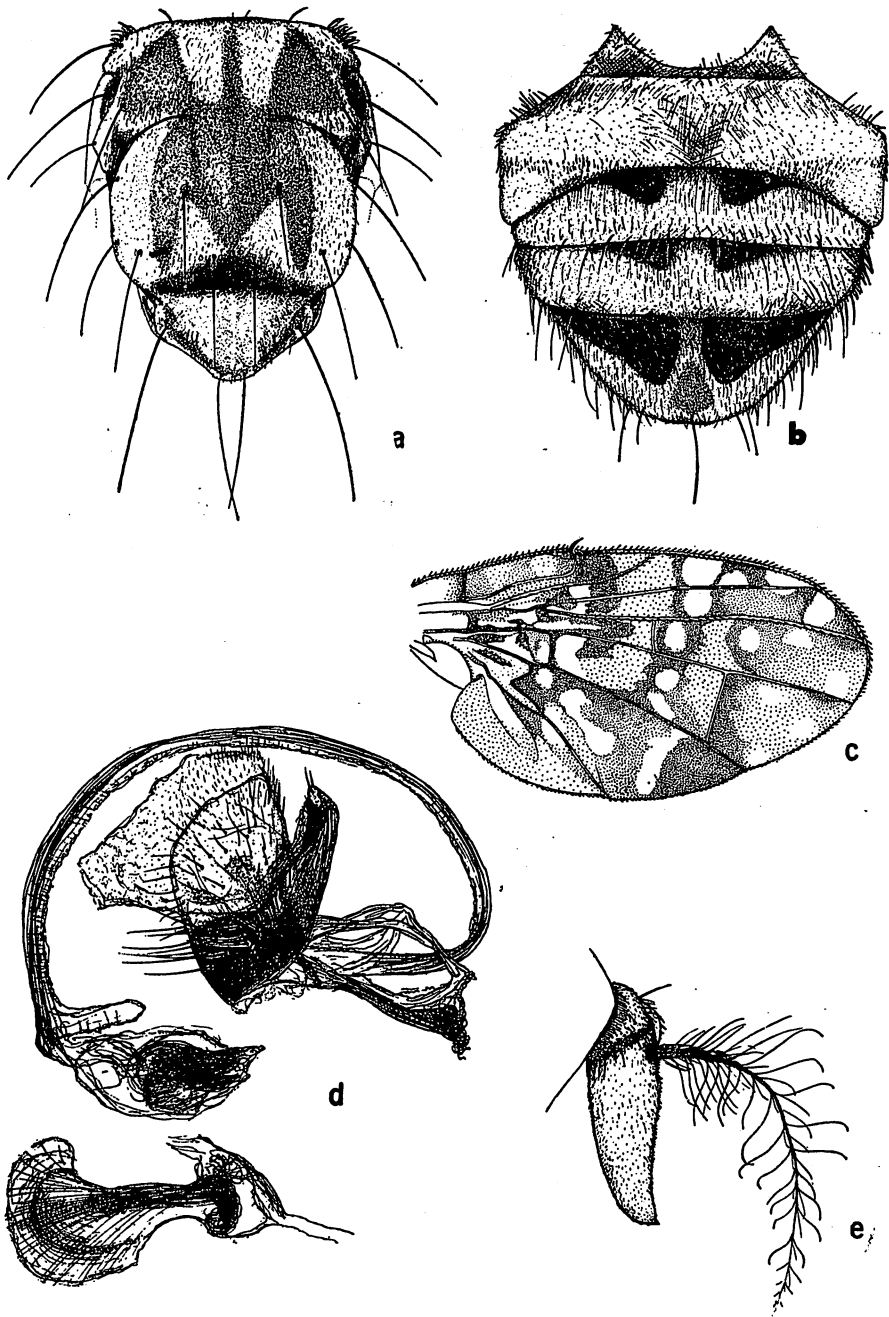


Fig. 93. *Phaeospilodes fritilla* n. sp. a. thorax; b. abdomen; c. wing; d. ♂ genitalia; e. antenna.



to the lateral markings in the middle of thorax. Mesonotum densely yellow-gray pubescent, almost obscuring the ground color and densely yellow setose. The scutellum is distinctly flattened, rather triangular in shape, and is rather thickly yellow setose. The dorsum of the scutellum is entirely yellow-white; the hind margin has 3 well-separated black spots. Sides of mesonotum broadly yellow including notopleural calli and humeri. Posterolateral corners of mesonotum with a velvety black spot on each side. Pleura yellow except for a tinge of brown on anterodorsal corner of each sternopleuron and a faint streak of brown near upper margin of each mesopleuron; also hind margins of hypopleura and metapleura are brown. Postscutellum and metanotum polished black in ground color, densely gray pubescent. Dorsocentral bristles situated in line with anterior supraalar. *Wings*: As in fig. 93c, predominantly yellow to gray or brownish gray in background with rather numerous hyaline spots on apical 1/2. The cubital cell is about 1/2 as long as vein  $Cu_1 + 1st A$ . *Abdomen*: Entirely yellow except for a pair of large black submedian spots at bases of terga 3-5. ♂ genitalia yellow, except for the shining dark brown to black epandrium. Fifth sternum almost 2× wider than long, the hind margin straight and with 3 bristles on each side. Sterna entirely yellow except for brown lateral margins of 5th. Pattern of marks on abdomen as in fig. 93b. ♂ genitalia as in fig. 93d.

Length: Body and wings, 4.75 mm.

♀. Fitting description of ♂ except that a complete, narrow, hyaline crossband extends over wing through area between r-m and m crossveins and the colored markings across the wing and around anteroapical portion are mostly dark brown. The abdomen has large submediobasal dark brown to black spots on terga 3-5 and the 6th tergum is yellow except for brown lateral margins. Sixth tergum about 3/4 as long as 5th. Basal segment of ovipositor short and broad, dark brown to black basally and apically, yellow medianly, subequal in length to terga 4-6. The piercer has not been extruded for study.

Holotype ♂, THAILAND: Bangkhen, 11.X.1965, no collector given. Allotype ♀ (BISHOP 10080a), Thailand: Nakhon Si Thammarat Prov., Thung Song Dist., 8 km E of town, 100 m, 1.IV.1969, J. J. S. Burton. One ♂ paratype, Thailand: Chiangmai Prov., Doi Suthep, 28-31.III.1958, T. C. Maa. One ♂ paratype, Thailand: Saraburi, on *Bambusa* sp., 6.IX.1961, P. Pholboon. Also 3 ♂ paratypes, LAOS: Sayaboury Prov., Muong Sayaboury, 915 m, 13.X.1966 and same locality, 488 m, 6.I.1968, F. G. Howarth. One ♂ paratype, S VIETNAM: Kontum, N of Pleiku, 500m, 13.V.1960, S. Quate.

Type returned to Kasetsart University. Allotype in B. P. Bishop Museum. Paratypes in the University of Hawaii collection.

Host: Probably breeds in shoots of bamboo.

### ***Phaeospilodes torquata* Hering Fig. 94a-g.**

*Phaeospilodes torquata* Hering, 1939, *Verh. VII Intern. Kong. Ent.* 1938, 1: 171, fig 5. Type-locality: Tonkin, Choganh (North Vietnam). Type ♀ in the Paris Museum of Natural History. I have studied the type ♀ and have a photograph of this specimen.

*P. torquata* is differentiated from other species in this genus by having the lower portion of the face yellow; the scutellum entirely yellow-white except for a brown basomedian spot, basal segment of ovipositor dark brown to black; and by the wing (fig. 94a) and thoracic markings (fig. 94e).

Head yellow to yellow-white except for compound eyes, with a faint tinge of brown in the antennal furrows and with a small brown marking opposite base of each antenna. Third antennal segment (fig. 94f) brown. Extreme apex of palpus tinged with brown. Two inferior fronto-orbital bristles present. Ocellars strong, longer than the lower superior fronto-orbitals. Thorax yellow-white, with prominent dark brown to black markings on mesonotum and pleura. Postscu-

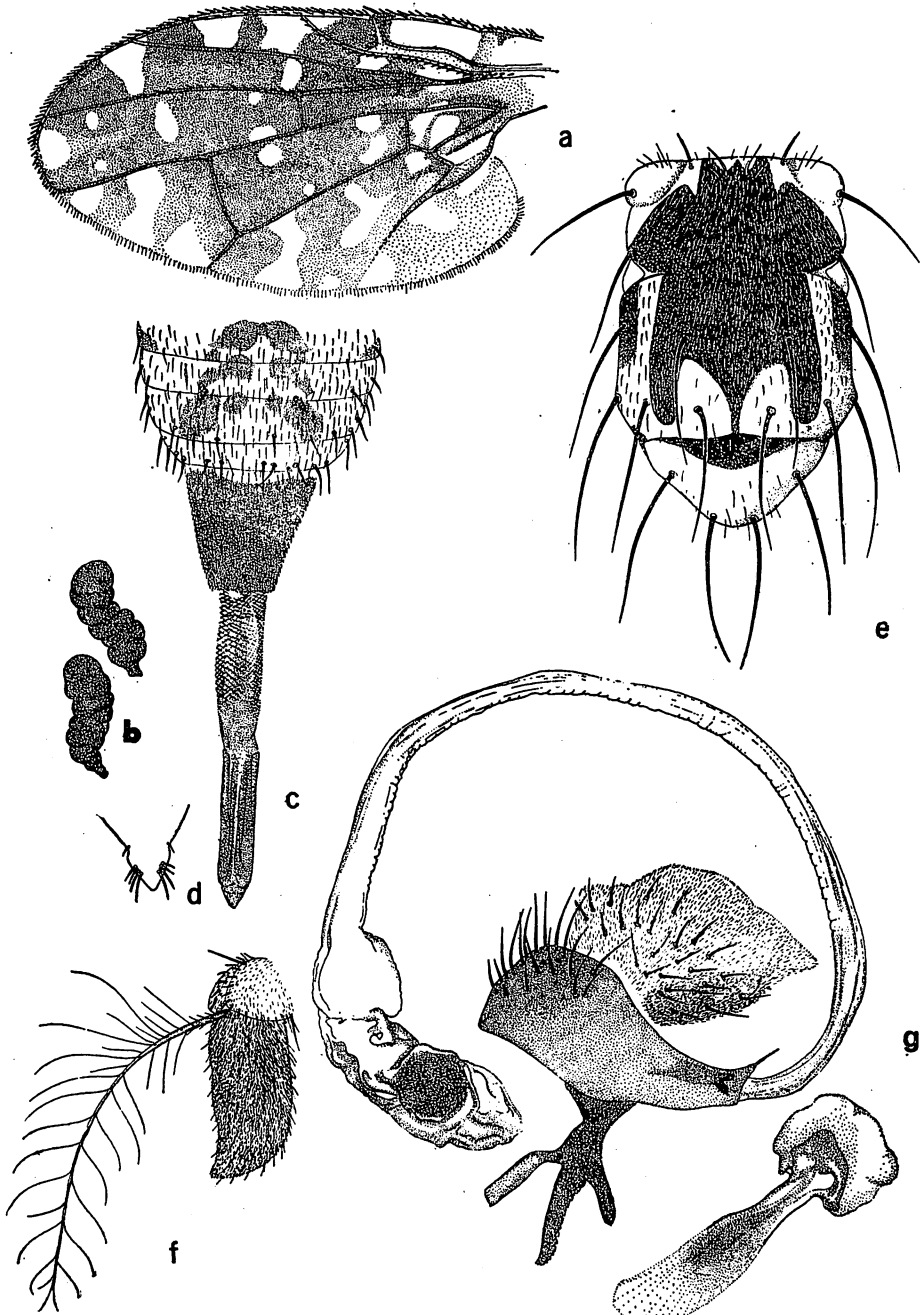


Fig. 94. *P. torquata* Hering. a. wing; b. ♀ spermathecae; c. ovipositor; d. apex of piercer; e. thorax; f. antenna; g. ♂ genitalia.

tellum and metanotum entirely dark brown to black covered with gray pubescence. Mesonotum mostly occupied with a large dark brown to black mark which has an extension on each side beyond dorsocentral bristles to about opposite posterior supraalar. The area from suture over humerus on each side is broadly yellow-white and a yellow-white vitta continues from suture on each side in line with posterior supraalar bristle to hind margin. The hind margin of mesonotum is yellow-white; this expands into a large quadrate mark in front of scutellum. A faint brown spot is also present in each hind corner of mesonotum. Scutellum entirely yellow-white except for a brown basomedian spot. Pleura predominantly dark brown to black with a yellow-white mark extending over posterior and dorsal portions of mesopleuron continuous with mark on humerus. Also, the upper portions of each metapleuron and pleurotergon are yellow-white. The mesonotum is rather densely gray pubescent. Three faint subshining black vittae are distinguishable in the gray covering. Legs mostly yellow, front femora brown on posterior surfaces, middle femora predominantly brown, broadly yellow at apices and hind femora brown on apical 1/2 to 2/3. Wings as in fig. 94a. The r-m crossvein is situated at middle of cell 1st  $M_2$ . Abdomen mostly yellow-white with a brown to black median vitta extending over most of first 2 terga; with 3 tergum dark brown to black medianly, yellow-white on sides and with a yellow-white streak through middle. Fourth tergum yellow-white with a pair of large submedian brown to black spots on anterior 1/2; 5th tergum with a pair of elongate brown spots near base, and in ♂ with posterolateral margins dark brown to black. The large brown spot is present on each side of 5th sternum in both sexes, and a small brown spot on lateral margins of 4th and 3rd sterna in both sexes. ♂ genitalia as in fig. 94g. Basal segment of ♀ ovipositor about equal in length to last 3rd abdominal segments and approximately 1.0 mm in length. The piercer is rather broad, shaped as in fig. 94d

Length: Body and wings, 4.0 mm.

Host: Probably breeds in shoots of bamboo.

Four specimens on hand from THAILAND: Bangkok, collected on *Bambusa* sp., 12.XII.1961 P. Pholboon. Two additional specimens from Thailand: Sukhothai, 29.IX.1963 and Nan, 10.VII.1963, collected on *Luffa acutangula*, R. Kawasaki.

#### Genus *Rhaibophleps* Hardy, new genus

This strange genus appears borderline between the Tribes Adramini and Gastrozoini. It possesses characters in common with both of these and it is difficult to decide where it should properly be placed. It lacks most of the major bristles, characteristic of Adramini, but does have well developed sternopleural bristles and because of this could be placed in Gastrozoini. It would run to Euphrantini using Hering's classification (1947: 15) by lacking presutural bristles. If it were placed here it would be the only known Oriental genus of Euphrantini which has the pleuroterga bare. All others have fine erect hairs on this sclerite. Because of the unusual wing markings, this genus would appear to resemble species of *Ortaloptera* Edwards and *Cleitamiphanes* Hering but these lack sternopleural bristles and are apparently Phytalmiinae; they have a different wing venation and are not related; vein  $R_{2+3}$  is wavy; the r-m crossvein is situated well beyond the middle of cell 1st  $M_2$ , etc. On the basis of the ♀ spermathecae and the strong sternopleurals, I would place *Rhaibophleps* in Gastrozoini since the spermathecae (2 in number) are more nearly like those of this tribe than to the Euphrantini or Adramini (3 in number) which I have studied. The wing markings and the general facies of this genus resemble *Terastiomyia* Bigot (Adramini), *Ortaloptera* Edwards and *Cleitamiphanes* Hering (Phytalmiinae) but it is readily differentiated

from these genera by having 4 pairs of fronto-orbital bristles, the sternopleural bristles present, by the outwardly bowed m crossvein as well as other details of wing venation and other characteristics.

This genus is well differentiated by having rudimentary ocellars lacking, postocellar, humeral, presutural and dorsocentral bristles. Four scutellar, also the prescutellar, sternopleural, mesopleural, pteropleural, supraalar and notopleural bristles are present. Head just slightly higher than long; face vertical, not at all convex. Occiput rather strongly swollen, at its widest point  $3/4$  as wide as the eye. Eyes oblong (fig. 95b). Subcostal cell  $3/4$  as long as 2nd costal. The r-m crossvein situated near the apical  $3/4$  of cell 1st  $M_2$  and m crossvein strongly bent outward (fig. 95a). Lobe of cubital cell rather short, about  $1/4$  as long as vein  $Cu_1+1st A$ . Vein  $R_{2+3}$  straight. Wing markings as in fig. 95a. Middle tibia with 1 prominent apicoventral spur  $1/3$  to  $2/5$  as long as basitarsus. Also with a 2nd bristle  $2/3$  as long as 1st and a 3rd bristle about  $1/2$  as long as 1st. ♀ ovipositor elongate, basal portion equal length to the remainder of the abdomen (fig. 95f).

Type of genus: *Rhaibophleps seclusa*, n. sp.

***Rhaibophleps seclusa* Hardy, new species** Fig. 95a-g.

♂. Readily differentiated from all other known Tephritidae by the characteristics given above under the generic diagnosis. **Head:** As described above, and as in fig. 95b. The entire hind portion of the occiput circling the cervix is broadly shining black, covered with gray pollen and pale pile. The remainder of occiput, the broad border behind vertex and around eye margins, yellow. Front yellow, tinged faintly with brown; face and genae entirely pale yellow. Face vertical with rather prominent antennal furrows. Front about  $1/2$  longer than wide, measured from frontal suture to ocellar triangle, and  $3/4$  to  $4/5$  as wide as 1 eye as seen in direct frontal view. Two pairs of inferior fronto-orbitals and 2 pairs of superior fronto-orbitals are present. The former are widely spaced on lower  $3/5$  of front; the superiors are rather closely placed near upper  $1/4$  of front. The genal bristle is well developed. Antennae yellow, 3rd segment nearly  $3\times$  longer than wide, rounded at apex. Arista long plumose, the longest rays are greater in length than width of 3rd segment. Palpi yellow, rather slender, not enlarged at apices and with black setae around lower margins. **Thorax:** Mesonotum predominantly shining black in ground color with a pair of gray pubescent vittae extending down median portion. Humeri pale yellow and with a continuous yellow marking extending over side of mesonotum, over metanotum, and over upper portion and down posterior portion of each mesopleuron. The hypopleura and pleuroterga are yellow on upper  $3/4$ , brown below. The remainder of pleura are dark brown to black. The postscutellum and metanotum are shining black. Prescutellar bristles well developed and hind margin of mesonotum with scattered, prominent yellow hairs. The outer scapulars are well developed, the inner ones are weak, setae-like. Halteres pale yellow. **Legs:** Coxae black dorsally, yellow-brown ventrally. Trochanters yellow, tinged faintly with brown. Front femora dark brown to black on dorsal surfaces, yellow to rufous ventrally. Middle femora entirely rufous. Hind femora yellow on apicoventral portions, otherwise brown to black. Front and middle tibiae rufous, tinged with brown, middle pair with 2 strong apical spurs. Hind tibiae dark brown to black. Tarsi reddish brown in ground color, very densely black setose. Middle tarsi flattened, the basitarsi broader than the tibiae and densely black setose (fig. 95c). **Wings:** Predominantly brown with a subapical, hyaline, transverse band extending from apex of cell  $R_1$  through apical portion of cell 2nd  $M_2$ , leaving just a narrow brown streak around apex through tips of cells  $R_3$  and  $R_5$ . One prominent bristle present on costa at end of subcostal vein. Hyaline markings over field of wing as in fig. 95a. The basal section of vein  $R_{4+5}$  in hyaline in the type and in some specimens (as in figure) a brown streak occurs along the vein to its base. **Abdomen:** Shining black in ground color with gray-brown pubescence and mostly black setose. Apical portion of 2nd tergum yellow in ground color, densely gray tomentose, covered with yellow setae. Fifth sternum about  $2\times$  as wide as long,

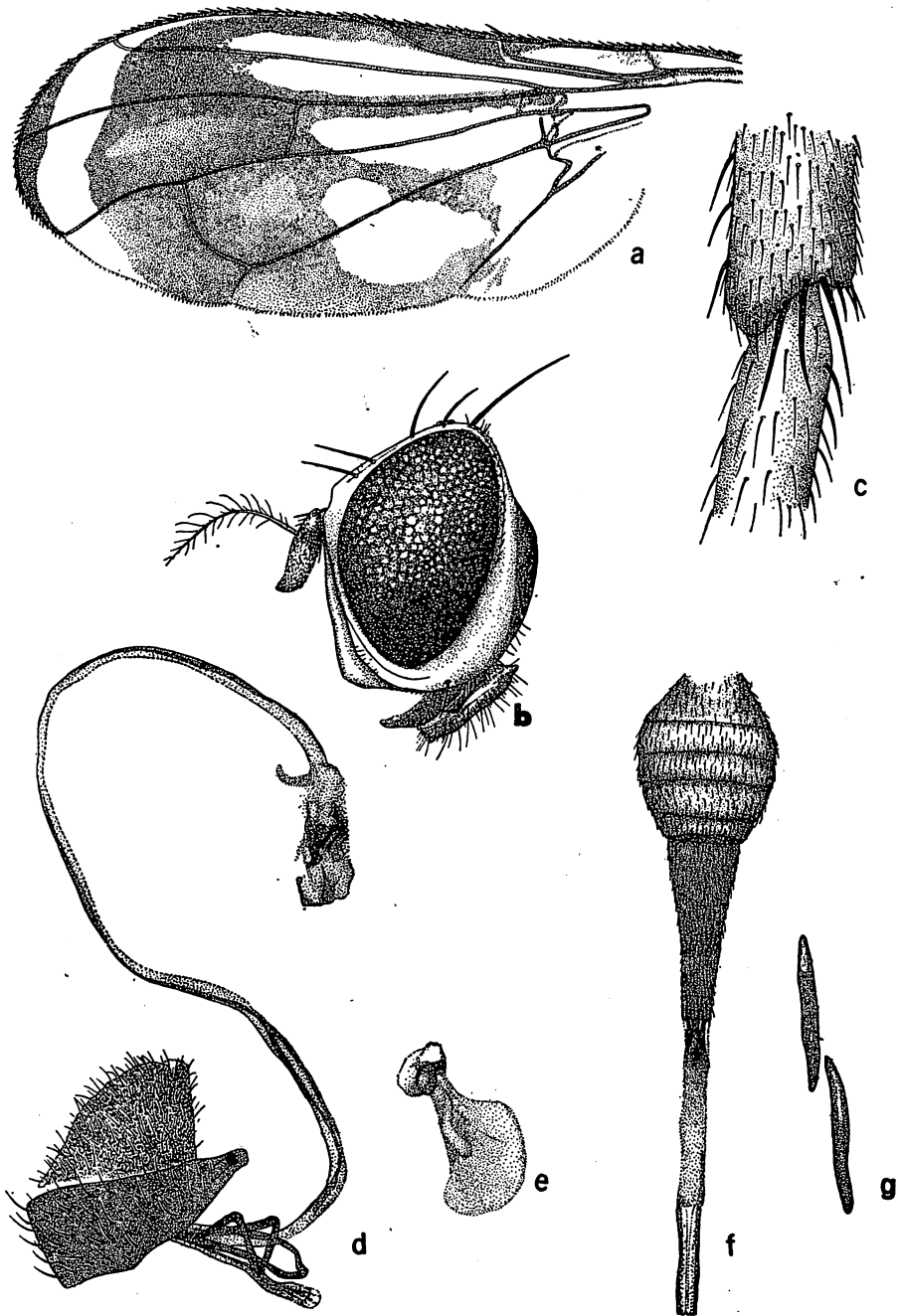


Fig. 95. *Rhaibophleps seclusa* n. sp. a. wing; b. head; c. middle basitarsus; d. ♂ genitalia; e. ♂ ejaculatory apodeme; f. ovipositor; g. eggs.

gently concave on posterior margin and lacking strong bristles. ♂ genitalia as in fig. 95d-e. The surstyli are short, stubby. The anal plates are rather large, equal in size to epandrium and slightly pointed.

Length: Body, 6.5 mm; wings, 6.1mm.

♀. Fitting the description of the ♂ in most respects but having a black stripe extending the full length down middle, raised portion, of face. Also, abdominal terga 4 and 5 are rufous at their apices. Sixth sternum of ♀ with a very prominent apodeme on inner basal margin; this is equal to length of segment. Fifth sternum with an apodeme extending  $\frac{2}{3}$  the length of segment and 3rd sternum with a very short basal median apodeme about equal in length to the setae on the outside of the sclerite. Base of ovipositor elongate, about equal in length to the remainder of abdomen, about 4.0 mm long and predominantly rufous, black at apex. The ovipositor is as in fig. 95f. Only 2 spermathecae present; these are tiny and inconspicuous; the apex is attenuated and pointed, the neck is rather long and slender. The eggs are elongate-shaped as in fig. 95g.

Length: Body and wings, 7.7 mm.

Holotype ♂ (BISHOP 9977) and allotype ♀, THAILAND: Khorat Prov., Sakaerat, 300 km NE Bangkok, 300-400 m, 2.III.1968, collected on stem of tall grass, D. E. Hardy. Eleven paratypes, same data, D. E. Hardy & M. D. Delfinado. Also 18 paratypes, 11 ♀♀, 7 ♂♂, from following localities, Thailand: Chiangmai, 1006m, 21.VI.1936, Thai Department of Agriculture, Lot 319; Chiangmai Prov., Tang Keo, 10.VI.1965, P. D. Ashlock. LAOS: Sayaboury Prov., Sayaboury, 2.III.1966, Malaise trap, N. R. Spencer. CAMBODIA: Kiri Rom, 700 m, 31.III-7.IV.1961, N. R. Spencer.

Type, allotype and some paratypes in the B. P. Bishop Museum. Paratypes deposited in the collections of the British Museum (Natural History), the Thai Department of Agriculture, National Research Corporation of Thailand, and the University of Hawaii.

#### Genus *Spaniothrix* Hardy, new genus

This species fits in Gastrozonini by having only 4 scutellar bristles and the arista plumose; it differs from other known genera in this Tribe by lacking sternopleural and presutural bristles. By having only 1 strong inferior fronto-orbital bristle, with the upper inferior fronto-orbital represented by a tiny pale seta. By the dorsocentral bristles being small,  $\frac{2}{3}$  to  $\frac{3}{4}$  as long as prescutellars and posterior in position, situated just slightly in front of a line drawn between posterior supraalars. The subcostal cell approximately  $\frac{2}{3}$  as long as 2nd costal cell. Vein  $R_{2+3}$  gently curved just beyond a level with r-m crossvein. The r-m crossvein situated distinctly beyond middle of cell 1st  $M_2$  and lobe of cubital cell short and pointed,  $\frac{1}{3}$  to  $\frac{1}{4}$  as long as  $Cu_1+1st A$  (fig. 96a).

Type of genus: *Spaniothrix vittata*, n. sp.

#### *Spaniothrix vittata* Hardy, new species Fig. 96a-d.

This species is differentiated by the characters given above.

♂. *Head*: Slightly higher than long, with compound eyes oval, higher than long. Occiput moderately swollen, at its widest point equal to approximately  $\frac{2}{5}$  eye width. Face concave as seen in direct lateral view, with epistomal margin projecting. Face only slightly raised down median portion. Front sloping gently, antennae situated near upper  $\frac{2}{3}$  of head (fig. 96b). Front opaque, pale yellow except for a tinge of brownish red in middle. Vertical calli (a wedge-like area on each side of front from inner vertical bristle to anterior superior fronto-orbital) polished yellow. Vertex and occiput pale yellow except for streaks of brown on posterolateral portion of

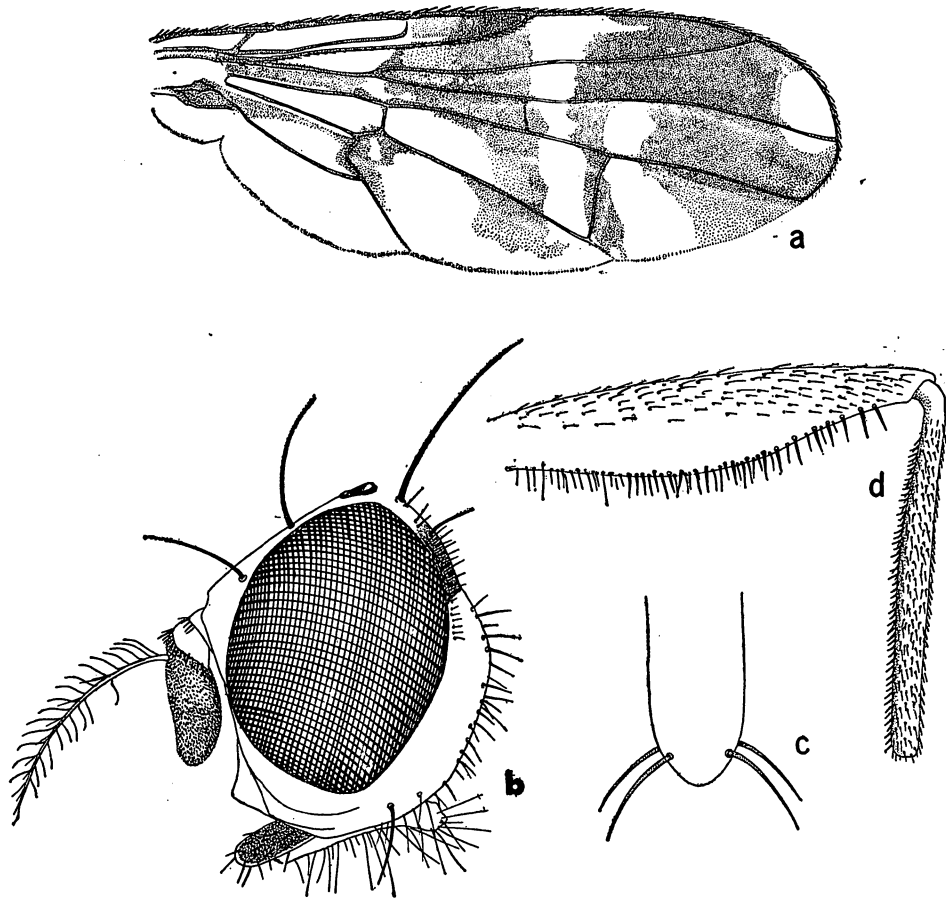


Fig. 96. *Spaniothrix vittata* n. sp. a. wing; b. head; c. apex of piercer; d. front femur.

occiput. Genae and face yellow-white. Clypeus yellow. Basal 1/2 of palpi pale yellow, apical portions brown, densely gray pubescent and with scattered short black setae around margin and over outside surfaces. Mouthparts pale yellow. Basal 2 segments of antennae pale yellow, 3rd segment brown, tinged with yellow, broadly rounded at apex and about 2× longer than wide. Arista moderately long plumose, the longest hairs are almost equal to width of the 3rd antennal segment. Lower inferior fronto-orbital bristles strong, almost equal in size to lower superior fronto-orbitals. Upper inferior fronto-orbitals weak, rudimentary, represented by just a small yellow-brown seta on each side. Ocellars rudimentary, hair-like. Postocellar bristles small, just slightly longer than the longest postocular setae. Genal bristle moderately developed, about 2/3 as long as anterior reclinate bristles. *Thorax*: Yellow in ground color, with 4 polished black vittae extending full length down mesonotum, the 2 lateral stripes run together in a rather large, polished black mark covering anterolateral margins of mesonotum. The submedian vittae join together on hind margin of mesonotum. The notopleural calli and humeri are pale yellow. Scutellum yellow. Pleura mostly pale yellow with a polished black mark from each mesopleural spiracle along dorsal edge and extending basad along suture in front of mesopleural bristle about 2/3 the length of the sclerite. Hypopleuron and metapleuron polished black; pteropleuron polished black on

basal 1/2. Postscutellum and metanotum polished black on sides, yellow down median portion. Halteres yellow. Only 1 mesopleural bristle present and 1 strong humeral present. Scutellum with short yellow setae over disc. Mesonotum rather thickly yellow setose. *Legs*: Entirely yellow, except for a tinge of brown at base of each middle femur. All femora slender, elongate, the hind pair approximately equal in length to first 4 segments of abdomen. Front femora densely short bristled on venter (fig. 96d), front tibiae densely setose ventrally. Middle tibia with 1 strong apical spine. *Wings*: Largely hyaline with brown markings as in fig. 96a. Vein  $R_{4+5}$  rather sparsely setose to a level slightly beyond m crossvein. Venation fitting the characters discussed above under the genus, and as in fig. 96a. *Abdomen*: Polished brownish red, tinged with black on sides of terga. Genitalia reddish brown. They have not been relaxed for study.

Length: Body and wings, 7.3 mm.

♀. Like the ♂ except that the front has a reddish brown median streak extending the full length. Face with a band of black along epistomal margin. Apical portions of palpi black. The 4 mesonotal vittae joined together along posterior margin. The black vertical mark over mesopleuron extending almost the full length of the sclerite and not continuous along entire dorsal edge of that sclerite. Pleuroterga polished black except for yellow upper 1/3. Abdomen shining, dark brown to black, yellow at apices of terga. Sixth tergum short, less than 1/2 as long as the 5th as seen from direct dorsal view. Basal segment of ovipositor yellow over the basal 2/3 to 3/4, black at apex, slightly longer than terga 4-6 and approximately 1.7 mm in length. The piercer has not been drawn out for study; the tip portion is visible in situ. It is slender, rounded at apex as seen under high power and with 2 rather strong yellow preapical bristles on each side (fig. 96c).

Holotype ♂ (B SHOP 9978), THAILAND: Chiangmai Prov., Doi Suthep, 14.XI.1957, J. L. Gressitt. Allotype ♀, Thailand: Khao Yai, 11.II.1964, no collector given. Eleven paratypes, 6 ♀ ♀, 5 ♂ ♂, from LAOS: Vientiane Prov., Ban Van Eue, II-IX.1965-1967, "native collector, Rondon".

Type, allotype and some paratypes in B. P. Bishop Museum. Other paratypes returned to Kasetsart University, and in British Museum (Natural History), U.S. National Museum and University of Hawaii.

### Genus *Spilocosmia* Bezzi

*Spilocosmia* Bezzi, 1913, *Philipp. J. Sci.* Sect. D, **8**: 327. Type-species: *bakeri* Bezzi, by original designation.

This genus is readily differentiated from other Gastrozonini by having the ocellar bristles lacking or rudimentary, the 3rd antennal segment with a sharp apical point above (fig. 97a), front femora of ♂ thickened and densely black setose on ventral surfaces. Body yellow, thorax with 4 shining black spots on each side of mesonotum, 1 on each humerus, and apex of scutellum shining black. Wings with 4 crossbands as in pl. 6, fig. 58. Looking superficially like *Dietheria* n. genus, but with 4 scutellar bristles rather than 2; lacking ocellars, rather than with 4 strong ocellars; body markings very different, etc.

Known only from the type-species, *bakeri* Bezzi, previously known only from the Philippines. It should be noted that *Prospilocosmia* Shiraki (1933: 212) was differentiated from *Spilocosmia* only by the presence of ocellar bristles. In the description, Shiraki says "ocellar bristles weak or strong." Hering in his card file listed *Prospilocosmia* as a synonym of *Spilocosmia*. It will be necessary to examine further material in order to clarify this question. It is apparent that there may be some variation in the development of the ocellar bristles in this case and I believe it probable that *Pro-*



*spilocosmia* may be a synonym of *Spilocosmia*.

***Spilocosmia bakeri* Bezzi** Fig. 97a; pl. 6, fig. 58.

*Spilocosmia bakeri* Bezzi, 1913, *Philipp. J. Sci. Sect. D*, **8**: 427. Type-locality: Mt. Makiling, Philippine Islands. Lectotype ♂ in the U.S. National Museum collection.

I see nothing to differentiate *Prospilocosmia punctata* Shiraki, 1933 from Formosa, except that it has 2 submedian black spots on anterior margin of mesonotum, and apparently has more distinct ocellar bristles. I believe these species are certainly congeneric. Shiraki further differentiates *punctata* by having 2 conspicuous costal bristles on each wing as well as "a very short spine-like apical process of antennae." *S. bakeri* has 2 costal bristles, 1 is short and 1 long, and the 3rd antennal segment terminates in a very prominent spine-like point (fig. 97a).

This species is readily recognized by the all yellow body, with large conspicuous black spots on dorsum of thorax; by the sharply pointed 3rd antennal segment; swollen front femora; densely short-bristled on the venter; and by the banded wings, as in pl. 6, fig. 58.

The face is entirely yellow except for a prominent, opaque black spot in middle at lower edge. The black spots on thorax are arranged as follows: 1 each on the humeri; 1 on each notopleural callus at base of posterior notopleural bristle; 1 on each side of mesonotum at suture; a large spot surrounding each inner postalar bristle; a large spot at apex of scutellum; and a small black spot on each side at wing base. ♂ abdomen yellow, except for a prominent black spot at each side of 5th tergum. ♀ abdomen with a narrow dark brown to black border along lateral margins of terga 2-6.

Length: Body, 6.5-8.0 mm; wings, 5.7-6.7 mm.

The species is described in detail in the monograph of the Philippine Tephritidae (Hardy, in press).

Two specimens on hand from VIETNAM: Ban Me Thuot, 500 m, 16-18.V.1960, S. Quate and S Vietnam: 33 km NE of Ban Me Thuot, 870 m, 18.V.1960, L. W. Quate. Also 1 from LAOS: Bolovens Plateau, 16 km S of Thateng, 1020 m, 22-24.VII.1960, Malaise trap, R. E. Leech. Previously known only from the Philippine Islands.

#### Genus *Taeniostola* Bezzi

*Taeniostola* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 119. Type-species: *vittigera* Bezzi, by original designation. Type ♂ in Zoological Survey of India collection.

As discussed under *Gastrozona* this genus is differentiated by the very strong ocellar bristles equal in size to lower superior fronto-orbital bristles, and wings typically with a complete hyaline band extending transversely over the wing just beyond the transverse brown band at level of r-m crossvein and with the brown band across m crossvein connected with the brown marking along costa. The type-species has only 2 inferior fronto-

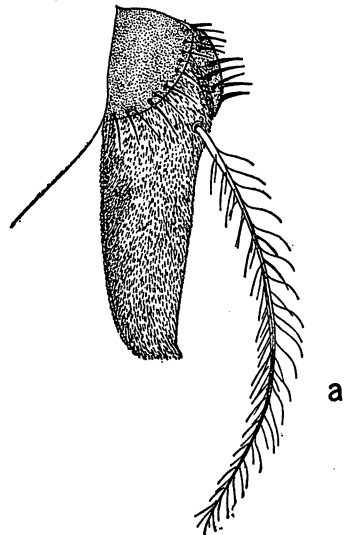


Fig. 97. *Spilocosmia bakeri* Bezzi.  
a. antenna.

orbitals but this is only of specific value.

List of species presently placed in *Taeniostola*: *apicata* Hering, Borneo, Burma; *connecta* Hendel, Formosa; *limbata* Hendel, Formosa, India; *melli* Hering, China; *morosa* Hering, Burma; *paragoda* Hering, Burma; *striatipennis* Hering, Borneo; and *vittigera* Bezzi, India.

Two species, *apicata* Hering and *limbata* Hendel, occur in Thailand.

#### KEY TO KNOWN SPECIES TO TAENIOSTOLA

1. Wing pattern *Gastrozona*-like; with oblique band over r-m crossvein continuous with brown costal band which extends along wing margin to apex; a subapical brown band and a brown mark over m crossvein (pl. 6, fig. 59). .....2  
Wing not as above, with a broad hyaline band across middle of wing in area between r-m and m crossveins and with band over m continuous to costa (pl. 6, fig. 55). .....3
- 2(1). Mesonotum with 4 longitudinal black vittae. Two inferior fronto-orbital bristles. Subapical band not joined with costal band (pl. 6, fig. 59). Formosa, India, Nepal, New Guinea and Thailand. ....**limbata** Hendel  
Mesonotum lacking black vittae. Four to 5 inferior fronto-orbital bristles present. Subapical band joined to costal band. China. ....**melli** Hering
- 3(1). Thorax with 5 longitudinal black vittae. ....4  
Thorax lacking black vittae. ....6
- 4(3). Wing with a complete transverse subapical hyaline band, a brown spot at apex of vein  $R_5$  (ref. fig. 31, Bezzi 1913, pl. ix). ....5  
Lacking a subapical hyaline band, with a hyaline spot or mark at apex of cell  $R_5$ , not continuous to costa. Borneo, Burma, Thailand. ....**apicata** Hering
- 5(4). Mesonotum yellowish pubescent. India. ....**vittigera** Bezzi  
Pubescence of mesonotum dark colored. Formosa. ....**connecta** Hendel  
(These are probably the same species).
- 6(3). Wing with only 1 complete hyaline band extending transversely beyond r-m crossvein. A hyaline spot extends from costa almost through cell  $R_5$  at level of m crossvein, a hyaline spot at apex of cell  $R_3$ , 1 at apex of  $R_5$  and 3 in cell 2nd  $M_2$  (ref. fig. 14, Hering 1938: 25). Burma...(generic placement questionable). ....**paragoda** Hering  
Not as above, lacking isolated hyaline spots in wing. ....7
- 7(6). Wing with 3 brown spots in apical 1/5: 1 at apex of cell  $R_1$ , a large one filling all of apex of  $R_5$  and part of  $R_3$ , and a brown subapical spot in 2nd  $M_2$  extending a short distance into cell  $R_5$  (fig. 13, Hering 1938: 15). Burma...(generic placement?). ....  
.....**morosa** Hering  
The transverse brown band at level of m crossvein is continuous around wing margin to vein  $M_{1+2}$ , also with a narrow subapical brown band connected to the costal band (fig. 2, Hering 1941b: 68). Borneo. ....**striatipennis** Hering

**Taeniostola apicata** Hering Fig. 98a-e; pl. 6, fig. 55.

*Taeniostola apicata* Hering, 1937, *Konowia* 16: 250, fig. 7. (The figure was erroneously labeled "plagiata".) Type-locality: Borneo, also recorded from Lower Burma by Hering. The type ♀ was in the Hamburg Museum and apparently has been lost. The paratype ♀ is in the British Museum. I have studied this specimen.

Specimens on hand from Thailand obviously belong to this species, but they do show some variation in the shape and development of the hyaline spots in apices of cells  $R_5$  and 2nd  $M_2$ . One ♂ specimen is the same as Hering's type. One is like his para-

type in having a small, rather indistinct hyaline spot at apex of vein  $R_{2+3}$  extending into upper apex of cell  $R_3$ . One ♀ on hand has the hyaline spot in upper cell  $R_3$  as in the last specimen and also has the spot in 2nd  $M_2$  extended through cell into lower portion of cell  $R_5$ . The second ♀ specimen has a spot essentially the same as the type except that the spot at apex of  $R_5$  extends across the cell into lower portion of cell  $R_3$ .

This species is recognized by having 5 longitudinal vittae extending down mesonotum and by the wing markings as noted above and as in pl. 6, fig. 55.

The ♂ has not been previously described. Head yellow, except for the dark reddish brown eyes and for a dark reddish brown to black vitta extending the entire length of front and a dark brown to black spot in middle of lower margin of face. Palpi slender, with conspicuous black setae around margins and inner surfaces. Ocellar bristles strong, almost equal in length to inner verticals. Thorax yellow except for the 5 narrow black vittae extending down mesonotum and

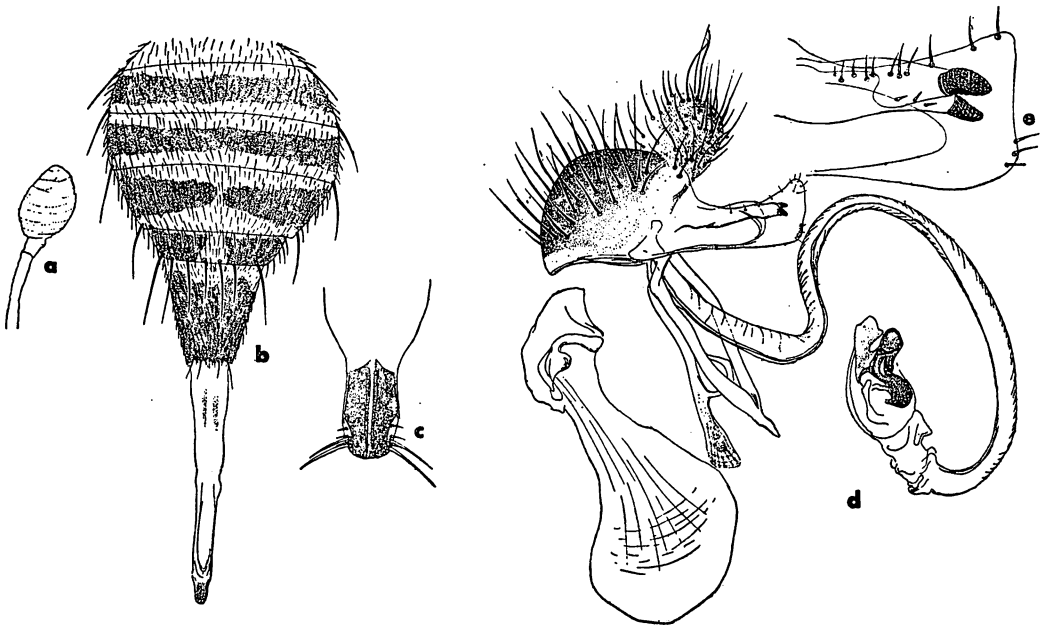


Fig. 98. *Taeniostola apicata* Hering. a. ♀ spermatheca; b. ♀ abdomen; c. apex of piercer; d. ♂ genitalia; e. ♂ surstylus and 10th sternum.

the black postscutellum and metanotum. The median vitta extends onto and over most of the length of scutellum. Also a small inconspicuous black spot is present on each side of mesonotum at wing base and another at lower hind margin of each metapleuron. Front femur thickly black-bristled on venter, with a row of strong black posteroventral bristles and numerous rows of short black bristle-like ventral setae. Wing as in pl. 6, fig. 55. Vein  $R_{4+5}$  setose almost to tip. Abdomen with broad black bands at bases of terga 2-4 and with sides of 5th tergum broadly black. Apices of terga 2-4 yellow, median portion of 5th rufous. Sterna entirely yellow, densely black setose. Genitalia as in fig. 98d. The epandrium mostly shining black, yellow along basal margin. Surstyli yellow, rather truncate at apices.

In the ♀, the black bands at apices of terga 5 and 6 are interrupted medianly. Sixth tergum scarcely over 1/2 as long as 5th. Basal segment of ovipositor yellow at base, otherwise brown,

rather short, as seen from dorsal view about equal in length to terga 5 + 6 and about 1.25 mm long. Piercer rather broad, blunt, rounded at apex (fig. 98c), and approximately 1.3 mm long. Extended ovipositor (fig. 98b), 4.0 mm.

Four specimens on hand from the following localities in THAILAND: Chiangmai Prov., Fang, 500 m, 12-19.IV.1958, T. C. Maa; Phu Kae, 30.VI.1965, no collector given; and Bangkhen, 15.VIII.1966, no collector given.

**Taeniostola limbata** Hendel Fig. 99a-e; pl. 6, fig. 59.

*Taeniostola limbata* Hendel, 1915, *Ann. Hist. Nat. Mus. Nat. Hung.* **13**: 435, pl. 8, fig. 3. Type-locality: Taihorinsho, Formosa. Type in Hungarian National Museum.

This species is readily recognized by its predominantly yellow body with 4 longitudinal black vittae down mesonotum; also by having a large black spot at apex of

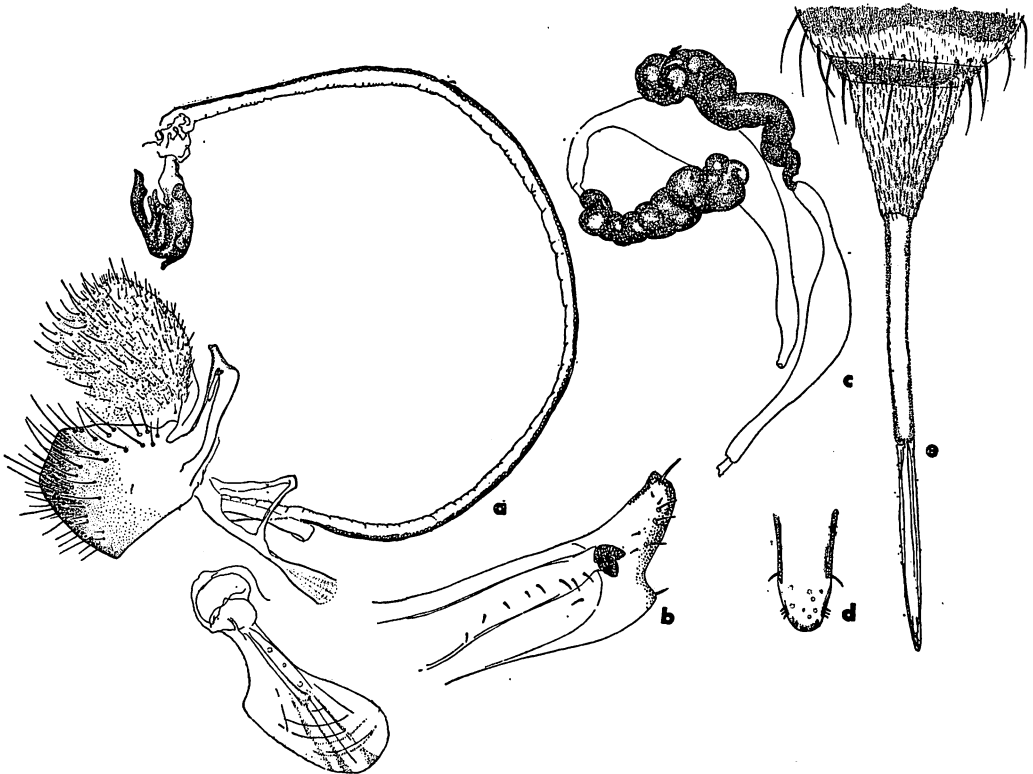


Fig. 99. *T. limbata* Hendel. a. ♂ genitalia; b. ♂ surstylus and 10th sternum; c. ♀ spermathecae; d. apex of piercer; e. ovipositor.

scutellum and with a broad black band at bases of terga 3-5 in the ♂ (3-6 in the ♀). The wing markings are *Gastrozona*-like, having an oblique brown band across wing intersecting r-m crossvein and connecting with a marginal band which extends to wing apex in cell  $R_5$ ; also with a subapical oblique band from apex of 2nd  $M_2$ , extending to vein  $R_{4+5}$  and a black mark from apex of cell  $M_4$  extending over m crossvein (pl. 6, fig. 59).

The species has been adequately described by Hardy (1964: 154, fig. 12-17). ♂ genitalia as in fig. 99a-b, with the epandrium highly arched, and the surstyli narrow, rather boot-shaped apices. Anal plates very large, larger than epandrium and with hind margin irregular. Ovipositor as in fig. 99d and 99e. Two spermathecae present; these are elongate, coiled (fig. 99c).

Length: Body, 8.5 mm; wings, 9.0 mm.

This species is common in northern India and Nepal. I have also seen specimens from New Guinea. Specimens are on hand from the following localities in THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa & J. L. Gressitt; and Doi Suthep, 1278 m, 29.III-4.V.1958, T. C. Maa.

#### Genus and Species Unplaced

One ♀ specimen on hand in poor condition from Chiangdao, Chiangmai Province, Thailand, 450 m, 5-11.IV.1958, T. C. Maa cannot be placed to genus. The head bristles and antennae are completely missing. It would appear to be an *Acanthonevrini*, although there is no evidence of secondary scutellar bristles. The wings are predominantly brown with hyaline wedges on anterior and posterior margins and would appear to fit near *Acanthonevra*. In fact, based on wing markings, it is superficially very like *A. sumbawana* Hering, from the Lesser Sunda Islands. It differs, however, by having the subcostal cell entirely dark brown and the 2 hyaline wedges originate in cell  $R_1$  beyond apex of vein  $R_1$ ; in *sumbawana* the subcostal cell is entirely hyaline. The species at hand obviously is not related to *Acanthonevra*. From the arrangement of the frontal bristles, based upon the bristle sockets since all of the bristles have been lost, this would appear to fit the *Rioxa* complex of genera (this group needs a complete review). On the specimen at hand there appear to be 4 pairs of inferior fronto-orbitals, evenly spaced from near lower margin of front to upper portion opposite the single pair of superior fronto-orbitals. The ocellar bristles are apparently rudimentary. The thorax is entirely yellow except for tiny spots of black pigment scattered over the sides and posterior portion of mesonotum and over the pleura. The middle tibia has 1 strong black apical spur plus 2 moderately strong bristles about 1/2 the length of the principal spur and 5 or 6 additional short brown to black bristles at apex. Wing as in pl. 6, fig. 60. Vein  $R_{2+3}$  setose to a level halfway between r-m and m crossvein. Only 2 spermathecae are present and on this basis, and because of the total lack of secondary scutellar bristles, I would tentatively place it as an unknown genus of *Gastrozonini*.

#### Tribe TRYPETINI

As interpreted here this tribe includes those Trypetinae which have the arista usually short pubescent or bare; 4 scutellar bristles; a full complement of head and thoracic bristles; and the postocular row of short bristles (strong setae) prominent and sharp pointed, almost always black or dark colored. It seems most logical in dealing with the Oriental species to delete Ceratitini. This tribe has been differentiated by having the scutellum inflated and the wings with dark brown to black subbasal streaks at level with the humeral crossvein. In the Oriental genera the shape of the scutellum intergrades to the point where a decision cannot be made on this character. The presence or absence of dark streaks in the wing base, or the body coloring, are of questionable importance as

tribal characters. Some cases in question: *Carpomyia* A. Costa has the scutellum slightly convex and would seem to best fit the characters which have been ascribed to Ceratitini but is obviously closely related to *Myiopardalis* Bezzi which has the scutellum flat. The genera *Xanthorrhachis* Bezzi and *Galbifascia* new genus have the scutellum swollen but the wing markings (fig. 118a and 138a) do not conform.\*

The ♀♀ of most of the genera included in this concept have 2 spermathecae; a few, however, have 3 and the phylogenetic value of this character needs further investigation.

### Genus *Acidoxantha* Hendel

*Acidoxantha* Hendel, 1914, *Wien. Ent. Zeit.* **33**: 83. Type-species: *punctiventris* Hendel, by original designation. Type ♂ in Deutsches Entomologisches Institut, Eberswalde, D. D. R.

*Acidoxantha* Hendel, 1915, *Ann. Hist. Nat. Mus. Hung.* **3**: 450 (emendation).

*Acidoxantha* differs from *Acidia* Robineau-Desvoidy by having the ocellar bristles rudimentary, vein  $R_{4+5}$  bare and the head and body bristles yellow. It keys near *Myoleja* Rondani but is differentiated by the bare  $R_{4+5}$ ; the distinctive wing markings, with a V-shaped yellow-brown mark in middle of wing (fig. 100a); the all yellow bristles; and by having 2 pairs of inferior fronto-orbital bristles.

The ♂ genitalia are very strange in development. The epandrium is broad, almost semicircular and has a strong dorsoapical bristle and numerous setae on each side. The surstyli are short, scarcely developed beyond margin of epandrium (fig. 101d). The 10th sternum is poorly developed and is not visible from lateral view. The anal plates are elongate, often expanded. ♀ with the 6th tergum longer than 5th. Basal segment of ♀ ovipositor thick, not strongly tapered. Piercer long, slender, straight-sided, needle-like (fig. 102a-b). Two spermathecae present; these are weakly sclerotized, difficult to discern.

The members of this genus evidently infest the buds of large flowers. *A. bombacis* de Meijere has been reared from flowers of *Bombax malabaricum* in Java and I have seen specimens from the Philippines reared from buds of "Hau" (*Hibiscus* sp.).

Three species have previously been described: *punctiventris* Hendel from Formosa; *bombacis* de Meijere from Java; and *nana* Hering from Timor. Two additional species are being described here and *balabacensis* Hardy, from the Philippines, has been described in the Danish Noona Dan expedition report (Hardy 1970: 106). A key to species is presented in the monograph of Philippine Tephritidae (Hardy, in press).

#### *Acidoxantha assita* Hardy, new species Fig. 100a.

Close to *totoflava*, n.sp. but differentiated by its larger size; by having a prominent black mark covering posterobasal 1/2 of each metapleuron, also 1 over lower portion of hypopleuron extending onto pleurotergon; also the Y-shaped mark through middle part of wing is very broad; the width of the stem of the Y extending through cell 1st  $M_2$  is about equal to the length of m crossvein, nearly 2 × the length of r-m; the costal band is narrow at apex and does not fill apex of cell  $R_5$  (fig. 100a). In *totoflava* the width of the stem of the Y through cell 1st  $M_2$  is less than the length of r-m, the anterior arm of the Y nearly fills all of base of cell  $R_5$  and the costal band fills apex of cell  $R_5$  (pl. 7, fig. 61). Otherwise fitting the description of *totoflava*. A thin brown vitta extends almost the entire length of mesonotum along a line drawn just outside each prescutellar bristle; on the posterior portion of thorax behind dorsocentral bristles this line is dark brown and extends almost to hind margin of mesonotum. Scutellum bare except for a

\* It probably will be best to treat these 2 as Gastrozonini.

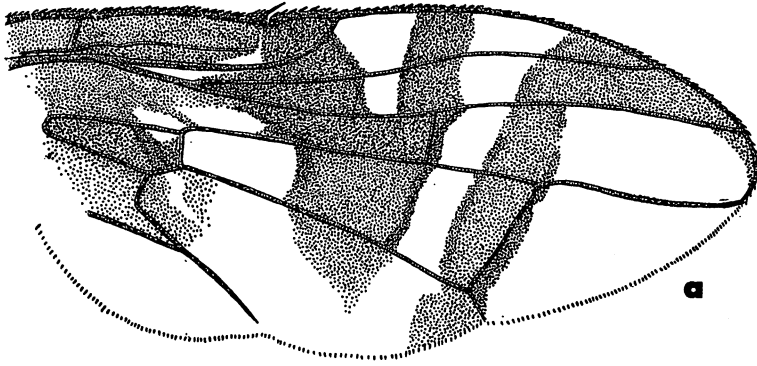


Fig. 100. *Acidoxantha assita* n. sp. a. wing.

few scattered pale setae around margin. *Wing*: As in fig. 100a. The genitalia have not been dissected for study.

Length: Body, 6.0 mm; wings, 5.75 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9979), LAOS: Sayaboury Prov., Muong Phieng, 400 m, 7.VII. 1967, F. G. Howarth.

Type in the B. P. Bishop Museum.

***Acidoxantha totoflava* Hardy, new species** Fig. 101a-d; pl. 7, fig. 61.

This species is close to *punctiventris* Hendel from Formosa and differs by having 4 prominent black spots on 4th tergum of ♂, rather than having 1 pair of posterolateral spots.

♂. Entirely yellow except for a pair of small, inconspicuous brown spots on hind margin of mesonotum, behind prescutellar bristles; a prominent black, nearly dumbbell-shaped mark on each posterolateral margin of mesonotum just above wing bases; a dark brown to black spot on each side of postscutellum; a pair of submedian, basal, dark brown to black spots and a pair of posterolateral brown to black spots on each of terga 4 and 5. *Head*: About 1/2 higher than long, front sloping, face vertical, not at all concave and with epistoma very slightly produced. Antennae situated near middle of head as seen in lateral view. Inferior fronto-orbitals rather widely spaced, lower situated at about lower 1/3 of front, upper situated distinctly above middle of front (fig. 101a). Second antennal segment with a prominent dorsal bristle. Front approximately 1/2 wider than long and about 2/3 width of compound eye. Eyes oval, slightly higher than long. Median portion of face slightly raised, antennal furrows shallow. Sides of oral margin with short inconspicuous setae. Third antennal segment about 2 × longer than wide, rounded at apex. Arista with microscopic, inconspicuous pubescence. *Thorax*: Yellow except for markings mentioned above and yellow-gray pollinose over mesonotum, subshining over scutellum and with an indication of 4 yellow vittae extending full length of mesonotum, 1 submedian pair almost in line with scapular bristles and the lateral pair between dorsocentral and supraalar bristles. These lines are faintly subshining and in some specimens the submedian vittae are tinged faintly with brown. Dorsocentral bristles situated approximately halfway between anterior supraalars and posterior supraalars. Propleura with numerous moderately long yellow setae. Halteres pale yellow. *Legs*: Yellow with yellow bristles. Two rather prominent preapical posterodorsal bristles on middle femur and 3 or 4 preapical dorsal bristles. Middle tibia with 1 moderately long apico-

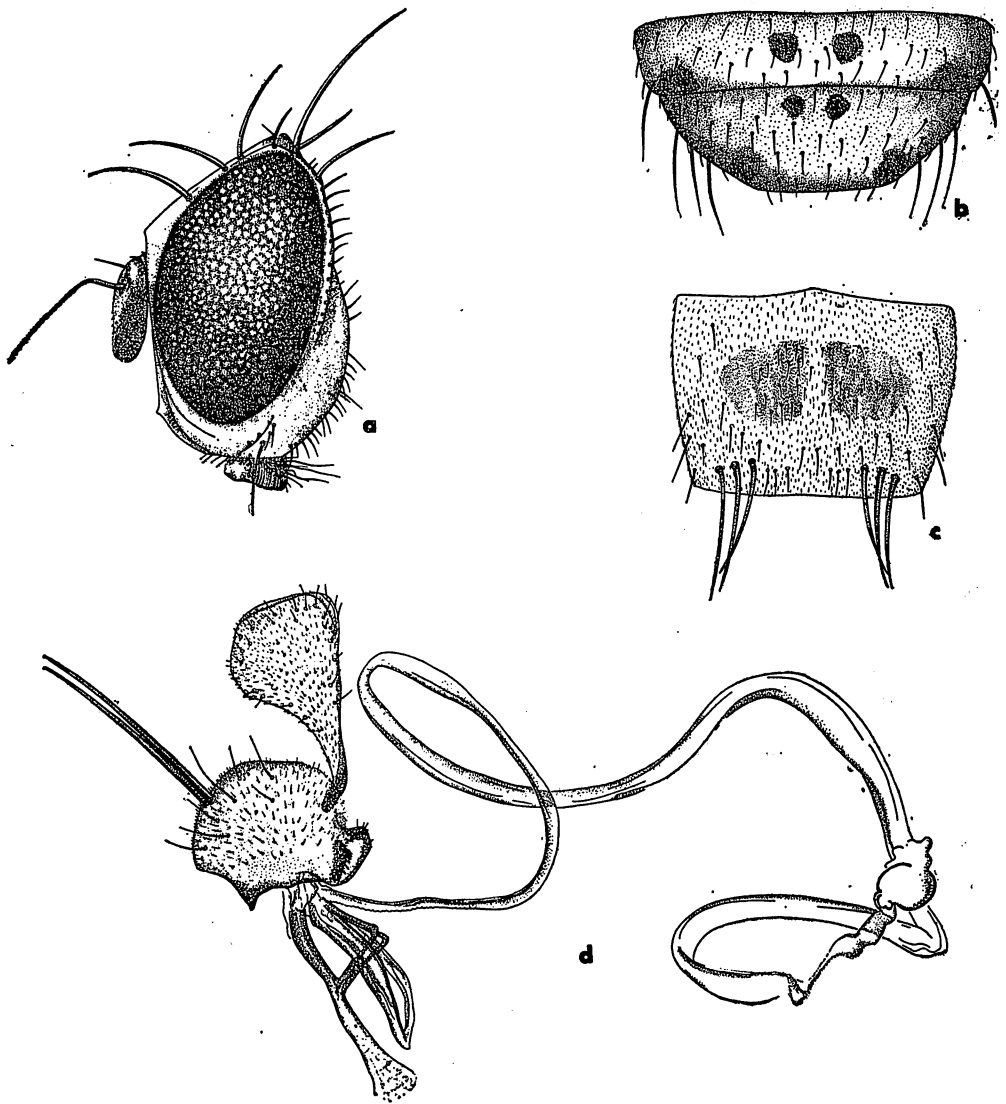


Fig. 101. *A. totoflava* n. sp. a. head; b. abdomen; c. ♂ 5th sternum; d. ♂ genitalia.

ventral bristle, a posteroventral bristle about  $1/2$  as long as the median and an anteroventral bristle about  $1/3$  as long as the median. Each middle tibia with 4 prominent anterodorsal bristles arranged from basal  $1/3$  to apical  $2/3$ . Hind tibia with 4 anterodorsal bristles near middle of segment and with about a dozen posterodorsal bristles extending almost full length of segment. *Wings*: Predominantly hyaline with a broad yellow-brown band around costa from apex of vein  $M_{1+2}$ , filling apical  $1/3$  of cell  $R_3$  and apical  $1/4$  of cell  $R_1$ , extending transversely across entire wing at this point in line with m crossvein, leaving a broad hyaline band extending across wing between m and r-m crossveins. With a yellow mark in the form of a Y in middle of wing, formed by a hyaline wedge from costal margin at base of cell  $R_1$  (pl. 7, fig. 61). Basal portion



of wing yellow-fumose, entire wing covered with microtrichia except at extreme base of cell R. Subcostal cell short, scarcely over 1/3 as long as 2nd costal cell. Vein  $R_{2+3}$  slightly wavy. The r-m crossvein situated near apical 2/3 of cell 1st  $M_2$ . Lobe of cubital cell about 1/3 as long as vein  $Cu_1+1st A$ . *Abdomen*: Yellow, marked as above and as in fig. 101b and covered with yellow setae and with yellow, faintly tinged with brown, bristles at lateral margins of terga 3-5 and at apex of 5. Entire abdomen subshining, lightly yellowish pollinose. Fifth sternum slightly wider than long, hind margin straight or nearly so and with 4 to 6 bristles on each side of hind margin (fig. 101c). Genitalia as noted above under generic discussion and as in fig. 101d.

Length: Body and wings, 4.3-4.7 mm.

♀. Fitting description of ♂. Piercer of ovipositor long and slender, appearing to be like other *Acidoxantha* which have been studied.

Holotype ♂ (BISHOP 9980) and 6 ♂ paratypes from LAOS: Vientiane Prov., Muong Ban Keun, Ban Na Pheng, 190 m, 19.V.1968, F. G. Howarth. Allotype ♀, S VIETNAM: Di Linh (Djiring), 27.IX.-14.X.1960, C. M. Yoshimoto. Eight ♂ paratypes from the following localities in Laos: Sayaboury Prov., Muong Sayaboury, 300 m, 7.I. and 25.V.1967, collected near stream, F. G. Howarth; Vientiane Prov., 28 km N of Vang Vieng, 370 m, 12.III.1968, F. G. Howarth; ♂, Sayaboury Prov., Muong Phieng, 400 m, 20.VIII.1967, collected in bamboo thicket, F. G. Howarth. Three paratypes, 1♂, 2 ♀ ♀, THAILAND: Trang Prov., Khaophappa, Khaochang, 200-400 m, 31.XII.1963-11.I.1964, G. A. Samuelson; Chiangmai Prov., Chiangdao, 5-11.IV.1958, T. C. Maa.

Type, allotype and some paratypes in B. P. Bishop Museum. Paratypes in U.S. National Museum and the University of Hawaii collection.

**Acidoxantha** new species? ♀ ♀ Fig. 102a-b.

Three ♀ specimens on hand from Changi, Singapore, VIII.1958, N. L. H. Krauss are similar to *totoflava*, n.sp. but have black markings on lower portions of meta- and hypopleura. In this regard they fit *balabacensis* Hardy from Balabac, Philippines. They differ, however, by having the apex of the piercer evenly tapered (fig. 102b), not spearhead-like at tip. The extended ovipositor (fig. 102a) measures nearly 7.0 mm and the piercer is 2.85 mm long.

#### Genus *Acroceratitis* Hendel

*Acroceratitis* Hendel, February 1913, *Suppl. Ent.*, Berlin 2: 82. Type-species: *plumosa* Hendel, by original designation.

*Stictaspis* Bezzi, May 1913, *Mem. Ind. Mus.* 3: 102. Type-species: *ceratitina* Bezzi, by original designation.

*Chelyophora* of most authors, not Rondani 1875.

The concept of this group has been completely confused in the literature. Bezzi (1918: 229) considered his *Stictaspis* a synonym of *Chelyophora* Rondani and Enderlein (1920: 355) placed both *Stictaspis* and *Acroceratitis* Hendel as synonyms of Rondani's genus. Subsequent workers have accepted this synonymy but the type of *Chelyophora borneana* Rondani has never been redescribed or correctly placed in the literature. At my request Dr Delfa Guiglia has carefully examined the type of *borneana* in the Museo civico di Storia Naturale, Genova and it is probable that *Chelyophora* is not congeneric with *Acroceratitis*. The 3rd antennal segment is not pointed, body markings differ, etc. *Chelyophora* is apparently a distinct genus and from the original description would fit

near (possibly equals) *Proanoplomus* Shiraki.

The genus previously contained 11 known Oriental species plus 5 African species. Twelve species are present from Thailand, Laos and Vietnam; 8 are undescribed.

Fitting the concept of "Ceratitis" by having the scutellum swollen, dorsal surface convex; the wing markings rather *Ceratitidis*-like with subbasal marks; transverse yellow to brown bands across the anterior 2/3 of the wing; and a broad yellow to brownish costal band. The genus is characterized by having the 3rd antennal segment pointed at upper apex (fig. 108a), except in *aberrata*, n.sp. and *adnata*, n.sp., the arista long plumose, with the longest hairs equal to or longer than width of 3rd antennal segment.\* Two species on hand from Laos seem to fit here except that the 3rd antennal segment is not pointed at apex. The pointed apex may not be reliable for separating all members of this genus. Mesonotum yellow with black markings, scutellum yellow, marked with black or black with yellow markings (except in *nigriacies* [de Meijere], from Sumatra); head much higher than long, face almost vertical. The dorsocentral bristles are located approximately in line with anterior supraalar; middle tibiae each with 1 strong apical bristle and wing markings distinctive as in fig. 103a, 104a and 105a. The r-m crossvein is usually basad in position; in the majority of species it is located at the basal 1/3 of cell 1st M<sub>2</sub>. The ♀♀ have 2 spermathecae.

This group is poorly known. Many of the species have been described from uniques and the specific characters are not well understood. The following key has been prepared largely from the literature and is very preliminary.

Members of this genus may possibly all be bamboo breeders. *A. plumosa* Hendel has been reared from several species of bamboo in Formosa (ref. Shiraki 1933: 136). *A. striata* (Froggatt) from Ceylon was bred from "decaying bamboo shoots" (Froggatt 1909: 111). A specimen of *A. ceratitina* (Bezzi) from Pusa, India is in Frey collection, Helsinki, labeled "ex bamboo shoot."

#### KEY TO KNOWN SPECIES OF ACROCERATITIS (EXCLUDING AFRICA)

- |        |  |    |
|--------|--|----|
| 1.     | Third antennal segment with a sharp spine-like point at upper apex (fig. 111c).<br>Wing with a broad costal band or a distinct hyaline crossband (fig. 106a, 107a,<br>and 109a). ..... | 2  |
|        | Third antennal segment rounded at apex. Wings as in fig. 103a and 104a. Apex<br>of scutellum broadly black. ....   | 17 |
| 2 (1). | Costal margin with a broad yellow to brownish band extending from apex of 2nd<br>costal cell to wing apex. ....  | 3  |

\* This probably best fits in Gastrozanini.

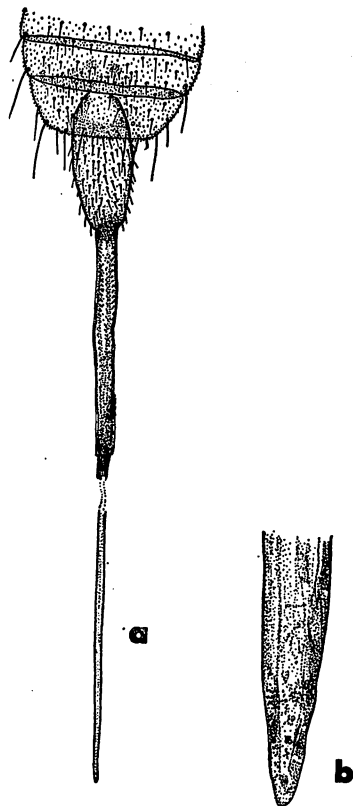


Fig. 102. *Acidoxantha* rel. to *totoflava*  
n. sp. a. ovipositor; b.  
apex of piercer.

- Costal band interrupted by a hyaline transverse band extending across middle of wing, or with a hyaline wedge near middle of cell  $R_1$  and a series of hyaline spots arranged transversely over wing (fig. 105a). .....11
- 3 (2). Mesonotum with a complete median longitudinal black vitta and with longitudinal black markings on sides. ....4  
 Mesonotum lacking a complete median black vitta. ....9
- 4 (3). Scutellum with the black divided into 3 large apical spots by yellow longitudinal lines. ....5  
 Scutellum entirely black, except for a yellow mark on each side at base and with 2 small, subapical, yellow spots. Ceylon. ....*striata* (Froggatt)  
 and Java. ....*bilineata* (de Meijere)  
 (I am unable to separate these).
- 5 (4). Pleura and sterna yellow, with not more than streaks of brown on mesopleura. Metanotum yellow. ....6  
 Pleura and sterna predominantly blackish yellow. Metanotum shining blackish brown. Thailand. ....*siamensis* (Munro)
- 6 (5). Brown band over m crossvein broadly joined with costal band (fig. 106a). ....7  
 Brown band over m crossvein isolated, or as in ♀ strongly narrowed dorsally and becoming very faint before joining the costal band at vein  $R_{4+5}$ . Base of ♀ ovipositor equal to last 4 abdominal segments. A small black spot on humerus. Thailand. ....*similis*, n.sp.
- 7 (6). Abdomen with 3rd tergum black and 5th brown to black. ....8  
 Abdomen all yellow. Humeri almost all shining black. Basal segment of ♀ ovipositor equal to last 3 abdominal segments. Thailand. ....*cognata*, n.sp.
- 8 (7). Basal segment of ovipositor equal to last 3 abdominal segments. Bihar, India. ....*gladiella* (Munro)  
 Basal segment of ovipositor equal to last 4 abdominal segments. Burma. ....*clavifera* (Hering)
- 9 (3). Mesonotum with a large black prescutellar spot. ....10  
 Mesonotum entirely yellow except for a large black spot on each hind corner and a small black spot above wing base. Thailand. ....*septemmaculata*, n.sp.
- 10 (9). Mesonotum with a narrow black vitta extending part way down middle from prescutellar spot. No black markings in sides of mesonotum anterior to supraalar bristles. Humeri yellow. Band over m crossvein not connected with costal band (pl. 7, fig. 62). Thailand, Laos. ....*incompleta*, n.sp.  
 Lacking a black vitta and with 4 prominent black spots down sides of mesonotum. Band over m connected with costal band. India. ....*ceratitina* (Bezzi)
- 11 (2). Crossvein r-m at about middle of cell 2nd  $M_3$ . If a complete hyaline band is present across wing, it is oblique, not transverse, except in *separata* (Bezzi) (India) which lacks complete longitudinal vittae on mesonotum. ....12  
 Crossvein r-m distinctly before middle, usually near basal 1/3 of 1st  $M_3$ . A complete transverse band over middle of wing (fig. 112b), and mesonotum with black vittae. ....14
- 12 (11). Wing with a transverse hyaline band or series of spots extending through area between r-m and m crossveins. ....13  
 Wings with an oblique hyaline band extending from apical portion of cell Sc to margin in cell 2nd  $M_2$  (fig. 109a). Scutellum with 5 or 6 black spots. China and Laos. ....*maai* (Chen)
- 13 (12). Mesonotum with 3 narrow, black, longitudinal vittae (fig. 105e). Abdomen with a pair of black basal spots on each of terga 3-5. Hyaline crossband over middle of

- wing narrowed, usually interrupted in cell 1st M; (fig. 105a). Thailand, Laos, Malaysia and Vietnam. .... **bimacula**, n.sp.
- Mesonotum not with 3 complete vittae, with a quadrate spot in front of scutellum and a small black streak on each side behind suture. Abdominal terga 3-5 with a black band along hind margin. Hyaline crossband broad (ref. fig. 15, Bezzi 1913). India. .... **separata** (Bezzi)
- 14 (11). Face and genae yellow, scutellum predominantly black. ....15  
Face and genae mostly black. Scutellum yellow. Subapical brown band on wing not connected to costal band. Sumatra. .... **nigrifacies** (de Meijere)
- 15 (14). Scutellum predominantly black, not divided into spots by yellow lines. ....16  
Scutellum yellow, with 3 large black apical spots. Abdominal terga 3-5 each with a black transverse spot on each side. Mesonotum densely grayish tomentose. Formosa, China and Vietnam. .... **plumosa** Hendel
- 16 (15). Scutellum with a pair of prominent yellow spots arranged vertically at apex (fig. 112f). Mesonotum largely black in ground color with the broad median areas joined with the submedian postsutural black marks just laterad of dorsocentral bristles (fig. 112f). Thailand. .... **tomentosa**, n.sp.  
Scutellum with yellow markings only basolaterally. Mesonotum with complete median black vitta, not connected to submedian markings (fig. 107d). Java and Thailand. .... **histrionica** (de Meijere)
- 17 (1). Cell Sc entirely brownish yellow, the narrow hyaline band across wing not continuous to costa; the oblique streak across apex of cell 2nd  $M_2$  isolated (fig. 103a). Hind margin of humerus broadly yellow. Laos. .... **aberrata**, n.sp.  
Apex of Sc hyaline and a very narrow complete hyaline crossband present and the subapical oblique band connected with the marginal band (fig. 104a). Humerus entirely black. Laos. .... **adnata**, n.sp.

**Acroceratitis aberrata** Hardy, new species Fig. 103a-b.

Similar to *adnata*, n.sp. but differing by having the subcostal cell entirely brownish yellow, the narrow hyaline band across wing not continuous to costa and the oblique band over apex of cell 2nd  $M_2$  isolated (fig. 103a); also the hind margin of the humerus is broadly yellow and the species is larger.

♂. Fitting most of the characteristics of *adnata*; the black and yellow markings on the dorsum of the thorax are as in fig. 103b. Abdomen yellow to rufous setose, with brown to black bristles on apices of terga 3-5. The genitalia have not been dissected for study. The visible portions are rufous.

Length: Body, 6.7 mm; wings, 7.0 mm.

Holotype ♂ (BISHOP 9981), LAOS: Vientiane Prov., Ban Van Eue, 15.VIII. 1966, "native collector, Rondon."

Type in the B. P. Bishop Museum.

**Acroceratitis adnata** Hardy, new species Fig. 104a-b.

This is 1 of 2 aberrant species from Laos which seem to fit the characteristics of *Acroceratitis* except that the 3rd antennal segment is rounded at the apex rather than pointed; also the branches of the arista are not quite as long as typical of that genus, the longest branches are subequal to the width of the 3rd antennal segment. Both of these would somewhat resemble *maai* (Chen) because of the presence of a narrow oblique hyaline band extending across wing from apex of cell Sc to hind margin in middle

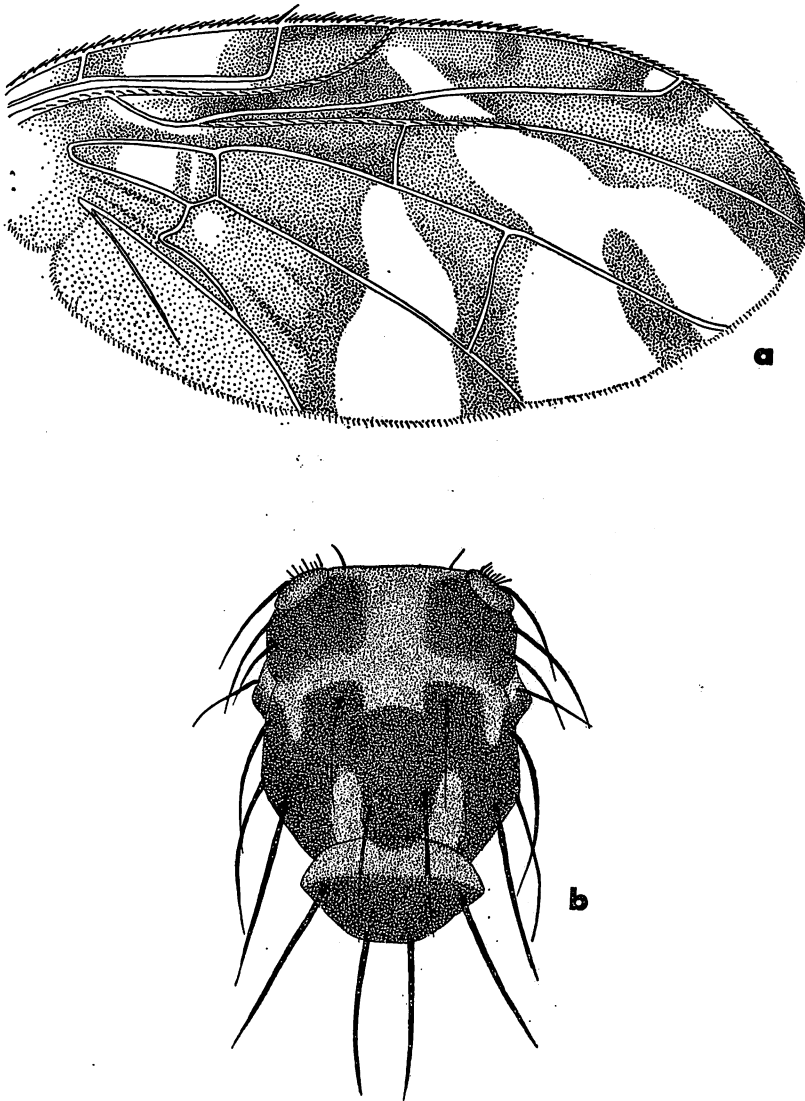


Fig. 103. *Acroceratitis aberrata* n. sp. a. wing; b. thorax.

of cell 2nd  $M_2$ ; both species are readily differentiated from *maai* by the markings of the thorax and scutellum as well as by the other characteristics of wing markings (compare fig. 103a, 104a, and 109a). *A. adnata* would fit closest to *aberrata*, n.sp. and both are readily differentiated from other known *Acroceratitis* by the rounded 3rd antennal segment and broadly blackened apex of scutellum. *A. adnata* is differentiated by having the apex of subcostal cell hyaline and a very narrow, complete, hyaline band extending obliquely from cell Sc through cells  $R_1$ ,  $R_3$ ,  $R_5$  and 2nd  $M_2$ , the band is very narrow and almost interrupted in cell  $R_1$  (fig. 104a); the oblique, brownish yellow band which ex-

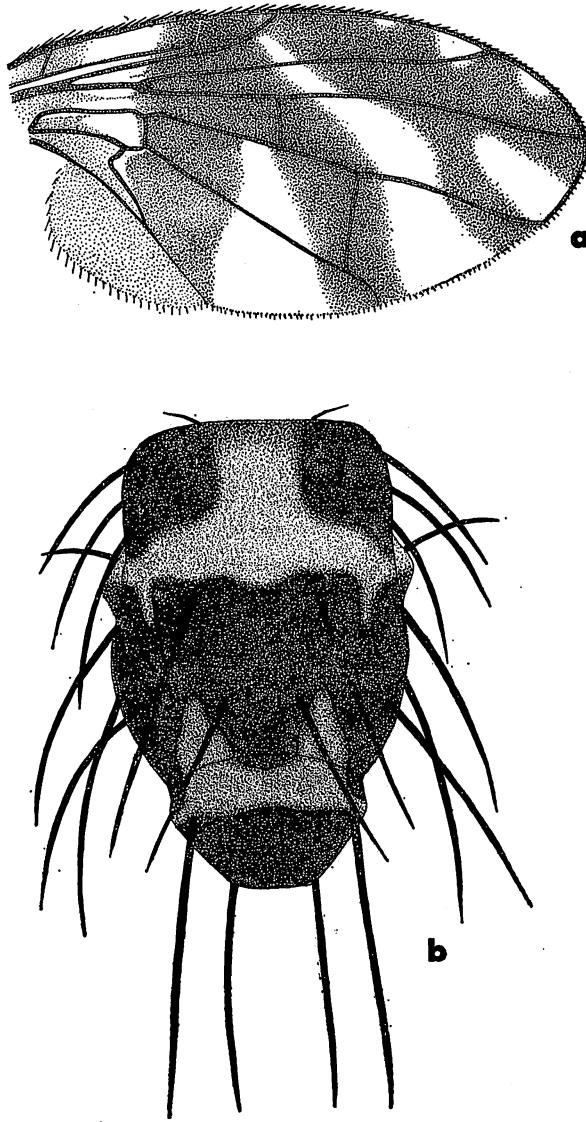


Fig. 104. *A. adnata* n. sp. a. wing; b. thorax.

tends to margin in apex of 2nd  $M_2$  is connected with the broad band around anterior margin of wing (fig. 104a); also the humeri are entirely black. Otherwise resembling *aberrata* except that the body size is smaller.

♂. *Head*: Slightly longer in comparison to the height than is typical for *Acroceratitis*, about 1/2 higher than long and with face slightly shorter than front. Entirely yellow, including appendages, except for the brownish red compound eyes and a large dark brown to black triangular spot on each side of upper occiput. Bristling typical of this genus with 2 pairs inferior and 2 superior fronto-orbital bristles. *Thorax*: Mostly polished black on the dorsum, with pleura entire-

ly pale yellow-white. Dorsum with yellow-white marks as in fig. 104b: a band from each notopleural callus extends across mesonotum just in front of suture; with a broad median yellow-white band extending to anterior margin and with a triangle of yellow-white extending behind suture on each side in line with inner postalar bristle and extending beyond base of supraalar bristles. Also a triangle of yellow-white on each side extending from scutellum anteriorly in line with dorsocentral bristles distinctly beyond the prescutellar bristles. Scutellum with apical area broadly black, the blackened area extending to bases of secondary scutellar bristles; basal portion of scutellum yellow with 3 black marks along posterior margin. Subscutellum opaque black, metanotum yellow to rufous. *Legs*: Entirely yellow. *Wings*: As in fig. 104a, the markings are yellow to brownish yellow. *Abdomen*: Entirely rufous, brown setose. The genitalia have not been dissected for study.

Length: Body, 5.0 mm; wings, 5.5 mm.

♀. Unknown.

Holtype ♂ (BISHOP 9982), LAOS: Vientiane Prov., Ban Van Eue, 30.IX.1967, "native collector, Rondon."

Type in B. P. Bishop Museum.

**Acroceratitis bimacula** Hardy, new species      Fig. 105a-e.

This species fits near *separata* (Bezzi) from India by having the r-m crossvein situated at middle of cell 1st  $M_2$  and a transverse hyaline streak across wing in area between r-m and m crossveins. It is readily differentiated by having 3 dark brown to black longitudinal vittae extending almost the entire length of mesonotum (fig. 105e). Abdominal terga 3-5 each with a pair of black spots on posterior margin; and the hyaline crossband over middle of wing narrowed and usually interrupted in cell 1st  $M_2$  (fig. 105a). In *separata* the mesonotum lacks complete vittae but has a quadrate spot in front of scutellum and a small black streak on each side behind suture; abdominal terga 3-5 each has a black band along hind margin; and the hyaline crossband is broad.

♂. *Head*: Shaped as in other members of this genus; the antennae and arista are as in other species. Three pairs of inferior fronto-orbital bristles, the lower pair small, poorly developed, about 2/3 as long as 2nd pair of bristles. *Thorax*: Yellow in ground color with 3 narrow brown to black vittae, 1 median and 1 on each side in line with dorsocentral bristles; a very narrow faint streak of brown is also present in area between dorsocentrals and supraalar bristles. The median vitta is expanded on posterior portion between prescutellar bristles. In some specimens, the markings are variable, much darker, more extensive on thorax and abdomen. Posterolateral corners of the mesonotum with a velvety black spot on each side and a small polished black spot is present at each wing base. The entire mesonotum is densely yellow-gray pubescent, not at all polished; almost obscuring the ground color. Humeri yellow-white, pleura yellow except for the brown lower margin of each metapleuron. Scutellum shining yellow with 3 large shining black spots at apex. The base is broadly yellow. Metascutellum black in ground color, densely gray pubescent. Metanotum yellow with a tinge of brown through median portion. *Legs*: Yellow except for a brown ventral spot in middle of hind femur. *Wings*: As in fig. 105a. The transverse hyaline band is somewhat variable; in some specimens, it is slightly interrupted in lower part of cell  $R_3$ . *Abdomen*: Predominantly yellow with a pair of black basal spots on terga 3-5. Genitalia yellow except for the shining black epandrium. I see nothing distinctive about the ♂ genitalia.

Length: Body, 5.4 mm; wings, 5.0 mm.

♀. Fitting description of ♂ in most respects. Some specimens have the mesonotum very densely gray pubescent, almost obscuring the ground coloring and the lateral black vittae are much broader than usual. Also the abdominal terga are sometimes tinged with brown along pos-

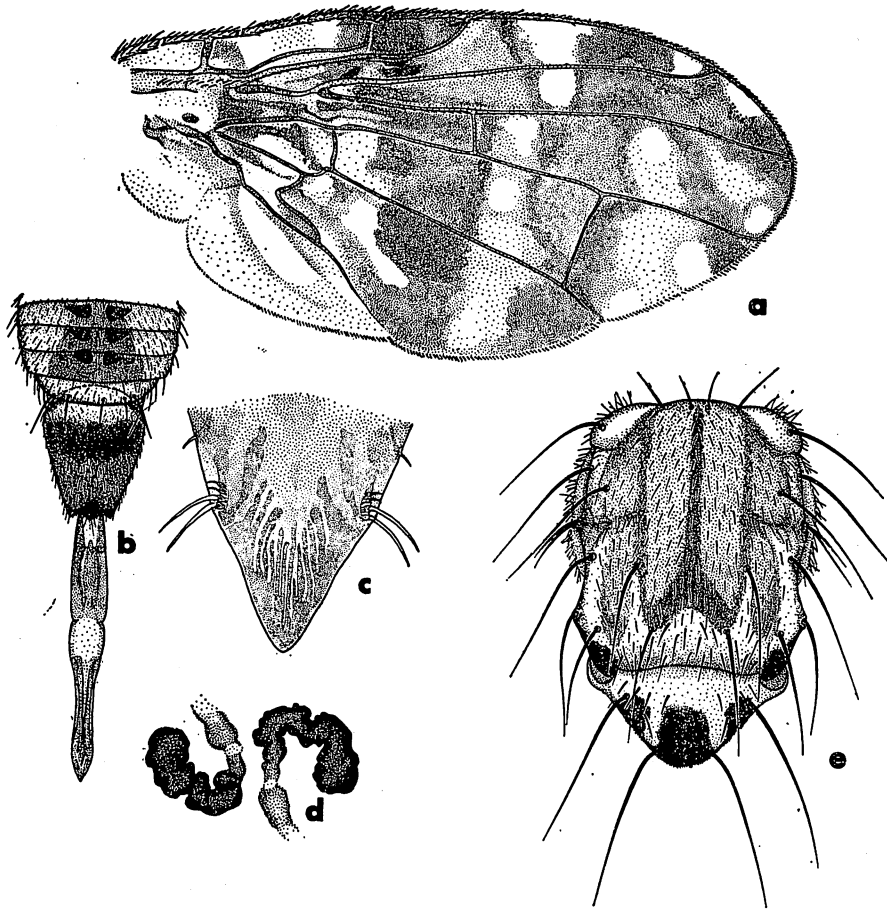


Fig. 105. *A. bimaculata* n. sp. a. wing; b. ovipositor; c. apex of piercer; d. ♀ spermathecae; e. thorax.

terior margins and sides so that the black median spots on hind margins are not as distinct as is typical; these specimens are probably discolored. The ovipositor is dark brown to black at base and at apex, largely rufous between, and about equal in length to the last 3 abdominal segments. The piercer is rather broad, sharply pointed at apex (fig. 105c). The base of the ovipositor is 2.3 mm long.

Length: Body and wings, 5.4 mm (excluding ovipositor).

Holotype ♂, THAILAND: Pak Chong, 17.VIII.1966, no collector given. Allotype ♀, Thailand: Phu Kae, 25.VIII.1965, no collector given. Eight paratypes, 2 ♀♀, 6 ♂♂, from the following localities in Thailand: same as allotype; Loei Prov., 12-15 km NW of Loei, 275 m, 15.IV.1969, J. J. S. Burton; Bangkhen, 14.VIII.1964; Chiangmai, 9.IV.1966. Ten paratypes, 5 ♂♂, 5 ♀♀, from the following localities in S VIETNAM: 15-35 km NW of Phan Rang, 8-16.XI.1960, C. M. Yoshimoto; Dai Lanh, N of Nha Trang, 30.XI-5.XII.1960, C. M. Yoshimoto; Ap Hung Lam, 21 km NW of Dilinh, 1100 m, 29.IX.-5.X.1960, C. M. Yoshimoto; 17 km S of Dilinh, 1300 m, 6-13.X.1960, C. M. Yoshimoto; 30-



50 km SW of Pleiku, 250-300 m, 10-14.V.1960, C. M. Yoshimoto; Fyan, 1200 m, 11.VII.-9.VIII.1961, N. R. Spencer. One ♀ paratype, LAOS: Vientiane, 28.VII.1965, native collector. Also 3 paratypes from W MALAYSIA: 1 ♂, Penang I., 22.VIII.1963, collected on mangosteen, T. Hamada; 1 ♀, Perak, 13.VIII.1963, "bud of bamboo", T. Hamada; and 1 ♂, Kuala Lumpur, 25.II.1949, N. L. H. Krauss.

Type and allotype returned to Kasetsart University. Paratypes in the collections of the Department of Agriculture, Bangkok, Applied Scientific Research Corp. of Thailand, B. P. Bishop Museum, U. S. National Museum, Yokohama Plant Protection Station, and the University of Hawaii.

A ♂ specimen on hand from Kuala Lumpur, Malaya, collected by N. L. H. Krauss in 1949, U.S. National Museum collection, evidently represents a new species very close to *bimacula*, but differing by having the abdominal terga 3-5 broadly blackened on posterior margins; by having dark brown to black markings over pleura and by having the median portions of all of femora brown. Also the mesonotal markings are much more broad than in *bimacula*. The antennae are broken and the specimen is not being described at this time.

**Acroceratitis cognata** Hardy, new species      Fig. 106a-f.

This species fits close to *clavifera* Hering from Burma, and apparently differs by having the abdomen entirely yellow; the humerus almost entirely black and the basal segment of ♀ ovipositor shorter, equal to last 3 abdominal segments rather than to last 4. According to the original description, *clavifera* is characterized by having the abdomen brownish yellow with terga 3 and 5 brown to black and the base of ovipositor equal to last 4 segments of abdomen. Also fitting close to *similis*, n.sp. but differing by the all yellow abdomen and by having the crossband of wing, which extends over m crossvein, broadly connected with costal band; also by having the humerus largely shining black. The lateral black markings on mesonotum are not separated from submedian black marks; in *similis* a narrow line of yellow separates these, except on posterolateral corners of mesonotum (fig. 106b).

♂. Fitting description of *siamensis* and other related species in most details. Markings of mesonotum and scutellum as in fig. 106b. Pleura, sterna and metanotum yellow except for a narrow longitudinal streak of brown near upper edge of mesopleuron. Wing with subapical band narrow, the other details of the wing markings are as in fig. 106a. The r-m crossvein is situated at basal 1/3 of cell 1st M<sub>2</sub> and the cubital cell is about 2/3 as long as vein Cu<sub>1</sub>+1st A. The mesonotum and scutellum with polished black marks as in fig. 106b; the pale markings are mostly yellow anterior to the dorsocentral bristles and white, tinged slightly with yellow, posterior to the bristles and over scutellum. Postscutellum polished black, metanotum yellow. Abdomen, including genitalia of both sexes entirely yellow except for a tinge of brown over dorsal surface of epandrium of ♂. Base of ♀ ovipositor about equal in length to last 3 abdominal segments, length of base 3.25 mm, length of piercer 4.2 mm (fig. 106d and 106c). Spermathecae elongate, coiled (fig. 106e). Fifth sternum of ♂ about 2× wider than long, hind margin almost straight; densely and evenly short setose with 6-8 long bristles on the posterior margin (fig. 106f).

Length: Both sexes, excluding ovipositor of ♀ body, 6.5 mm; wings, 6.25-6.5 mm.

Holotype ♂ (BISHOP 9983), THAILAND: Tak Prov., Mae Sot Dist., Huai Muang, Canton, 200 m, 11.VII.1969, Malaise trap, J. J. S. Burton. Allotype ♀, Thailand: Pak Chong, 26.XII.1908. Five paratypes, 1 ♂, 4 ♀, from the following localities in Thai-

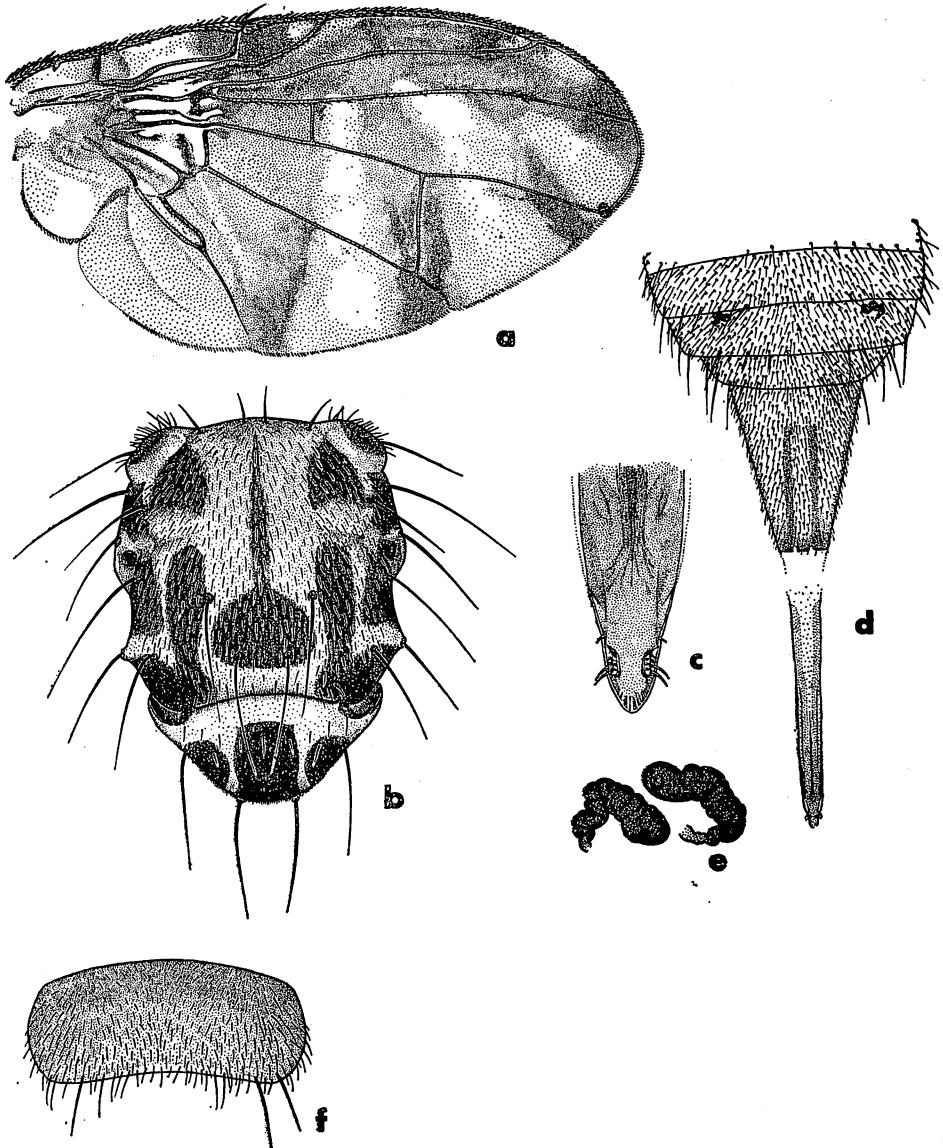


Fig. 106. *A. cognata* n. sp. a. wing; b. thorax; c. apex of piercer; d. ovipositor; e. ♀ spermathecae; f. ♂ 5th sternum.

land: Nakorn-nayok, 18.IX.1964, no collector given; Muak Lek, 12.IX.1964; and Kanchanaburi, 11.VII.1963; Chiangmai Prov., Doi Suthep, 1360 m, 2.V.1958, T. C. Maa; and Chiangmai Prov., Ban Tin Doi, 350 m, 12.XI.1957, J. L. Gressitt.

Type in B. P. Bishop Museum. Allotype returned to Kasetsart University, Bangkok. Paratypes in the B. P. Bishop Museum and the University of Hawaii collection.

**Acroceratitis histrionica** (de Meijere) Fig. 107a-f.

*Chelyophora histrionica* de Meijere, 1914, *Tijdschr. Ent.* 57: 205, pl. 5, fig. 12. Type-locality: Java. Type ♂ in Zoölogisch Museum, Amsterdam.

Specimens on hand from Thailand fit the original description, and my notes and photographs of the type. I do not agree with Hendel (1915: 438) that this is a synonym of *plumosa* Hendel.

This species fits in the complex which is characterized by having the costal band interrupted by a hyaline transverse band extending across middle of wing and r-m crossvein situated near basal 1/3 of cell 1st  $M_2$  (fig. 107a). It fits close to *tomentosa*, n.sp. from Thailand, and is differentiated by having the scutellum entirely black except for a yellow mark on each side at base, and by having a complete median black vitta on mesonotum. The median vitta is not connected with the submedian black marks on mesonotum. Also, the basal segment of ovipositor is shorter (1.8 mm); the piercer (1.2 mm long) is broader at apex as in fig. 107c and 107e; and the mesonotum is not so densely tomentose. The ground color is not obscured by the gray pubescence. ♂ genitalia are as in fig. 107f. The anal plates are rather elongate, distinctly longer than wide and almost quadrate at apex.

Fitting the description of *tomentosa*, n.sp. in most respects. Differing in the details pointed out above, and shown in fig. 112f, 112d, and 112c.

*Host*: Bamboo. This species has been reared from bamboo shoots and collected on bamboo in Bangkok.

Nineteen specimens are on hand from the following localities in THAILAND: Bangkok, 2.VI.1964 to 24.IX.1964; Bangkok, XII.1961 and I.1967; Phu Kae, 28.VIII.1965, and 27.VIII.1966; and Chiangmai, 30.X.1963. Also from the following localities in LAOS: Luang Prabang Prov., Xieng Ngeun, 600 m, 29.VIII.1966, F. G. Howarth and Sayaboury, 914 m, 13.X.1966, F. G. Howarth.

**Acroceratitis incompleta** Hardy, new species Fig. 108a; pl. 7, fig. 62.

Fitting near *A. ceratitina* (Bezzi) from India, but differing by having an incomplete black vitta extending part way down middle of mesonotum from prescutellar spot; by lacking black markings on sides of mesonotum anterior to supraalar bristles and by having the mark extending over m crossvein not connected with the band along costal margin (pl. 7, fig. 62). It is also somewhat similar to *similis*, n.sp. but differs by having the abdomen all yellow, not with 3rd tergum black; by lacking a complete median vitta on mesonotum; and lacking black marks on humeri or on sides of mesonotum anterior to supraalars. Also the wing markings are almost entirely yellow rather than brown, etc.

♂. Entirely yellow except for black markings on posterior portions of thorax. *Head*: Higher than long with eyes oblong in shape. Antennae situated near upper 2/3 of front as seen in direct lateral view, 3rd segment with a sharp spine-like point at apex (fig. 108). Three pairs inferior fronto-orbitals, 2 pairs superior fronto-orbitals. Ocellar bristles very strong, almost equal in length to inner vertical bristles. Face slightly concave as seen in direct lateral view. *Thorax*: Polished black marks on thorax large and conspicuous, arranged as follows: 3 covering apical portion of scutellum, these extend almost 2/3 the distance over dorsum, the median quadrate spot is separated from the laterals by a narrow line on each side; 1 large quadrate spot on each side at hind corn-

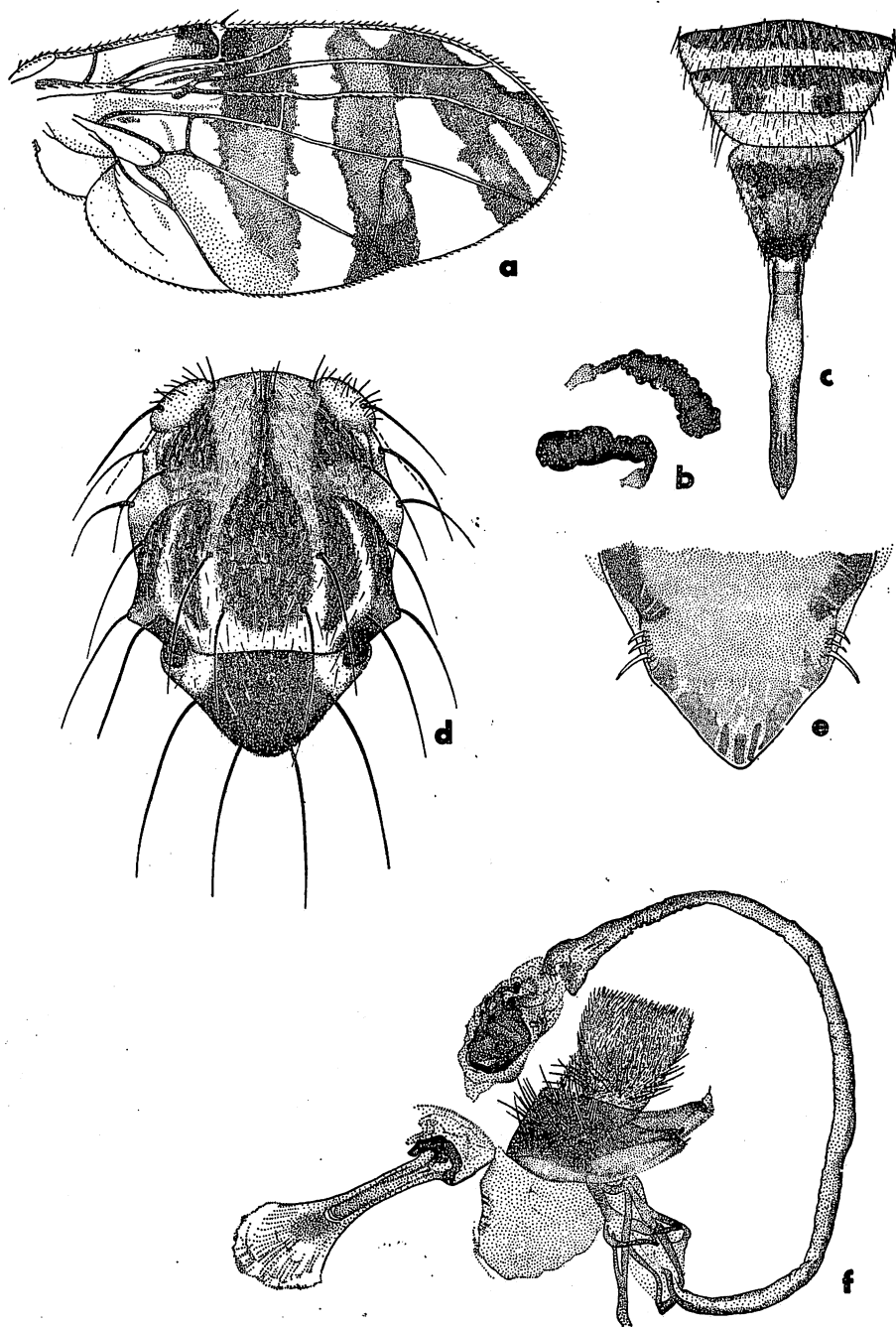


Fig. 107. *A. histrionica* (de Meijere). a. wing; b. ♀ spermathecae; c. ovipositor; d. thorax; e. apex of piercer; f. ♂ genitalia.

ers of mesonotum behind postalar bristles; a prescutellar mark, bordered by prescutellar bristles, and extending anteriorly as a narrow vitta approximately to a level with presutural bristles; also an oblong black spot on each side laterad of dorsocentral bristles and extending from near level with dorsocentrals slightly beyond a level with prescutellars. Dorsocentral bristles situated in line with supraalars. *Legs*: As in other *Acroceratitis*. *Wings*: Similar in most respects to other species except that the markings are predominantly yellow, rather than brown. The preapical oblique band becomes very faint before connecting with the costal band and the marking across m crossvein does not connect with the costal band (pl. 7, fig. 62). The r-m crossvein is situated near basal 1/4 of cell 1st  $M_2$ . *Abdomen*: Entirely yellow. Second tergum enlarged, hind margin extending over the 3rd almost completely covering this tergum on the sides. The genitalia have not been relaxed for study.

Length: Body and wings, 6.0-6.25 mm.

♀. Similar to ♂, except in specimen on hand from Laos a short streak of black is present on each side in line with dorsocentral bristles. The apex of piercer is subacute.

Holotype ♂ (BISHOP 9984), THAILAND: Chiangmai Prov., Doi Suthep, 1278 m, 29.III.-4.IV.1958, T. C. Maa. Allotype ♀, LAOS: Vientiane Prov., Ban Van Eue, 30.VI.1966, native collector. One ♂ paratype, Thailand: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

Type and allotype in the B. P. Bishop Museum. Paratype in the University of Hawaii collection.

#### *Acroceratitis maai* (Chen) Fig. 109a-d.

*Chelyophora maai* Chen, 1948, *Sinensia* 18: 92, fig. 4. Type-locality: Shao-Woo, Fukien, China. Type ♂ in Maa collection.

One ♀ specimen on hand from Laos apparently belongs here. The ♀ has not been previously described.

This species is differentiated from all other known *Acroceratitis* by the position of the hyaline crossband over the wing. In other species which have a complete hyaline band from anterior to posterior margins it lies between the r-m and m crossveins; in *maai* the band begins in the apex of the subcostal cell and extends transversely through cells  $R_1$ ,  $R_3$ ,  $R_5$  and 2nd  $M_2$  (fig. 109a). The specimen on hand seems to fit Chen's description except that only 5 scutellar spots are present rather than 6, the small median basal black spot mentioned by Chen is missing. The pattern of the polished black spots on the mesonotum and scutellum are as in fig. 109b. (The median spot is somewhat diagrammatic since the pin pierces through this portion). Otherwise fitting the description of *maai* except that he refers to the color of the pleura and abdomen as variable from yellow-brown to black (Chen had only 1 specimen). On the specimen at hand the pleura is entirely pale yellow and the abdomen including the ovipositor is entirely rufous, with a faint tinge of brown on the dorsomedian portion of the basal segment of the ovipositor. Also the metanotum is entirely yellow except for a black rim along the upper margin. Basal segment of ovipositor almost as long as terga 3-6. Piercer rather short and thick, 1.8 mm long, blunt at apex, shaped as in fig. 109d. Extended ovipositor, 5.0 mm. Spermathecae shaped as in fig. 109c. Wings as in fig. 109a.

Length: Body, excluding ovipositor, 6.2 mm; wings, 6.5 mm.

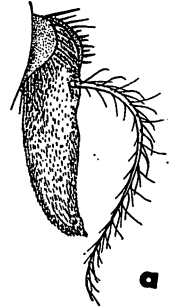


Fig. 108. *A. incompleta* n. sp.  
a. antenna.

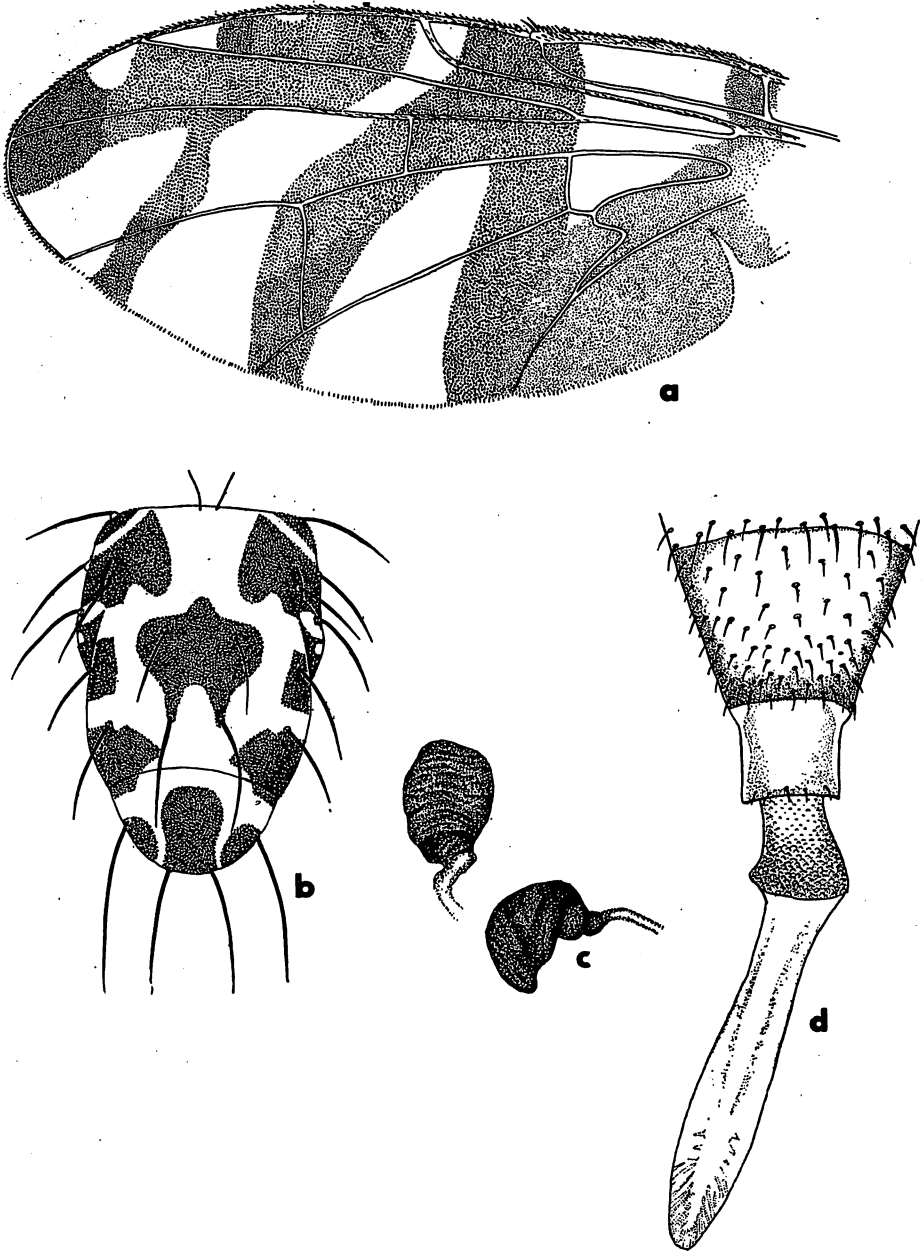


Fig. 109. *A. maai* (Chen). a. wing; b. thorax; c. ♀ spermathecae; d. apex of piercer.

The specimen on hand is from LAOS: Vientiane Prov., Ban Van Eue, 15.II.1967, light trap, native collector, Rondon.

**Acroceratitis plumosa** Hendel Pl. 8, fig. 71.

*Acroceratitis plumosa* Hendel, 1913, *Suppl. Ent.* 2: 82. Type-locality: Kankau, Formosa. Type ♀ in Deutsches Entomologisches Institut, Eberswalde. I have studied the type.

This species is differentiated from others which have the band between r-m and m crossveins, by having r-m crossvein situated before middle of cell 1st  $M_2$ ; scutellum with 3 large shining black spots over apex; the mesonotum with a large black spot and densely gray tomentose; and abdominal terga 2-5 with a submedian black transverse spot on each side. Mesonotum with entire median portion black, covered with gray pollen, lateral margins and prescutellar area broadly yellow; the black marking extends posteriorly as an arm on each side to a level slightly beyond the postalar bristles. Wing markings as in pl. 8, fig. 71. Basal segment of ovipositor with a continuous black band around apex and with a black band over basal portion on dorsum, otherwise yellow. The base of ovipositor, measured on venter, is about 1.3 mm. The tip of the piercer is broken on the specimen at hand.

Length: Body, excluding ovipositor, 4.5 mm; wings, 4.4 mm.

One ♀ specimen on hand: S VIETNAM: 55 km NW of Phan Rang, 3-16.XI.1960, C. M. Yoshimoto.

**Acroceratitis septemmaculata** Hardy, new species Fig. 110a-c.

This species fits in the complex which has the broad uninterrupted costal band and the r-m crossvein situated near basal 1/3 of cell 1st  $M_2$ . It is readily differentiated from all known species in this genus by having the mesonotum entirely yellow except for a large black spot on each hind corner (fig. 110c) and for a small black spot above each wing base.

♀. *Head*: As in other members of this genus. Third antennal segment as in fig. 110b. Three pairs of inferior fronto-orbitals present. Ocellar bristles strong, equal to lower superior fronto-orbitals. *Thorax*: Entirely yellow to rufous except for the 2 black spots on each side of hind margin as mentioned above (fig. 110c). Scutellum yellow, divided into 3 large shining black spots on hind margin, the spots extending at least 2/3 the length of scutellum (fig. 110c). Metascutellum predominantly yellow, black along the margin. Metanotum yellow to rufous. Wing as in fig. 110a. The transverse band extending over m crossvein does not connect with costal band. *Abdomen*: Entirely reddish yellow, base of ovipositor rufous, tinged faintly with brown and about equal in length to last 3 abdominal segments. The piercer is flat, rather broad, similar to other species of this genus. The ovipositor has not been relaxed for study.

Length: Body and wings, excluding ovipositor, 5.5 mm.

♂. Unknown.

Holotype ♀, THAILAND: Phu Kae, 24.VIII.1965, no collector given.

Type returned to Kasetsart University, Bangkok.

**Acroceratitis siamensis** (Munro)

*Chelyophora siamensis* Munro, 1935, *Rec. Ind. Mus.* 37: 17. Type-locality: Lat Bua, Kao, E. Siam. Type in Zoological Survey of India collection.

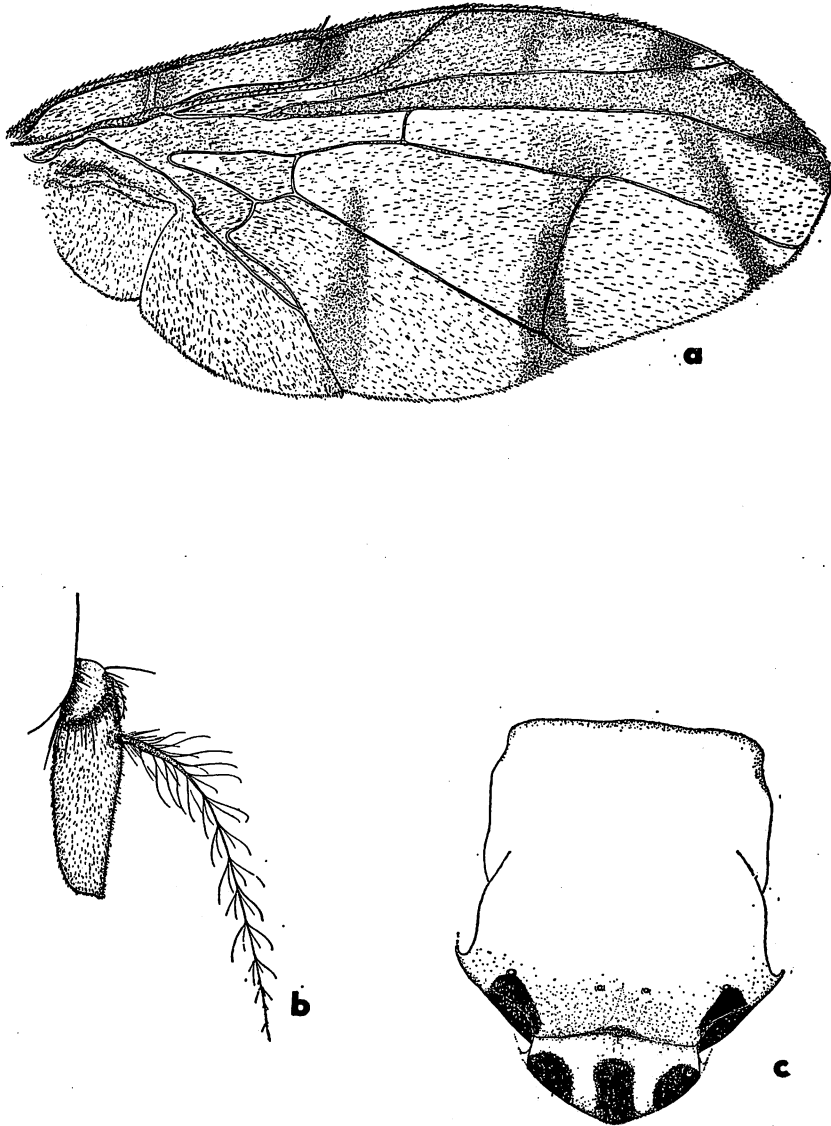


Fig. 110. *A. septemmaculata* n. sp. a. wing; b. antenna; c. thorax.

This species is differentiated from other closely related *Acroceratitis* by having the pleura and sterna predominantly black, only slightly tinged with yellow; by having the metanotum shining blackish brown and the transverse brown band which extends from vein  $Cu_1 + 1st A$  over  $m$  crossvein not connected with costal band. The original description states that the "cubital" band is free; this is the band over the  $m$  crossvein. It fits the description of *C. similis*, n.sp. in most respects.

I have studied the type ♂ in the Zoological Survey of India collection and had



previously determined a series in the British Museum (Natural History) from Thailand as *siamensis*. Further study, however, made it apparent that a complex of species related to *siamensis* exists. *Chelyophora clavifera* Hering (1938: 7) from Burma is obviously close to *siamensis* but is differentiated by having the band over the m crossvein not isolated; and by having the pleura, sterna, and metapleura predominantly yellow.

**Acroceratitis similis** Hardy, new species      Fig. 111a-h.

This species is obviously related to *siamensis* (Munro) because of the isolated brown band over m crossvein, but differs by having the pleura, sterna and metanotum entirely yellow except for a faint narrow streak of brown across upper portion of each mesopleuron in line with upper mesopleural bristle, and a very faint discoloration of brown at a level just below the lower sternopleural bristle. Also, the black spot on humerus is comparatively small, the dorsal and anterior margins of humerus are broadly yellow. The brown to black spot is confined to the area below the humeral bristle, occupying the posteroventral portion of the humerus except for a narrow yellow margin.

**♂. Head:** Yellow, except for the reddish brown eyes, with the slight discoloration of brown in lower median portion of front and on each gena just below eye margin. Head distinctly higher than long. Face almost vertical. Occiput moderately swollen, at its widest point about equal to  $\frac{2}{3}$  the width of eye. Two pairs inferior fronto-orbitals and 2 pairs of superior fronto-orbitals. Ocellars strong, slightly longer than lower superior fronto-orbitals. Antennae yellow, tinged slightly with brown on 3rd segment; 3rd segment with a sharp point at upper apex (fig. 111c). Arista long plumose, the longest rays are greater in length than width of 3rd segment. **Thorax:** Mesonotum predominantly polished black with yellow or white markings as in fig. 111b. The humeri are mostly black, yellow-white around hind margins. Scutellum white, with a small black basal spot on each side, a large quadrate middle spot extending between apical bristles  $\frac{4}{5}$  the distance to base, and a large nearly round spot on each side just below each of the subbasal bristles. Pleura yellow except for a dark brown to black streak near upper edge of each mesopleuron. The postscutellum is polished black, the metanotum is yellow. **Legs:** Entirely yellow. **Wings:** With markings yellow-brown and arranged as in fig. 111a. The r-m crossvein is situated at basal  $\frac{1}{3}$  of cell 1st  $M_2$ . Vein  $R_{4+5}$  setose to a level almost opposite tip of vein  $M_{3+4}$ . Cell  $R_1$  scarcely more than  $\frac{1}{2}$  as long as 2nd costal cell and lobe of cell Cu about  $\frac{2}{3}$  as long as vein  $Cu_1+1st A$ . In the ♂ specimens, the band over m crossvein is completely isolated from the costal band (fig. 111a). In the ♀ the band over m is brown almost to vein  $M_{1+2}$ , then is yellow and narrows sharply so that a very faint yellow, thin strip meets the costal band at vein  $R_{4+5}$ . **Abdomen:** Largely yellow, tinged with reddish brown on extreme lateral margins of first 2 terga and along narrow basal margin of 5th tergum. Third tergum dark brown to black, and 4th tergum pale yellow except for a narrow brown band along posterior margin. Fifth sternum of ♂ about  $2\times$  wider than long, hind margin nearly straight. ♂ genitalia yellow except for dark brown to black epandrium. ♂ genitalia as in fig. 111f. The basal segment of the ovipositor is rufous, tinged faintly with brown and is comparatively elongate, equal to the last 4 abdominal segments and distinctly longer than in *cognata*, n.sp. (refer to fig. 111e and 106d). The piercer is as in fig. 111h. The spermathecae are comparatively long and curled (fig. 111d). Basal segment of ovipositor, measured from apex of 6th tergum, is 4.75 mm. The piercer is 5.0 mm long.

Length: Body, 6.8-7.0 mm; wings, 6.4 mm.

Holotype ♂, THAILAND: Phu Kae, 8.IX.1968, no collector given. Allotype ♀, Thailand: Kanchanaburi, 10.VII.1963, no collector given. One ♂ paratype, Thailand: Bangkok, 17.IX.1966, no collector given.

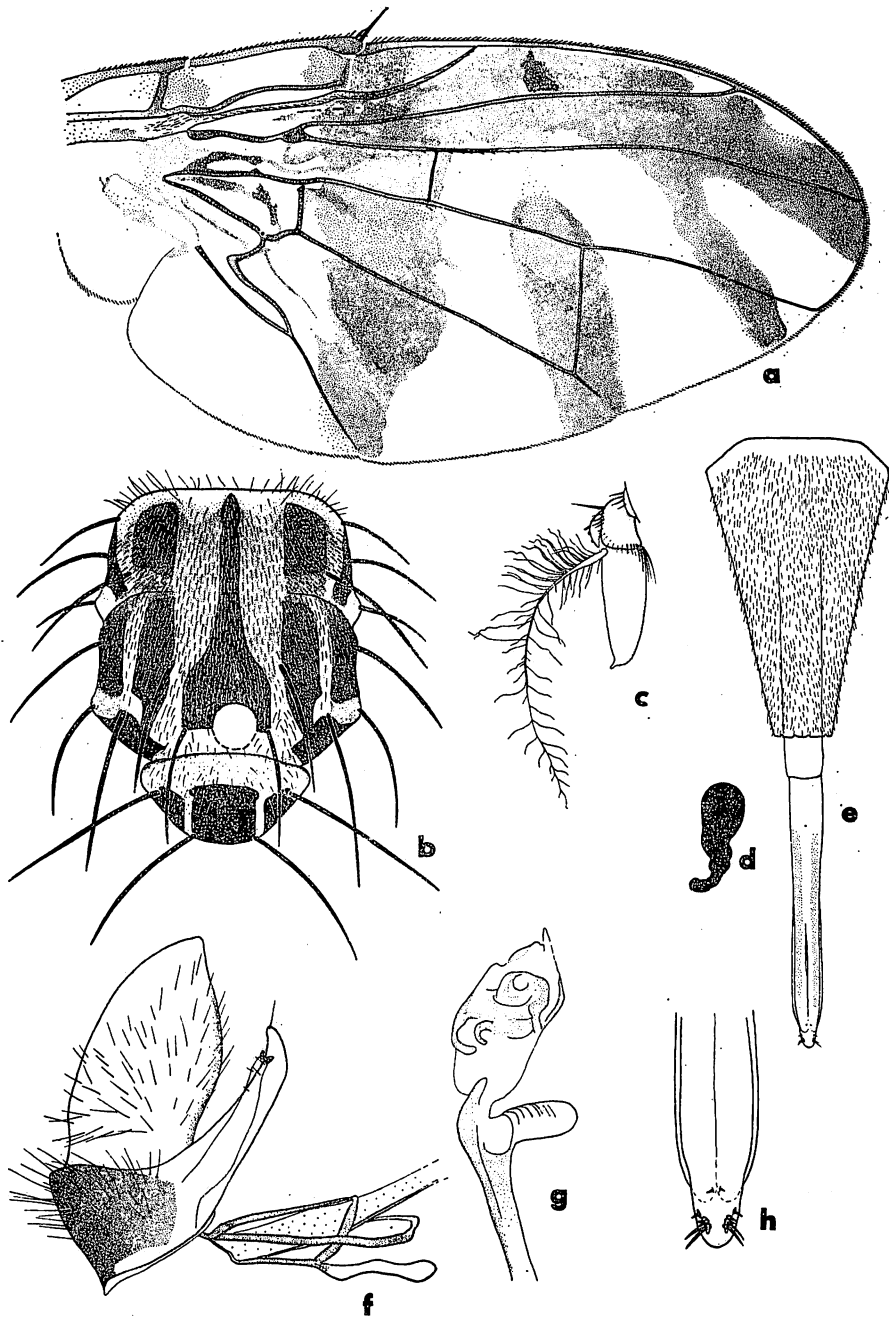


Fig. 111. *A. similis* n. sp. a. wing; b. thorax; c. antenna; d. ♀ spermatheca; e. ovipositor; f. ♂ genitalia; g. ♂ ejaculatory apodeme; h. apex of piercer.

Type and allotype returned to Kasetsart University, Bangkok, Thailand. One paratype retained in the University of Hawaii collection.

**Acroceratitis tomentosa** Hardy, new species Fig. 112a-f.

Fitting near *histrionica* (de Meijere); differing by having a pair of prominent yellow spots at apex of scutellum; the mesonotum largely black in ground color with the broad median area joined with the submedian postsutural black marks laterad of dorso-central bristles (fig. 112f). The mesonotum is much more densely gray pubescent; the base of the ovipositor more elongate and the piercer more sharply pointed (fig. 112c) than in *histrionica*.

♀. *Head*: Distinctly higher than long, shaped as in fig. 112a; with face vertical, and the occiput only slightly swollen. Two pairs inferior fronto-orbital bristles present. Ocellars strong, equal in size to lower superior fronto-orbitals. Antennae as typical of this genus with 3rd segment slender, sharp pointed at upper apex and arista long plumose. *Thorax*: Predominantly shining black in ground color, rather densely gray to yellow-gray pubescent, with the pollinose markings forming a pair of broad gray submedian vittae overlying the black ground color. In the ground color, the black extending over median portion of metanotum is connected to the submedian black marks which extend behind suture outside dorsocentral bristles (fig. 112f). A broad triangular area behind each humerus is black and the lateral margins of mesonotum are predominantly dark brown to black, yellow in the area just before posterior supraalar; the posterolateral margins of the mesonotum are broadly shining black and this marking extends onto the extreme bases of scutellum. Scutellum almost entirely shining black, rather sparsely yellow setose and distinctly swollen, scarcely longer than wide. A subbasal yellow mark extends vertically on each side and a submedian vertically arranged yellow mark is present just outside each apical scutellar bristle. Pleura predominantly brownish yellow with a broad yellow-white mark extending over most of mesopleuron onto notopleuron, the anterolateral corners of mesonotum and over humeri; similar to the marking of thorax in species of *Gastrozona*. The upper 2/3 of metapleuron and pleurotergon are also white. The postscutellum and metanotum are polished black, lacking pubescence or pollen. *Legs*: Predominantly yellow, tinged with brown over median portions of middle and hind femora. *Wing*: As in fig. 112b, very similar to that of *histrionica*. The r-m crossvein is at the basal 1/3 of cell 1st M<sub>2</sub> and the lobe of the cubital cell is comparatively short, scarcely over 1/3 as long as vein Cu<sub>1</sub>+1st A. *Abdomen*: Predominantly yellow-white, 3rd segment dark brown to black except narrow apical margin, 4th and 5th terga with a broad brown to black basal margin, and 2nd tergum with a narrow black apical margin. Sixth sternum dark brown to black on sides. Base of ovipositor mostly rufous, brown to black at the apex and approximately equal in length to the last 3 abdominal segments. Piercer extended into a rather sharp point (fig. 112c). Basal segment of ovipositor, measured beyond apex of 6th tergum, equals 3.0 mm.

Length: Body, excluding ovipositor, and wings, 6.0-6.2 mm.

♂. Fitting the description of the ♀ except for genital characters; the markings of the pleura are darker in color than in the type, mostly brownish black. The genitalia are yellow except for the shining black epandrium. The 5th sternum is dark brown to black on each side. The genitalia are as in fig. 112e. The lobes of the 10th tergum, anal plates, are distinctly longer than wide.

Length: Body, 5.4 mm; wings, 4.75 mm.

Holotype ♀, THAILAND: Bangkok, Bangkokhen, 20.VIII.1965, no collector given. Allotype ♂, Thailand: Kanchanaburi, 20.IX.1964, no collector given. Four paratypes, 1 ♂, 3 ♀ ♀, from the following localities in Thailand: same as type, 24.VIII.1965 and 5.IX.1963; Pattahi, 23.V.1966, and Pitsanuloke, 10.VII.1965.

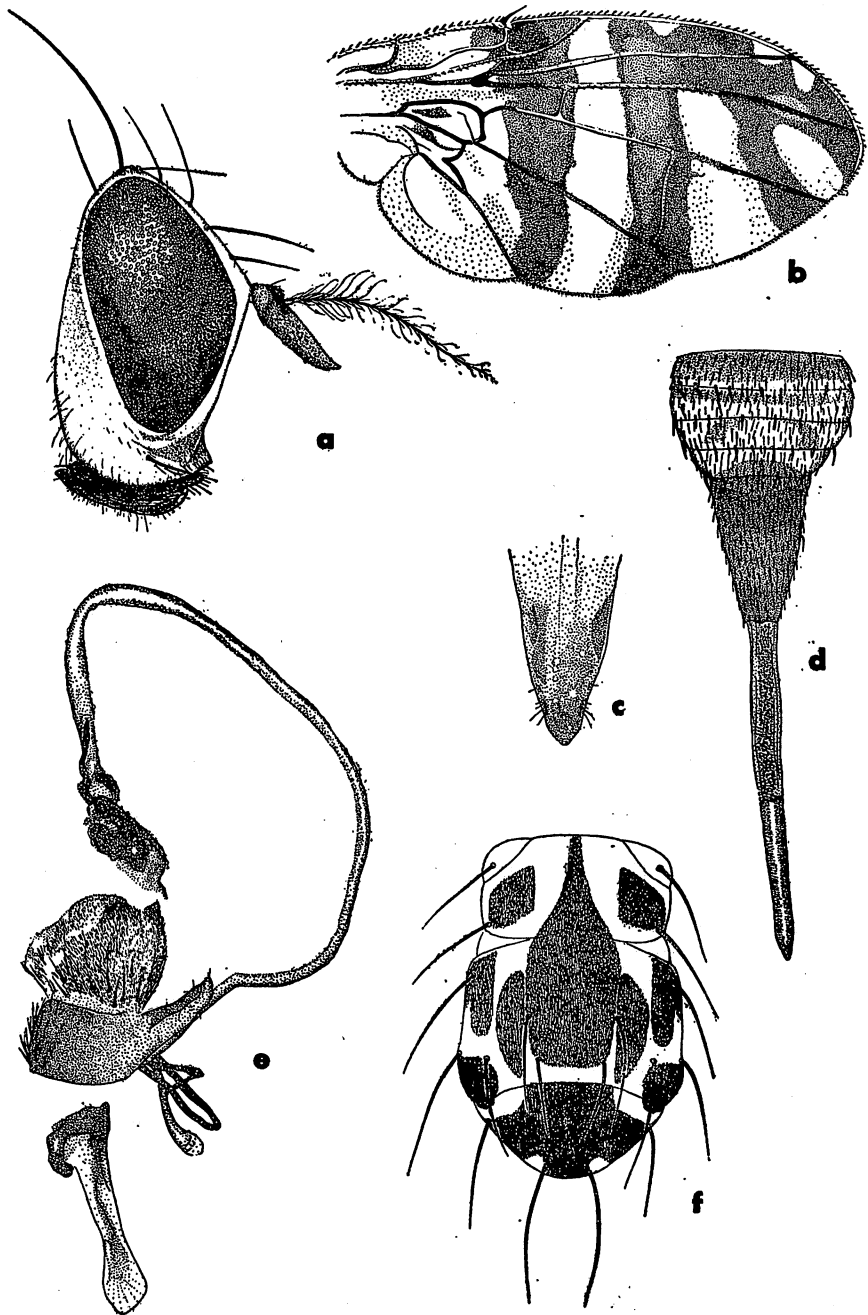


Fig. 112. *A. tomentosa* n. sp. a. head; b. wing; c. apex of piercer; d. ♀ abdomen; e. ♂ genitalia; f. thorax.

Type and allotype returned to Kasetsart University. Paratypes in the collections of the B. P. Bishop Museum and the University of Hawaii.

### Genus *Anomoia* Walker

*Anomoia* Walker, 1836, *Ent. Mag.* **3** (1): 80. This was emended to *Anomoea* by Lacordaire, 1848, *Mem. Soc. R. Sci. Liege* **5**: 131. The emendation is not valid. Type-species: *Trypeta gaedii* Meigen (as *goedii*), by monotypy = synonym of *Musca permunda* Harris. As discussed by Malloch (1939a: 448), *Anomoia* Walker (1835) is not preoccupied by Chevrolat. He says "it has been conclusively proven that the part of Chevrolat's catalogue containing the name *Anomoia* did not appear until 1837." *Anomoia* Chev. is also based on a nomen nudum.

*Phagocarpus* Rondani, 1847, *Bull. Soc. Ent. Ital.* **3**: 171. Type-species: *Musca permunda* Harris, by original designation.

*Neanomoea* Hendel, 1914, *Wien. Ent. Zeit.* **33**: 84; 1915, *Ann. Hist. Nat. Mus. Nat. Hung.* **13**: 454. Type-species: *approximata* Hendel, by original designation. **New synonym** based upon examination of syntype series in Hungarian National Museum. Chen (1948: 107) placed this as a synonym of *Euleia* Walker (= *Myoleja* Rondani); because of the obliquely placed m crossvein it best fits in *Anomoia* Walker.

*Hamoucheta* Blanchard, 1929, *Physis* **9**: 458. Type-species: *ogloblini* Blanchard, by monotypy.

Most authors have used the emended spelling *Anomoea*. The name *Phagocarpus* has been used widely in the literature by various writers dealing with those Trypetini which have the characteristic semicircular brown pattern in apical 2/5 of wing (pl. 7, fig. 63) and m crossvein oblique in position making a sharp-pointed angle to apical portion of cell 1st  $M_2$ . Malloch 1939a: 449 and 1939b: 274 redefined the concept of *Anomoia* and said that the most reliable character for differentiating this was "the marked downward dip of the fourth vein [ $M_{1+2}$ ] immediately proximad of the inner crossvein [r-m]." I find this character to be only of specific importance; the type of the genus, *permunda* (Harris), has this portion of  $M_{1+2}$  gently curved. Of the species known from Thailand and surrounding countries this portion of vein  $M_{1+2}$  is straight except in *kraussi*, n. sp. in which it is distinctly bent downward (pl. 8, fig. 76).

This genus fits close to *Myoleja* Rondani and is differentiated by having the m crossvein strongly oblique in position so that cell 1st  $M_2$  is sharply pointed at its lower apex. Also vein  $R_1$  is bent rather sharply upward, entering the costa at almost a right angle and at the apex almost parallel to the subcosta (pl. 8, fig. 76). I have found no other reliable characters to differentiate these and feel that it is very possible that this character may intergrade with *Myoleja*.

Approximately 20 Oriental and Pacific species have been described under this genus, predominantly as *Phagocarpus*. Seven species are presently recognized from the area under study.

### KEY TO KNOWN SPECIES OF ANOMOIA FROM THAILAND AND SURROUNDING COUNTRIES

1. Thorax unicolorous, reddish brown to black. Face yellow. ....2  
 Thorax with 3 longitudinal black vittae. Face black. Burma. .... **melanopsis** (Hering)
- 2 (1). Base of wing entirely dark brown, including both costal cells, except for a small hyaline V in middle of the 2nd (pl. 8, fig. 76). .... 3  
 First costal cell hyaline and 2nd with a large quadrate hyaline spot which extends to base of cell  $R_3$ . ....4
- 3 (2). Antepenultimate section of vein  $M_{1+2}$  straight, not curved down sharply before r-m cross-

- vein and vein  $R_{2+3}$  almost straight. The narrow brown band extending along anterior margin of costa and the band across m crossvein not joined with basal median portion of wing, extending only into basal portion of cell  $M_4$  and not into the cubital cell; posterior lobes of wing hyaline. Burma. .... **pusilla** (Hering)
- Antepenultimate section of vein  $M_{1+2}$  curved downward sharply before r-m crossvein and vein  $R_{2+3}$  distinctly undulate in line with r-m crossvein. The brown mark over m crossvein continuous along vein  $M_{1+2}$  and joining median brown mark. The brown band around apical margin extending only to about vein  $R_{4+5}$  and brown marking over basal median portion of wing more extensive, filling most of cubital cell and base of cell  $M_4$  (pl. 8, fig. 76). Malaya and Thailand. .... **kraussi**, n. sp.
- 4 (2). At least the upper arm of the semicircular mark in apical 2/5 of wing widely separated from basal median brown marking. ....5
- Both arms of the semicircular mark in apical portion of wing connected with brown basal median mark (pl. 7, fig. 63). Formosa and Thailand. .... **vana** (Hering)
- 5 (4). Semicircular mark continuous and distinctly separated from the brown submedian marking. Femora entirely rufous. Burma. .... **flavifemur** (Hering)
- Brown marking over m crossvein extending along vein  $M_{1+2}$ , joining with brown marking in middle of wing. ....6
- 6 (5). Middle and hind femora dark brown. Burma. .... **brunneifemur** (Hering)
- Legs predominantly yellow. Burma. .... **malaisei** (Hering)
- (Note: These 2 are probably synonyms; I find no other differences).

**Anomoia kraussi** Hardy, new species Fig. 113a-d; pl. 8, fig. 76.

This species is closely related to *pusilla* (Hering) from Burma, and is differentiated by having the antepenultimate section of vein  $M_{1+2}$  sharply curved downward before r-m crossvein (pl. 8, fig. 76); by having the narrow brown band over m crossvein continuous along vein  $M_{1+2}$  and joining with the median brown marking of wing and the narrow brown band along anterior margin extending only to vein  $R_{4+5}$ ; also by having the brown marking over basal part of wing filling most of cubital cell and base of cell  $M_4$ . In *pusilla* the brown band extending along anterior margin of costa and the one over m crossvein do not join with the basal median marking but are nearly confluent in middle of cell  $R_5$  beyond r-m crossvein. The antepenultimate section of vein  $M_{1+2}$  is straight and the median brown markings of the wings extend only into basal portion of cell  $M_4$  and do not extend into cubital cell; the posterior portion of the wing is hyaline (refer to Hering 1938: 23, fig. 23).

♂. *Head*: Yellow including appendages, except for compound eyes. Nearly 2 × higher than long with eyes long oval and 2/3 higher than long (fig. 113a). Front about 1/2 longer than wide and slightly narrowed anteriorly, with numerous short black setae through median portion and with 3 pairs of inferior fronto-orbitals and 2 pairs of superior front-orbitals. Ocellar bristles equal in size to inferior fronto-orbitals and postocellars equal to postvertical bristles. Antennae situated at about median portion of head. Third antennal segment about 2.5 × longer than wide. Face almost vertical, slightly developed on epistomal margin and also raised down median portion. Genal bristles black, genae covered with short black setae. *Thorax*: Polished black in ground color, densely black setose and with a thin covering of gray to brown pollen on sides and dorsum. The humeri are tinged faintly with rufous in ground color. All bristles black, the dorsocentrals are situated in line with postalar bristles; humeri and propleura with a group of bristle-like hairs near anterior margins; some of these are as long and as strong as postocellar bristles. In addition to the usual pair of strong bristles each mesopleuron has 2 or 3 rather strong bristle-like hairs on posterior margin, plus the small setae which are usually present. Scutellum with 4

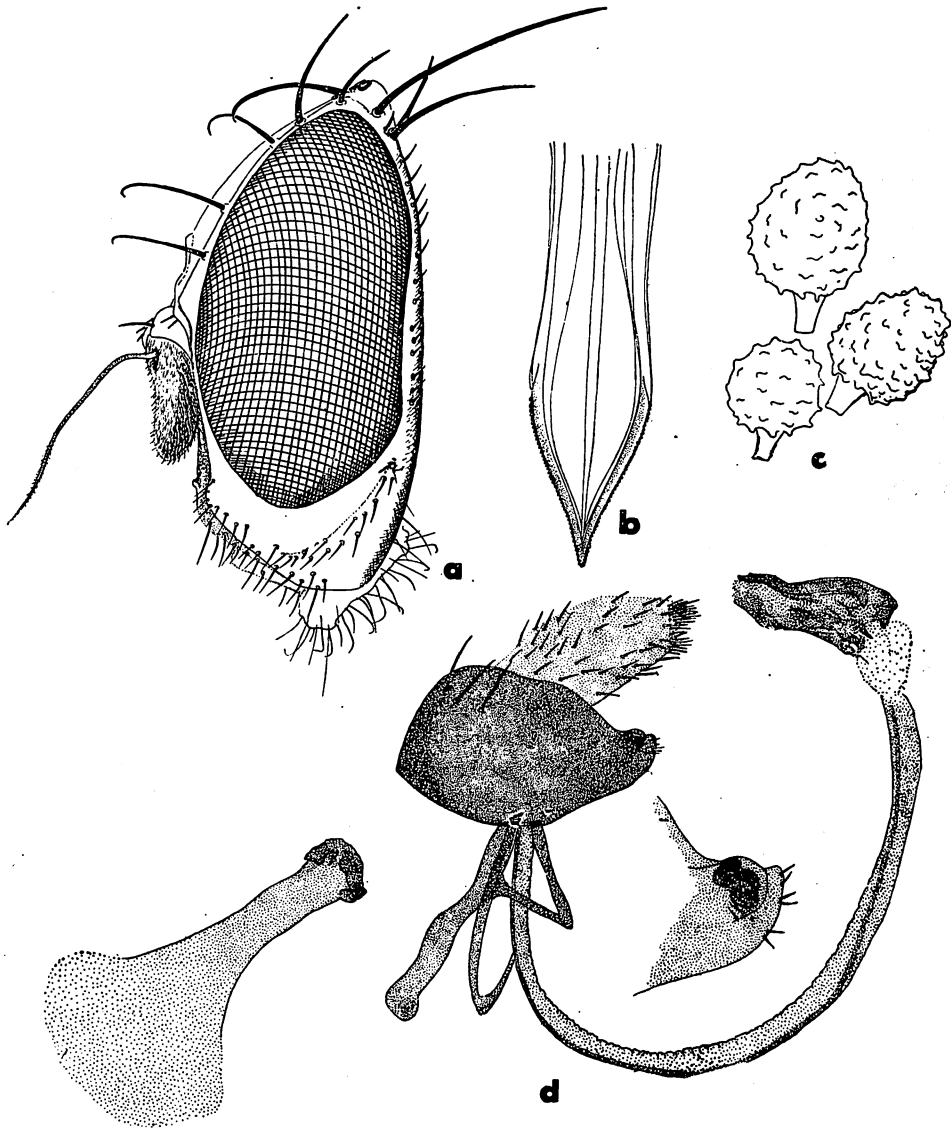


Fig. 113. *Anomoia kraussi* n. sp. a. head; b. apex of piercer; c. ♀ spermathecae; d. ♂ genitalia.

strong bristles, entirely black with but a faint tinge of rufous in the ground color on the margins and with numerous short black setae over the disc. *Legs*: Coxae, trochanters and femora black, tinged with rufous on anterior legs and on apices of mid femora. Front femur with a row of moderately strong posteroventral bristles. *Wings*: Markings and venation as in pl. 8, fig. 76. With basal 3/5 predominantly dark brown, including the 2 costal cells, with the exception of a small wedge-shaped hyaline mark in middle of 2nd costal cell. *Abdomen*: Shining black, densely covered with black setae and with a row of moderately long black bristles around apex of 5th tergum. The sterna are dark brown, thickly black setose. Fifth sternum 2 × longer than wide,

very gently concave on hind margin. Epandrium black, rather broad. Surstyli tapered, curved upward at their apices. Anal plates rather elongate, nearly 2 × longer than wide. Other aspects of ♂ genitalia as in fig. 113d.

Length: Body, 4.75 mm; wings, 4.5 mm.

♀. Fitting the description of the ♂ in most respects. Sixth tergum about 2/3 as long as 5th. Basal segment of ovipositor dark brown to black, rather short, as seen from dorsal view about equal in length to 5th tergum and with prominent black bristles around apical margin; measured on the venter the basal segment is 0.9 mm. The piercer is rather short, measuring about 0.63 mm and sharply pointed at the apex with the margins minutely serrated (fig. 113b). The extended ovipositor measures 2.4 mm. Three round spermathecae present (fig. 113c).

Holotype ♂, W MALAYSIA: Negri Sembilan, Ampangan, nr Serembam, VI.1948, ex fruit of *Gmelina* sp., N. L. H. Krauss. Allotype ♀, same data, ex fruit of *Gmelina* sp. Twenty-two paratypes, 14 ♂♂, 7 ♀♀, same data as type. Also 3 ♂♂ from S VIETNAM: Nha Trang and 22 km S of Nha Trang, 17-26.XI.1960, C. M. Yoshimoto.

Type, allotype, and a series of paratypes deposited in the U. S. National Museum. Paratypes in the B. P. Bishop Museum, British Museum (Natural History), and the University of Hawaii collection.

#### ***Anomoia pusilla* (Hering)? new combination**

*Phagocarpus pusillus* Hering, 1938, *Ark. Zool.* 30A (25): 23, fig. 23. Type-locality: Kambaiti, Burma.

Type ♂ in Naturhistoriska Riksmuseet, Stockholm. I have studied the type.

One ♂ specimen on hand from S VIETNAM: Di Linh (Djiring), 1000 m, 27.IX-14. X. 1960, C. M. Yoshimoto appears to fit *pusilla* except that the brown line over the apical margin of the costa and the brown line over the m crossvein are widely separated by most of the width of cell  $R_5$ ; the uppermost band extends just a short way into the upper portion of cell  $R_5$  and the lower band extends along vein  $M_{1+2}$ , very similar to the marking in *kraussi*, n. sp. Also as in *kraussi* the brown mark extends from the basal median brown coloring of the wing all the way across the middle of cell  $M_4$  to the wing margin. It differs from *kraussi* by not having the penultimate section of vein  $M_{1+2}$  curved downward and having vein  $R_{3+4}$  straight or nearly so, not with a distinct undulation in line with the r-m crossvein. For typical *pusilla* refer to Hering's original figure.

#### ***Anomoia vana* (Hering), new combination**      Fig. 114a-c; pl. 7, fig. 63.

*Phagocarpus vana* Hering, 1942, *Mitt. Zool. Mus. Berlin* 25 (2): 279, fig. 6. Type-locality: Formosa.

Type ♂ in Zoologisches Museum, Berlin. I have studied the type and have a color photograph.

One ♀ specimen on hand from Thailand fits the description and is evidently this species. This is most closely related to *klossi* (Edwards) from Sumatra, but is differentiated by having both of the narrow bands over anterior margin of costa and over m crossvein connected with the brown coloring which extends over most of basal 1/2 of wing, as in pl. 7, fig. 63; in *klossi* the dorsal band is not connected. In the original Hering said the thorax is black with only the humeri and propleura yellow-brown. In the specimens at hand the mesonotum is brownish red in ground color, rather densely gray pollinose, with the pollen almost obscuring the ground color. The pleura are predominantly dark reddish brown to black. The other details are as described by Hering



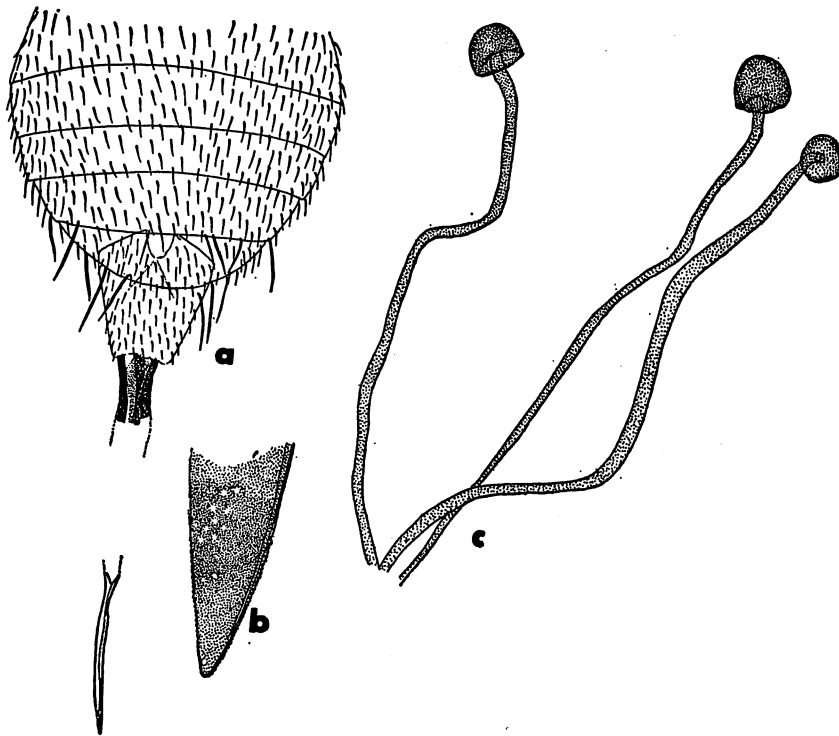


Fig. 114. *A. vana* (Hering). a. ♀ abdomen; b. apex of piercer; c. ♀ spermathecae.

with the head entirely yellow and the legs yellow except for the brown tinged mid and hind femora. The species is easily differentiated by the wing markings, and by having the r-m crossvein situated less than its length from m crossvein (pl. 7, fig. 63).  $R_{4+5}$  is setose to a level just beyond m crossvein. The ♀ has not been previously described. The abdomen is dark brown, tinged with black, the 6th tergum about 3/4 as long as 5th. Basal segment of piercer black, densely black setose and as seen from dorsal view only about equal in length to 5th tergum. Three small, round, rather mushroom-shaped spermathecae are present. As measured on the venter, the basal segment is 1.0 mm in length. Piercer slender, sharp-pointed (fig. 114b), 1 mm in length. The inversion membrane has not been extruded but the extended ovipositor would probably measure 3 mm. The sterna of the specimen on hand are yellow, tinged faintly with brown except for the brown 6th sternum.

Length: Body, 4.75 mm; wings, 5 mm.

Specimen on hand from NW THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

#### Genus *Anoplomus* Bezzi

*Anoplomus* Bezzi, 1913, *Mem. Ind. Mus.* 3: 100. Type-species: *flexuosus* Bezzi, from India, by original designation.

This is a borderline "Ceratitis" with scutellum slightly convex, readily differentiated from all other known genera by lacking humeral bristles. These are strikingly marked species with a distinctive pattern in the wing (fig. 115a), very swollen occiput, and with a densely gray to yellow-gray band on the 2nd and on the 4th abdominal terga. The arista is long plumose, and because of this character would probably fit best in Gastrozoni. Third antennal segment slightly pointed at upper apex. Scutellum ivory-white with 3 shining black spots at apex and mesopleuron entirely ivory-white except for anteroventral margin and continuous with mark on humerus. The ♀ has 2 spermathecae.

Two species have previously been recognized in this genus. One, the type, is from India, and *cassandra* (Osten-Sacken) is from the Philippines. Two new species are on hand from Thailand and Laos.

**Anoplomus nigrifemoratus** Hardy, new species Pl. 8, fig. 80.

This species shows relationship to *flexuosus* Bezzi but is differentiated by having cell Sc entirely dark brown, with the dark brown subbasal wing marking occupying all of the subcostal cell making the hyaline crossband narrow, about equal in width to the length of the r-m crossvein, rather than Sc mostly yellow, brown only at base; by having the oblique preapical cross-band connected with the brown mark extending around anterior margin of wing and also broadly connected with the brown mark over m crossvein (pl. 8, fig. 80), rather than with oblique crossband isolated, not distinctly connected with other markings; femora all black except for bases of hind pair, rather than with front femora all yellow and hind broadly yellow basally; scutellum mostly yellow ventrally with lateral black spots small, confined to under surface, rather than with 3 large black spots over apex of scutellum and entire ventral surface black.

♂. Fitting the typical characteristics of *Anoplomus*. *Head*: Higher than long with the lower occiput rather strongly swollen. Mostly yellow, median portion of front tinged reddish brown and with a large brown mark extending over each gena. Two pairs inferior fronto-orbital bristles and 2 pairs superior fronto-orbitals. Ocellars rudimentary, represented by small setae. Antennae yellow, 3rd segment about 3× longer than wide, very slightly pointed at upper apex. *Thorax*: Subshining black on dorsum, lightly gray pollinose and yellow pilose and with 2 submedian gray longitudinal vittae. The yellow-white mark over the mesopleuron is connected with the yellow-white humeri and the remainder of the pleura are dark brown to black except for the yellow-white metapleura. Halteres pale yellow. Scutellum yellow-white with a narrow black band along base, a shining black median spot at apex extending over the venter from a level with the apical scutellar bristles. Most of the ventral portion of scutellum yellow with a small spot of dark brown on each side; these do not extend over the apex of the scutellum. *Legs*: Femora black except for narrow basal portions of hind femora and extreme apices of front. Tibiae and tarsi yellow. Two strong apical spurs on middle tibiae. *Wings*: As in pl. 8, fig. 80. *Abdomen*: Black, with 2nd and 4th terga densely gray pollinose and densely yellow pilose. The genitalia have not been dissected for study.

Length: Body and wings, 7.75 mm.

♀. Fitting description of ♂ in most details. *Abdomen*: Second tergum mostly yellow in ground color, with the ground color obscured by dense gray pollen. Also with a broad gray crossband over apical 2/3 of tergum 4 and also tergum 5. Basal segment of ovipositor equal in length to terga 3-6. The piercer has not been extruded for study.

Length: Body, excluding ovipositor, 9.0 mm; wings, 10.0 mm.

Holotype ♂ (BISHOP 9985), LAOS: Vientiane Prov., Ban Van Eue, 31.VII.1965,

native collector. Allotype ♀, same locality, 30.VI.1967, native collector. One paratype ♀, Laos: Sayaboury Prov., Sayaboury, 30.IX.1966, native collector.

Type and allotype in B. P. Bishop Museum. Paratype in collection of University of Hawaii.

**Anoplomus rufipes** Hardy, new species      Fig. 115a-c.

This species is related to *flexuosus* Bezzi from India, but differs by having the wing sharp-pointed at apex (fig. 115a), not rounded; by having the femora all yellow, not with middle and hind femora broadly brown to black at apices; 2nd costal cell mostly hyaline, brown only at extreme apex and with a faint tinge of brown at base, rather than having the 2nd costal cell all dark brown except for a small hyaline spot toward the basal portion; also the mesonotum has 2 prominent gray vittae, which are densely covered with yellow setae.

I have on hand 2 specimens, ♂ and ♀, from North Khasi Hills, Assam, which fit Bezzi's description of *flexuosus*. I also have 4 specimens, 3 ♀ ♀, 1 ♂, from Travancore, South India, which may possibly represent a distinct species. The leg coloring is somewhat variable, but for the most part the femora are all dark brown, to black, except for narrow yellow bases of front and hind pair; also the 2nd costal cell is all brown in most of these specimens. The front also has a reddish brown median vitta, extending the entire length.

♂. *Head*: About 1/3 higher than long with the occiput rather strongly swollen as is characteristic of species of this genus; at widest point, the occiput is equal to more than 1/2 the width of compound eye. Eyes oblong, almost 2× higher than long. Occiput entirely yellow, except for a brown to black streak on each side of upper median portion. The area of the outer vertical bristles is dark brown to black on each side. Vertex and front yellow, median portion of front yellow, tinged with brown. Face and genae pale yellow, just a faint indication of brown on gena directly below the eye margin. Face vertical, raised down median portion and with rather prominent antennal furrows; gibbose on sides at lower margin (fig. 115b). Genal bristle small, black, poorly developed, scarcely larger than apical setae on palpi. Oral vibrissae represented by weak, yellow to black setae. Two pairs inferior fronto-orbitals and 2 pairs of superior fronto-orbitals, these bristles are approximately 3× longer than wide and slightly pointed on upper apices. Ocellar bristles rudimentary, seta-like. Arista long plumose, the longest rays are longer than width of 3rd segment. Palpi yellow, tinged faintly with brown basally and with scattered setae around margins. *Thorax*: Predominantly shining black in ground color, with prominent ivory-white marks on humeri, pleura and scutellum. Mesonotum with a pair of submedian gray vittae, these are densely covered with short yellow hairs (fig. 115c). The white mark which covers all except anteroventral margin of mesopleuron is continuous with the white mark over humerus. Meta-pleura and pleuroterga entirely yellow-white except for a narrow border of brown along ventral margins, densely yellow pubescent. Scutellum ivory-white with 3 apical black spots; these are separated by about the width of median spot. Postscutellum and metanotum polished black. Halteres pale yellow. *Legs*: Entirely yellow, except for brown middle and hind coxae. Middle tibia with 2 strong apical spines. Front femur with a row of about 6 rather strong posteroventral bristles extending over apical 2/3 of segment. Middle tibia with 5 or 6 short black bristles at middle of posterior surface. *Wings*: Markings as in fig. 115a, with apex sharply pointed and most distinctive. *Abdomen*: Polished black in ground color, with broad yellow-gray bands covering most of terga 2 and 4. The 5th sternum is 2× wider than long and the hind margin is straight. The epandrium is polished black, tapered ventrally and the surstyli are short, truncate apically. The anal plates are yellow and equal or slightly longer than epandrium.

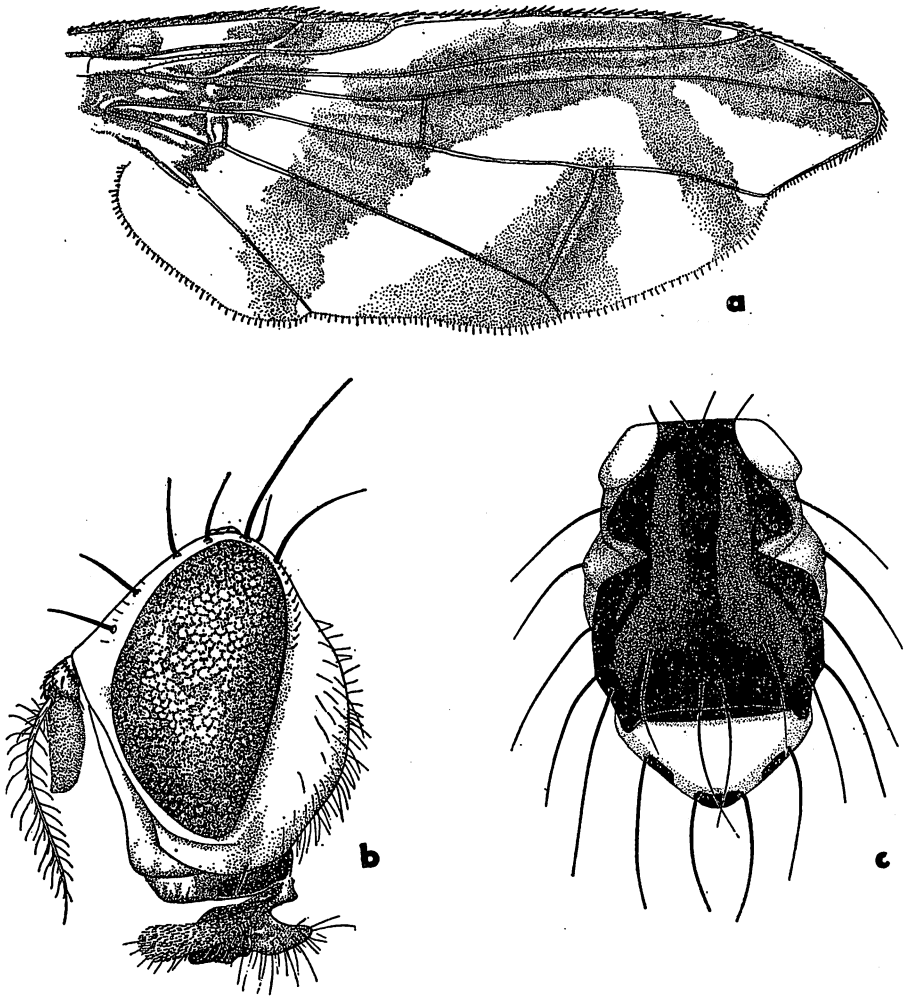


Fig. 115. *Anoplomus rufipes* n. sp. a. wing; b. head; c. thorax.

Length: Body, 7.0 mm; wings, 7.7 mm.

♀. Fitting description of ♂ in most respects. Middle femora largely brown, yellow on bases and narrow apices and hind femora broadly tinged with brown at apices. Wings narrowed apically but not so sharply so as in ♂. First tergum black at apex; 2nd entirely yellow, densely pollinose and 3rd entirely black. Fourth and 5th terga yellow, densely pollinose, except for narrow black bases. Sixth tergum subshining brown, about 1/2 as long as 5th. Basal segment of ovipositor shining, reddish brown tinged with black, as seen from above slightly longer than terga 3-6. Measured on the venter the basal segment is 2.7 mm long. The piercer is broad, straight-sided and abruptly tapered at apex, 2.5 mm long. Extended ovipositor 7.5 mm. Two spermathecae are present.

Length: Body, excluding ovipositor, 7.25 mm; wings, 8.0 mm.

Holotype ♂ (BISHOP 9986), THAILAND: Chiangmai Prov., Chiangdao, 5-11.IV.

1958, T. C. Maa. Allotype ♀, Thailand: Chiangmai Prov., Fang, 500 m, 15.IV.1958, T. C. Maa. Four paratypes, 2 ♂♂, 2 ♀♀, from Thailand: Loei Prov., 12-15 km NW of Loei, 275 m, 14-15.IV.1969, J. J. S. Burton; LAOS: Xieng Om, 30.III.1920, R. Vitalis de Salvaza.

Type in B. P. Bishop Museum, allotype in University of Hawaii collection and paratypes in collections of University Zoological Museum, Helsinki, U.S. National Museum and University of Hawaii.

#### Genus *Carpomyia* A. Costa

*Carpomyia* A. Costa, 1854, *Annal. Scient.*, Napoli 1: 87. Type-species: *vesuviana* A. Costa, by monotypy.

*Carpomyia* resembles some genera which have been placed in the Tribe Ceratitini, by other authors, because of the slightly convex, wider than long scutellum, and the yellow body with prominent polished black spots on the dorsum of the thorax. Superficially it appears to fit near *Paratrirhithrum* Shiraki but is not related to this genus. It is readily differentiated by its predominantly hyaline wings with yellow marks as in pl. 7, fig. 64; by lacking basal black streaks in the wing; by being predominantly pale yellow with polished black marks on mesonotum and scutellum as in fig. 116b; by having 3 pairs of inferior fronto-orbital bristles, rather than 2, and having the antennae pointed at upper apex (fig. 116a), rather than rounded at apex; as well as in other details. I prefer to treat this as a Trypetini close to *Myiopardalis* Bezzi but differing by having the ocellar bristles rudimentary, rather than strong; eyes oval, rather than oblong; the scutellum slightly convex, rather than flat; and by other details pointed out under the species description.

Four Palearctic species belong in this genus; 1 of these is widespread over southern Europe, also over India, Pakistan, and probably Southeast Asia. The latter, *vesuviana*, occurs in Thailand and may be widespread through Southeast Asia wherever its host, *Zizyphus*, occurs.

***Carpomyia vesuviana* A. Costa** Fig. 116a-e; pl. 7, fig. 64.

*Carpomyia vesuviana* A. Costa, 1854, *Annal. Scient.*, Napoli 1: 87, fig. 10. Type-locality: Italy. Original description not seen.

Distribution: Widespread over southern Europe, India, Pakistan and Thailand (probably over a wider area of Southeast Asia).

Hosts: The larvae infests fruits of various species of *Zizyphus*: *jujuba* and *nummularia* in India, Pakistan and Thailand, and *sativa* in Italy.

This species closely resembles *Myiopardalis pardalina* (Bigot); the general facies, genitalia, body coloring, wing markings and venation, shape of antennae and arrangement of bristles are very similar in the 2 and they obviously are closely related. They are readily differentiated by having the ocellars rudimentary, seta-like in *Carpomyia*; the eyes oval, about 1/3 higher than long and genae comparatively narrow, the width equal to less 1/4 the eye height; scutellum slightly convex as seen in lateral view and in this regard approaching the characteristic feature of "Ceratitini" as used by other authors. The shape of the scutellum seems obviously to be an integrating character and I question that it is of more than generic importance. *M. pardalina* differs by having strong ocellar bristles, equal in size to the orbital bristles; eyes oblong, at least 1/2 higher than

long and genae broad, the width equal to about  $1/2$  the eye length; scutellum flat or nearly so, more distinctly pointed and triangular in shape. Also the scutellum has 4 black spots, apicoventral in position, while *C. vesuviana* has 5 black spots as in fig. 116b.

This species is readily differentiated by the yellow body with shining black spots on dorsum of thorax as in fig. 116b. Also the postscutellum with shining dark brown to black spots on each side. Head as in fig. 116a. Three pairs inferior fronto-orbitals, 2 pairs superior fronto-orbitals, and with small seta-like ocellars. Antennae entirely yellow, 3rd segment ending in a sharp point at upper apex. Arista short pubescent. Wing markings and venation as in pl. 7, fig. 64. Vein  $R_{4+5}$  bare except for 2 or 3 small setae at base above. Abdomen yellow, opaque gray pollinose,

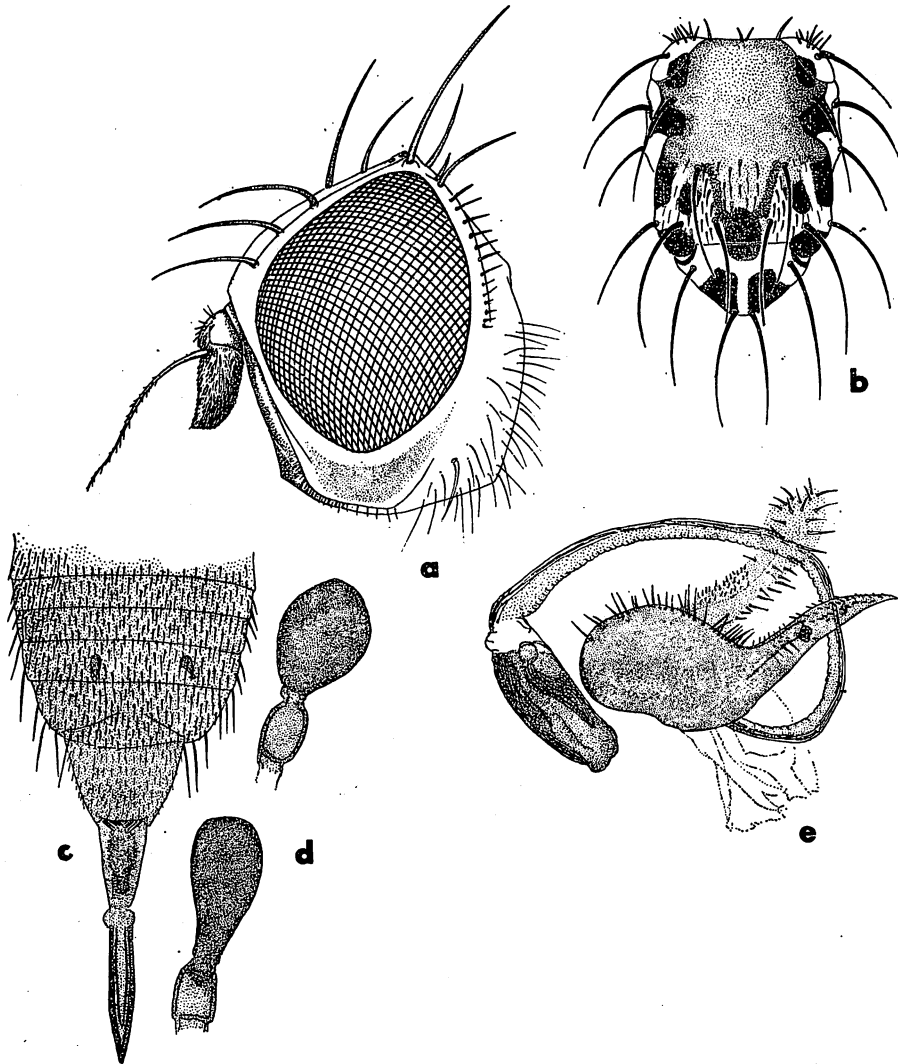


Fig. 116. *Carpomyia vesuviana* A. Costa. a. head; b. thorax; c. ovipositor; d. ♀ spermathecae; e. ♂ genitalia.

subshining on apical portion of 5th tergum and with a row of prominent dark brown to black bristles at apex of 5th. Sixth tergum of ♀ short, only about 1/4 as long as 5th. Sterna entirely yellow. Fifth sternum of ♂ narrow, over 4x wider than long and with a broad U-shaped concavity on hind margin. ♂ genitalia yellow except for a polished black spot on dorsal portion of epandrium. Tenth tergum (cercus) long and slender, surstyli long, slender, pointed at apices (fig. 116e). ♀ ovipositor yellow. Basal segment, as seen from dorsal view, only about 1/2 as long as 5th tergum. Measured on venter the base is 0.7 mm and a fringe of short black hairs is present on apicomedian portion. The piercer is sharp-pointed (fig. 116c) and measures 0.9 mm. The extended ovipositor (fig. 116c) is 2.3 mm. Two spermathecae; these are pear-shaped with short, thick necks (fig. 116d).

Length: Body, 4.0 mm; wings, 3.8 mm.

A large series of specimens on hand from THAILAND: Bangkok, VII-XI.1950, rear-  
ed ex *Zizyphus jujuba*. I have seen specimens from several localities in India and Pakistan.

The biology of this species was studied by Khare (1923).

#### Genus *Galbifascia* Hardy, new genus

This genus is closely allied to *Xanthorrhachis* Bezzi but is characterized by having the front horizontal, the head nearly quadrate, approximately as high as long, with the antennae situated almost in line with upper margin of eye (fig. 117a); by having the subcostal cell about equal in length to 2nd costal cell; the lobe of cell Cu scarcely over 1/3 as long as vein  $Cu_1 + 1st A$  (fig. 118a); and 2nd tergum of ♂ not expanded over base of 3rd tergum, and basal segment of ♀ ovipositor with strong bristles at apex (fig. 118e). The wing markings are very similar to those of *Xanthorrhachis*, vein  $R_{2+3}$  is only slightly curved, straight or nearly so, and the r-m crossvein is situated near middle of cell 1st  $M_2$ . Ocellar bristles are not developed; these are represented by tiny setae about equal in size to the setae along eye orbits. Three pairs of inferior fronto-orbital bristles and 2 pairs of superior fronto-orbital bristles are present. The middle tibia has 1 strong apical spur. The scutellum is inflated, convex dorsally and rounded apically.

Type-species: *Galbifascia sexpunctata*, n. sp.

Two species are recognized in this genus, 1 from Laos, Vietnam and possibly South India, and 1 from Ceylon.

Members of this genus may possibly breed in bamboo shoots.

#### *Galbifascia quadripunctata* Hardy, new species Fig. 117a-d.

Fitting the description of *sexpunctata*, n. sp. in all respects except that the scutellum has 4 black spots rather than 6. The black spots at the base of each of the lateral bristles is expanded into an oblong spot which extends onto the dorsum of the scutellum on each side. Also the r-m crossvein is situated at apical 3/5 of cell 1st  $M_2$ , nearly opposite apex of vein  $R_1$ . Ovipositor as in fig. 117b. The basal segment with 4 strong apical bristles and 1.7 mm in length. The piercer is 1.5 mm. Two heavily sclerotized spermathecae present.

Length: Body and wings, 5.4 mm.

♂. Unknown.

Holotype ♀, CEYLON: Pundaluoya, VIII. 1893, E. E. Green, 1 ♀ paratype, same data, X.1897. Type returned to the British Museum (Natural History), paratype in the col-

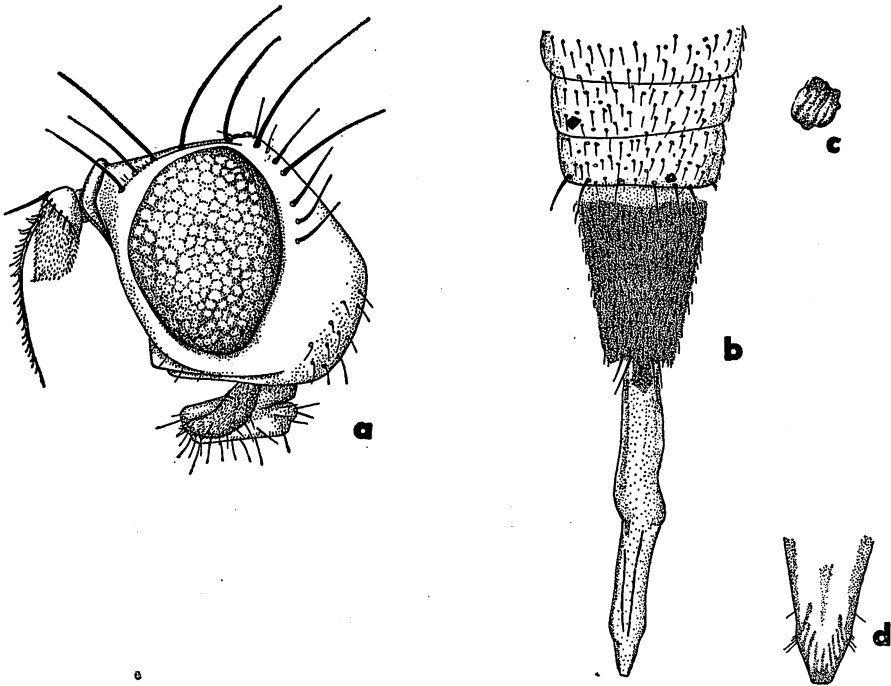


Fig. 117. *Galbifascia quadripunctata* n. sp. a. head; b. ovipositor; c. ♀ spermatheca; d. apex of piercer.

lection of the University of Hawaii.

***Galbifascia sexpunctata* Hardy, new species** Fig. 118a-e.

Entirely yellow to pale greenish species except for 1 black spot on each hind corner of mesonotum behind postalar bristles and 4 black spots on scutellum.

♂. *Head*: Similar to that of *quadripunctata*, n. sp. (fig. 117a). With 3 pairs of inferior fronto-orbitals, and with head slightly produced before bases of antennae. Occiput swollen, at its widest point  $3/4$  to  $4/5$  as wide as compound eye. Third antennal segment scarcely over  $1/2$  longer than wide and with a prominent spine-like point at upper apex. Arista moderately plumose, the longest rays are almost equal in length to the width of 3rd antennal segment. Apices of palpi tinged with green. *Thorax*: Predominantly pale green. The paratype is pale yellow, tinged faintly with brown and is discolored. The dorsocentral bristles are situated in line with anterior supraalars. Scutellum with a small black spot at base of each bristle and with a pair of submedian larger black spots on the disc (fig. 118b). Knobs of halteres green. *Legs*: Yellow, tinged with green. Middle tibia with 1 large apical spur. *Wings*: With markings very similar to those of *Xanthorrhachis anandalei* Bezzi and as shown in fig. 118a. Crossvein r-m is situated slightly before end of vein  $R_1$  at middle of cell 1st  $M_2$ , and the mark along vein  $R_{1+2}$  is yellow except for a brown spot at apex. *Abdomen*: Entirely pale yellow. The 2nd tergum is large, but not expanded on sides over 3rd as in *Xanthorrhachis*. The 2nd is approximately equal in length to terga 3+4. The 5th tergum of the ♂ with about 8 black bristles along hind margin.

Length: Body and wings, 5.4-5.75 mm.

A ♀ on hand from Travancore, South India appears to belong here but possibly represents a



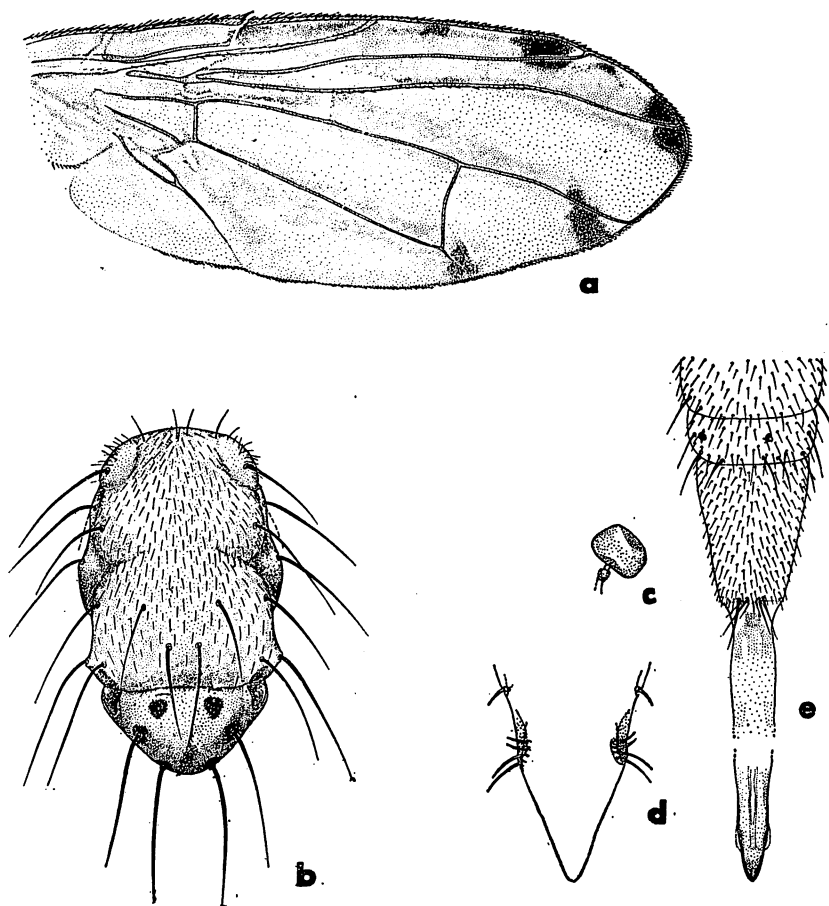


Fig. 118. *G. sexpunctata* n. sp. a. wing; b. thorax; c. ♀ spermatheca; d. apex of piercer; e. ovipositor.

distinct species, differentiated by having r-m crossvein distinctly beyond middle of cell 1st  $M_2$  and by having dorsocentral bristles distinctly in front of a line drawn between anterior supraalars. Basal segment of ovipositor 1.3 mm long and with 4 prominent dorsal bristles at apex (fig. 118e). Piercer broad, gradually tapered to a sharp point at apex (fig. 118d) and 1.2 mm in length. Spermathecae round, each with a short, straight neck. The ♀ specimen is not being included in the type series, but I am including figures of the ovipositor.

Length of ♀: body and wings, 4.5-4.7 mm.

Holotype ♂ (BISHOP 9987), LAOS: Vientiane Prov., Muong Tourakom, 120 m, 17. VII.1966, collected in bamboo thicket, F. G. Howarth. Seven ♂ paratypes from the following localities: Laos: Sayaboury Prov., Sayaboury, 915 m, 13.X.1966, F. G. Howarth. N VIETNAM: "Pau" or possibly "Pan", Hemi (spelling ?) Ket (Pauhemiket ?), 13.III. 1920, R. Vitalis de Salvaza. S VIETNAM: 20 km N of Pleiku, 650 m, 9.V.1960, S. Quate. THAILAND: Chiangmai Prov., Chiangdao, 500 m. 5-19.IV.1958, T. C. Maa; Chiangmai Prov., Fang, 500 m, 12-19.VI.1958, T. C. Maa. The ♀ specimen is from

S INDIA: Travancore, Thekkadi, Periyar Dam, 6-10.V.1937, B. M.-C. M. Exped. to S India.

Type and some paratypes in the B. P. Bishop Museum. Paratypes in collections of University of Hawaii and the University Zoological Museum, Helsinki and the ♀ specimen has been returned to the British Museum (Natural History).

#### Genus *Hemilea* Loew

*Hemilea* Loew, 1862, Die Europ. Bohrfl., p. 32. Type-species: *Trypeta dimidiata* O. Costa, by monotypy, synonym of *pulchella* Fabricius, 1805. The type of the genus is European.

*Ocneros* Rondani, 1871, *Bull. Soc. Ent. Ital.* 3: 180, nec O. Costa, 1844.

*Hemilea* is nearest to *Parahypenidium* Shiraki but differs by having the 3rd costal section relatively short, subequal to the 2nd costal section, rather than being extremely long in the ♂, equal to the 2 costal cells combined; by having vein  $R_{4+5}$  sparsely setose, with the setae not extending to m crossvein, rather than  $R_{4+5}$  rather thickly setose well beyond m crossvein; and by the narrow genae, equal to about the width of 3rd antennal segment, rather than having the genae broad, equal to about 1/2 the eye height.

This genus is readily differentiated from any other tephritids known from Thailand or surrounding areas by having wings long, narrow, parallel-sided, 3× longer than wide, with the anterior 3/4 entirely dark brown and only the posterior portion hyaline as in pl. 7, fig. 65. Crossvein r-m situated near apex of cell 1st  $M_3$ .

***Hemilea araliae*** Malloch? Fig. 119a; pl. 7, fig. 65.

*Hemilea araliae* Malloch, 1939, *Ann. Mag. Nat. Hist.* (ser. 11) 4: 271, pl. 11, fig. 25. Type-locality: New Britain. Type ♀ in the British Museum (Natural History). I have studied the type and the type series.

One ♂ specimen on hand from Bangkok, Thailand, 3.VIII.1963, no collector given, appears to fit here, but differs slightly from the original description. The original states that the mesonotum is pale brown, not much darker than the pleura, the upper 1/3 of mesopleura and scutellum ivory-white. The specimen at hand has the mesonotum largely rufous, tinged with brown especially on posterior portion and the entire pleura are pale yellow; only slightly more white on mesopleura. The scutellum is white, tinged faintly with yellow. Also, the basal 2 segments of the abdomen of the specimens from New Britain are rufous. In the specimen at hand the basal 2 segments are brown, tinged with rufous; this may be discolored and is probably atypical. In comparing with my photograph of the type, I do not see significant differences in these and believe the specimen from Thailand is *araliae*. The slight color differences noted are probably of no significance.

The species is readily differentiated by the wing markings, by the presence of a small hyaline spot just beyond apex of vein  $R_1$ , by having the hyaline posterior border extending through most of cell 2nd  $M_2$  but interrupted by faint lines of brown through median portion of cell and along m crossvein, leaving a conspicuous hyaline mark in lower apex of cell 1st  $M_2$ . One characteristic on the specimen at hand would indicate that this may possibly represent a distinct species: the dorsocentral bristles are situated in line with the anterior supraalars and in the specimens of *araliae* as well as other Asian or Pacific *Hemilea* which I have examined, the dorsocentral bristles are situated distinctly behind the anterior supraalars; the latter is characteristic of the type of the genus, *pulchella*, from Europe. It will be necessary to examine more specimens from Thai-

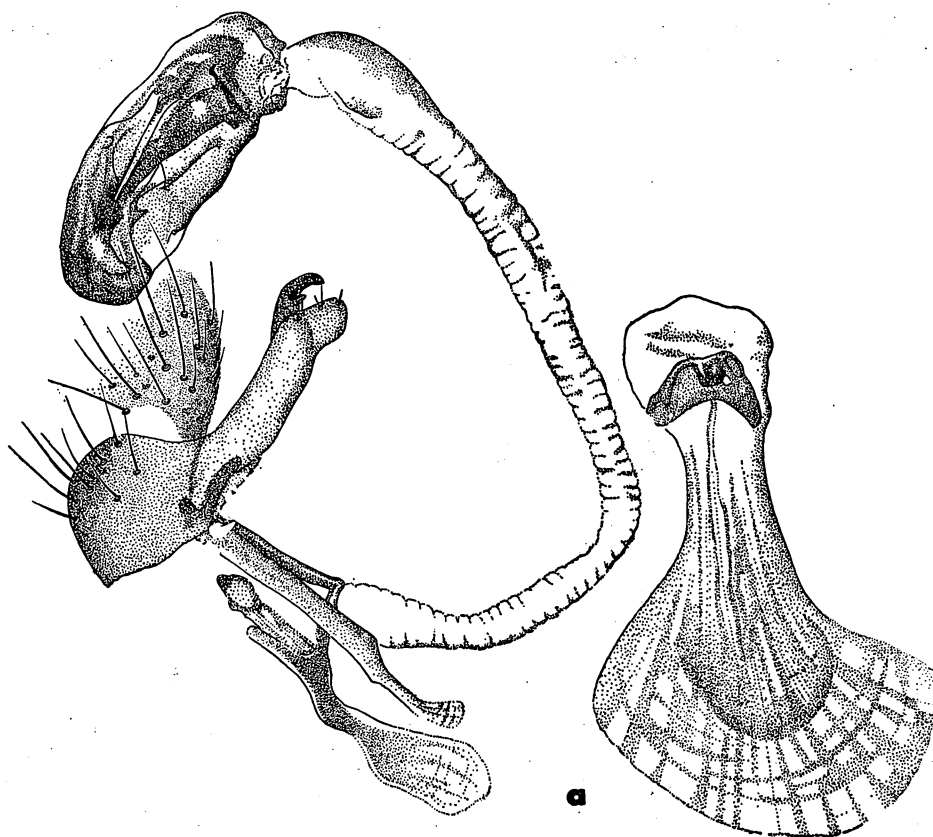


Fig. 119. *Hemilea araliae* Malloch. a. ♂ genitalia.

land to decide this question. Vein  $R_{4+5}$  is sparsely setose above, the setae do not extend beyond the r-m crossvein. The r-m crossvein is situated near apex of cell 1st  $M_2$  and the lobe of cubital cell is about  $3/4$  as long as vein  $Cu_1+1st A$  (pl. 7, fig. 65). Apical 3 abdominal segments polished black. The sterna are lightly sclerotized, pale in color. The 5th sternum is  $2 \times$  wider than long, the hind margin is straight or nearly so. The ♂ genitalia are as in fig. 119a. The epandrium is dark brown, the surstyli are yellow, rather narrow, straight-sided, blunt at apices. The apical processes of the 10th sternum are plainly visible in lateral view.

Length of specimen at hand: Body 5.0 mm; wings, 6.0 mm long  $\times$  1.9 mm wide.

It should be noted that Hering in his personal card file included this species under *Pseudacidia* Shiraki. I cannot confirm this placement; it appears to be a typical *Hemilea*.

***Hemilea bipars* (Walker)** Fig. 120a-b; pl. 7, fig. 66.

*Sophira bipars* Walker, 1862, *Proc. Linn. Soc. Lond.* 6: 23. Type-locality: Moluccas. Type ♀ in British Museum (Natural History).

*Hemilea bipars*: Hardy, 1959, *Bull. Brit. Mus. (N. H.)* 8 (5): 199, pl. 14, fig. 22.

This species is differentiated by having the mesonotum and scutellum pale rufous, with the latter concolorous with the mesonotum; by having a small hyaline spot in cell  $R_1$  just beyond end of vein  $R_1$ , the brown marking filling upper 2/3 of wing and with

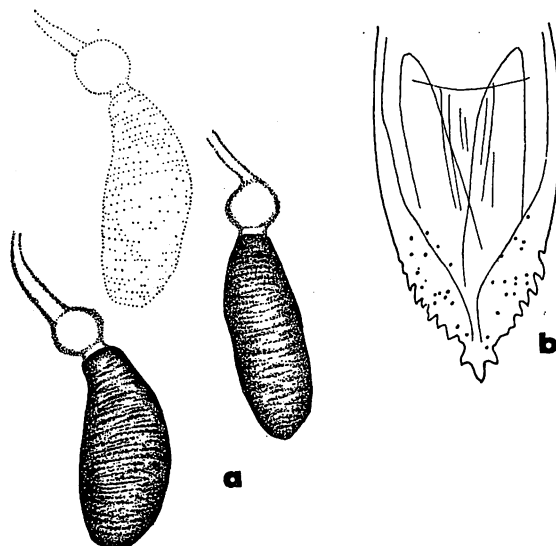


Fig. 120. *H. bipars* (Walker). a. ♀ spermathecae; b. apex of piercer.

a distinct band of brown extending to hind margin of wing along  $m$  crossvein and over apex of vein  $M_{3+4}$  (pl. 7, fig. 66). Abdomen entirely black. Basal segment of ovipositor short and broad, about as wide as long, and about 1.0 mm in length. The piercer is short and thick, the apical portion is toothed on the sides (fig. 120b). Piercer 0.65 mm long by 0.3 mm at broadest point. Three rather elongate, sausage-shaped spermathecae (fig. 120a).

Length: Body, excluding ovipositor, 5.5 mm; wing, 7.2 mm.

One ♀ on hand from LAOS: Vientiane Prov., Ban Van Eue, 30.II.1967, "native collector, Rondon."

### Genus *Myoleja* Rondani

*Myoleja* Rondani, 1856, *Dipt. Ital. Prodr.* 1: 112. Type-species: *Tephritis lucida* Fallén, by original designation.

*Myoleja*, *Myioleia*, *Myiolia*, and *Myolia*, errors or emendations.

*Philophylla* Rondani, 1870, *Bull. Soc. Ent. Ital.* 2: 9; 1871, op. cit. 3: 175. Type-species: *Musca caesia* Harris, by original designation.

*Euleia*, of authors, not Walker, refer to discussion below.

*Pseudosphenicus*, of authors.

*Hendelina* Hardy, 1951, *Pacif. Sci.* 5 (2): 179. Invalid replacement name for *Pseudosphenicus* Hendel, 1914.

As pointed out by Foote (1959: 145), the concepts of *Euleia* and *Philophylla* (= *Myoleja*) have been totally confused in the literature. The treatment, in the sense of Hendel (1927: 96 and 100), and others, must be reversed. As stated by Foote "Walker,

in 1836, proposed the genus *Euleia*, with *Musca onopordinis* F. as sole species and *Musca caesio* Harris and *Musca centaureae* F. in synonymy. Under the present rules it is necessary to consider *Euleia* as originally monobasic with *onopordinis* as the sole included species. The names originally in synonymy with it may not be used for the designation of a type for *Euleia*, both *onopordinis* and *centaureae* have long been accepted as synonyms of *Musca heraclei* L., but *caesio* has been shown to be specifically and generically distinct." ... "In 1870, Rondani established the name *Philophylla* with *Musca caesio* Harris as type."

I agree with Chen (1948: 107) that there seems to be no satisfactory way to separate this large complex of species into distinct genera, and I, too, prefer to treat them under one group until characters can be demonstrated which are of generic importance. I have studied representatives of the different names involved and have found that the characters which have been used are rather trivial and for the most part intergrade and are of doubtful generic importance. The width of the frons does not appear to be of any value and the width of the genae varies considerably from broad to comparatively narrow; in *setigera* it is almost 1/2 as wide as the eye. The eyes are typically oblong in shape, but may be oval or almost round in some species. The dorsocentral bristles vary considerably in position; in *setigera*, *ravida* and others, they are posterior in position, just slightly in front of a line drawn between inner postalars and prescutellar bristles. Also, the vestiture of the scutellum varies considerably; in *setigera* and *ravida* the disc is densely black setose, in other species it is bare or nearly so. The presence or absence of propleural bristles, or bristly hairs is very questionable. Shiraki (1933: 125) keyed "*Myiolia*" in the group with "propleural bristles distinct" but in the immediate couplet said "prothorax without bristle-row." In his discussion of the "genus" (p. 248), however, he says "prothorax with a row of yellow bristly hairs, or with one or two black ones." *Myoleja* would fit in Shiraki's classification in the group with propleural bristles not distinct. This character is of no value in dividing these. After studying all available specimens in the British Museum (Natural History) collection, I have concluded that there is no satisfactory way of separating these into sound groupings. There is considerable variation in the shape of the head; in some the occiput is more swollen than in others. The wing markings vary considerably and the pattern does not seem to be of generic importance.

The present concept of this genus would include those Trypetini which have 3 pairs of inferior fronto-orbital bristles, 2 pairs of superior fronto-orbitals and ocellar bristles rather weak; face vertical, not gibbose or convex in median portion; subcostal cell short, not more than 1/2 as long as 2nd costal cell, with vein  $R_1$  sloping rather gradually into costa so apex of cell Sc is pointed; crossvein m parallel or nearly so with r-m crossvein and perpendicular in position (pl. 7, fig. 68). Mostly shining black species. Thorax densely setose and propleura with rather numerous strong, usually black setae (bristle-like hairs). Dorsocentral bristles variable in position, in some only slightly behind supraalars and in others well behind these bristles, nearer to inner postalars. Front approximately 1/2 longer than wide in majority of species. The r-m crossvein situated distinctly beyond middle of cell 1st  $M_2$  and vein  $R_{4+5}$  setose to about level with r-m crossvein. Lobe of cubital cell approximately 1/2 as long as vein  $Cu_1+1st A$ . Under this concept, the wing markings would be extremely diversified for this genus. The known species from

Southeast Asia, however, still have a rather typical pattern as in fig. 121a and 125b. The wings have a large dark brown spot occupying most of the basal portion to approximately r-m crossvein and with a transverse band across m crossvein continuing around anterior margin to apex at middle of cell  $R_5$  (pl. 7, fig. 68). The ♀♀ of species which have been studied have 2 spermathecae.

Six species are now known from the area being studied. They are separated by the following key.

KEY TO KNOWN SPECIES OF *MYOLEJA* FROM THAILAND AND SURROUNDING COUNTRIES

1. Wings with an isolated brown band extending transversely in line with m crossvein from apex of vein  $M_{3+4}$  to costa, then extending along costal margin to about middle of cell  $R_5$  (fig. 125b); or with the brown transverse band not completely isolated, connecting with dark median marking in cell  $M_4$  (pl. 7, fig. 69). .....2  
Lacking such a band, brown coloring of basal 2/3 of wing continuous to beyond m crossvein (fig. 123a). .....4
- 2 (1). Wing lacking an oblique subapical brown streak (fig. 125b). .....3  
Wing with an oblique subapical brown streak or band, extending through cell  $R_3$  beyond level of m crossvein (pl. 7, fig. 69). .....5
- 3 (2). Body predominantly black. First costal cell entirely brown, 2nd mostly brown with hyaline marks in middle. Eye oblong, gena equal to about 1/4 eye height. Middle and hind femora brown. Thailand and Laos.....*ravida*, n.sp.  
Predominantly rufous species, first 2 costal cells subhyaline. Eye round, gena 1/2 to 3/5 eye height. Legs entirely yellow. Thailand. ....*setigera*, n.sp.
- 4 (1). Vein  $R_{2+3}$  very short, ending about opposite r-m crossvein so that 4th costal section is shorter than 3rd (stigma). First costal cell all brown, 2nd with 2 hyaline wedges and apicomarginal brown band not connected with brown marks through basal 2/3 of wing (fig. 121a). Vietnam. ....*disjuncta*, n.sp.  
Vein  $R_{2+3}$  extending well beyond level with m crossvein. Fourth costal section at least 3× longer than 3rd. First costal cell hyaline, 2nd with a large hyaline mark in middle and with 2 hyaline wedges in cell  $R_1$  and 2 brown streaks radiating from the 2nd brown arm through  $R_1$  as in fig. 123a. Laos. ....*radiata*, n.sp.
- 5 (2). Transverse band over m isolated, not joined to median marking of wing. Subapical brown streak isolated, not joined to the crossband (pl. 7, fig. 67). Japan, Formosa, India, Burma, Indonesia, New Ireland, Singapore, Philippines, Thailand, Vietnam, and Laos. ....*fossata* (Fabricius)  
Transverse band joined with median marking along lower edge of cell 1st  $M_2$  and in cell  $M_4$ . Subapical band joined with the transverse band (pl. 7, fig. 69). Formosa, Japan, Philippines, Borneo, and Malaysia. ....*superflucta* (Enderlein)

*Myoleja disjuncta* Hardy, new species Fig. 121a.

One species on hand from Vietnam appears to fit best in *Myoleja* but differs from all known species in this genus by having vein  $R_{2+3}$  very short, ending about opposite the r-m crossvein, making the 4th costal section shorter than the 3rd (stigma); also the narrow brown band around margin of wing is isolated, ending at apex of vein  $R_{2+3}$  and not connected with the brown marking over basal 2/3 of the wing (fig. 121a).

♀. A polished black species with the scutellum, and a broad mark over each mesopleuron, yellow-white. *Head*: Nearly 2× higher than long with eyes oblong and genae comparatively narrow, about 1/6 as wide as eye height. Face vertical, very slightly raised down median portion

and with shallow antennal furrows. Head entirely shining dark brown, tinged with black and with a tinge of rufous on vertex and over front. Three pairs inferior fronto-orbital bristles and 2 pairs superior fronto-orbitals, and with an abundance of short black setae over front, especially along orbits. Ocellar bristles short, scarcely over  $2\times$  longer than frontal setae. First 2 antennal segment rufous, tinged with brown, 3rd segment brown, slightly tinged with rufous in ground color and  $3\times$  longer than wide, rounded at apex. Arista bare. *Thorax*: Polished black, tinged faintly with

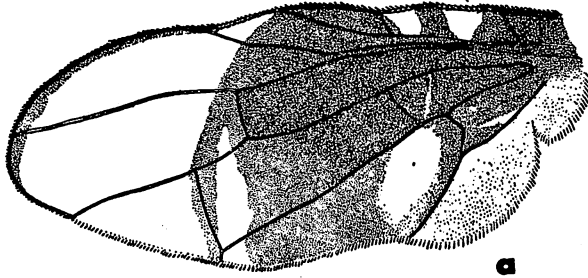


Fig. 121. *Myoleja disjuncta* n. sp. a. wing.

reddish brown in ground color with the scutellum and a broad mark through mesonotum yellow-white. Halteres yellow-white. Dorsocentral bristles situated slightly behind anterior supraalar. *Legs*: Black except for pale yellow tarsi. Middle tibia with 1 strong apical spur. *Wings*: Venation and markings as in fig. 121a. Vein  $R_{4+5}$  setose to r-m crossvein. *Abdomen*: Polished dark brown to black. Sixth tergum about  $2/3$  to  $3/4$  as long as 5th. Basal segment of ovipositor dark brown to black, comparatively short, rather rounded in appearance and approximately equal in length to 5th tergum as seen from direct dorsal view. Measured on the venter the basal segment is 0.5 mm. The piercer has not been extended for study.

Length: Body, 3.0 mm; wings, 3.5 mm.

♂. Unknown.

Holotype ♀ (B:SHOP 9988), VIETNAM: Dalat, 1500 m, 26-27.IX.1960, C. M. Yoshimoto.

Type returned to the B. P. Bishop Museum.

***Myoleja fossata* (Fabricius), new combination** Fig. 122a-d; pl. 7, fig. 67.

*Tephritis fossata* Fabricius, 1805, *Syst. Antl.*, p. 320. Type-locality: "Tranquebariae." Type in Universitetets Zoologiske Museum, Copenhagen.

*Trypeta elimia* Walker, 1849, *List Spec. Dipt. Ins. Coll. Brit. Mus.* 4: 1033. Type-locality: Philippines. In British Museum (Natural History).

*Ortalis regularis* Doleschall, 1859, *Nat. Tijdschr. Ned. Ind.* 17: 119. Type-locality: Amboina. Type has evidently been lost.

A moderately small subshining black species characterized by having an oblique pre-apical streak of brown extending from upper apex of cell 2nd  $M_2$  to vein  $R_{4+5}$ ; and a narrow longitudinal hyaline streak through entire length of cell  $M_4$ . For details of the wing markings refer to pl. 7, fig. 67. The species has been very adequately described and figured by Shiraki (1968: 37, pl. 14, 13 fig.) Fifth abdominal sternum of ♂ about  $2\times$  longer than wide, hind margin straight and with about 4 small bristles on each side (fig. 122d). ♂ genitalia as in fig. 122a. Surstyli long and slender, pointed apically and with the appendages of the apex of the 10th sternum visible from lateral view. ♀ with

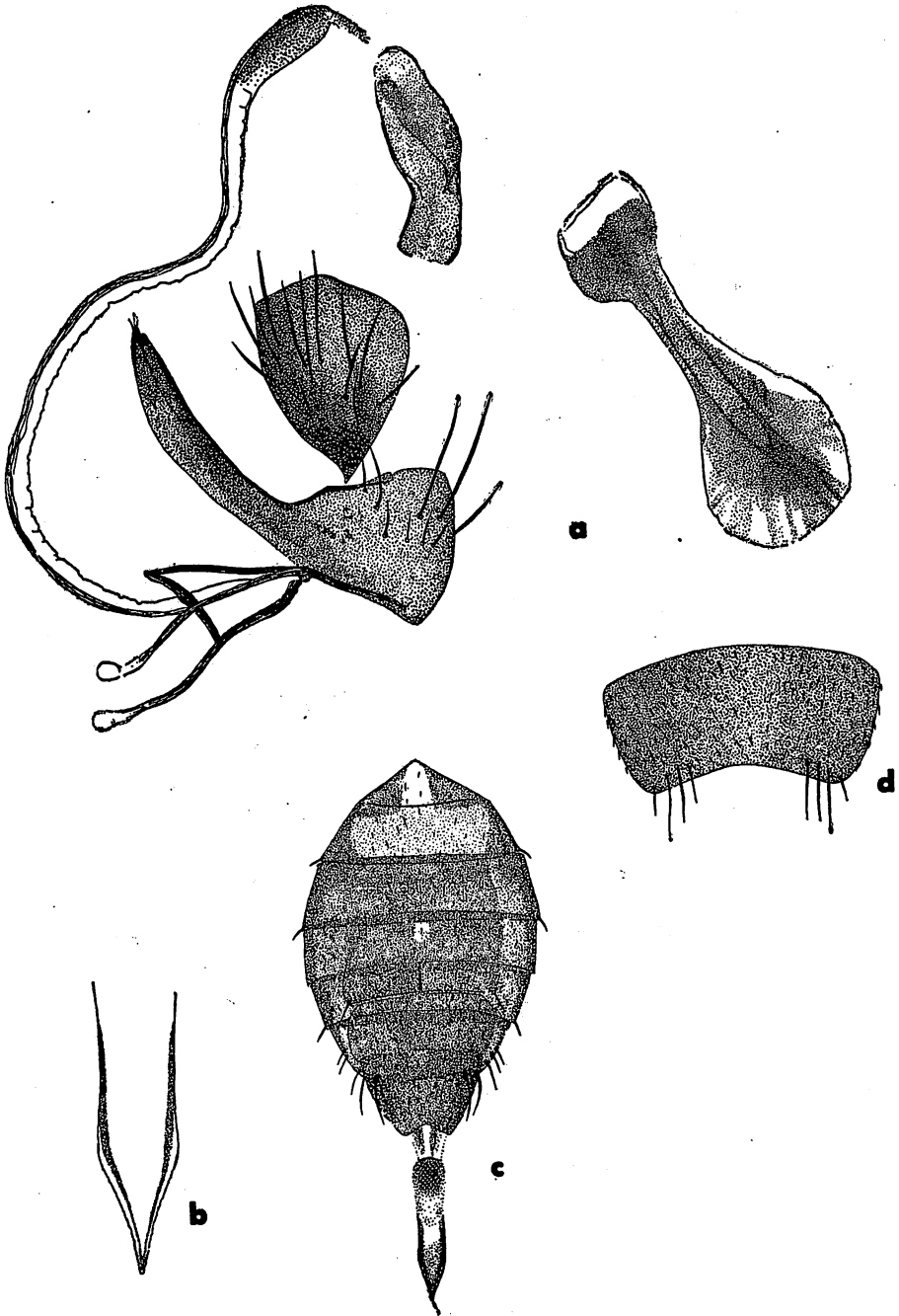


Fig. 122. *M. fossata* (Fabr.). a. ♂ genitalia; b. apex of piercer; c. ♀ abdomen; d. ♂ 5th sternum.



abdomen entirely dark brown to black. Sixth tergum  $\frac{3}{4}$  as long as 5th. Basal segment of ovipositor short and thick, as seen from dorsal view about  $\frac{1}{3}$  to  $\frac{1}{2}$  longer than 5th tergum. Measured on ventral margin the basal segment is about 0.6 mm. Piercer short and thick, abruptly tapered to a sharp apex (fig. 122b) and approximately 0.6 mm. Extended ovipositor (fig. 122c) 1.8 mm long.

Length: Specimens at hand, body, 3.5 mm; wings, 3.3 mm. Shiraki measured the body as 4.5 mm, wings, 4.3 mm.

The species has been recorded from Japan, Formosa, Burma, India, New Ireland, Singapore, Philippines, Indonesia. One specimen on hand from THAILAND: Langsuan, 17.VII.1963, R. Kawasaki and 2 from the following localities in S VIETNAM: Di Linh (Djiring), 1200 m, 22-28.IV.1960, L. W. Quate and Blao (Balao), 500 m, 14-21.X.1960, C. M. Yoshimoto. Also 1 from LAOS: Ban Van Eue, 15.VIII.1966, J. A. Rondon.

***Myoleja radiata*** Hardy, new species Fig. 123a.

This species differs from other known *Myoleja* by having 2 hyaline wedges through cell  $R_1$ , no brown vitta extending transversely over wing but with a narrow brown band along apex of wing and an oblique strip of brown extending from the brown mark covering median portion of wing from vein  $R_{4+5}$  to upper apex of cell 2nd  $M_2$  (fig. 123a).

♂. A predominantly subshining black species. *Head*: Distinctly higher than long, front sloping and face vertical, with antennae situated near middle of head as seen in direct lateral view. Occiput comparatively narrow, at widest point scarcely over  $\frac{1}{3}$  the width of eye. Genae much nar-

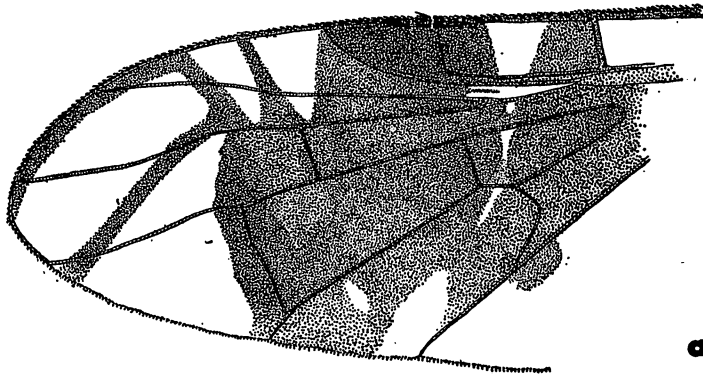


Fig. 123. *M. radiata* n. sp. a. wing.

rower than in *setigera*, scarcely over  $\frac{1}{3}$  the width of eye height. Eyes oblong, distinctly higher than wide. Ocellar bristles well developed, about equal in length to lower superior fronto-orbitals. Front about  $\frac{1}{2}$  longer than wide. *Thorax*: Mostly subshining dark brown in ground color, posterior portion of mesonotum and scutellum yellow, tinged with brown. Humeri brownish yellow. Knobs of halteres brown. Postscutellum and metanotum dark brown, covered with gray pubescence. Dorsocentral bristles situated about halfway between supraalars and postalars. By comparison with *setigera* this species is rather inconspicuously setose. The setae on the propleura are fine, hair-like, and the scutellum is almost bare on the disc on the specimen at hand, with scattered setae on margin. *Legs*: Yellow, with a tinge of brown on middle and hind femora and on hind tibiae. *Wings*: As in fig. 123a. The extreme base is hyaline, the 2nd costal cell has a

large hyaline spot in middle. Two hyaline wedges occur in cell  $R_1$  and the other markings are as mentioned above and as in fig. 123a. Vein  $R_{4+5}$  has numerous setae extending just slightly beyond r-m crossvein. Venation as in fig. 123a. *Abdomen*: Entirely shining black, lightly covered with gray pollen. The genitalia have not been dissected for study. The surstyli are long and slender and the visible parts look very similar to those of *setigera* (undissected).

Length: Body and wings, 5.7-5.9 mm.

♀. Unknown.

Holotype ♂, LAOS: Kien Then, 13.III.1920, R. Vitalis de Salvaza.

Type returned to the University Zoological Museum, Helsinki.

**Myoleja ravida** Hardy, new species Fig. 124a; pl. 7, fig. 68.

This species closely resembles *M. nigrescens* (Shiraki) from Okinawa but is readily differentiated by having the apical portion of cell  $M_4$  yellow along entire margin; by having an isolated small hyaline spot at base of cell  $M_4$ ; by the hyaline area separating the brown markings between m and r-m crossveins narrow, about  $1/2$  as long as penultimate section of vein  $M_{1+2}$ , and the specimens slightly larger in size. In *nigrescens* the brown marking through median portion of wing extends broadly along apical portion of cell  $M_4$  and is continuous, at least as a faint marking along wing margin, with the transverse brown mark over m crossvein. The hyaline mark at posteroapical portion of cell  $M_4$  is continuous to m-cu crossvein, only slightly infuscated in middle of cell  $M_4$ . The hyaline mark across wing between the crossveins is broad, approximately  $2/3$  to  $3/4$  the width of penultimate section of vein  $M_{1+2}$  (refer Shiraki 1968: 42, fig. 1). This species would also resemble *erebia* (Hering) from New Guinea, but it lacks the complete hyaline mark extending from wing margin along lower portion of cell  $M_4$  to r-m crossvein. The other details of the wing markings of *erebia* are as in *nigrescens* and I am not sure how the latter 2 species are differentiated.

♂. Predominantly black species. *Head*: Yellow except for the compound eyes. Front about  $1/3$  to  $1/2$  longer than wide. Face vertical, the antennal furrows well developed and median portion rather broad, in middle part the ridge is greater in width than 3rd antennal segment. Occiput moderately developed, at widest point about  $2/5$  as broad as compound eye. Genae about  $1/4$  to  $1/5$  as wide as eye. Eyes oval, slightly higher than long. Oral margin with short black setae which extend up sides of face. Antennae yellow. The black setae on 2nd segment short, not developed bristle-like. *Thorax*: Predominantly black, propleura, humeri, margin of scutellum, posterolateral margins of mesonotum and anterior margin of mesopleuron yellow in ground color. Remainder of thorax black in ground color, covered with gray pollen (microscopic pubescence). No indication of vittae present on mesonotum, halteres with brown to black knobs. *Legs*: Yellow, middle and hind femora brown. Middle tibia with 1 strong apical spur plus 1 spur about  $3/4$  the length of the stronger. *Wings*: As in pl. 7, fig. 68. The brown mediobasal marking extends broadly from r-m crossvein to base of wing, interrupted by a small oblong hyaline spot at base of cell  $M_4$ . A faint marking extends across base of cell  $M_4$ , and a large hyaline spot is present in middle of 2nd costal cell. A large hyaline wedge is at base of cell  $R_1$  and a narrow brown band extends around wing margin from middle of apex of cell  $R_5$  to apical portion of cell  $R_1$  transversely across wing at level with m crossvein. Apical portion of cell  $M_4$  broadly hyaline and with a hyaline mark extending about  $2/5$  the length of this cell along upper edge of vein  $Cu_1+1st A$ . Subcostal cell slightly over  $1/2$  as long as 2nd costal cell. Vein  $R_1$  very slightly wavy in median portion. The r-m crossvein situated near apex of cell 1st  $M_2$ . Other details as in pl. 7, fig. 68. Vein  $R_{4+5}$  setose from base to just beyond r-m crossvein. *Abdomen*: Entirely dark brown to black, densely black setose. Fifth sternum  $2\times$  longer than wide and with hind margins straight or

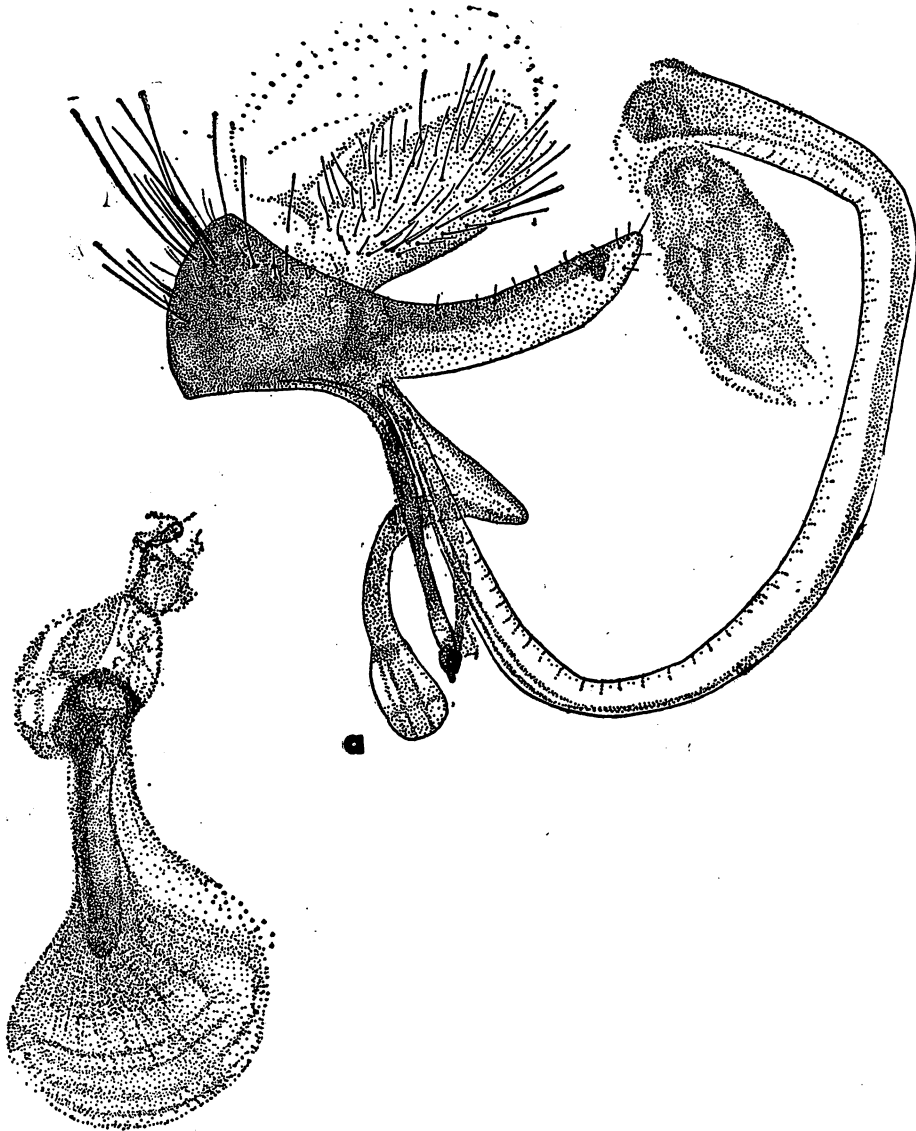


Fig 124. *M. ravida* n. sp. a. ♂ genitalia.

nearly so and with about 6 bristles on each side. Genitalia as in fig. 124a. The surstyli are elongate, curved upward at apices. The 10th sternum is plainly visible from lateral view.

Length: Body and wings, 7.0 mm.

♀. Unknown.

Holotype ♂, THAILAND: Nakhon Ratchasima, Khao Yai, 15.XI.1965, Anant. One ♂ paratype, same data as type and 1 ♂ paratype, LAOS: Nam Pot, 2.IV.1920, R. Vitalis de Salvaza.

Type returned to the Thailand Department of Agriculture collection, Bangkok. Paratypes in the University of Hawaii collection and the University Zoological Museum, Helsinki.

***Myoleja setigera* Hardy, new species** Fig. 125a-b.

Because of the rufous thorax this resembles *rufescens* (Hendel) from Formosa, but it differs by lacking distinct vittae on the mesonotum and by having the band over m crossvein distinctly separated from the brown over the r-m, rather than joined with this mark as shown in Hendel's fig. 10 (1915, plate 8); also by lacking the small hyaline spot in cell  $R_5$  before r-m crossvein which is typical of Hendel's species and by having the basal cells and costal cells subhyaline, not with basal cells brown, etc. It also resembles

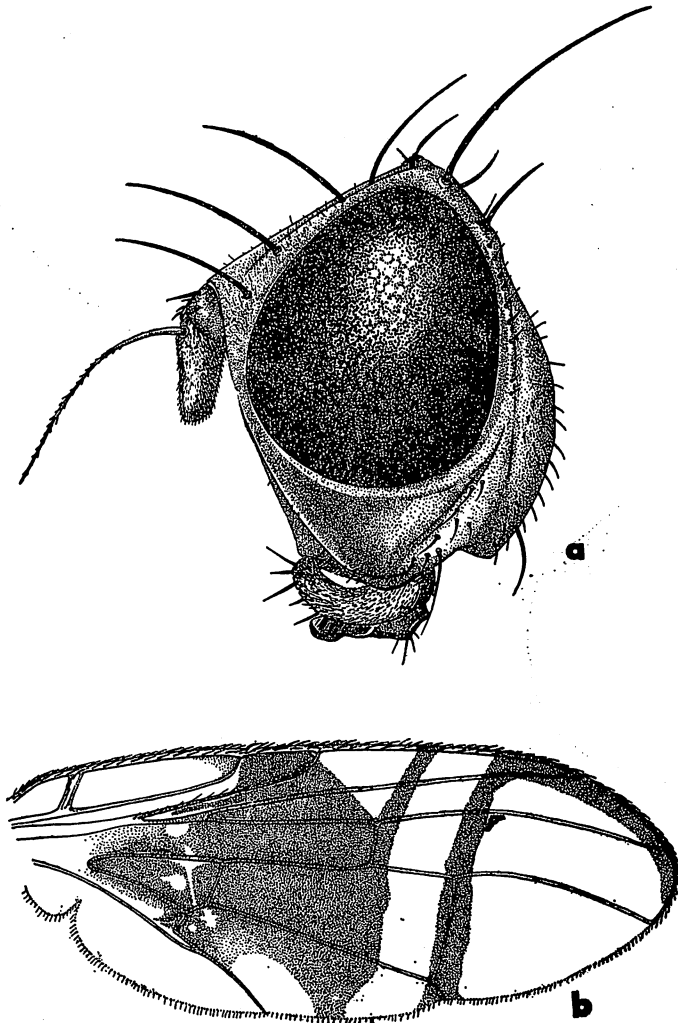


Fig. 125. *M. setigera* n. sp. a. head; b. wing.

*invada* (Hering) from Burma, but that species has the band over m crossvein bifurcate with an arm of brown extending obliquely over apex of cell 2nd  $M_2$  and also with other differences in wing markings as shown in Hering's fig. 16 (1938: 18).

♂. A predominantly rufous, very densely black setose species. *Head*: Entirely yellow except for the dark compound eyes. Head shaped as in fig. 125a. Eyes just slightly higher than long, almost round. Occiput moderately produced, at widest point about 1/2 width of compound eyes. Genae broad, the width is equal to about 2/3 eye height. Face vertical, with prominent antennal furrows developed on sides. Oral margin with numerous short black setae; these continue approximately 2/5 the distance up sides of face. All head bristles black. Ocellar bristles small, scarcely over 2× larger than the scattered black setae on front. Antennae yellow, broadly rounded at apex of 3rd segment (fig. 125a). Palpi and mouthparts entirely yellow with rather large black setae scattered over apex and outside surface of palpus. *Thorax*: Yellow to rufous in ground color, tinged faintly with brown on mesonotum and dark brown on sternopleura, hypopleura and over metanotum. Entire thorax rather densely gray pollinose, or microscopically pubescent. Dorsocentral bristles situated just in front of a line connecting postalar bristles and prescutellar bristles; these are located much nearer the hind margin of mesonotum than in other known species of this genus. Two strong mesopleural bristles present, other bristles normal for this group. Approximately 6 strong bristle-like setae are present on front margin of propleuron, and ventral portion of each sternopleuron thickly covered with long black bristle-like setae. Halteres yellow. *Legs*: Entirely yellow, front femur thickly setose over posterior surface; these are stronger, more bristles-like on posteroventral and posterodorsal surfaces. Middle tibia with 1 prominent, plus 2 short apical spurs. A row of prominent suberect bristle-like setae extends down posterodorsal surface almost entire length of each hind tibia. *Wings*: With basal and costal cells subhyaline and the other markings as in fig. 125b. About a dozen setae are situated on vein  $R_{4+5}$  from base to approximately r-m crossvein. *Abdomen*: Entirely rufous, subopaque, densely black setose. The genitalia have not been dissected for study; the visible parts are entirely rufous. The surstyli are long and slender, curved upward at their apices and the anal plates are well developed, longer than wide.

Length: Body, 5.0 mm; wings, 4.75 mm.

♀. Fitting description of ♂ in most respects. Sixth abdominal tergum approximately equal in length to 5th. Ovipositor short and thick, basal segment approximately equal in length to terga 5+6 and about 0.9 mm in length. The piercer is short, thickened at base, sharply pointed at apex. Two spermathecae present; these are oblong in shape.

Length: Body, 6.35 mm; wings, 6.7 mm.

Holotype ♂ and allotype ♀, THAILAND: Petchaboon, 31.V.1965, no collector given.

Type returned to Kasetsart University, Bangkok. Allotype in the University of Hawaii collection.

***Myoleja superflucta* (Enderlein), new combination** Fig. 126a-e; pl. 7, fig. 69.

*Trypeta superflucta* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 428, fig. J. Type-locality: Takao, S. Formosa. Lectotype ♂ in Institute of Zoology, Warsaw. I have studied the type.

This species is widespread over Southeast Asia from Singapore, Borneo, through the Philippines; also Japan, Formosa and the Ryukyu Islands. It probably occurs in Thailand.

Mostly shining black species, lightly gray pollinose over the mesonotum. Easily differentiated from other *Myoleja* by the distinctive wing markings (pl. 7, fig. 69). The costal cells are dark brown, the subcostal is unusually short, about as long as wide. The r-m crossvein is situated near apical 3/5 of cell 1st  $M_2$ . The brown transverse band over m crossvein is broad and connects

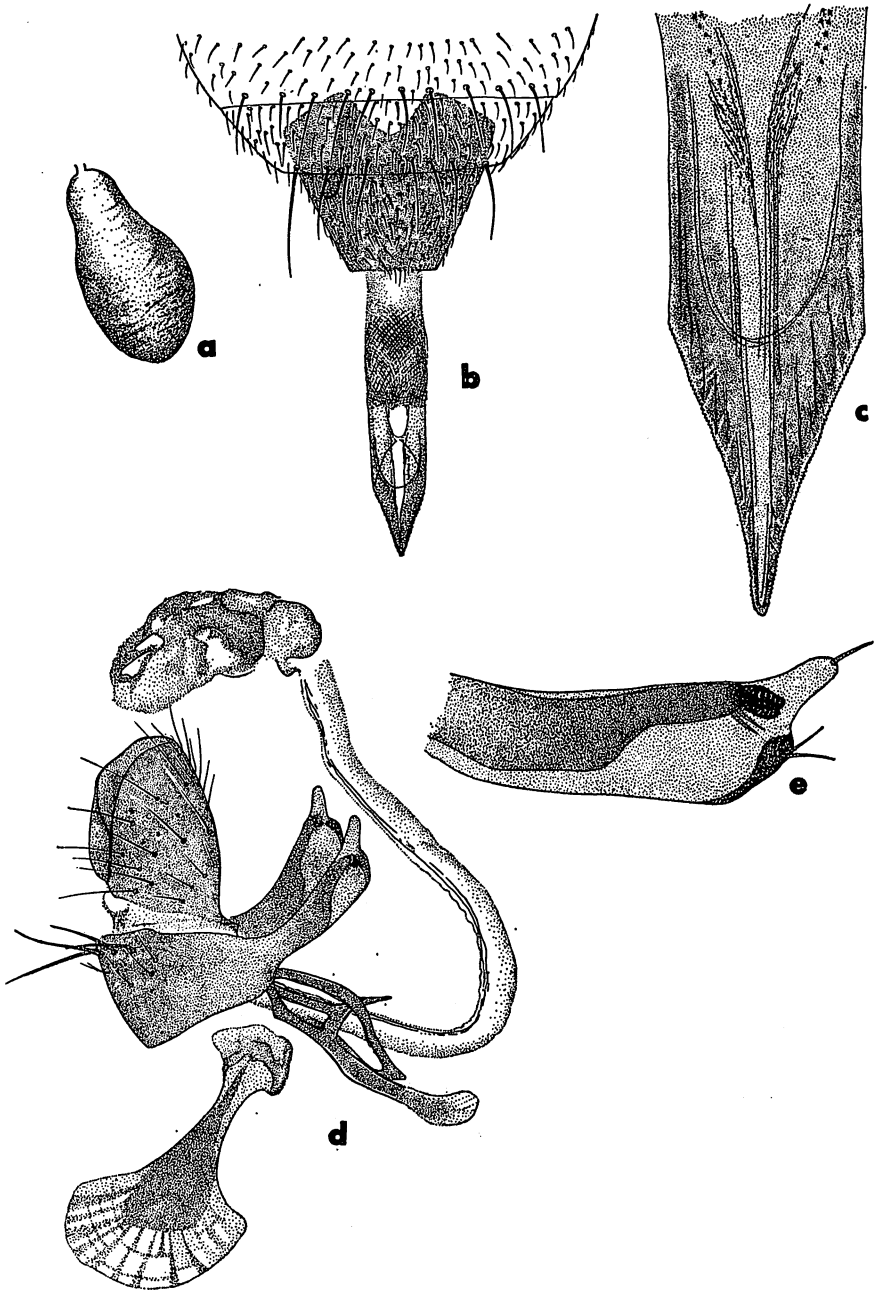


Fig. 126. *M. superfucta* (Enderlein). a. ♀ spermatheca; b. ovipositor; c. apex of piercer; d. ♂ genitalia; e. ♂ surstylus and 10th sternum.

with median brown marking in cell  $M_4$  and the subapical brown band connects with the transverse band (pl. 7, fig. 69). The ♂ genitalia are as in fig. 126d-e and the ♀ ovipositor as in fig. 126b-c.

Length: Body and wings, 3.5 mm.

A series is on hand from Changi, Singapore, II. 1949, ex *Clerodendron inerme* plants, N. L. H. Krauss.

For a complete description and figures refer to Shiraki (1968: 39-42, fig. 1-13)

### Genus *Paratrirhithrum* Shiraki

*Paratrirhithrum* Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imper. Univ.* **8**: 137. Type-species: *nitobei* Shiraki. Type ♂ in Entomological Museum, Taiwan University, Taipei.

This genus is differentiated from other Trypetini from Southeast Asia which have the scutellum swollen and dark subbasal streaks in the wing by having the arista short pubescent; only 2 pairs inferior fronto-orbital bristles; the eyes nearly round, just slightly higher than long; and crossvein r-m situated at middle of cell 1st  $M_2$ . Also the 3rd antennal segment is short, broadly rounded at apex, scarcely 1/2 longer than wide.

Only the type-species from Formosa and 1 other species, *sobrinum* (Zia) n. comb. from Szechuan, China, have been previously known in this genus. One new species is on hand from Thailand.

#### KEY TO KNOWN SPECIES OF PARATRIRHITHRUM

1. Mesonotum not vittate. .... 2  
    Mesonotum with 4 grayish yellow longitudinal vittae. Formosa. .... *nitobei* Shiraki
2. Face brown in ground color, white tomentose. Mesonotum with gray pollinose marking continuing to anterior margin in middle (refer Zia 1937: 178, fig. 20A). China. ....  
    ..... *sobrinum* Zia  
    Lower 2/3 of face white. Mesonotum polished black in front of a line between presutural bristles (fig. 127c). Thailand. .... *nitidum*, n. sp.

#### *Paratrirhithrum nitidum* Hardy, new species      Fig. 127a-c.

This species fits close to *P. sobrinum* (Zia) from Szechuan, China but differs by having the lower 2/3 of face white and the mesonotum polished black in front of a line drawn between presutural bristles. The humeri and upper 3/4 to 4/5 of the mesopleura are white. *P. sobrinum* has the face brown in ground color; the white tomentose area over the mesonotum continues to the anterior margin in the middle and according to the original description the "humeral callus and pleural regions [are] whitish gray."

♀. *Head*: Rather narrow, much higher than long with the face almost vertical and compound eyes nearly round (fig. 127a). Upper 2/3 of occiput brown, margins and lower portion yellow. Genae yellow-white, densely silvery white tomentose. Lower 2/3 of face ivory-white, upper portion pale brown. Antennal furrows very shallow, scarcely noticeable. Front yellow-white except for a faint brown transverse line across middle at level with lower superior fronto-orbitals. Front approximately as wide as long. Two pairs inferior fronto-orbitals and 2 pairs of superiors. Ocellar bristles small, scarcely 2 to 3 × larger than the sparse setae in middle of front. Genal bristles small, not much larger than the setae on lower occiput and on edge of gena. Antennae yellow, tinged with brown on 3rd segment, 3rd segment rounded at apex, scarcely over 1/2 longer than wide. Palpi yellow, with rather sparse, short, black setae. *Thorax*: Predominantly polished black in ground

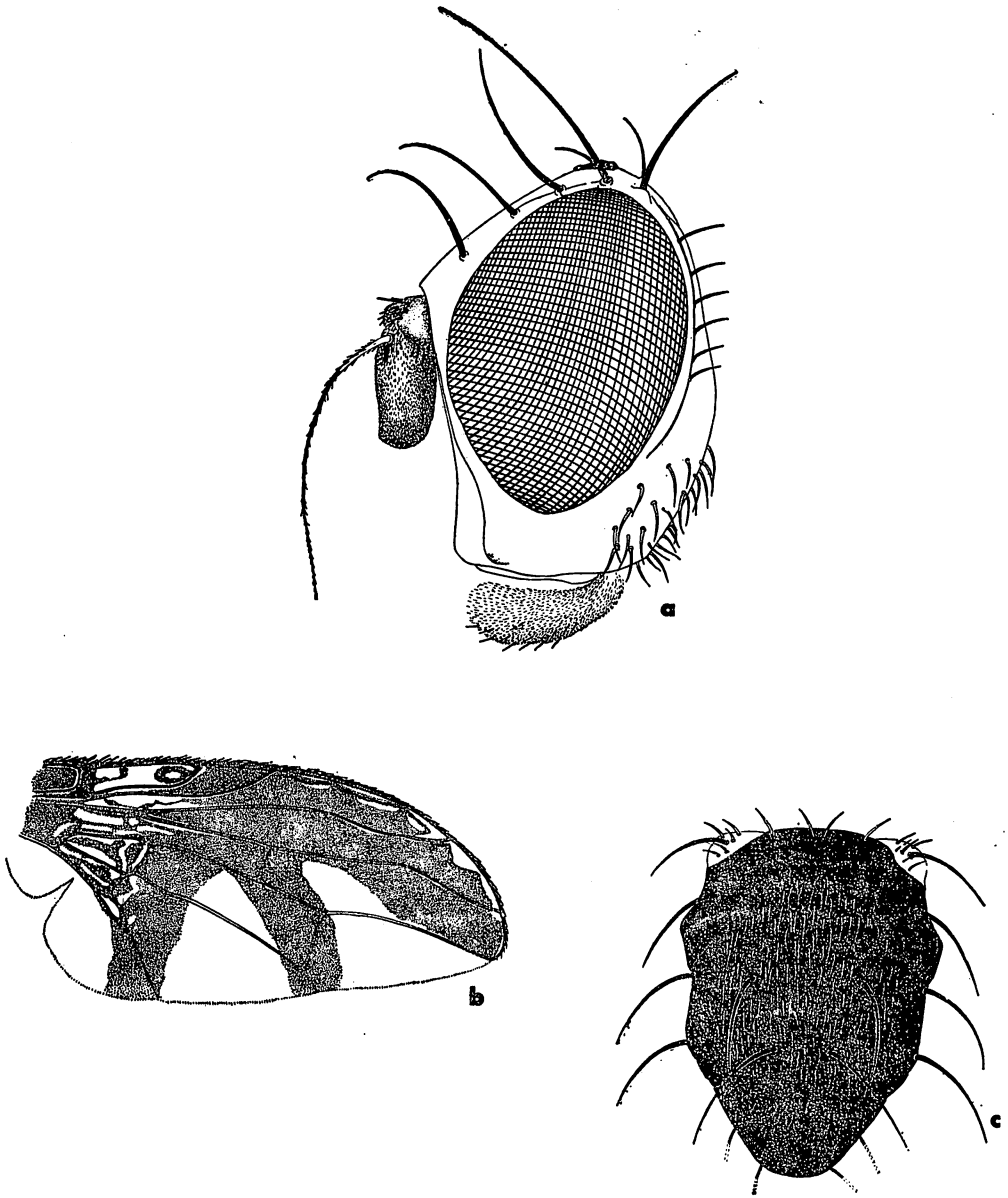


Fig. 127. *Paratrirhithrum nitidum* n. sp. a. head; b. wing; c. thorax.

color except for the white markings on humeri and mesopleura, also the subalar sclerites are white. The mesonotum is broadly polished black on sides and anterior margins, the median portion is silvery gray tomentose except for a shining black spot on each side at suture, in line with the dorsocentral bristles, and a median subshining spot on a level with the suture which extends posteriorly for a short distance as an indistinct subshining vitta to about level with dorsocentral bristles (fig. 127c). Dorsocentral bristles situated in line with supraalar. Scutellum entirely



polished black, with 4 strong bristles, and very sparsely white setose over disc. Mesonotum with short black setae in the polished black areas and white setae in the tomentose area. Metanotum densely silvery gray tomentose, completely obscuring the ground color. *Legs*: Femora brown except for extreme apices, tibiae and tarsi yellow. Middle tibia with a strong black apical spur. *Wings*: Marked as in other members of this genus with the 3 broad brown bands radiating out from the subcostal cell (fig. 127b). *Abdomen*: Polished black in ground color with 2nd tergum entirely silvery gray tomentose and 4th tergum with a silvery gray tomentose band across hind margin. Median portion of 3rd tergum and basal median portion of 4th broadly yellow-brown tomentose. Sixth tergum very short, scarcely visible from dorsal view. Base of ovipositor dark reddish brown, tinged with black, almost straight-sided, rather tubular and as seen from dorsal view approximately equal in length to terga 3-5. Measured on venter the basal segment is 0.75 mm. The piercer has not been extruded for study.

Length: Body and wings, 3.0 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9989), NW THAILAND: Chiangmai Prov., Fang, 500 m, 12-19.IV.1958, T. C. Maa.

Type returned to the B. P. Bishop Museum.

### Genus *Proanoplomus* Shiraki

*Proanoplomus* Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imp. Univ.* **8**: 127. Type-species: *japonicus* Shiraki, by original designation.

*Paranoplomus* Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imp. Univ.* **8**: 131. Type-species: *formosanus* Shiraki, by original designation.

*Pardalaspinus* Hering, 1952, *Traubia* **21** (2): 282. New synonymy. Type-species: *Pardalaspis migrata* Hering (= *Ceratitis laqueata* Enderlein).

As pointed out by Chen (1948: 88), *Proanoplomus* and *Paranoplomus* were based upon slight differences in the antennae. He indicated that these characteristics are of no value, but continued to maintain these as 2 distinct genera. Ito (in press) treats these as synonyms and I agree with this treatment.

I have studied all of the species included by Hering in *Pardalaspinus*, including the holotype ♂ of his type-species, and find no characters which will separate this from *Proanoplomus*.

Hering (1952: 282) placed 3 species, *migratus* Hering, *adversarius* Hering, and *laqueatus* (Enderlein), under *Pardalaspinus*. I am synonymizing *migratus* with *laqueatus*.

This genus is characterized by having the 3rd antennal segment rounded at apex or very slightly pointed dorsoapically, but not developed into a spine-like point; the arista short plumose with the longest rays scarcely over 1/2 the width of 3rd antennal segment; 3 pairs of inferior fronto-orbitals; the occiput strongly swollen, at its widest point almost equal in width to the compound eye; scutellum swollen, semi-globose; wings *Ceratitis*-like, with a broad transverse band over wing at a level with apex of subcostal vein, continuous with a broad costal band which extends to apex of wing; also with 2 transverse brownish bands, 1 extending across wing over r-m and m crossveins and another extending to margin in apex of cell 2nd M<sub>2</sub> (fig. 130b). The ♀ has 2 spermathecae.

Six species have been previously known in *Proanoplomus*. Two are from Formosa, 2 from China and 2 from Japan (3 have been described in *Paranoplomus*, and 3 were described in *Proanoplomus*). Five of these species have been keyed by Chen (1948: 89).

This key has been modified by Ito (1949: 54) to include the 6th species, *arcus* (Ito). I am adding 2 species which were under *Pardalaspinus* and describing 6 new species from Thailand, Laos, Vietnam and Burma.

#### KEY TO PROANOPLOMUS KNOWN FROM SOUTHEAST ASIA

1. Mesonotum, scutellum, and humeri with conspicuous yellow to ivory-white markings. ....2  
 Mesonotum entirely polished black, with a pair of submedian gray pollinose vittae, extending almost full length. Scutellum and humeri dark brown. Brown mark over m crossvein not connected to brown band along costal margin (fig. 132a). Vietnam. ....*spenceri*, n. sp.
2. Mesonotum black except for a postsutural yellow mark on each side. Scutellum yellow-white with 3 apical black spots (fig. 133b) or with a transverse yellow-white mark across middle (fig. 129a). .... 3  
 Mesonotum with yellow or ivory-white markings posteriorly, scutellum mostly black, not marked as above. ....4
3. Scutellum white with 3 black spots on apical margin. Laos. ....*trimaculatus*, n. sp.  
 Scutellum black, except for a long white mark extending transversely over the dorsum. Burma. ....*longimaculatus*, n. sp.
4. Posteromedian portion of mesonotum broadly ivory-white. ....<sup>5</sup> 6  
 Posteromedian portion of mesonotum dark colored, brown to black. ....<sup>6</sup> 5
5. Posterior portion of mesonotum with a rather broad yellow-white triangle on each side in line with dorsocentral bristles, lacking postsutural yellow marks on mesonotum or subapical marks on scutellum. Subapical brown marking in wing connected to costal band (fig. 130b). Thailand. ....*minor*, n. sp.  
 Posterior portion with a yellow vitta on each side in line with dorsocentrals, a prominent yellow mark on suture and with a postsutural vitta in line with inner postalar bristles. Scutellum with a yellow mark over apex on each side exterior to the apical bristles. Subapical wing mark represented by an isolated streak across apex of cell 2nd  $M_2$  (fig. 134a). Thailand, Burma, India. ....*vittatus*, n. sp.
6. The brown subapical band through apex of cell 2nd  $M_2$  broadly connected with costal band (fig. 131c). .... 7  
 Subapical band pale yellow-brown and not connected with costal band, evanescent in middle of cell  $R_5$ . Java and Burma. .... *adversarius* Hering
7. Notopleural calli bright yellow, humeri yellow on hind margins. Coxae, femora and knobs of halteres yellow, tinged with brown. Hyaline wedge through apical portion of cell 2nd  $M_4$  not extending to vein  $R_{1+5}$  (fig. 131c). Smaller species, body and wings 4.0-4.75 mm. Thailand. .... *nitidus*, n. sp.  
 Notopleural calli, humeri, coxae, femora and knobs of halteres brown to blackish, only slightly tinged with yellow. Hyaline wedge through 2nd  $M_2$  extending to  $R_{4+5}$  (fig. 128a). Body and wings ( $\sigma$ ) 6.0-8.0 mm. India, Laos and Vietnam. ....*laqueatus* (Enderlein)

***Proanoplomus laqueatus* (Enderlein), new combination.** Fig. 128a-g.

*Ceratitis laqueata* Enderlein, 1920, *Zool. Jahrb. (Syst.)* **43**: 347. Type-locality: Ceylon. Type ♀ in Zoologisches Museum, Berlin.

*Pardalaspis migrata* Hering, 1944, *Sirima Seva* **5**: 5, fig. 1. New synonymy. Type-locality: "Ost-Indien." Type ♂ in Naturhistorisches Museum, Wien.

*Pardalaspinus laqueatus*: Hering, 1952, *Treubia* **21** (2): 283.

Hering (1952: 283), under his discussion of *Pardalaspinus adversarius* Hering, gave characters for separating this from *migrata* Hering but gave no differentiating characters

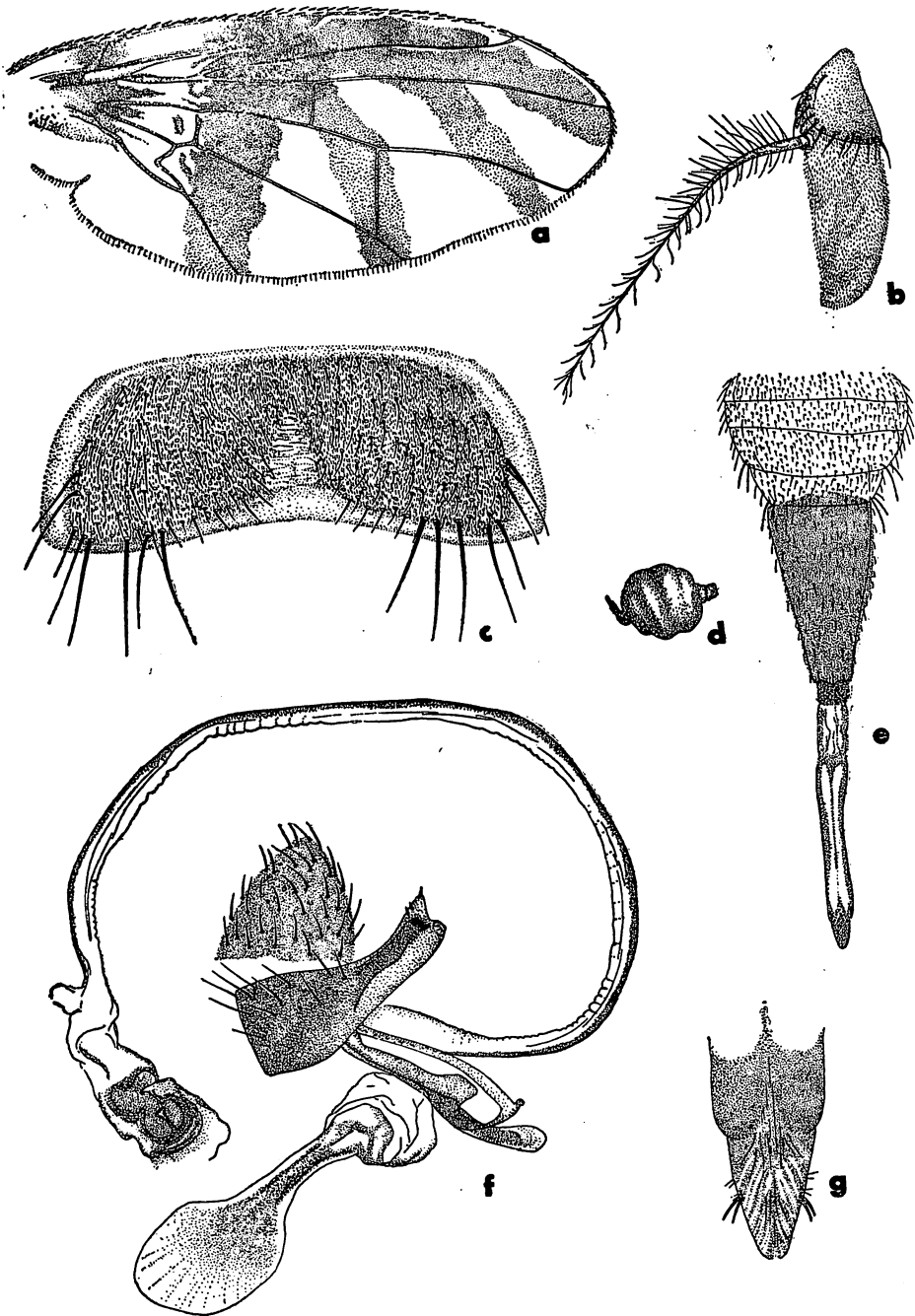


Fig. 128. *Proanoplomus laqueatus* (Enderlein). a. wing; b. antenna; c. ♂ 5th sternum; d. ♀ spermatheca; e. ovipositor; f. ♂ genitalia; g. apex of piercer.

for *laqueatus*. He stated that the thoracic markings are essentially the same in all of the species which he placed under *Pardalaspinus* but that the type specimen of *laqueatus* is very dirty and the markings are difficult to discern. I have studied Enderlein's type and it is actually in reasonable good condition except that the antennae are broken (as they are in Hering's type of *migrata*); the mesonotum is discolored and the pin obscures the posteromedian portion so it is difficult to make out the markings. I see no way to separate *migrata* from *laqueatus* and consider them synonymous.

This species is closely related to *nitidus*, n. sp. from Thailand, but is readily differentiated by its distinctly larger size; by being much blacker; lacking the yellow mark on notopleural callus; having coxae, femora and knobs of halteres mostly brown to black; with humeri and lower 2/3 of pleura and sterna black; the arista longer plumose (fig. 128b), the longest rays equal to 2/3 the width of 3rd antennal segment; the basal 2/3 to 3/4 of 2nd abdominal tergum opaque brown to black; the costal band not extending to middle of cell R<sub>5</sub>; and the hyaline wedge through cell R<sub>5</sub> extending to vein R<sub>4+5</sub> (fig. 128a), not with the costal mark extending to middle of cell R<sub>5</sub> and the hyaline wedge not extending to vein R<sub>4+5</sub> as in *nitidus* (fig. 131c). Also the inferior fronto-orbital bristles are evenly spaced; in *nitidus* the 2 lower bristles are closer together, and the upper bristles unevenly spaced.

Fitting description of *nitidus* except for the details noted above. The type ♂ has 4 pairs of inferior fronto-orbital bristles; 1 paratype has 4 bristles on one side, 3 on the other; the others have 3 pairs of fronto-orbital bristles. The arista are distinctly longer plumose than in *nitidus*, the longest rays are at least 2/3 to 3/4 the width of 3rd segment. The upper 1/2 to 3/5 of each mesopleuron is white, this continues posteriorly over upper pteropleuron, the wing base, over metapleuron and pleurotergon; it contrasts sharply with the black lower portion of the pleuron. Wings as in fig. 128a. Abdomen predominantly polished black in ground color, opaque over basal 4/5 of 2nd tergum. The posterior margin of 2nd and posterior 2/3 to 3/4 of terga 3 and 4 are yellow in ground color, densely white pollinose, completely obscuring ground color. Fifth tergum entirely polished black. Fifth sternum of ♂ about 3 × wider than long, gently concave on posterior margin, and with 4 to 5 bristles on each side. The sternum is densely setose except for a bare area extending down middle (fig. 128c). ♂ genitalia as in fig. 128f. ♀ abdomen entirely shining black, lightly pollinose basally, but lacking the white pollinose areas which are typical of the ♂. Base of ovipositor very large, approximately 2.35 mm in length and about equal to the remainder of the abdomen. The piercer is elongate, straight-sided, gently tapered at apex (fig. 128g).

Length: ♂, body and wings, 6.0-6.2 mm; ♀, body, 5.5 mm (excluding ovipositor), wings, 6.0 mm. Enderlein gave the body length as 8.5 mm and the wing 7.0 mm. Hering gave 9.0 mm for wing length.

A series of specimens have been studied from the following localities: LAOS: 9 km N of Vientiane, 180 m, 11.V.1968, F. G. Howarth; Vientiane Prov., Ban Na Pheng, 180 m, 15.V.1968, F. G. Howarth; Sayaboury Prov., Muong Sayaboury, road to Muong Phieng, 21.V.1967, in secondary woods, F. G. Howarth; Muong Sing, NW of Luang Prabang, 650 m, 6-10.VI.1960, S. & L. W. Quate. S VIETNAM: M'Drak, E of Ban Me Thuot, 4-600 m, 8-19.XII.1960, L. W. Quate.

***Proanoplomus longimaculatus* Hardy, new species** Fig. 129a-b.

This species is differentiated from other known *Proanoplomus* by having the scutellum polished black except for an elongate white mark extending transversely across

middle. It may possibly be the species which Hering (1938: 7) identified as *Paranoplomus formosanus* Shiraki from Kambaiti, Burma, but his description says "Das Scutellum ist nicht immer schwarz, sondern meistens durch eine hellgelbe, schmale Querlinie in einen vordern und einen hinteren Teil getrennt."

♀. Fitting the description of *trimaculatus* in most respects. Front with 4 pairs of inferior fronto-orbital bristles. *Thorax*: With postsutural lateral yellow marks narrow, rather elongate, extending beyond a level with dorsocentral bristles. Submedian silvery gray vittae on mesonotum very distinct. A white mark across scutellum as in fig. 129a. *Legs*: As in *trimaculatus* except that narrow bases of hind femora are yellow. *Wings*: With a brown transverse streak at level with humeral crossvein followed by a hyaline streak across wing, and another brown streak at

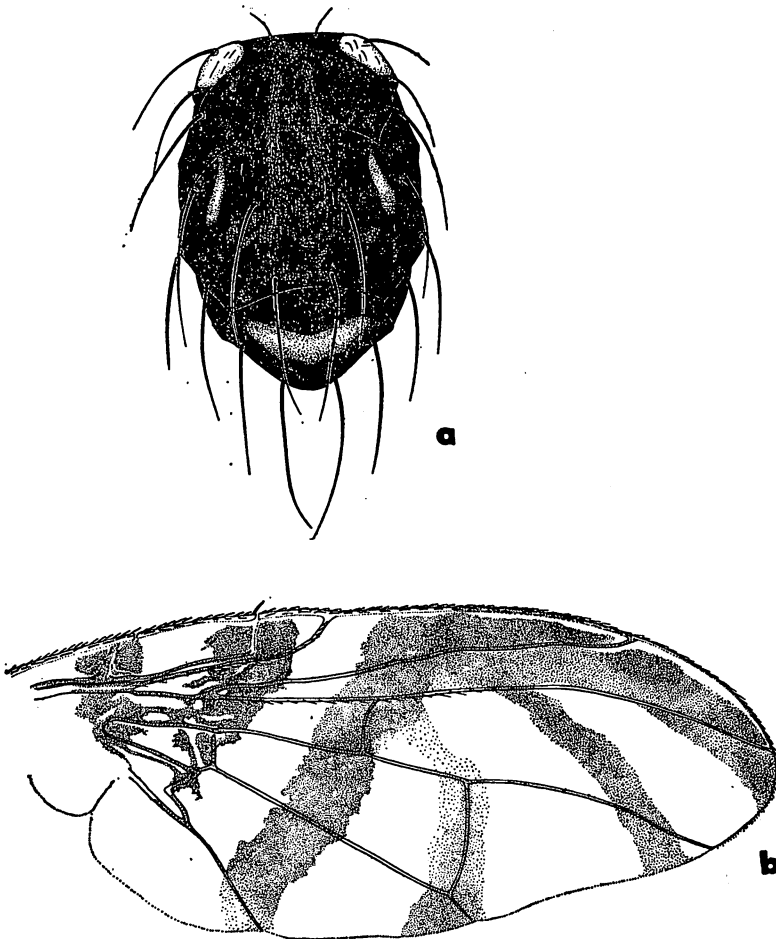


Fig. 129. *P. longimaculatus* n. sp. a. thorax; b. wing.

level with end of subcostal vein over base of Cu. The wing markings differ from those of *trimaculatus* by having both the transverse marking over m crossvein and the marking across wing from apex of cell 1st  $M_2$  connected with the brown band which extends around margin and obliquely over r-m crossvein (fig. 129b). *Abdomen*: Marked as in *trimaculatus*, 6th tergum very short, 1/4 to 1/5 as long as 5th as seen from dorsal view. Basal segment of ovipositor shining black, covered with brown to black setae. Basal portion of ovipositor as seen from above is approximately equal in length to terga 4+5 and about 1.0 mm long.

Length: Body, not counting ovipositor, 5.0 mm; wings, 6.0 mm.

♂. Unknown.

Holotype ♀, NE BURMA: Kambaiti, 2000 m, 6.I.1934, R. Malaise.

Type returned to the University Zoological Museum, Helsinki.

***Proanoplomus minor* Hardy, new species** Fig. 130a-b.

This species fits in the group of *Proanoplomus* which is characterized by having the scutellum entirely polished black except for a narrow line of yellow near base on each side. It is differentiated by having the posteromedian margin of mesonotum polished black with a yellow-white triangle on each side from hind margin extending anteriorly in line with the dorsocentral bristle and lacking yellow-white marks on or immediately behind the suture. It fits in the same complex as *nitidus*, n.sp. and *laqueatus* (Enderlein).

♂. *Head*: Mostly yellow-white, tinged with brown on upper lateral portions of occiput and with a brown mark across each gena just below eye margin; also with the frontal plates brown in the area bordered by superior fronto-orbital bristles. Occiput swollen, at widest point approximately equal in width to eye. Face vertical, epistomal margin not produced. Front gently sloping, antennae situated at about middle of head. Compound eyes narrow, almost 2× higher than wide (fig. 130a). Four pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals. Ocellar bristles strong, equal in size to frontal bristles. Front rather broad, as wide as long. Basal 2 segments of antennae yellow, 3rd segment yellow-brown, broadly rounded at apex. Arista short plumose. *Thorax*: Predominantly polished black in ground color, mesonotum with a pair of broad, submedian, gray pollinose vittae extending most of its length and with the anteriorly directed yellow-white triangular areas as noted above. Also with the suture tinged with yellow on each side. Notopleural callus yellow-white and humeri brown, tinged with yellow around margins. A broad yellow-white band extends across upper edges of pleura from propleura across metapleura and pleuroterga. Postscutellum and metanotum black, the latter densely gray tomentose. Dorsocentral bristles situated approximately in line with the supraalar. *Legs*: Femora brown, tinged with yellow at apices; tibiae and tarsi yellow. Middle tibia with 1 strong apical spur. *Wings*: As in fig. 130b, with the band over m crossvein connected to the broad brown band across basal 3/5 of wing. *Abdomen*: Shining black in ground color with the broad gray tomentose band across 3rd tergum. The genitalia have not been dissected for study. The epandrium is black; the surstyli are yellow and are long and slender.

Length: Body and wings, 3.25 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9990), NW THAILAND: Chiangmai Prov., Chiangdao, 450 m, 5-11.IV.1958, T. C. Maa.

Type returned to the B. P. Bishop Museum.

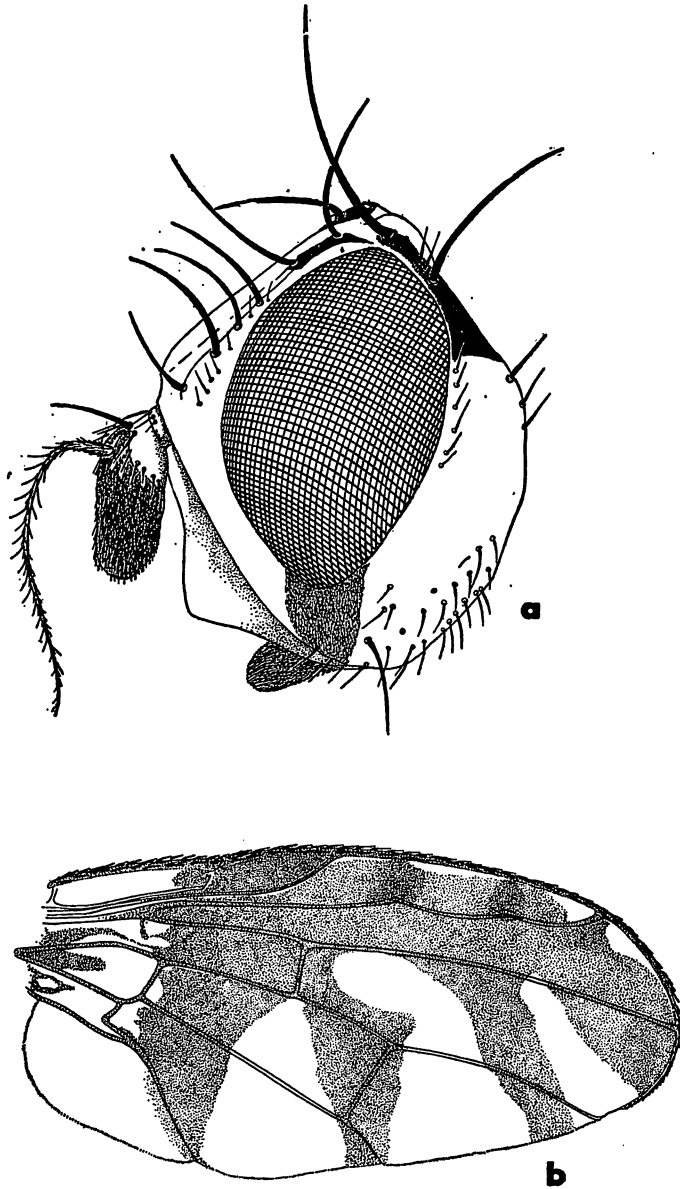


Fig. 130. *P. minor* n. sp. a. head; b. wing.

***Proanoplomus nitidus* Hardy, new species** Fig. 131a-e.

This species fits near *formosanus* (Shiraki). It would run to that species in Chen (1948: 89) by having the mesonotum non-tomentose and the arista short plumose. It is readily differentiated from *formosanus* by having the mesonotum polished black, not pubescent; by the presence of a large yellow-white spot occupying the entire postero-

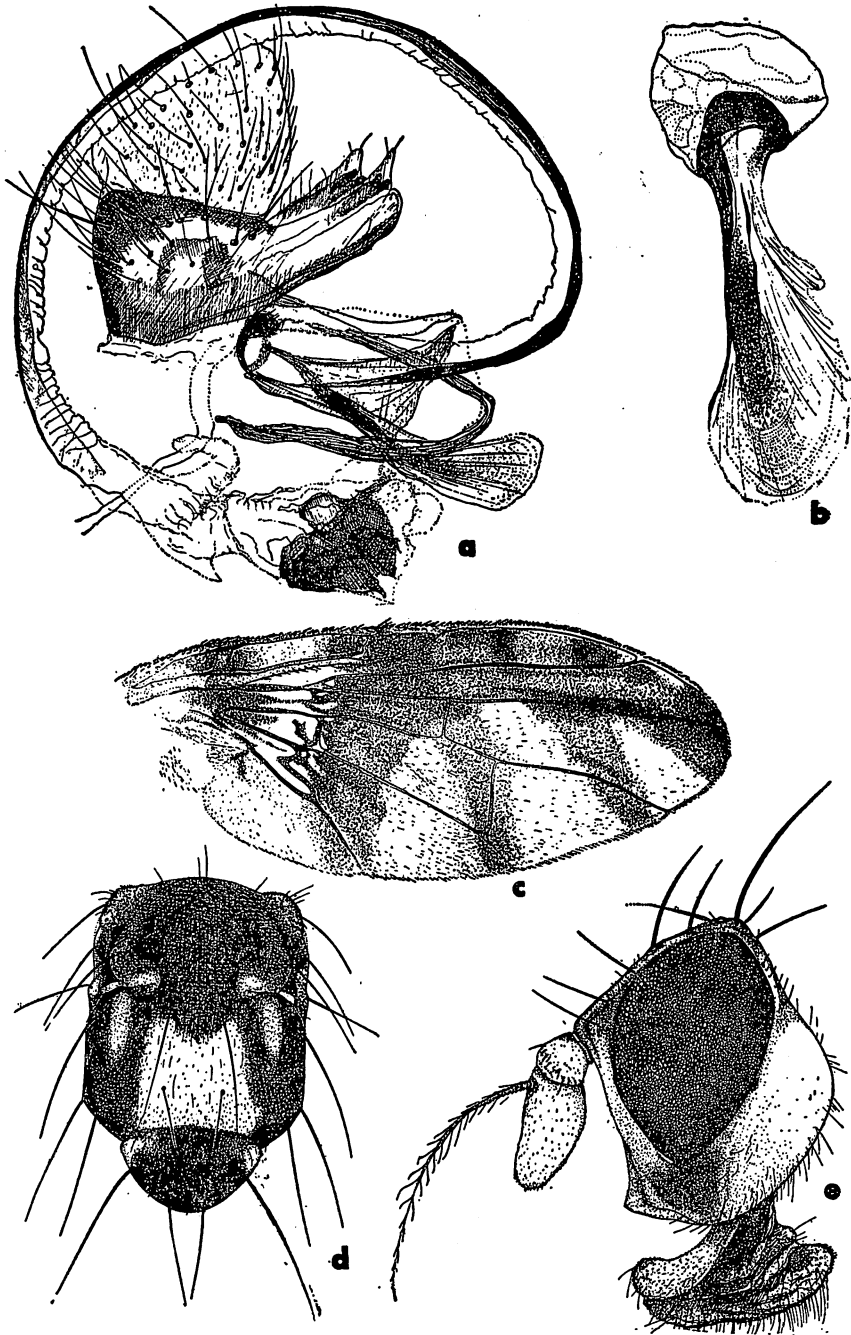


Fig. 131. *P. nitidus* n. sp. a. ♂ genitalia; b. ♂ ejaculatory apodeme; c. wing; d. thorax; e. head.



median portion of mesonotum in area marked off by dorsocentral bristles; a small transverse yellow spot on each side in line with the suture; a yellow spot on each notopleural callus; and a yellow vertical stripe on each side of scutellum near base, also the apex of 2nd tergum and almost all of 3rd and 4th are densely yellow-gray pubescent. The wing markings are as in *formosanus*. The species is related to *laqueatus* (Enderlein) from Laos, and is differentiated by the characters given in the description of that species.

♂. *Head*: Shaped as in fig. 131e. With occiput strongly swollen as is characteristic of this genus; the antennae situated at middle of head height, and face short, almost vertical. Yellow-white, with a golden tinge on front, with a brown spot on each gena below eye margin. Occiput gray pubescent. Antennae yellow, faintly tinged with yellow on 3rd segment, with 3rd rounded at apex appearing somewhat variable in the 4 specimens at hand. In one fitting Shiraki's figure of the type of *Paranoplomus* Shiraki, completely rounded at apex; in other specimens the apex comes to a very slight point above; this is obviously somewhat variable. Aristae short plumose, the longest rays are equal to about 1/2 the width of 3rd antennal segment. Three pairs of inferior fronto-orbital bristles present. Ocellar bristles equal in size to lower superior fronto-orbitals. *Thorax*: Largely polished black, gray pubescent only across median area in a narrow space just before the large posteromedian yellow-white mark. Markings as noted above and as shown in fig. 131d. Scutellum distinctly swollen; as seen from lateral view it is slightly more than 1/3 longer than high. Polished black except for a yellow mark on each posterolateral margin and thickly covered with erect yellow hairs. A small triangular spot of yellow-white is present on each notopleural callus, and a narrow streak of yellow extends dorsad for a short distance from each postalar bristle. Humeri yellow-brown, the anterior border yellow-white. Pleura brown on lower 1/2, white above. Postscutellum and metanotum black covered with gray pubescence. Knobs of halteres yellow-brown. *Legs*: Yellow, tinged with brown on the coxae and femora. *Wings*: Similar to those of *formosanus* and as in fig. 131c. The r-m crossvein situated distinctly beyond middle of cell 1st  $M_2$  and lobe of cubital cell rather short, scarcely over 1/3 as long as vein  $Cu_{1+1st A}$ . Brown costal marking extending to middle of cell  $R_5$  at wing apex. *Abdomen*: Principally brown to black, densely yellow brown pollinose over basal 2/3 of 2nd tergum, yellow-gray pollinose at apex of tergum; with terga 3 and 4 densely yellow-gray pollinose and 5th tergum entirely polished black. The 5th sternum is 2.5× wider than long, is densely setose except for a bare area extending entire length down middle, and with 6 strong bristles on hind margin. ♂ genitalia as in fig. 131a; the epandrium is dark brown to black.

Length: Body and wings, 4.0-4.75 mm.

♀. Unknown.

Holotype ♂ and 3 ♂ paratypes, THAILAND: Uthaitani, 8.IV.1965, collector name written in Thai script.

Type and 1 paratype returned to the Thailand Department of Agriculture collection, Bangkok. One paratype in the B. P. Bishop Museum and 1 in the University of Hawaii collection.

### ***Proanoplomus spenceri* Hardy, new species      Fig. 132a.**

One ♀ specimen on hand differs from all *Proanoplomus* which have been described by having the mesonotum entirely polished black, lacking yellow or white markings; having 2 complete gray pollinose vitta extending almost the full length of mesonotum, in combination with the brown mark over m crossvein not connecting with the brown band extending along apical margin of costa, pteropleura entirely brown, and scutellum polished black except for a very narrow vertical streak of yellow at each side at base.

♀. *Head*: Shaped as in other *Proanoplomus*, higher than long with the occiput bulging and at

widest point equal to approximately  $\frac{2}{3}$  width of eye. Face, genae, and lower occiput white except for brown mark on each gena below eye margin. Face vertical. Front yellow, tinged with reddish brown in median portion and with brown to black streak on each side in area occupied by superior fronto-orbital bristles. Three pairs inferior and 2 pairs superior fronto-orbitals. Ocellar bristles small, thin and hair-like, measuring about  $\frac{2}{3}$  as long as postocellar bristles. *Thorax:*

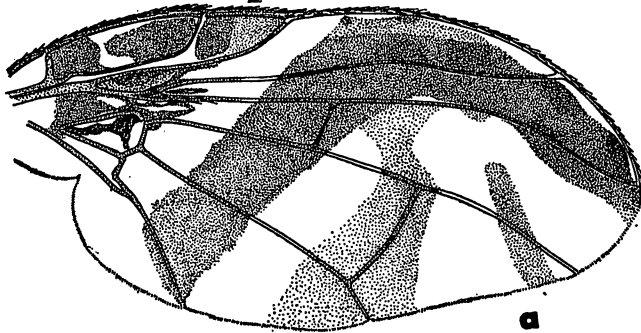


Fig. 132. *P. spenceri* n. sp. a. wing.

Predominantly polished black on dorsum, brown on pleura except for large white mark covering posterior  $\frac{2}{3}$  of each sternopleuron, extending to margin of humerus and except for white metapleura and pleuroterga. Submedian vittae on mesonotum extending from just anterior to scapular bristles to about  $\frac{1}{2}$  the distance between anterior and posterior dorsocentrals. Humeri brown, tinged with rufous on anterior margins. Scutellum swollen, almost bare, with only scattered pale setae over the disc. Postscutellum and metanotum dark brown to black, tinged with rufous on median portion. Halteres with yellow bases and brown knobs. *Legs:* Coxae, trochanters, and front femora yellow-brown, middle and hind femora brown, the latter tinged with yellow on narrow apices and at bases. Middle tibiae each with 1 strong apical spur. Hind tibiae each with a row of prominent anterodorsal bristles along median portion. *Wings:* With markings and venation as in fig. 132a. The preapical oblique band extending through upper apical portion of cell 2nd  $M_2$  is faintly connected with the brown band along costa and the large marking over m crossvein is broadly isolated. *Abdomen:* Shining black in ground color with terga 2 and 4 densely gray pollinose, and bearing erect yellow setae. Other terga opaque brown, with black setae. Sixth tergum short, about  $\frac{1}{2}$  as long as 5th. Basal segment of ovipositor shining dark reddish brown, tinged with black. As seen from dorsal view the basal segment is slightly longer than abdominal segments 3-6. Measured on the venter the basal segment is 2.0 mm long. The piercer has not been extruded for study.

Length: Body, excluding ovipositor, 5.7 mm; wings, 6.0 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9991), S VIETNAM: Fyan, 1200 m, 11.VII-9.VIII.1961, N. R. Spencer.

Type returned to the B. P. Bishop Museum.

**Proanoplomus trimaculatus** Hardy, new species Fig. 133a-e.

This species appears related to *japonicus* Shiraki and is evidently the same species as was recorded by Hering (1938: 7) from Kambaiti, Burma as *P. japonicus*. It differs from *japonicus* by having the abdomen polished black in ground color with broad gray pollinose bands across terga 2 and 4, rather than having the abdomen predominantly

grayish white tomentose, covered with yellow-white pile, but not with distinct bands of gray over the 2nd and 4th terga. Also, the femora are all black, rather than yellow with brown to black apices.

♂. *Head*: Shaped as in other members of this genus (fig. 133e) with the occiput swollen, at its greatest point, nearly  $\frac{2}{3}$  eye width. Upper median portion of occiput black, otherwise white. Genae with a pale brown spot below each eye margin. Face white, densely white pubescent, almost vertical, evenly rounded over median portion and with rather slight antennal furrows developed. Front golden yellow with a polished black vitta extending from vertex on each side

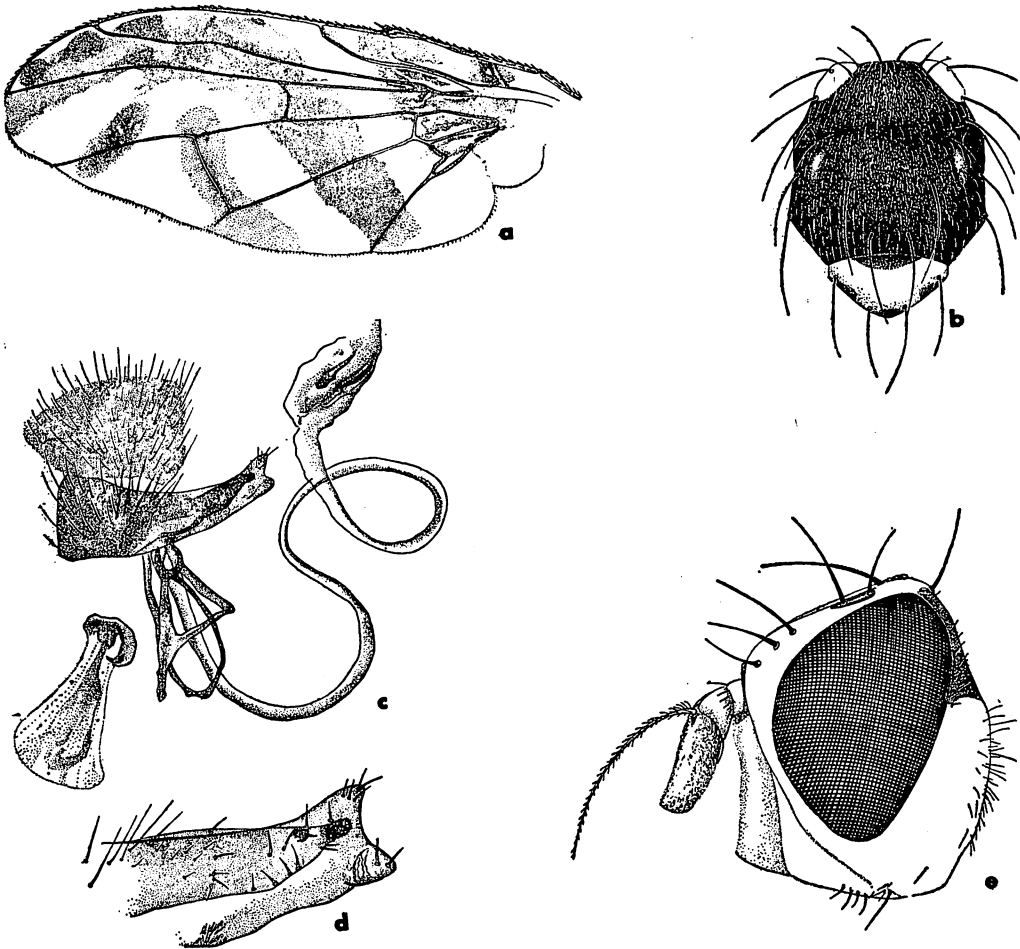


Fig. 133. *P. trimaculatus* n. sp. a. wing; b. thorax; c. ♂ genitalia; d. ♂ surstylus and 10th sternum; e. head.

in region occupied by superior fronto-orbital bristles. Front broad, as wide as long, measured from median ocellus to front margin. Three pairs inferior fronto-orbital bristles present. Antennae rufous, tinged slightly with brown along dorsal margin of 3rd segment. Third segment less than  $3\times$  longer than wide and broadly rounded at apex. Arista short plumose (fig. 133e). *Thorax*: Polished black on dorsum, except for a short yellow subtriangular postsutural mark on

each side extending just a short way beyond anterior supraalar bristles. Also, with a pair of submedian gray vittae extending over anterior 2/3 of mesonotum. Scutellum ivory-white, with 3 large black apical spots (fig. 133b). Mesopleura entirely ivory-white except for narrow anteroventral margin, the markings are continuous with those of humeri. Postscutellum and metanotum polished black. *Legs*: Coxae and femora dark brown to black, except for extreme apices of anterior femora. Tibiae and tarsi yellow. Middle tibia with 1 long apical spine. *Wings*: Hyaline at the base with moderate brown subbasal marks and the hyaline longitudinal streaks through basal cells typical of this group. With 2nd costal cell brown at base and at apex, hyaline through median portion. The base of subcostal cell also brown. A broad brown band extends obliquely across wing from vein  $Cu_1+1st\ A$  over r-m crossvein to wing margin and along margin to wing apex in upper portion of cell  $R_5$ . A rather faint brown streak extends transversely across m crossvein and another incomplete brown streak extends from near apex of cell 2nd  $M_2$  through most of cell  $R_5$ , not quite connecting with brown costal band (fig. 133a). *Abdomen*: Polished black with a broad silvery gray band covering almost all of 2nd tergum and one covering apical 3/4 of 4th tergum. These pollinose bands are covered with yellow-white pile. Basal portion of tergum 4 polished black. Sterna all dark brown, 5th sternum  $2\times$  longer than wide, the hind margin straight and the entire sclerite is densely black setose. Genitalia as in fig. 133c. Anal plates very large, expanded, nearly  $2\times$  larger than epandrium. Surstyli broad, straight-sided, indistinctly bilobate at apices (fig. 133d). Ejaculatory apodeme slightly expanded distally.

Length: Body, 5.5 mm; wings, 6.0 mm.

♀. Unknown.

Holotype ♂ LAOS: Nam Tiene, 14.IV.1918, R. Vitalis de Salvaza. One ♂ paratype, Laos: Nam Mia, 17.IV.1918, R. Vitalis de Salvaza.

Type returned to the University Zoological Museum, Helsinki, paratype in the University of Hawaii collection.

### ***Proanoplomus vittatus* Hardy, new species** Fig. 134a-f.

As pointed out in the key, this species differs from other known *Proanoplomus* by having the posteromedian portion of the mesonotum brown to black, with a narrow yellow vitta on each side in line with dorsocentral bristles; by having narrow yellow vitta across apex of scutellum just outside each apical bristle; the brown band through apical portion of 2nd  $M_2$  not connected with the costal band; also it differs by having the abdomen rufous except for a discoloration of brown on the 2nd tergum of ♂ and except for the ♀ ovipositor. It fits near *minor*, n. sp. but the 2 are not related.

♀. A most handsome, conspicuously marked species. *Head*: Higher than long, the occiput swollen, approximately 2/3 as wide as eye (fig. 134b). Head except eyes predominantly pale colored; face and lower 2/3 of occiput yellow-white; upper occiput yellow; front golden pollinose, opaque, vertical calli subshining yellow; the gena below eye is discolored with brown. Face almost vertical. Antennae rufous, tinged with brown on 3rd segment. Third segment rounded at apex. Arista short plumose, the longest rays are scarcely over 1/2 the width of 3rd antennal segment. Three pairs of inferior fronto-orbital bristles typically present and 2 pairs of superior fronto-orbitals. In some specimens 4 pairs of inferior fronto-orbitals are present, and in 1 specimen, 5 bristles (2 rather poorly developed) are present on 1 side of front. Ocellar bristles well-developed, equal in length to fronto-orbitals. Palpi yellow, thickly black setose on ventral portion and around apex. *Thorax*: Mesonotum predominantly dark brown to black, rufous, tinged lightly with brown on anterior portion and with the following yellow marks: on each side along suture; a narrow vitta on each side from suture extending 1/2 the distance to inner postalar bristles in line with the latter; and a narrow yellow vitta on each side from just behind and in line with dorsocentral bristle,

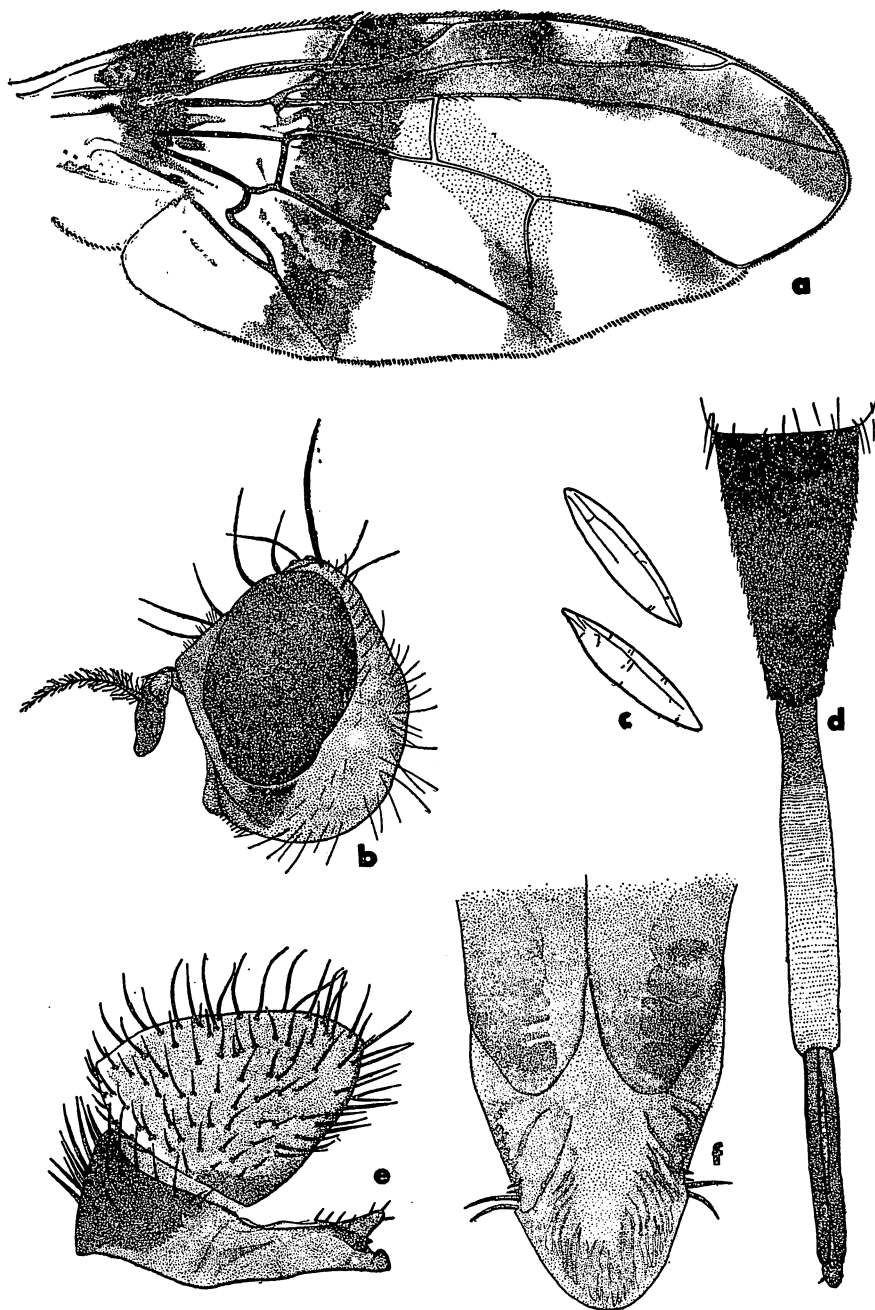


Fig. 134. *P. vittatus* n. sp. a. wing; b. head; c. eggs; d. ovipositor; e. ♂ surstylus and 10th sternum; f. apex of ovipositor.

extending to hind margin. Scutellum predominantly polished black, basolateral portions rather broadly yellow, this marking extending almost to basal bristles; also with a narrow vertical yellow mark on outer side of each apical bristle. The scutellum is distinctly rounded over dorsal portion, inflated, as seen in direct lateral view it is scarcely longer than high and sparsely covered with conspicuous brownish yellow setae over disc. One strong humeral bristle is present. The dorso-centrals are in line with anterior supraalars. The metanotum is dark brown to black, tinged with rufous in ground color. The pleuroterga and metapleura are yellow-white except for a brown marking along lower margins. A broad yellow-white marking also extends across upper portions of pteropleura and mesopleura. The pleura are otherwise brown, tinged with rufous; the propleura are predominantly yellow. The humeri are yellow. Stems of halteres yellow, knobs brown. *Legs:* Predominantly yellow with apical 1/3 of hind femora brown and the middle femora brown except for bases. The front femora are tinged with brown dorsally. The middle tibia has 1 long and 1 short apical spur. *Wings:* The extreme base hyaline with a prominent dark brown spot extending transversely from the area surrounding humeral crossvein into the basal part of cell Cu, and with a brown streak extending distally from this mark into bases of cells R<sub>5</sub>, M, and Cu. A broad brown streak the width of the subcostal cell extends across entire wing in line with subcostal cell; this brown marking is continuous as a broad costal band extending through the upper portion of cell R<sub>5</sub> to wing tip. A broad yellow band extends from this brown marking transversely across wing over r-m and m crossveins, verging into brown before reaching wing margin at apex of M<sub>3+4</sub>. Also, a rather narrow brown streak extends obliquely from wing margin just below vein M<sub>1+2</sub> into lower portion of cell R<sub>5</sub>, this does not connect with the brown costal band (fig. 134a). The costal spines are not strongly developed; 2 spines present just before the subcostal break are approximately 2× larger than the other bristles along costa. The subcostal vein is setose to a level with humeral crossvein. Vein R<sub>4+5</sub> has setulae from base to about 1/2 the distance of the vein from r-m crossvein to wing apex. The other details of venation are as in fig. 134a. *Abdomen:* Entirely rufous except for the polished black basal segment of ovipositor. The ovipositor base is exceptionally large (fig. 134d), about 1/3 longer than abdomen and at its hind margin is almost equal in width to abdomen. The basal segment of ovipositor measures 4.3 mm; the membranous portion measures 5.0 mm in length and the piercer is 3.7 mm. The piercer is blunt, rounded at apex (fig. 134f). The spermathecae are round, with a short neck. The eggs are shaped as in fig. 134c. They are 2.35 mm long by 0.5 mm at the widest point.

Length: Body, excluding ovipositor, 9.7 mm; wings, 9.3 mm.

♂. Fitting description of ♀ in most respects. The 2nd abdominal tergum is discolored with brown; the abdomen is otherwise rufous. ♂ genitalia as in fig. 134e.

Length: Body, 6.5-7.0 mm; wings, 7.0-7.7 mm.

Holotype ♀ and allotype ♂, THAILAND: Kanchanaburi, 31.V.1962, Lot 2824. Five paratype ♀♀, same data as type. One ♂ paratype, BURMA: Tenasserim, Amherst, 1896-192, Lt. Col. Bingham; also 2 ♂ paratypes, INDIA: Sikkim, Singla, 610 m, 1896-192, no collector given.

Type and allotype returned to the Thailand Department of Agriculture, paratypes deposited in the collections of the U. S. National Museum, British Museum (Natural History); B. P. Bishop Museum, and University of Hawaii.

### Genus *Trypeta* Meigen

*Trypeta* Meigen, 1830, *Ill. Mag. Insekt.* 2: 277. Type-species: *Musca artemisiae* Fabricius, from Europe, by subsequent designation (Coquillett 1910: 618).

For synonymy refer to Hendel (1927: 77).

According to Hendel (1927: 77), as far as is known the larvae are leaf miners. This genus is characterized by having 4 scutellar bristles; 3 pairs superior fronto-orbitals; arista

bare or very short pubescent; ocellar bristles well developed; antennae rather short not extending to margin of face, the 3rd segment rounded at apex. Typically the r-m crossvein is situated near middle of cell 1st  $M_2$ , vein  $R_{4+5}$  is setose to beyond a level with r-m crossvein and the dorsocentral bristles are situated approximately in line with the supraalars. Also the wings are typically predominantly hyaline with irregular streaks, or markings, of brown (refer to Hering 1938: 38-43, fig. 39-46.)

This is a cosmopolitan genus; over 50 species have been described to date. Approximately 20 are known from the Oriental region; 10 were described from Kambaiti, Burma by Hering (loc. cit.). One species on hand from Vietnam appears to belong here but is definitely aberrant.

***Trypeta aberrans* Hardy, new species** Fig. 135a-c.

Fitting *Trypeta* except that the dorsocentral bristles are situated nearer the postalars than to the supraalars, the r-m crossvein is situated near apical  $2/3$  of cell 1st  $M_2$ , and vein  $R_{4+5}$  has only about 6 scattered setae on basal portion and 1 seta at level with r-m crossvein. It should be noted that the position of r-m crossvein and the degrees of setation of vein  $R_{4+5}$  are variable in species of *Trypeta* and these are obviously not reliable characters; also the species at hand has very different wing markings than any previously described *Trypeta*. It is probable that this will eventually prove to be generically distinct but more specimens will need to be studied before a decision can be made.

Differing from all known *Trypeta* by having the wings predominantly brown with hyaline spots along margin and small rather numerous spots in the field (fig. 135b).

♂. Almost entirely yellow to rufous. **Head:** About equal in width to thorax and approximately as high as long, slightly narrowed anteriorly with the face approximately  $2/3$  as long as front and the front gently sloping so that the antennae are situated near the upper  $2/3$  of head height (fig. 135a). Face gently concave as seen from direct lateral view; the median portion is not raised and the antennal furrows are moderately developed. Genae narrow, less than  $1/12$  the eye height. Eyes oval. Occiput moderately swollen. Front rather broad, almost as wide as long and approximately equal in width to 1 eye. Antennae and mouthparts entirely pale yellow; 3rd antennal segment  $1/2$  longer than wide, broadly rounded at apex and with aristae almost bare, microscopically pubescent basally. Palpi slender, covered with fine yellow hairs except for 2 black setae at apex. **Thorax:** Pale rufous in ground color, rather densely gray pollinose with short yellow-brown setae over dorsum and yellow hairs on sides. Dorsocentral bristles situated approximately  $3/5$  the distance from supraalars to postalars. Scutellum yellow except for a tinge of brown at apex between apical bristles, the disc with very inconspicuous short yellow-brown hairs. Post-scutellum brown on lower portion, metanotum brown on sides, yellow down middle. **Legs:** Entirely yellow. Front tarsi with dense covering of short yellow pile ventrally and each basitarsus with a row of long yellow-brown posteroventral cilia. Front femur with the usual row of posteroventral bristles. Middle tibia with 1 strong apical spur, plus about 5 short black bristles. Middle tibia also with a row of short yellow-brown posterior bristles at middle of segment. Each hind femur with 3 rather prominent anterodorsal bristles just before apex and each hind tibia with a prominent row of short yellow-brown posteroventral bristles extending entire length of the segment. **Wings:** With venation and markings as in fig. 135b. Vein  $R_{4+5}$  with about 6 setae on basal portion extending approximately  $1/4$  to  $1/3$  the distance to r-m crossvein and 1 wing with 1 seta situated opposite r-m crossvein. **Abdomen:** Rufous, tinged with brown over 5th tergum and with predominantly yellow setae on first 2 terga and on apex of 3rd; otherwise brown setose. Fifth tergum with rather prominent black bristles around lateral margins. The genitalia have not been dissected for study. As seen in situ the entire genitalia appear to be rufous. The surstyli have

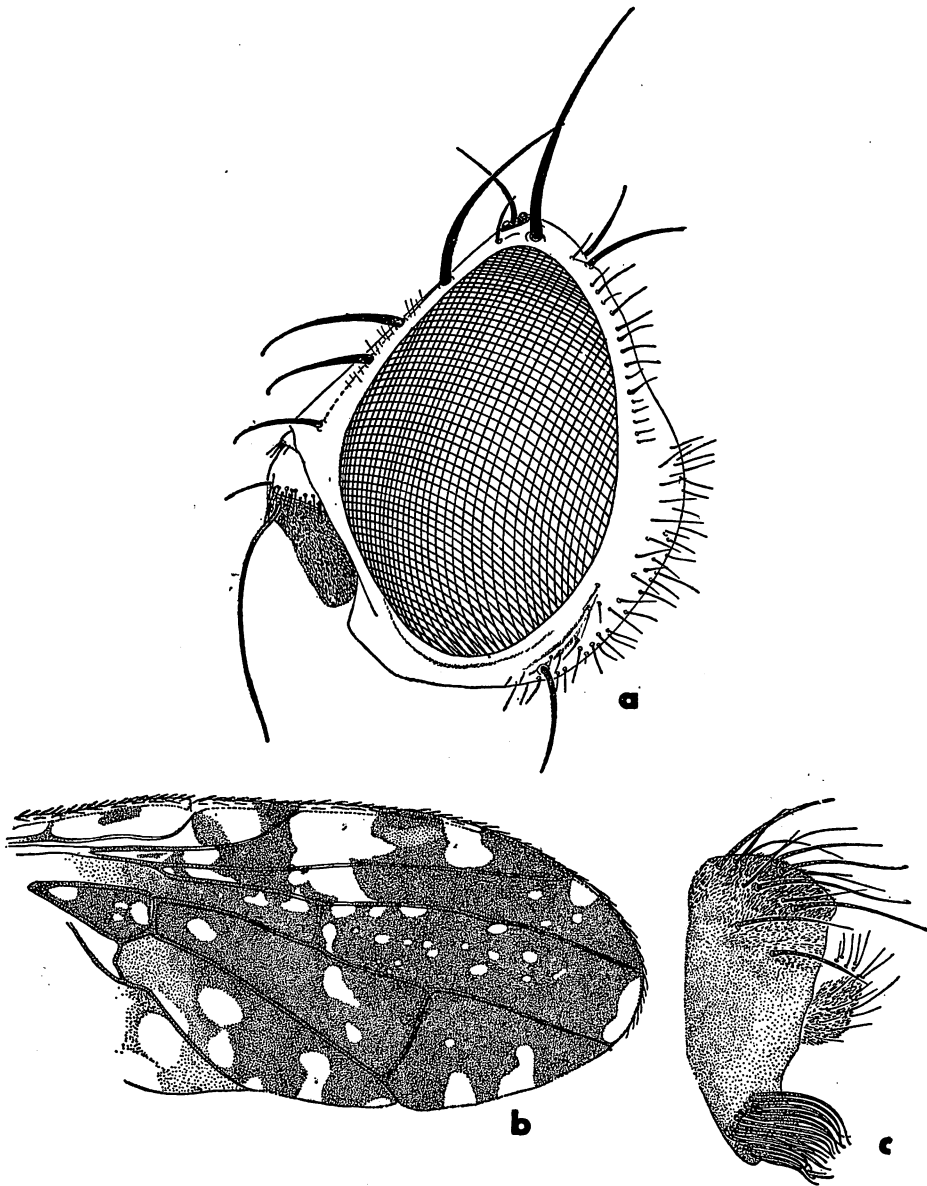


Fig. 135. *Trypeta aberrans* n. sp. a. head; b. wing; c. ♂ surstylus.

a dense clump of prominent hairs on lateral margins (fig. 135c).

Length: Body and wings, 6.0-6.25 mm.

♀. Unknown.

Holotype ♂ (BISHOP 9992), S VIETNAM: Fyan, 900-1000 m, 11.VII-9.VIII.1961, N. R. Spencer.

Type in the B. P. Bishop Museum.



***Trypeta accola* Hardy, new species** Fig. 136a.

This species fits in the complex near *diffluata* Hering from Burma but the wing markings are different and 4 pairs of inferior fronto-orbital bristles are present. It is differentiated by having the upper apical portion of cell  $R_3$  and lower apical portion of cell  $R_5$  hyaline, rather than having a brown mark extending over entire apices of  $R_3$  and  $R_5$ ; by lacking a continuous brown mark across m crossvein through cell  $R_5$  to vein  $R_{4+5}$ , or a continuous transverse band of brown from cell Cu to cell  $M_4$  over r-m crossvein (compare fig. 136 with fig. 43, Hering 1938: 41). Also the basal segment of the ovipositor is rufous, rather than black.

♀. An all rufous species except for the yellow occiput, genae, and face. *Head*: Distinctly higher than long, with the face gently concave. Four pairs of strong black inferior fronto-orbital bristles and 1 pair of superior fronto-orbitals, with upper inferiors situated opposite superiors. Ocellar bristles weak, rather hair-like, scarcely over  $2\times$  longer than the setae on front. Front just slightly longer than wide, approximately equal in width to eye as seen from dorsal view. Third antennal segment red, tinged with brown. Palpi yellow, tinged with brown around apical

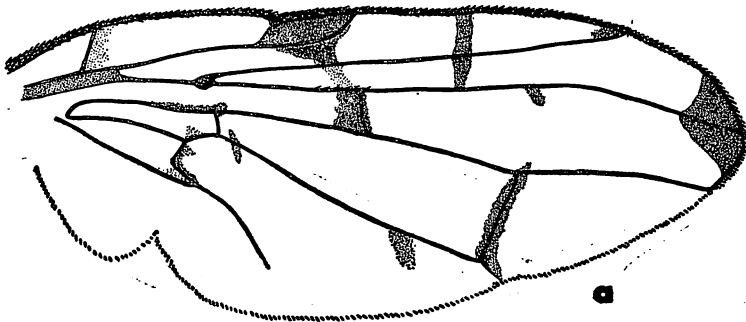


Fig. 136. *T. accola* n. sp. a. wing.

margin. Aristae microscopically pubescent. *Thorax*: Yellow to rufous; humeri, scutellum, mesopleura and notopleura more distinctly yellow. Dorsocentral bristles situated opposite supraalars. *Legs*: Entirely yellow to rufous. One strong apical spine on middle tibia. *Wings*: As in fig. 136a, with r-m crossvein situated at middle of cell 1st  $M_2$ . Vein  $R_{4+5}$  setose to a level approximately halfway between r-m and m crossveins. *Abdomen*: Entirely rufous except for a tinge of brown at apex of basal segment of ovipositor. Sixth tergum  $3/4$  to  $4/5$  as long as 5th and with strong black bristles around margin. Basal segment of ovipositor short and thick, as seen from dorsal view just slightly longer than 5th tergum and measured on venter approximately 0.8 mm long. The piercer has not been relaxed for study.

Length: Body, excluding ovipositor, and wings, 5.75-6.0 mm.

♂. Unknown.

Holotype ♀: BURMA: Chin Hills, Mt Victoria, 2400-2800 m, V.1938, G. Heinrich. Type returned to the British Museum (Natural History).

#### Genus *Xanthorrhachis* Bezzi

*Xanthorrhachis* Bezzi, 1913, *Mem. Ind. Mus.* 3: 137. Type-species: *amandalei* Bezzi, by original designation. Type ♂ in the Zoological Survey of India collection.

This genus is characterized by having the scutellum swollen but wings not *Ceratitis*-

like and with distinctive markings (fig. 137a); by having 3 yellow longitudinal bands, 1 on the costa and 1 each on veins  $M_{1+2}$  and on  $M_{3+4}$ ; with no black streaks at the wing base, etc.; by having the 3rd antennal segment sharply pointed at upper apex (it should be noted that Bezzi in the original description of the genus stated that the 3rd antennal segment is rounded at the apex, but he had access to only 1 specimen and this character may have been obscured). It fits very near *Galbifascia*,\* n. genus but is differentiated by having the front sloping; the head distinctly higher than long; the antennae situated near upper 1/3 of front as seen in direct lateral view (fig. 137f); by having the lobe of cell Cu 1/2 to equal the length of vein  $Cu_1 + 1st A$  (fig. 137a and 138a); and by having the 2nd tergum of ♂ very large, completely covering 3rd tergum on sides (fig. 137b); also the ovipositor base lacks bristles at apex. Two spermathecae are present. On the basis of the 2 species which I feel are congeneric, my concept would also include ocellar bristle tiny, setae-like (type-species), or moderately developed (*assamensis*, n.sp.).

Members of this genus may possibly breed in bamboo. Only 1 species has been previously recognized.

**Xanthorrachis annandalei** Bezzi Fig. 137a-f.

*Xanthorrachis annandalei* Bezzi, 1913, *Mem. Ind. Mus.* 3: 138, pl. 9, fig. 44. Type-locality: Dawna Hills, Lower Burma. Type ♀ in the Zoological Survey of India collection.

Specimens on hand from Burma, Thailand, Vietnam, and Laos fit Bezzi's description of *annandalei* and are apparently this species. This is readily recognized by being entirely yellow to pale green except for an opaque small black spot on each hind corner of the mesonotum, directly behind inner postalar bristle; this spot is very densely black pubescent. Also, a very tiny black spot is present just behind each wing base, and a small shining black spot present at base of each scutellar bristle. The wing markings and venation are as in fig. 137a. The head and antennae are as in fig. 137f. The 2nd tergum of the abdomen completely covers the sides of the 3rd (fig. 137b). Ocellar bristles tiny, represented by pale setae, scarcely larger than the setae on the front in most specimens. Bezzi indicated that no ocellars are present. Fifth sternum of ♂ about 2× wider than long, the hind margins straight or nearly so, the entire surface rather thickly setose and with 6 to 8 bristles on hind margin. ♂ epandrium with numerous setae over dorsal surface. A single large rectal gland is developed in the ♂. Ovipositor base approximately equal in length to last 3 abdominal segments and the portion extending beyond the 5th tergum is approximately 1.5 mm. The piercer measures 2.0 mm, is very distinctive in shape (fig. 137e), broad and blunt at the apex. The spermathecae are longer than wide, thickened apically, slightly narrowing to the base and apparently made up of very compact coils (fig. 137d).

Length: Body and wings, excluding ♀ ovipositor, 7.0-7.25 mm.

A series of specimens are on hand from the following localities: BURMA: Mishmi Hills, Delei R., 518 m, 29.I.1935, M. Steele; Chin Hills, Mt Victoria, 1000 m, III.1938, G. Heinrich. LAOS: Sayaboury Prov., Muong Sayaboury, 915 m, 13.X.1966, F. G. Howarth; Vientiane Prov., Muong Tourakom, 180 m, 17.VII.1966, collected in bamboo thicket, F. G. Howarth; Vientiane Prov., Ban Na Pheng, 180 m, 15.V.1968, F. G. Howarth. THAILAND: Tak Prov., Mae Sot Dist., Huai Muang Canton, 200 m, 11.VII.1969, Malaise trap, J. J. S. Burton; Kanchanaburi, 31.V.1962, Department of Agriculture lot

\* These both may probably best fit in *Gastrozonini*.

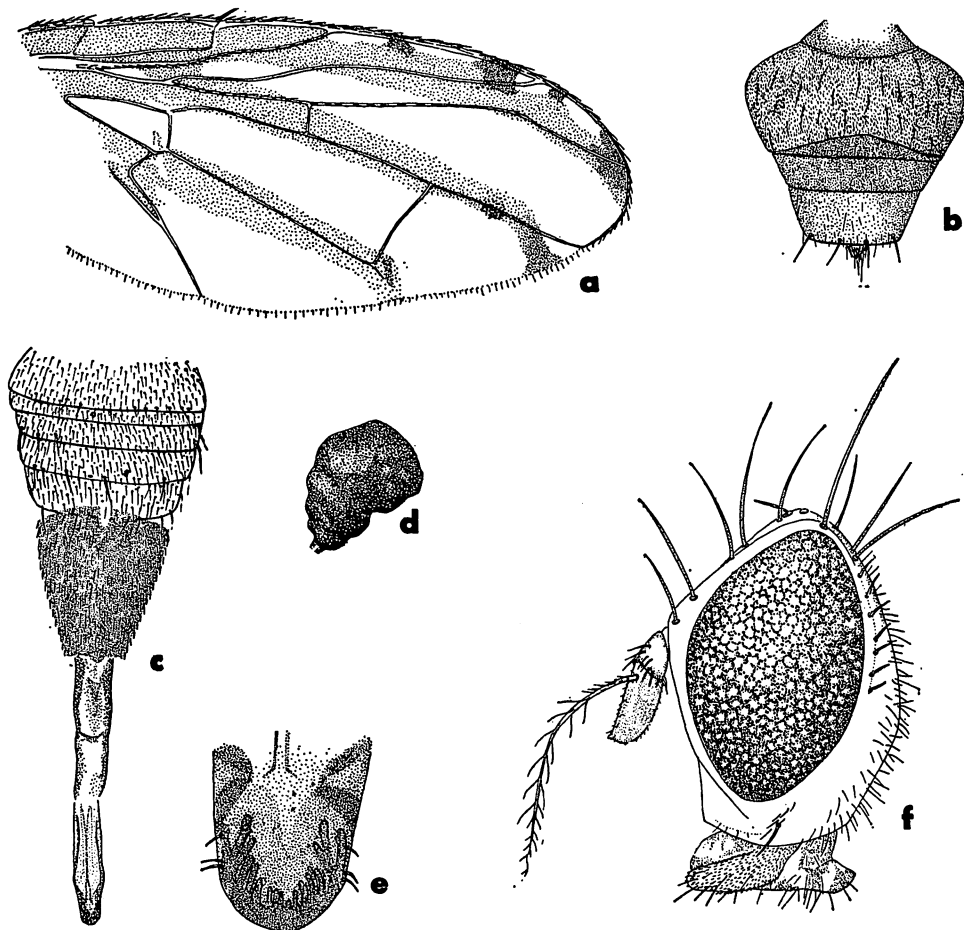


Fig. 137. *Xanthorrhachis amandalei* Bezzi. a. wing; b. ♂ abdomen; c. ♀ abdomen; d. ♀ spermatheca; e. apex of piercer; f. head.

2824; Chiangmai Prov., Fang, 500 m, 12-19.IV.1958, T. C. Maa. S VIETNAM: Fyan, 1200 m, 11.VII.-9.VIII.1961, N. R. Spencer.

***Xanthorrhachis assamensis* Hardy, new species** Fig. 138a.

Because of the close resemblance of the majority of characters, I consider this congeneric with *amandalei*, in spite of the fact that ocellar bristles are moderately developed in *assamensis*. It seems best to include this description here even though the species does not occur in Thailand. Besides the latter character, this species is readily differentiated from *amandalei* by having 3 black spots on margin of scutellum; having a black spot on each humerus and 3 black spots on each side of mesonotum. Also, the wing has a yellow to brown marking across m crossvein connecting longitudinal bands on veins  $M_{1+2}$  and  $M_{3+4}$ , and the lobe of cubital cell is equal in length to vein  $Cu_1+1st A$  (fig. 138a).

♂. *Head*: Entirely yellow to rufous except for reddish brown eyes, distinctly higher than long with occiput moderately swollen,  $2/3$  to  $3/4$  as wide as compound eye and with antennae situated at approximately upper  $1/3$  of front, as in *amandalei*. The antennae are yellow. Third segment is approximately  $3\times$  longer than wide, and terminates in a short point at upper apex. The arista are densely plumose, the longest rays are almost equal in length to width of 3rd segment. The face is nearly straight, slightly concave as seen in lateral view. Three pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals. Ocellar bristles about equal in length to inferior

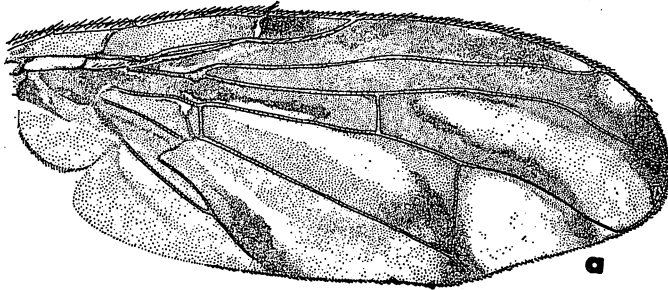


Fig. 138. *X. assamensis* n. sp. a. wing.

fronto-orbitals. Front opaque, golden pubescent, faintly tinged with brown. The area of the superior fronto-orbital bristles yellow. *Thorax*: Entirely yellow except for the 3 spots on sides of mesonotum, 1 just before suture at upper edge of notopleuron, 1 above wing, below anterior supraalar bristle, and 1 near hind margin just behind outer postalar bristle. Humerus with an opaque black spot below the bristle. Spots on scutellum rather large, confined to apicoventral margin, the median spot extends a short way onto dorsum between the 2 apical bristles and each lateral spot is situated well below the bristles. *Legs*: Entirely yellow, middle tibia with 1 strong apical spur. *Wings*: As in fig. 138a, the markings all yellow except for brown in the subcostal cell, a tinge of brown along margin in cells  $R_1$  and  $R_3$ , with a brown spot in each of the apices of cells  $R_5$ , 2nd  $M_2$ , and along lower portion of m crossvein and apex of vein  $M_{3+4}$ . Markings and venation as in fig. 138a. Subcostal cell scarcely over  $1/2$  as long as 2nd costal cell. Vein  $R_{2+3}$  only slightly wavy, above r-m crossvein. The r-m crossvein situated near apical  $1/3$  of cell 1st  $M_2$  and the lobe of the cubital cell equal in length to vein  $Cu_1+1st A$ . *Abdomen*: Entirely yellow. Second tergum of ♂ very well developed, covering over the 3rd tergum on the sides as in *amandalei* (fig. 137b); first 2 segments of abdomen equal in length to remainder of abdomen. The genitalia have not been dissected for study.

♀. Fitting the description of the ♂. Basal segment of ovipositor approximately equal in length to last 4 abdominal segments. Equal to about 2.2 mm. The piercer has not been extended for study.

Length: Body of both sexes, 7.7-8.0 mm; wing of ♂, 7.0 mm; of ♀, 8.6 mm.

Holotype ♂, allotype ♀ and 1 ♂ paratype, INDIA: Assam, N. Khasi Hills, lower ranges, "1878, 96-135," A. Chennell. One ♂ paratype, Assam, India, 1901-262, Cameron.

Holotype and allotype returned to the British Museum (Natural History). Also 1 damaged specimen not being designated; 1 paratype in U.S. National Museum and 1 in the University of Hawaii collection.

#### SUBFAMILY SCHISTOPTERINAE

This subfamily is characterized by the distinctive wing markings (fig. 139b); by having the costa of wing with a deep cleft at apex of subcostal vein and a prominent

lobe developed at apex of 2nd costal (fig. 141e). Only 1 genus occurs in the region being studied.

### Genus *Rhabdochaeta* de Meijere

*Rhabdochaeta* de Meijere, 1904, *Bijdr. Dierk.* **17**: 109. Type-species: *pulchella* de Meijere, by monotypy.

This genus is characterized from all other fruit flies from Southeast Asia by the subfamily characters given above. Also 2 to 3 pairs of dorsocentral bristles present; 3rd antennal segment elongate and pointed; palpi elongate, fringed with short black setae; some of the frontal bristles usually highly modified; 3rd costal section usually very short; cubital cell pointed at lower apex, not lobate. Most species have well developed bullae in the center of the wing. The ♀♀ have only 2 spermathecae. For a detailed description of the genus refer to Shiraki (1933: 483). For a key to the Oriental species, refer to Bezzi (1926b: 309).

Fourteen species are presently known from the Oriental and Pacific regions. Thirteen species have been recorded from Africa.

#### KEY TO KNOWN SPECIES OF RHABDOCHAETA FROM THAILAND AND SURROUNDING COUNTRIES

1. With narrow black rays extending to costal margin through cell  $R_1$  (fig. 139b). .....2  
Rays in  $R_1$  broad, white in center, bordered with brown (fig. 141e). Subcostal cell with an incomplete streak of brown in the middle. Face with a prominent carina in upper median portion and a black spot in middle below the protuberance. Philippine Islands, Thailand, Laos and Vietnam. ....**bakeri** Bezzi
- 2 (1). Cells  $R_1$  and  $R_3$  each with 2 brown streaks through middle. Cell Sc with a complete brown band through middle or entirely hyaline to faintly yellow fumose (fig. 139b and pl. 4, fig. 34). .....3  
Cell  $R_1$  with only 1 brown streak through middle (fig. 140d, 142a). Basal portion of cell Sc brown, with 1 or 2 small hyaline spots in *asteria* Hendel. ....4
- 3 (2). Subcostal cell hyaline or faintly tinged with yellow basally. Vein  $M_{1+2}$  only slightly bent upward beyond m crossvein. An incomplete preapical brown band on front femur. Face entirely yellow. No shining red area in upper basal portion of cell 2nd  $M_2$  and no velvety black mark in cell  $R_3$  before r-m crossvein. Java, Thailand, Laos and Vietnam. ....**venusta** de Meijere  
Three black lines extend to costa through cell Sc, 1 forming anterior and 1 forming posterior margin of cell.  $M_{1+2}$  strongly bent upward, a shining red area (bulla) present in upper basal portion of cell 2nd  $M_2$  and a large, elongate, velvety black spot covers the entire median area of cell  $R_3$  before and beyond r-m crossvein. Front femur with 2 black rings. Face with a black median spot. Large species, body 3.5 to 4.0 mm; wings, 4.25-4.75 mm. Thailand and Vietnam. ....**ampla**, n.sp.
- 4 (2). With 2 complete brown streaks through  $R_3$ , a distinct isolated streak of brown in apex of cell  $R_5$ . Cell Sc hyaline except for narrow brown streak at base (fig. 142a). Flores, Balabac Island, Malaya, Thailand. ....**multilineata** Hering  
With only 1 streak through  $R_3$ , only a faint streak at apex of  $R_5$  and basal portion of cell Sc brown, enclosing a hyaline spot (fig. 140d). Formosa, Japan, Okinawa, India, through Southeast Asia. ....**asteria** Hendel

**Rhabdochaeta ampla** Hardy, new species Fig. 139a-b.

This is the largest species of *Rhabdochaeta* known to me. It fits in the group which has narrow black rays extending into the costal margin through cell  $R_1$ . It appears to fit closest to *venusta* de Meijere from Java (and apparently through Southeast Asia), but the body size and wing markings, venation, etc., are very different in the 2 (fig. 139b, compare with pl. 4, fig. 34). Also, *ampla* has 2 brown to black rings on each front femur, rather than having a single incomplete preapical brown marking and the face has a prominent median black spot, rather than being all yellow. The 3 black lines extending to costa through cell Sc, 1 forming the anterior and 1 forming the posterior margins of the cell, the strong upward bend of vein  $M_{1+2}$  just beyond m crossvein, and the presence of a shining red spot in the upper basal portion of cell 2nd  $M_2$ , also the large size, will readily differentiate *ampla*.

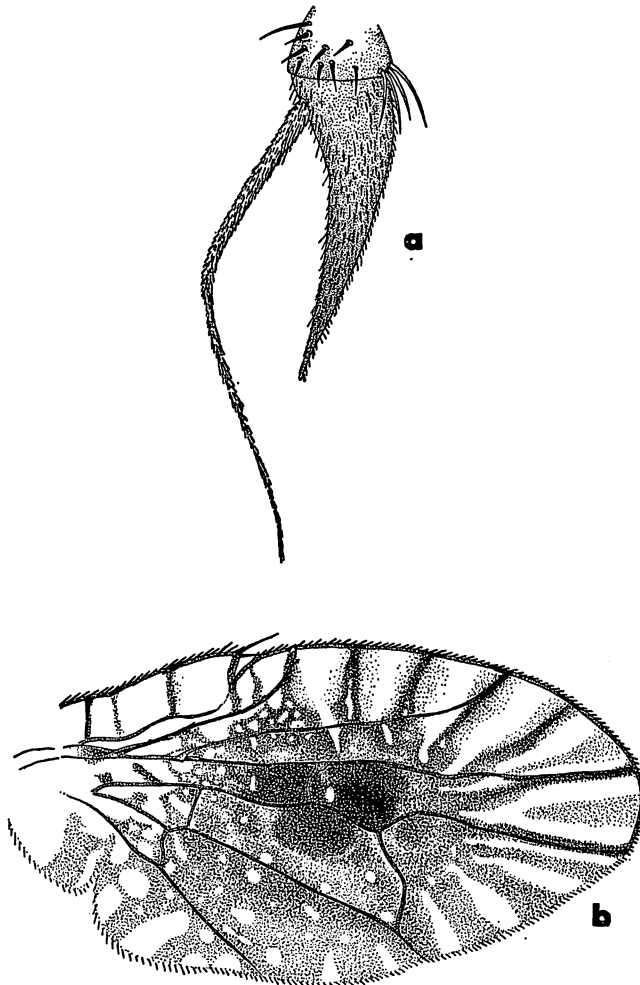


Fig. 139. *Rhabdochaeta ampla* n. sp. a. antenna; b. wing.

♂. *Head*: With the usual complement of bristles found in *Rhabdochaeta*; with the upper inferior fronto-orbitals flat, scale-like, dark in color, and with inner vertical bristles flattened on basal 1/2. Ocellar bristles white, rather flat, equal in size to post-ocellars. A prominent pair of white inter-frontal bristles directly beneath ocellar triangle, almost in line with the lower superior fronto-orbitals. Face with a carinate projection in middle immediately below antennae and with a prominent black median spot just below the projection. Also with a small brown to black spot on each side of upper face near eye margin. Antennae yellow-white, tinged with brown on dorsal surface of 3rd segment. Third segment rather elongate, terminating in a long point (fig. 139a). Genal bristle black. I see nothing distinctive about the palpi or mouthparts. *Thorax*: Dark brown to black in ground color, densely gray pollinose, completely obscuring the ground color. When the mesonotum is wet with 70% alcohol, the lateral areas behind the suture are yellow in ground color. Pleura black, densely gray pollinose, marked with yellow on humeri and notopleural calli, propleura, anterior portions of mesopleura, and posterodorsal portions of sternopleura. Scutellum yellow, tinged with brown to black dorsomedianly and with a tinge of brown on each side. Metanotum black. Halteres yellow. Only 2 pairs of dorsocentral bristles present. Scutellum with a pair of strong dark bristles, 2 pairs of white bristles, and the apical cruciate pair of strong dark setae. *Legs*: Predominantly yellow with a pair of broad black rings on each femur. Front femur with 3 black posteroventral bristles on apical 1/3 to 2/5 and 3 strong white posteroventral bristles on basal portion of segment. Middle tibia with 1 strong black apical spur. *Wings*: Marked as in fig. 139b. With the velvety black marking extending through median portion of cell  $R_5$  both before and beyond r-m crossvein. With 6 shining red areas in middle of wing; 1 at upper basal portion of cell 2nd  $M_2$ ; 1 large spot at upper median portion and 1 at base of cell 1st  $M_2$ ; an elongate spot in cell  $R_5$  beyond r-m crossvein above velvety black mark; and 2 smaller less distinct red marks in cell  $R_3$ , 1 before level with r-m crossvein and 1 beyond. Vein  $M_{1+2}$  bent upward rather sharply just beyond m crossvein. The m crossvein slightly convex, oblique in position and approximately 3× longer than apical portion of vein  $M_{4+5}$ . Cell  $R_1$  with 2 brown streaks in median portion. Cell  $R_3$  with 2 brown streaks extending to costa, the 2nd streak is pale brown, less pronounced. A faint, interrupted streak of brown is present in apex of 2nd  $M_2$ . Posterobasal portion of wing brown, with numerous hyaline spots (fig. 139b). *Abdomen*: Predominantly brown to black with a narrow yellow streak extending the entire length down middle of the dorsum and with apices of terga distinctly narrowed. The genitalia have not been dissected for study.

Length: Body and wings, 4.0-4.25 mm.

♀. Fitting description of ♂ in most respects. *Abdomen*: With prominent sublateral markings of yellow on terga 3-6, and with the 6th tergum largely yellow except for submedian brown marks. Sixth tergum equal or slightly longer than 5th. Basal segment of ovipositor brown on basal 1/2 and on extreme apex, otherwise yellow and about equal in length to abdominal terga 5+6, as seen from direct dorsal view. Measured on ventral margin the ovipositor base is 0.9 mm long. Piercer slender, curved downward as seen in lateral view, with a pair of preapical teeth, 0.8 mm long. Extended ovipositor 2.4 mm long.

Length: Body and wings, 4.5-4.75 mm.

Holotype ♂ (BISHOP 9993), S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V.-8.VI. 1961, N. R. Spencer. Allotype ♀ and 3 ♀ paratypes, same data as type. One ♂ paratype, S Vietnam: Dalat, 1500 m, 29.IV.-4.V.1960, S. Quate. One ♀ paratype, THAILAND: Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa.

Type and allotype returned to the B. P. Bishop Museum. Paratypes in the collections of the U.S. National Museum and the University of Hawaii.

### *Rhabdochaeta asteria* Hendel Fig. 140a-d.

*Rhabdochaeta asteria* Hendel, 1915, *Ann. Hist. Nat. Mus. Nat. Hung.* **13**: 462, pl. 9, fig. 18. Type-

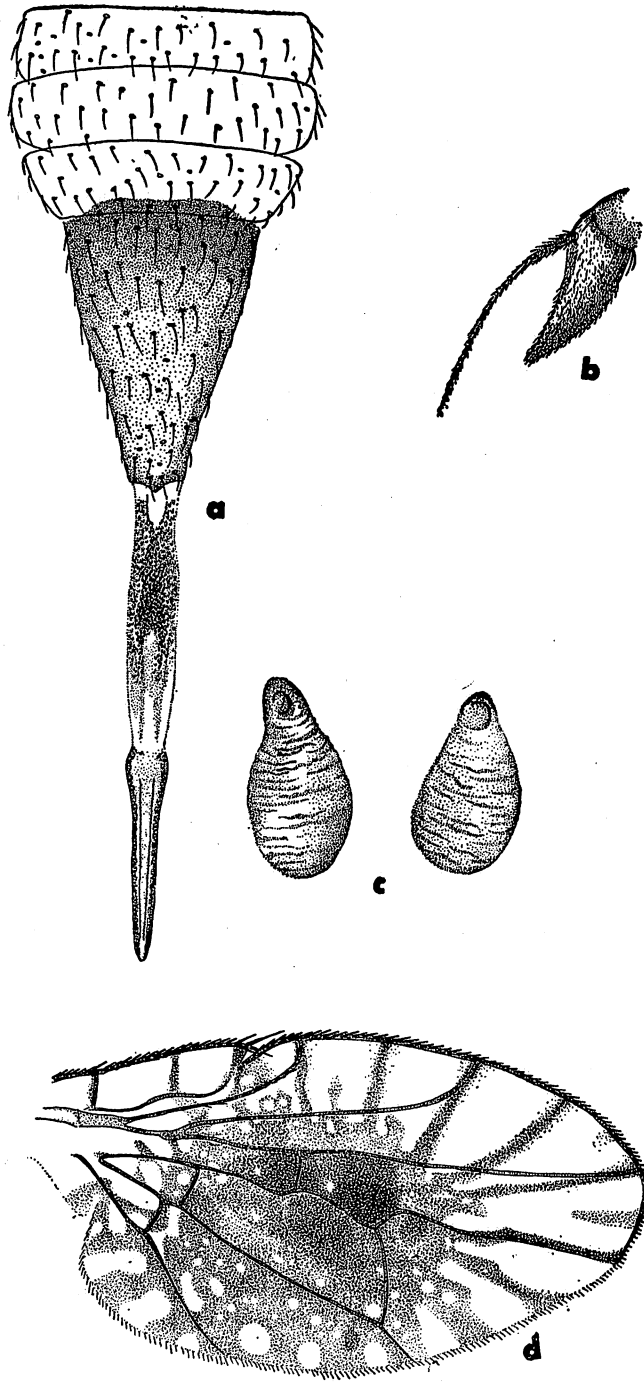


Fig. 140. *R. asteria* Hendel. a. ovipositor; b. antenna; c. ♀ spermathecae; d. wing.



locality: Formosa. Type ♂ in the Hungarian National Museum, Budapest.

A wide-spread species, it has been recorded from Formosa, Japan, and the Ryukyu Is. Specimens have been seen from INDIA: Bangalore, 13.IX.1964, "fly emerged in cage with gall on *Ellipta alba*"; THAILAND: Sathorn Road, XI.1933, W. E. S. Ladell; LAOS: Sayaboury Prov., Muong Sayaboury, 305 m, 12.VIII.1967, F. G. Howarth; and S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer.

Hosts: Hendel in the original says that the larvae live in the flower heads of *Blumea lacera* D. C. One specimen from Japan contained the label "Puppen in Infloresenz von *Wedelia chinensis*."

This species is differentiated from other Oriental *Rhabdochaeta* which have narrow dark rays into the anterior margin of the wing by having only 4 scutellar bristles; by having only 1 brown ray extending to costa in each of cells  $R_1$  and  $R_3$ ; vein  $M_{1+2}$  strongly curved upward just beyond m crossvein; 5 shining yellow-red bullae in central portion of wing; hind femur with a brown preapical band; only 4 dorsocentral bristles present; 3rd antennal segment elongate, slender, pointed at apex; and basal 1/2 of base of antennae polished black. The face is entirely yellow and has a median prominence just below antennae. For details of the antennae, wings, and ♀ ovipositor, refer to fig. 140b, 140d, and 140a. For a detailed description refer to Shiraki (1933: 486 and 1968: 93, pl. 35). Two spermathecae are present in the ♀; these are rather pear-shaped, blunt at apex, tapered basally. The apical 2/5 of basal segment of ovipositor is yellow, tinged lightly with brown. The basal segment is approximately equal in length to the last 3 abdominal segments and measured on the venter is approximately 1.0 mm. The piercer is slender, sharp pointed, about 0.7 mm long. The extended ovipositor (fig. 140a) is approximately 2.4 mm.

Length: Body, 2.4-2.7 mm; wings, 2.7-3.0 mm.

### ***Rhabdochaeta bakeri* Bezzi Fig. 141a-e.**

*Rhabdochaeta bakeri* Bezzi, 1913, *Philipp. J. Sci.* (D) **8**: 328; 1926, *Spolia Zeylanica* **13** (3): 311, fig. 1. Type-locality: Los Baños, Laguna, Philippine Islands. Lectotype ♀ in U.S. National Museum.

This species is differentiated from other *Rhabdochaeta* which have broad rays, white in the middle bordered by brown, extending through cell  $R_1$  to costa (fig. 141e) by having a strong carinate projection in middle of face just below antennae and a black median spot below the projection; 6 scutellar bristles, plus a pair of prominent apical, cruciate setae; subcostal cell with an incomplete brown streak through middle; vein  $M_{1+2}$  strongly curved upward just beyond m crossvein and with a red shining area (bulla) in cell 2nd  $M_2$  just below the curved portion of vein  $M_{1+2}$ ; and vein  $R_{2+3}$  rather long, with the 4th costal section, that section between the tips of veins  $R_1$  and  $R_{2+3}$ , approximately 1/2 longer than 5th section; also apical portion of  $M_{3+4}$  approximately 1/3 as long as m crossvein. Other details of wing markings and venation as in fig. 141e.

This is obviously very close to *pulchella* de Meijere from Java and these may be synonyms. Bezzi (1926b: 309) differentiated *pulchella* by having only 4 scutellar bristles and vein "II" ( $R_{2+3}$ ) very long, "the segment of costa between veins I and II twice as long as between veins II and III." *R. bakeri* separated by having 6 scutellars and vein "II shorter." In my photograph of the lectotype ♀ of *pulchella* it is apparent that the wing markings and venation are the same as specimens I have seen from the Philip-

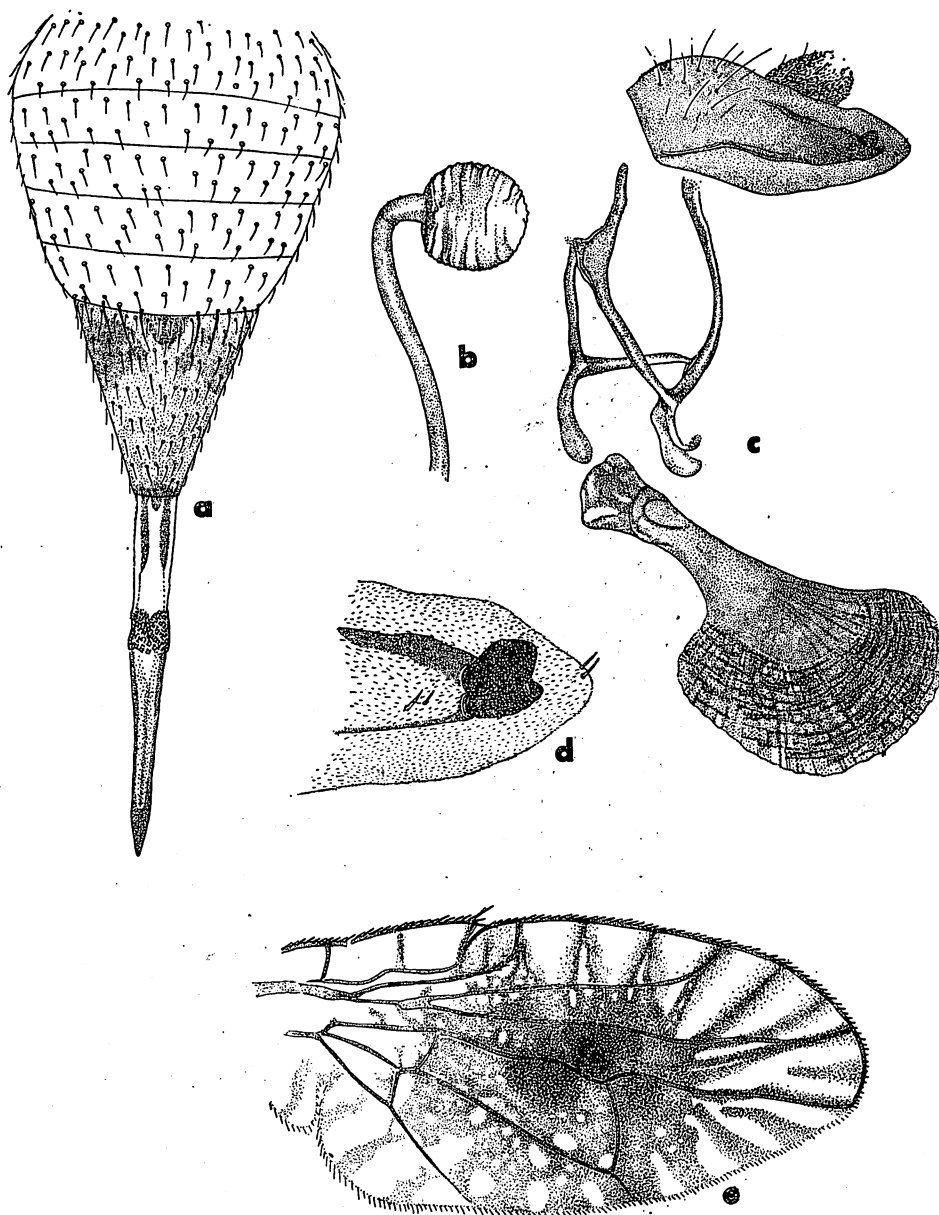


Fig. 141. *R. bakeri* Bezzi. a. ♀ abdomen; b. ♀ spermatheca; c. ♂ genitalia; d. ♂ surstylus and 10th sternum; e. wing.

pinus. My photograph does not show the median carina on the face or the median black spot which may be characteristic of *bakeri*. It will be necessary to study further material from Java. It should be noted that Bezzi's key (1926b: 310) indicates that there are dark spots present "between the fuscous rays along the fore border" of the wing.

His figure also indicates a small brown, isolated streak between the first 2 brown rays at apex of cell  $R_5$ . In the specimens I have seen from the Philippines and also the large series on hand from Thailand and Vietnam a white streak is present in each of these areas where Bezzi has indicated that it is dark.

Third antennal segment elongate, sharp-pointed at apex. Upper inferior fronto-orbital bristles flat, scale-like. Only 2 pairs of dorsocentral bristles. Mesonotum predominantly black in ground color, densely gray pollinose. Scutellum yellow, tinged with brown dorsobasally, and pleura yellow with prominent dark brown to black spots. Scutellum with 1 pair strong pale brown bristles situated medianly on sides, 1 pair of white, basolateral and 1 pair of white, apicodorsal bristles. Legs yellow with preapical band of brown on front femur and 2 bands of brown to black on middle and hind femora. Abdominal pattern somewhat variable, terga predominantly brown to black, yellow down median portion. ♂ genitalia as in fig. 141c-d. Apex of aedeagus long, slender, not enlarged. Surstyli tapered, but rounded at apices. Sixth tergum of ♀ well developed, equal in length to 5th. Basal segment of ovipositor yellow, brown laterobasally and the portion visible from direct dorsal view is just slightly longer than segments 5+6. As measured on the venter the basal segment is 0.95 mm in length. Piercer sharp-pointed, 0.8 mm long (fig. 141a). Extended ovipositor 2.4 mm (fig. 141a).

A large series of specimens on hand from the following localities: THAILAND: Pak Chong, NE of Bangkok, 100 m, 2.XII.1957, J. L. Gressitt; Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa; Chiangmai Prov., Fang, 500 m, 15.IV.1958, T. C. Maa. S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer; Dalat, 1500 m, 29.IV.-4.V.1960, S. & L. W. Quate. LAOS: Bolovens Plateau, 16 km S of Thateng, 1020 m, 22-24.VII.1960, sweeping grasses, R. E. Leech; Vientiane Prov., Ban Van Eue, 31.XII.1963, native collector.

### **Rhabdochaeta multilineata** Hering Fig. 142a-e.

*Rhabdochaeta multilineata* Hering, 1941, *Arb. Morph. Taxon. Ent. Berlin* 3(1): 44, fig. 14. Type-locality: Flores, Lesser Sunda Islands. Type ♀ in Zoological Museum, Halle am Salle, D.D.R.

Specimens are on hand from Thailand and Malaya which fit the description of *multilineata*. I have also recorded it from Balabac Island, Philippines.

This species fits in the complex which has narrow brown streaks extending to the costa along the anterior margin. It shows relationship to *asteria* Hendel but differs by having 2 brown rays through middle of cell  $R_5$  rather than 1; with a distinct isolated streak of brown in apex of cell  $R_5$ , rather than having a faint indication of a brown streak in this area; by differences in the wing pattern, for example no isolated hyaline spot in basal portion of subcostal cell, as is found in *asteria*; and with 2 small white spots in cell  $R_5$  just beyond r-m crossvein, not with 1. Also by having only 3 shining red bullae in middle of the wing, not with 5; and by having a pair of black, cruciate setae situated at apex of scutellum immediately below the pair of white apicomedian bristles (fig. 142d); these setae and also the prominent subbasal pair of white setae are not present in *asteria*. The femora are entirely yellow in *multilineata*; in *asteria* each femur has a dark preapical ring. Hering made no mention of this character. Otherwise fitting the description of *asteria*. The wing markings and venation are as in fig. 142a. Abdomen brown down the sides, broadly yellow medianly, 5th tergum brown except for apicomedian portion and narrow hind margin which are yellow. Sterna yellow. Fifth

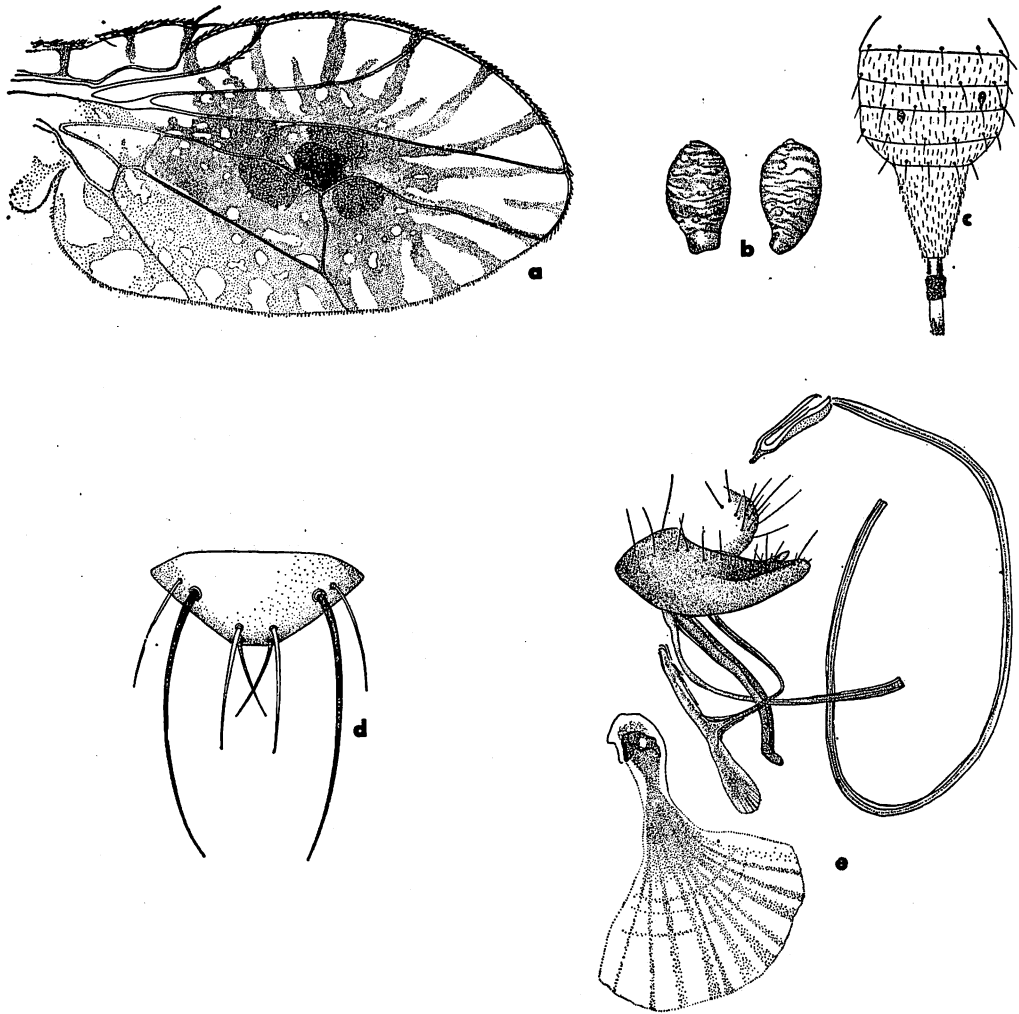


Fig. 142. *R. multilineata* Hering. a. wing; b. ♀ spermathecae; c. ovipositor; (piercer not extended); d. scutellum; e. ♂ genitalia.

sternum of ♂ about 1/2 longer than wide, hind margin straight; the sclerite is almost devoid of setae except for a few along hind margin. Surstyli rather short, gradually tapered from epandrium and subacutely pointed at apices; not completely covering apex of 10th sternum as seen from lateral view (fig. 142e). Aedeagus not expanded at apex and ejaculatory apodeme greatly expanded distally, fan-shaped. ♀ with first 2 terga brown except for extreme lateral margins. Terga 3, 4 and 5 with a brown vitta extending down each side. The 6th tergum yellow, approximately equal in length to 5th. Ovipositor yellow, as seen from above basal segment about equal to terga 4-6 (fig. 142c). Measured on the venter the basal segment is 0.8 mm. Piercer slender, sharp-pointed at apex, 0.65 mm in length. The extended ovipositor measures 2.2 mm. Two

spermathecae present; these are oblong in shape (fig. 142b).

Length: Body, 2.0 mm; wings, 2.4 mm.

The species has previously been recorded from Balabac Island, Philippines (Hardy 1970: 113). Six specimens are on hand from THAILAND: Bangkok, XI.1958, N. L. H. Krauss, and W MALAYSIA: Kuantan, Pahang, VIII.1948, ex *Wedelia biflora* flowers, N. L. H. Krauss.

**Rhabdochaeta venusta** de Meijere? or spp. complex Fig. 143a-c; pl. 4, fig. 34.

*Rhabdochaeta venusta* de Meijere, 1914, *Tijdschr. Ent.* 57: 215, pl. 6, fig. 18. Type-locality: Salatiga, Java. Type ♀ in Zoölogisch Museum, Amsterdam.

Specimens on hand from Thailand, Laos, and Vietnam fit the original description and figure of *venusta* except that the original says that the 3rd antennal segment is egg-shaped and ends in a short, sharp point. Bezzi (1926b: 310) interpreted this as "3rd antennal joint oval, ending in a short point." It should be noted that Bezzi distinguishes *venusta* by having "2nd segment of costa distinctly longer than third." I am not at all sure what he is referring to but he probably means that the 4th section of costa (that section between tips of veins  $R_1$  and  $R_{2+3}$ ) is distinctly longer than 5th (that between tips of veins  $R_{2+3}$  and  $R_{4+5}$ ). Also, Bezzi states that only 2 pairs of dorsocentrals are present. The original description made no mention of dorsocentral bristles and I suspect there are 2 weaker presutural bristles present in each dorsocentral row. The specimens on hand also fit a color photograph I made of a specimen from Java. I would certainly not, however, interpret the 3rd antennal segment as being egg-shaped with a short, sharp point. The segment is more lanceolate, swollen on venter, straight on upper side and shaped as in fig. 143c. I find considerable variation in body coloration. The abdomen varies from predominantly yellow except for a pair of submedian brown spots on last tergum to predominantly black, densely gray pollinose, with 5th tergum polished brown to black, tinged with rufous. Also, I find some variation in the development of the median carina at upper portion of face; in some specimens this is very prominent, in others it is a small carina and in 1 specimen there is no evidence of a carina present.

I suspect that this series may represent a complex of species, but most of the specimens on hand are in rather poor condition and it will be necessary to study a larger series in order to make definite decisions. One series of specimens from Pak Sae, Sedone Prov., Laos, and Dai Lanh, N of Nha Trang, Vietnam, are distinctly smaller than the other specimens, but the morphological characters appear to be the same. One ♀ specimen on hand from Dalat, Vietnam, obviously represents a different species since the basal segment of the ovipositor is at least 2 × as long and much stouter than in any of the others in this series.

This species (complex?) belongs in the group characterized by having narrow black rays entering the costa in cell  $R_1$ ; by having subcostal cell hyaline except for a faint yellowish tinge in basal portion; having 2 streaks of brown through middle of cell  $R_1$  and 2 through middle of  $R_2$ ; vein  $M_{1+2}$  only slightly curved upward beyond m crossvein and cell 2nd M lacking a red shining spot in upper basal portion. Antennae and wings as in fig. 143c and pl. 4, fig. 34. Thorax mostly black, in some specimens with posteromedian portion of mesonotum yellow. Basal segment of ovipositor approximately equal to terga 4-6, as seen from dorsal view. Base of ovipositor predominantly yellow, tinged with brown at base and extreme apex; measured on ventral margin it is 1.1 mm in length. Piercer slender, curved downward as seen in lateral view and with a pair

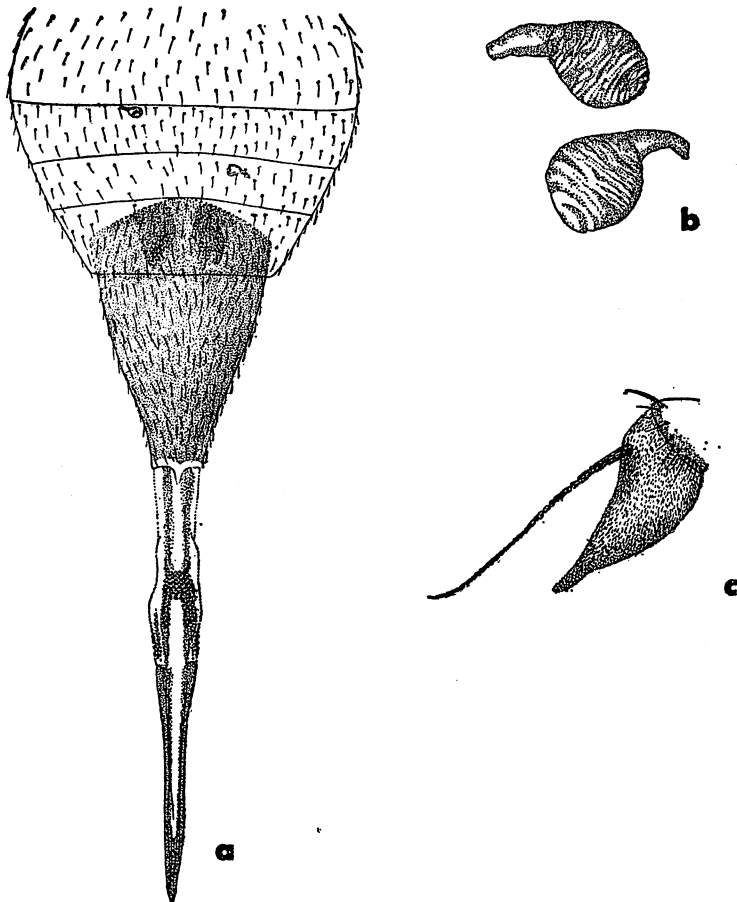


Fig. 143. *R. venusta* de Meijere. a. ovipositor; b. ♀ spermathecae; c. antenna.

of tiny preapical teeth as seen in dorsal and ventral views, 0.9 mm in length. Extended ovipositor (fig. 143a), 2.9 mm. Two prominent spermathecae present; these are oval with short, thick necks (fig. 143b).

Length: Specimens on hand vary from 2.0-3.0 mm for the body length.

Fifteen specimens are on hand from the following localities: THAILAND: Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa. S VIETNAM: Dalat, 1500 m, 29.IV.-4.V.1960, L. W. Quate; Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer; Dai Lanh, N of Nha Trang, 30.XI.-5.XII.1960, C. M. Yoshimoto. LAOS: Sedone Prov., Pakse, 14.V.1965, P. D. Ashlock.

#### SUBFAMILY TEPHRITINAE

As used here this subfamily is differentiated by having the occipital row of bristles or strong setae flattened, rather scale-like, yellow-white or white; postocellar, outer vertical and upper fronto-orbital bristles (if present) white or yellow-white; mesonotum

densely covered with flat, scale-like, white or yellow-white recumbent setae, except in *Indaciura* Hering; 6th tergum of ♀ almost without exception longer than 5th; apex of cubital cell acutely pointed, to short lobate, but not extended into a prominent apical lobe; vertical suture over mesonotum rudimentary or lacking, not plainly marked; arista short pubescent or bare; and wings variously marked.

I am arranging the Oriental genera into 4 tribes.

#### KEY TO TRIBES AND GENERA OF ORIENTAL TEPHRITINAE

1. Body shining black, rather lightly gray pollinose, especially on abdomen, usually not obscuring the ground color except on thorax of *Spathulina* Rondani. Wings dark brown with large hyaline wedges from anterior and posterior margins but few hyaline spots in the middle of wing. Tephrellini. ....13  
Not as above, abdomen densely pollinose, wings differently marked (fig. 146d, 157a, 159b). ....2
- 2 (1). Bases of antennae very close together, 3rd antennal segment not concave on upper surface and not pointed at apex. Vertical plates normal, superior fronto-orbital bristles confined to upper portion of front. Tephritini and Platensini. ....3  
Bases of antennae distinctly separated, 3rd segment short, concave on dorsum and pointed at apex (fig. 144a). Vertical plates long, extending to at least middle of front; lower superior fronto-orbitals situated about opposite upper inferior fronto-orbitals (fig. 144a). Ditrichini ..... **Dictyotrypeta** Hendel
- 3 (2). Four scutellar bristles. ....4  
Two scutellar bristles. ....11
- 4 (3). Thorax entirely yellow with 8 shining black spots on mesonotum. Wing with a broad brownish yellow costal band extending to below apex of vein  $M_{1+2}$  and with vein  $R_{4+5}$  bent downward at apex narrowing cell  $R_5$  (pl. 5, fig. 48). Tephritini, in part. .... **Craspedoxantha** Bezzi  
Not as above. ....5
- 5 (4). Wings either very broad, less than  $2\times$  longer than wide, nearly all brown with rather few hyaline spots (fig. 146d); or long and narrow, straight-sided, brown anteriorly and hyaline along posterior margin (fig. 157a). ....6  
Wings normal in shape, with numerous hyaline spots (pl. 6, fig. 56). Tephritini. ....7
- 6 (5). Wings long and narrow, nearly parallel-sided and almost  $3\times$  longer than wide. Marked as in fig. 157a. Tephritini, in part. .... **Elaphromyia** Bigot  
Wings very broad, less than  $2\times$  longer than wide, broadest at level of m crossvein; extreme apex white (fig. 146d).  $R_{4+5}$  setose over most of its length and with white spots on costa and a few over the wing. Platensini. .... **Platensina** Enderlein
- 7 (5). Proboscis short, thick; not long, slender and geniculate. ....8  
Proboscis slender, geniculate, labellum nearly equal to length of lower margin of head (fig. 156c). Wings as in pl. 5, fig. 49, 50. ....15
- 8 (7). Vein  $R_{4-5}$  bare except for 1-2 setae at base, wings as in pl. 5, fig. 47 and pl. 6, fig. 54. ....9  
Vein  $R_{4+5}$  setose to level of m crossvein. Wing brown with numerous small hyaline spots over field and small hyaline wedges all around margin (pl. 6, fig. 57). Three pairs of inferior fronto-orbitals. Arista short pubescent. Dorsocentral bristles approximately in line with supraalar. .... **Xyphosia** Robineau-Desvoidy
- 9 (8). Two pairs inferior fronto-orbitals. Wings extensively brown with hyaline spots (pl. 6, fig. 54). Third antennal segment rounded at apex. ....10  
Three pairs inferior fronto-orbitals. Wings hyaline with indistinct brown markings

- (pl. 5, fig. 47). Third antennal segment pointed at apex. .... **Acanthiophilus** Becker
- 10 (9). Apical scutellars large, equal in size to basal bristles. Anterior dorsocentral bristles situated distinctly before suture. ♂ aedeagus with a dense patch of dorsal setae before apex. .... **Scedella** Munro
- Apical scutellars about 1/2 as long as basal bristles. Anterior dorsocentrals situated on suture. Wing markings as in pl. 6, fig. 54. Usually with an apical fork in the markings. ♂ aedeagus bare before apex. (Note the scutellar bristle character has not been checked throughout the genus and may not be a constant character.) ..... **Tephritis** Latreille
- 11 (3). Proboscis short, stout; labella fleshy, much shorter than head. .... 12
- Proboscis slender, geniculate; labella slender, equal in length to lower margin of head (fig. 156c). Wings hyaline, with numerous, somewhat diffused brown spots (fig. 156a). Tephritini, in part. .... **Dioxyna** Frey
- 12 (11). Wings very broad, about 2× longer than wide, brown with rather few hyaline spots (pl. 5, fig. 45). Platensinini, in part. .... **Platensina zodiacalis** (Bezzi)
- Wings normal, 3× longer than wide, typically basal 2/3 hyaline and with a stellate pattern of brown in apical 1/3 to 2/5 of wing (fig. 164a), or with at least basal portion hyaline (fig. 163a). Tephritini, in part. .... **Trupanea** Schrank
- 13 (1). Wings with 2 hyaline wedges in middle of anterior margin and 3 in middle of posterior margin. Base of wing brown at least along costal margin (pl. 5, fig. 46), apex entirely brown. .... 14
- Wing with base and apex hyaline, with 3 hyaline marks in cell R<sub>1</sub> and 5 along posterior margin (fig. 153a). Only 2 scutellar bristles; epistoma prominent, protruded as seen in lateral view. .... **Spathulina** Rondani
- 14 (13). Four scutellar bristles. Mesonotum covered with recumbent, pale, scale-like setae. Base of wing hyaline except for a narrow brown band along costa. No isolated hyaline spots in middle of wing (pl. 5, fig. 46). Cubital cell with a short pointed apical lobe. Sixth tergum of ♀ equal or slightly longer than 5th. .... **Isoconia** Munro
- Two scutellars. Mesonotum lacking pale scale-like setae. Base of wing dark brown, except for a hyaline mark in 2nd costal cell. Two isolated hyaline spots in middle of wing (pl. 6, fig. 51). Cubital cell not pointed at apex, 6th tergum of ♀ shorter than 5th. .... **Indaciura** Hering
- 15 (7). Wings conspicuously marked with brown (pl. 5, fig. 49 and pl. 6, fig. 56). Head as high as long. Two pairs superior fronto-orbital bristles. .... 16
- Wings nearly clear, only faint tinges of brown. Head distinctly longer than high. Only 1 pair superior fronto-orbitals. (probably occurs in Thailand). .... **Ensina** Robineau-Desvoidy
- 16 (15). Front bare in middle. Lacking ventral bristles on hind femora. Wings brown with numerous white spots and no continuous brown or hyaline bands across wing and with 3 hyaline spots in cell R (pl. 6, fig. 56). Dorsocentral bristles at or near suture. .... **Stylia** Robineau-Desvoidy
- Front with numerous scale-like hairs in middle. With 2-4 anteroventral bristles before apex of hind femur. Wings with a continuous brown band through area occupied by r-m and m crossveins and a complete hyaline band just beyond (pl. 5, fig. 49). Dorsocentrals approximately in line with supraalars. .... **Sphenella** Robineau-Desvoidy

## Tribe DITRICHINI

Members of this tribe are characterized by having the vertical plates well developed, extending 1/2 the length of front; by having the 3rd antennal segment concave on upper



margin, pointed at upper apex (fig. 144a); and bases of antennae distinctly separated, rather than fitting very closely together at bases.

This tribe has been previously recorded only from the Palaearctic Region except for 1 species from Peru and 1 from India. It presently consists of 16 species arranged in 5 genera and 2 subgenera as follow: *Ditricha* Rondani, 3 species; *Noeeta* Robineau-Desvoidy, 3 species; *Noeeta* (*Paranoeeta*) Shiraki, 1 species; *Noeeta* (*Pseudonoeeta*) Hering, 3 species; *Paracanthella* Hendel, 2 species; *Paracarphotricha* Hendel, 2 species; and *Dictyotrypeta* Hendel, 2 species. One species on hand from Thailand belongs to the latter genus.

### Genus *Dictyotrypeta* Hendel

*Dictyotrypeta* Hendel, 1914, *Abh. Ber. Zool. Anthr.-Ethn. Mus. Dresden*, 1912, **14**(3): 49; 1914, *Wien. Ent. Zeit.* **33**: 93. Type-species: *syssema* Hendel, from Peru; by original designation.

This genus is similar in many respects to *Paracarphotricha* Hendel from the mountains of Austria, Switzerland and in Siberia, by having the proboscis short, not elongated; by having 3 pairs of inferior fronto-orbital bristles, 2 brown to black and 1 white, flattened. It differs by having the vertical plates extending well beyond middle of front, measured on middle line, with anterior superior fronto-orbitals almost opposite upper inferior fronto-orbitals, rather than with anterior superior fronto-orbitals situated distinctly above upper inferior fronto-orbitals; by having numerous black bristles in occipital row and few white bristles, rather than the orbital row being made up largely of white bristles; scutellum subshining only around posterior margin, densely gray to yellow-gray pollinose, not polished; front straight-sided, not narrowed anteriorly; wings very broad, scarcely over 1/3 longer than wide, *Platensina*-like in shape (fig. 146d), and densely covered with tiny white spots over the field, rather than wings approximately 2× longer than wide and with fewer and larger hyaline spots in the field. Cubital cell with a well developed, sharp-pointed apical lobe (pl. 4, fig. 35), rather than cubital cell being without an apical lobe; and vein R<sub>4+5</sub> setose to about opposite the apex of vein R<sub>2+3</sub>, rather than setose only to about r-m crossvein.

Besides the type, there is only 1 other known species, *D. longiseta* Hering, previously known only from India; this also occurs in Thailand.

#### *Dictyotrypeta longiseta* Hering Fig. 144a-d; pl. 4, fig. 35.

*Dictyotrypeta longiseta* Hering, 1939, *Verh. VII Intern. Kongr. Ent.* Berlin, 1938 **1**: 190, fig. 26.

Type-locality: Trichinopoly, S. India. Type in Museum National d'Histoire Naturelle, Paris. I have studied the type ♂.

This is the only species of this tribe known to me outside of the Palaearctic Region. It is readily differentiated by the tribal and generic characters given above.

♂. Head approximately as long as high with the front almost horizontal and the antennae situated at a level with upper margins of compound eyes, as seen in direct lateral view (fig. 144a). Face rather strongly concave with epistomal margin projecting. Three pairs inferior fronto-orbital bristles present, the lower pair white, flattened, about 3/5 as long as 2nd bristle; upper 2 pairs of inferior fronto-orbitals brown, tinged with yellow. Front yellow in ground color densely yellow to gray pollinose, distinctly broader than long, measured from median ocellars to anteromedian margin of front and with frontal suture strongly concave, extending posteriorly to a level slightly

beyond median inferior fronto-orbital bristles. Vertical plates, containing the superior fronto-orbitals, extending  $1/2$  the length of front measured on lateral margins and  $2/3$  the length measured on median margin, with anterior superior fronto-orbitals situated just slightly behind upper inferior fronto-orbitals (fig. 144a). Ocellar bristles strong, brownish yellow, equal in size to upper superior fronto-orbitals. Postocellar bristles, outer verticals, and upper occipitals white, flattened. Occipital row of bristles short, black, flattened with only 2 or 3 white scale-like bristles intermixed on sides, the latter are about  $2\times$  longer and stronger than the black bristles. Genal bristles black. Face yellow except for a black mark on lower median margin, a black, rather indistinct mark on each side of middle margin, and with a prominent black spot on upper lateral margins slightly below level with antennae. Genae, each with a prominent black spot near upper portion. Also a black mark is present on each side of frontal lunule above each antenna base. Antennae mostly yellow, tinged with brown on margins of 2nd segment and dark brown to black on posterobasal surface of 3rd segment. Third segment short, scarcely  $1/2$  longer than wide and about equal in length to the first 2, broadly rounded on ventral margin, concave dorsally, and terminating in a blunt point at upper apex. Entire 3rd segment densely pale pilose. First antennal segment with pale, flat setae around apical margin; 2nd with short, black setae over dorsal surface. Arista yellow on the basal  $1/3$ , black apically and densely pubescent. Palpus yellow except for a brown to black preapical spot on outside surface, rather thickly covered with short, black setae around apex. Mouthparts

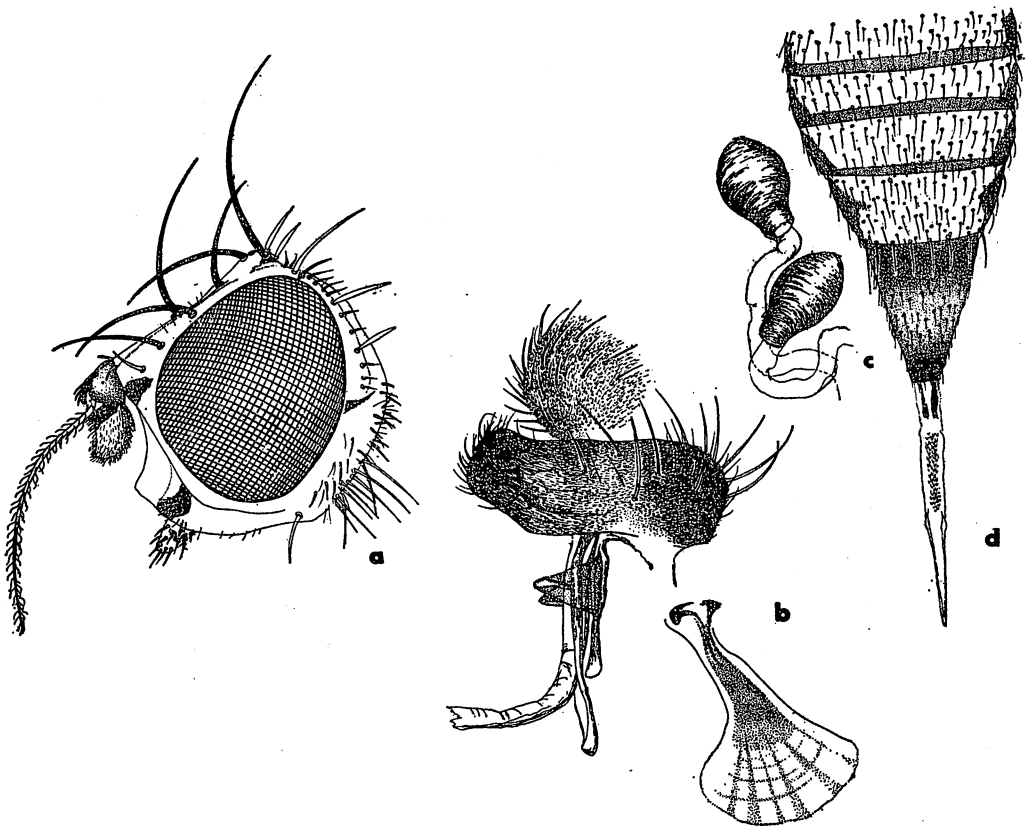


Fig. 144. *Dictyotrypeta longiseta* Hering. a. head; b. ♂ genitalia; c. ♀ spermathecae; d. ♀ abdomen.

yellow to rufous. Labella thick and fleshy, densely pale pilose. Thorax shining brown to black in ground color of dorsum, yellow-brown in ground color on pleura; densely gray pollinose and with 5 indistinct brown vittae extending down mesonotum. Mesonotum with rather scattered, flat, recumbent yellow-white setae; yellow setae abundant on pleura. Scutellum shining brown in ground color of disc, yellow around margins and densely yellow-gray pollinose, obscuring the ground color except on posteromedian and lateral portions. Dorsocentral bristles situated just slightly behind suture. Halteres yellow except for a preapical brown mark on knobs. Legs mostly yellow with 3 brown to black marks on ventral surface of each of middle and hind femora. Front femur with brownish yellow posteroventral bristles. Middle tibia with 1 strong, dark brown apical spur. Wings broadly rounded on hind margin, widest at a level with m crossvein and slightly less than 1/2 longer than wide. The wing measurements (taken from the ♀ since the ♂ wings are folded slightly in the middle — I see no evidence of sexual dimorphism) are 5.3 mm long by 3.7 mm at the widest point. With numerous hyaline marks around entire margin and an abundance of tiny hyaline spots in the field as in pl. 4, fig. 35. Two strong costal bristles present. The ♂ abdomen is colored as in ♀ with the yellow submarginal band down each side and with the median vitta extending from base to apex of 4th tergum. Sterna of ♂ yellow, each with a black spot on each lateral margin. All sterna densely gray pollinose and thickly black setose, with white bristles along posterior margins especially on sides. Fifth sternum about 1/3 wider than long, with a broadly V-shaped concavity in the middle of hind margin and with about 5 strong black bristles on each side of hind margin. Genitalia rufous, tinged with brown, surstyli broad and completely covering 10th sternum (fig. 144b).

Length: Body, 5.3 mm; wings, 5.2 mm.

♀. Fitting description of ♂ except that only 1 strong costal bristle is present. Dorsum of abdomen with a pair of large submedian brown spots on terga 3-5, the median portion of 6th brown, and with a prominent brown marking across dorsobasal portion. The base of ovipositor is approximately equal in length to terga 5+6 as seen from dorsal view and is thickly covered with brown to black setae. Measured on ventral margin, the basal segment is 1.4 mm long. Piercer sharp-pointed at apex (fig. 144d), approximately 0.95 mm long. Extended ovipositor (fig. 144d) 3.25 mm. Two pear-shaped spermathecae present (fig. 144c).

Two specimens on hand from THAILAND: Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa.

#### Tribe PLATENSININI

As used in this study this tribe includes those Tephritinae which have very broad rounded wings, which are predominantly dark brown with prominent white spots (fig. 146d, 149b); vein  $R_{4+5}$  setose above over most of its length; also the front of the head is broadly rounded, not angulate at bases of antennae.

Only the genus *Platensina* Enderlein occurs in this region.

#### Genus *Platensina* Enderlein

*Platensina* Enderlein, 1911, *Zool. Jahrb. (Syst.)* **31**: 454. Type-species: *sumbana* Enderlein, by original designation.

*Tephrostola* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 153. Type-species: *Trypeta acrostacta* Wiedemann, by original designation.

This genus is readily differentiated from other Tephritinae by the very broad rounded wings, approximately 2× longer than wide and broadest at a level with m crossvein; and by having vein  $R_{4+5}$  setose over most of its length. Three pairs of inferior fronto-orbital bristles and 2 pairs of superior fronto-orbitals are present and the scutellars may

vary from 2 to 4 according to the species. The wing markings are distinctive as in fig. 146d and 149b; in all known species the apex of cell  $R_5$  is hyaline; hyaline marks are present along wing margin, and a few hyaline spots are present in the field. Two strong costal bristles present. The cubital cell is acutely pointed at apex; the lobe, however, is very short (fig. 146d). Arista moderately long pubescent. The longest rays are approximately equal in length to the short setae over 2nd antennal segment. Sides of epistoma practically bare. Two spermathecae present in ♀; these are elongate and typically spiny.

Approximately 17 species have been named from the Oriental region and New Guinea and 6 species are known from Africa. Seven species are present in the area studied.

#### KEY TO PLATENSINA KNOWN FROM THAILAND AND ADJOINING COUNTRIES

1. Four scutellar bristles present.....2  
Only the 2 basal scutellars present. Wing as shown by Bezzi (1913 fig. 65, pl. 10).  
India, Pakistan, Nepal, Ceylon, Malaysia, Cambodia, Laos and Thailand. ....  
.....**zodiacalis** (Bezzi)
- 2 (1). Face yellow and at least a hyaline spot present in apical portion of cell  $R_3$ . .....3  
Face and genae of ♂ black; face silvery white pollinose on lower 1/2. No hyaline spots in apical portions of cells  $R_1$  or  $R_3$ . ♀ face yellow. India, Pakistan, Ceylon, Thailand and Cambodia. ....**acrostacta** (Wiedemann)
- 3 (2). Hyaline marks in base of cell  $R_1$ , beyond apex of vein  $R_1$ , extending across cell into upper portion of cell  $R_3$  (fig. 149b). .....4  
Cell  $R_1$  with only small hyaline spots confined to margin and not filling cell (pl. 5, fig. 44). India and Vietnam. ....**tetrica** (Hering)
- 4 (3). With conspicuous white spots in middle of wing, 4th costal section nearly  $3 \times$  5th. ....5  
Wings lacking white spots except on margin (pl. 5, fig. 42), sometimes with small, inconspicuous, pale fuscous spots in the field which are slightly paler than the remainder of wing membrane. Fourth costal section about  $2 \times$  longer than 5th. Lesser Sunda Islands, Burma and Thailand. ....**euryptera** (Bezzi)
- 5 (4). Hyaline marks in basal  $R_1$  wedge-shaped or narrow streaks, not occupying more than basal 1/2 of cell beyond vein  $R_1$ . Cell  $M_4$  with 2 hyaline streaks from margin (pl. 5, fig. 43), or with only small, round spots on margin as in fig. 146d. Face rufous, not silvery pollinose. ....6  
Wings with 2 large quadrate spots filling basal 2/3 of cell  $R_1$  beyond vein  $R_1$  and with 3 large hyaline marks extending across all of cell  $M_4$  to vein  $M_{3+4}$ . Face silvery pollinose on sides, lower lateral margins and on upper 1/2. Thailand and Vietnam. ....**quadrula**, n. sp.
- 6 (5). Wings very broad and rounded, about 1/3 longer than wide; measuring 5.7 by 3.4 divisions on my micrometer. With 2 hyaline spots on margin in cell 2nd  $M_2$ , and 3 small hyaline spots on margin in  $M_4$  (fig. 146d). Widespread from Formosa through Micronesia, Solomon Islands, Indonesia, Malaysia, Thailand, Laos, and Vietnam. ....**amplipennis** (Walker)  
Wings about  $2 \times$  longer than wide; measuring 7 by 3.4 divisions on my micrometer. Only 1 hyaline spot on margin in cell 2nd  $M_2$  and 2 hyaline streaks from margin extending across most of cell  $M_4$  (pl. 5, fig. 43). Thailand and Vietnam. ....**intacta**, n. sp.

**Platensina acrostacta** (Wiedemann) Fig. 145a-d.

*Trypeta acrostacta* Wiedemann, 1824, *Anal. Ent.* p. 54. Type-locality: India. Lectotype ♂ in Universitetets Zoologiske Museum, Copenhagen.

*Ensina guttata* Macquart, 1843, *Mem. Soc. Lille*, 1842: 387, pl. 31, fig. 10. Type-locality: Coromandel. Type in Museum National d'Histoire Naturelle, Paris.

*Tephrostola acrostacta* (Wiedemann), Bezzi, 1913, *Mem. Ind. Mus.* 3: 153.

*Platensina acrostacta* (Wiedemann), Munro, 1938, *Rec. Ind. Mus.* 40: 36.

This species is common throughout India, Pakistan and Ceylon.

Because of the wing markings, it fits nearest to *fulvifacies* Hering from Indonesia, and to *apicalis* Hering from Formosa. It is differentiated by the all-black face of the ♂ with the lower 1/2 densely gray to silvery white pubescent and by the velvety black genae; also, by the all-yellow face of the ♀. It is very probable that *Platensina apicalis* Hendel from Formosa is a synonym of *acrostacta*. This is known only from the type ♀, and supposedly differs from *acrostacta* by having only 1 hyaline spot in cell 1st M<sub>2</sub>, rather than 2. I have 1 ♂ specimen on hand from Thailand which is like this but fits *acrostacta* in all other regards, and I doubt that this is a constant character. It will be necessary to study further material from Formosa.

♂. Head shaped as in fig. 145a. With the frontal and ocellar bristles brownish yellow. Ocellars strong, approximately equal to lower superior fronto-orbitals. The other head bristles are white. Third antennal segment predominantly dark brown in ground color. Face, black, lower 1/2 densely silvery gray pollinose; this pollen also extends as a narrow line along eye margin at each side of face. Genae velvety black. Thorax mostly black in ground color, densely covered with gray pollen, humeri and sides of mesonotum, also sides and venter of scutellum, yellow in ground color. Pleura yellow, tinged with brown and densely gray pollinose. Halteres pale yellow. Legs entirely yellow. Wings lacking a hyaline spot in apical portion of cell R<sub>1</sub> and usually with 2 hyaline spots in 1st M<sub>2</sub>. Abdomen mostly black, yellow on sides of first 2 terga, with 1st tergum yellow-brown, the 2nd largely yellow with the yellow coloring continuing down the middle portion, also extending over the middle of terga 3 and 4, leaving a shining black mark covering the posterior lateral portions of each of these terga. Fifth tergum entirely shining black; some specimens may have the abdomen discolored so that the yellow markings do not show clearly. Fifth sternum approximately as wide as long, concave on posterior margin as in fig. 145c. Genitalia as in fig. 145d. Epandrium dark brown to black with surstyli not attenuated and with 10th sternum completely hidden from lateral view. The bulbular portion of the aedeagus very small compared to most Tephritidae. The ejaculatory apodeme is expanded as in fig. 145d.

♀. Showing considerably sexual dimorphism. Face and genae entirely yellow, with a faint tinge of brown on the latter. Also pleura yellow and sides of abdomen more broadly yellow. Base of ovipositor dark brown to black, equal or slightly longer than the last 3 terga, and about 1.3 mm long. Piercer as in fig. 145b. Two spermathecae; these are oblong with a moderately long, straight neck.

Length: Body and wings; 4.3-4.5 mm.

Distribution: Common throughout India, Pakistan and Ceylon.

Host: Specimens in British Museum from South India labeled "larvae causing galls on *Jussiaea*."

Five specimens are on hand from THAILAND: 2 ♀ ♀, 3 ♂ ♂, which appear to belong here: Kanchanaburi, 11.VIII.1963; Prachuabkirihan, 11.VIII.1963; Ratburi 15.VIII.1964, also 3.VI-15.VIII.1964; also Sathorn Road, 26.XI.1933, W. R. S. Ladell. The latter specimen was in the British Museum labeled *P. apicalis* Hendel and is the ♂ spoken

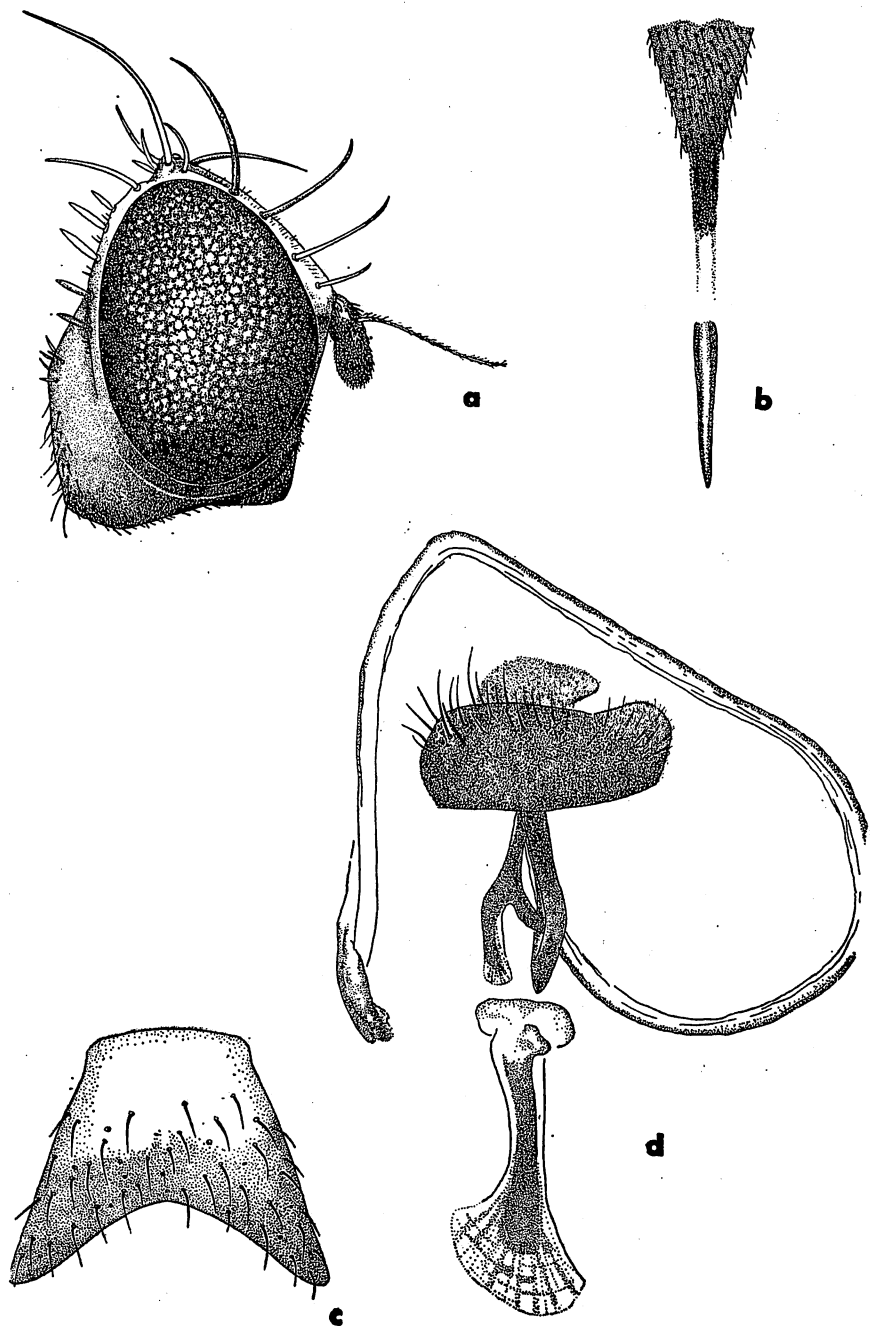


Fig. 145. *Platensina acrostacta* (Wiedemann). a. head; b. ovipositor; c. ♂ 5th sternum; d. ♂ genitalia.

of above. Also 2 specimens in British Museum from Bangkok, Phiyati, 19.IX.1928, W. R. S. Ladell and 1 from CAMBODIA: Kiri Rom, 700 m, 31.III-7.IV.1961, N. R. Spencer.

**Platensina ampliennis** (Walker) Fig. 146a-d.

*Trypeta ampliennis* Walker, 1860, *Proc. Linn. Soc. Lond.* **4**: 159. Type-locality: Celebes. Type ♀ in British Museum (Natural History).

*Platensina ampliennis* (Walker), Hardy, 1959, *Bull. Brit. Mus. (N. H.), Ent.* **8** (5): 208, pl. 15, fig. 28.

*Platensina ampliennis* (Walker), Munro, 1947, *Mem. Ent. Soc. S. Afr.* **1**: 216.

*Platensina platyptera* Hendel, 1915, *Ann. Hist. Nat. Mus. Nat. Hung.* **13**: 461, pl. 9, fig. 17. **New synonymy** based upon a study of the type. Type-locality: Formosa. Type ♀ in Hungarian National Museum, Budapest.

*Platensina malaita* Curran, 1936, *Proc. Calif. Acad. Sci.* 4th Ser. **22**(1): 29, pl. 1, fig. 1. **New synonymy** based upon Curran's original description and figures compared with specimens from several localities. Type-locality: Malaita Island, Solomons. Type ♀ in California Academy of Sciences collection. I see no way to differentiate the latter from *ampliennis*. I also see no way to differentiate *dubia* Malloch from North Queensland, but I have had no occasion to compare specimens from Australia.

In the series of specimens I have studied, the wing spotting shows considerable variation and I am not at all sure how reliable these characters are. *P. ampliennis* is differentiated from other *Platensina* by having 2 wedge-shaped marks in basal portion of cell R<sub>1</sub> extending into upper portion of cell R<sub>3</sub>, these marks are comparatively slender; by having a hyaline spot just before apex of cell R<sub>1</sub> and a spot in apex of cell R<sub>3</sub>; by having entire apex of cell R<sub>5</sub> hyaline and a prominent hyaline spot in cell R<sub>5</sub> beyond r-m crossvein and often with a small hyaline spot in cell R<sub>5</sub> before r-m crossvein; cell 1st M<sub>2</sub> with 2 brown hyaline spots and 2nd M<sub>2</sub> with 2 marginal spots; cell M<sub>4</sub> usually with 6 spots and anal cell with 2. The 2nd costal cell is hyaline except for a brown streak across middle and a streak near base. The subcostal cell is dark brown, usually with a small hyaline spot at base. Wing (fig. 146d) very broad, less than 2× longer than wide; the width measures 2.7 mm, the length 4.2 mm. The base of ♀ ovipositor is dark brown to black, equal in length to terga 4-6 as seen from dorsal view and approximately 0.85 mm long. The piercer is slender, sharp-pointed (fig. 146a). Two spermathecae are present; these are lightly sclerotized and elongate (fig. 146b-c).

Length: Body and wings, 4.0-4.5 mm.

Distribution: Widespread, having been recorded from Formosa, Micronesia, Indonesia, Solomon Islands, and Malaya.

Specimens are on hand from the following localities: THAILAND: Chiangmai Prov., Doi Pui, 1860 m, 2.V.1958, T. C. Maa; Trang Prov., Khaochang, Phaophappa, 200 m, 11-15.I.1964, G. A. Samuelson. LAOS: Vientiane Prov., Ban Ky Sok, 30 km N Muong Van Vieng, 900 m, 15.III.1968, F. G. Howarth; Sedone Prov., Pakse, 15.V.1965. T. D. S. Lock; Sayaboury Prov., Muong Sayaboury, 335 m, 9.XII.1967, in secondary woods, F. G. Howarth; Sayaboury Prov., Muong Phieng, 400 m, 7.VII.1967, F. G. Howarth. S VIETNAM: Fyan, 1200 m, 11.VII-9.VIII.1961, N. R. Spencer; Nha Trang, 17-26.XI.1960, C. M. Yoshimoto. W MALAYSIA: Selangor, Klang, 14.VIII.1963, on pomelo leaf, R. Kawasaki.

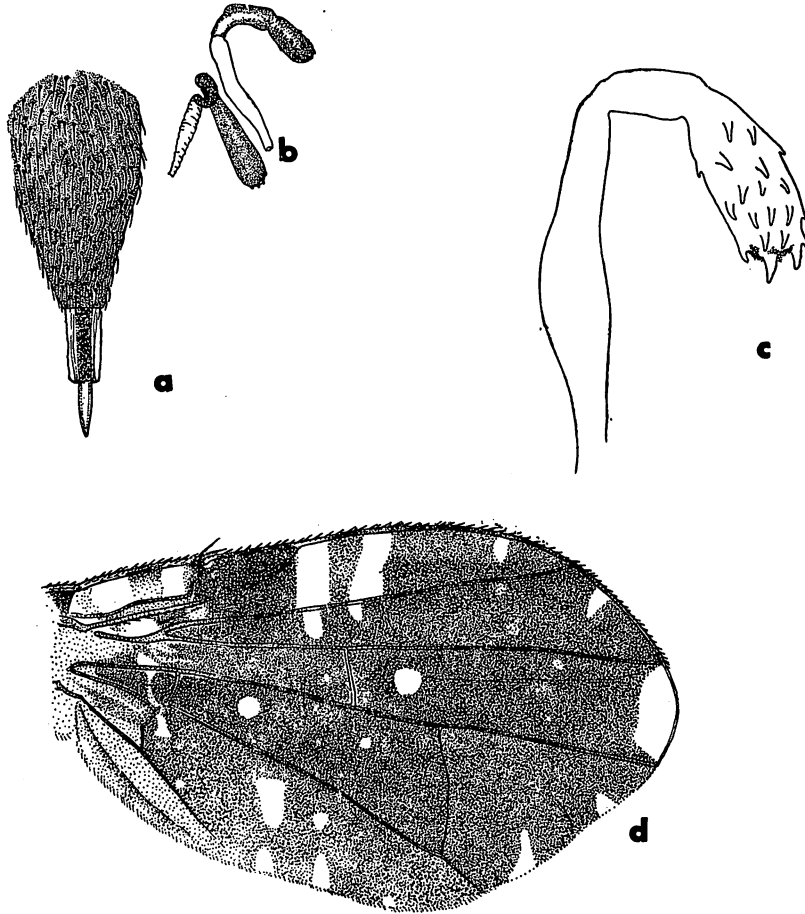


Fig. 146. *P. amplipennis* (Walker). a. ovipositor; b. ♀ spermathecae; c. ♀ spermatheca (enlarged); d. wing.

**Platensina euryptera** (Bezzi) Fig. 147a-b; pl. 5, fig. 42.

*Tephritis euryptera* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 162, pl. 10, fig. 64. Type-locality: Tenasserim, Lower Burma Type. ♀, in poor condition, in Zoological Survey of India collection.

*Platensina extincta* Hering, 1952, *Verh. Naturf. Ges. Basel* **63**: 47, fig. 4. Type-locality: East Sumba, Lesser Sunda Islands. Type ♂ in Natural History Museum, Basel. I have examined the type.

**New synonymy**, based upon study of the specimens from Burma, Thailand and Lesser Sunda Islands.

This species differs from other *Platensina* which have the face yellow, apex of cell  $R_5$  hyaline, and the hyaline marks in basal portion of cell  $R_1$  beyond apex of vein  $R_1$  extending all the way across cell (pl. 5, fig. 42); by lacking white spots on wings except on margin; and by having 4th costal section about  $2\times$  longer than 5th. The wings sometimes have small inconspicuous pale fuscous spots in the field which are slightly paler than the remainder of wing membrane, but do not have contrasting hyaline spots. The



wing markings are as in pl. 5, fig. 42. In most specimens the hyaline marks in base of cell  $R_1$  extend into upper portion of  $R_3$ . The 6th tergum of the ♀ is slightly longer than 5th. Basal segment of ovipositor subshining black and approximately equal in length to terga 4-6, as seen from dorsal view. Measured on venter, the basal segment of ovipositor is 1.5 mm long. The piercer is long and slender, gradually tapered to a sharp point at apex, lacking preapical setae (fig. 147a) and approximately 1.35 mm in length. The extended ovipositor probably measures 4.5 mm. The inversion membrane is densely spinose; it has not been extended on the specimens at hand. Two elongate spermathecae present; these are covered with microscopic, rounded projections (fig. 147b).

Length: Body, and wings average 6.0 mm. Width of wing 3.5 mm.

Five specimens on hand from the following localities in THAILAND: Chiangmai Prov., Fang, 500 m, 12.IV.1958, T. C. Maa; Chiangmai Prov., Doi Suthep, 1278 m, 29.V.- 4.VI.1958, T. C. Maa; Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa.

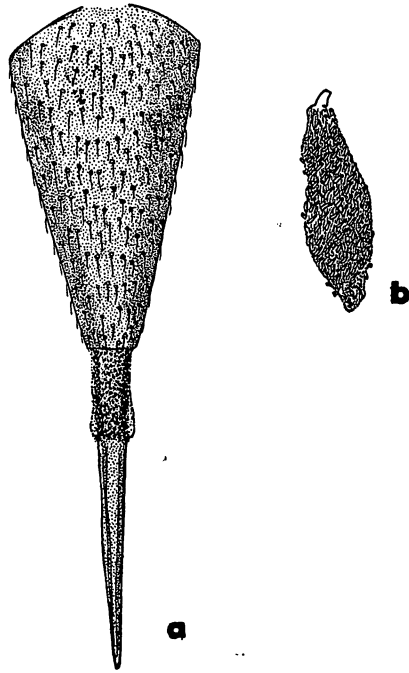


Fig. 147. *P. euraptera* (Bezzi). a. ovipositor; b. ♀ spermatheca.

**Platensina intacta** Hardy, new species Fig. 148a-d; pl. 5, fig. 43.

Fitting near *ampli pennis* (Walker) but differing by having the wings more slender, not so distinctly broadened, about 2× longer than wide, rather than approximately 1/3 longer than wide; by having only 1 hyaline spot on margin in cell 2nd  $M_2$  and with 2 hyaline streaks from margin extending across most of cell  $M_4$  (pl. 5, fig. 43), rather than with 2 hyaline spots on margin in cell 2nd  $M_2$  and 3 small hyaline spots on margin in  $M_4$  (fig. 146d).

♂. Fitting the general characteristics of members of this genus. **Head:** Front yellow, tinged with brown in ground color, paler along orbits. Three pairs inferior fronto-orbital and 2 pairs superior fronto-orbital bristles. Ocellars strong, about equal in length to the largest of the fronto-orbital bristles. Postocellars, outer verticals, and occipital bristles flat, rather scale-like and white. Palpi and antennae yellow, 2nd segment densely black setose. Third segment about 1/2 longer than wide, slightly rounded at apex. Arista short plumose. **Thorax:** Black in ground color of dorsum, yellow-brown in ground color on pleura, densely yellow-gray pollinose with faint indications of 3-5 brownish vittae on mesonotum and with mesonotum thickly covered with recumbant yellow scale-like setae. Scutellum yellow around margin, apical scutellar bristles about 1/2 to 2/5 as long as subapical pair. Dorsocentral bristles situated about 1/2 the distance between anterior supraalar and suture. **Legs:** All yellow. One strong apical spur on middle tibia. **Wings:** As noted above and as in pl. 5, fig. 43. One specimen on hand has no hyaline mark in cell 2nd  $M_2$ . **Abdomen:** Polished black, marked with yellow to rufous on the lateral margins of terga 1-3; rather thickly covered with black setae. Sterna rufous. Fifth sternum approximately as wide as long, gently concave on posterior margin and bearing about 3 black

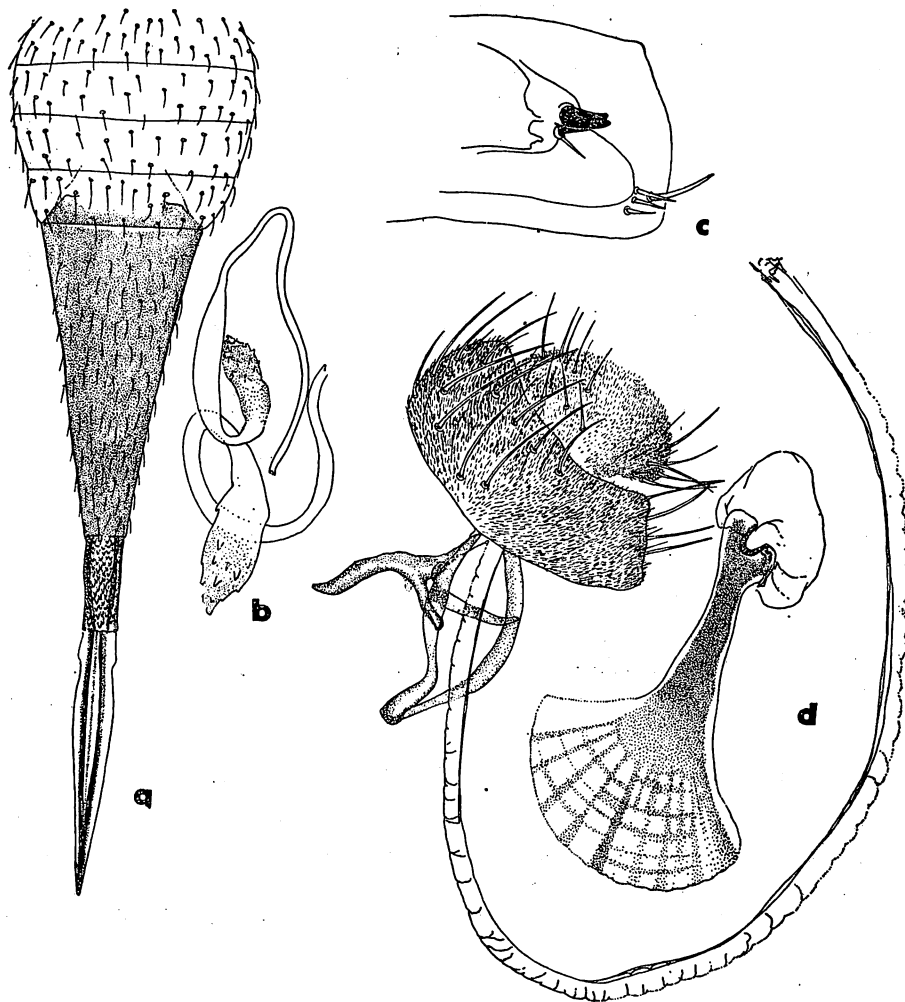


Fig. 148. *P. intacta* n. sp. a. ovipositor; b. ♀ spermathecae; c. ♂ surstylus and 10th sternum; d. ♂ genitalia.

bristles on each side of hind margin. Epandrium and surstyli yellow-brown, the latter very broad, about equal in width to epandrium and not differentiated from the latter, blunt at apex, completely covering 10th sternum as seen in lateral view (fig. 148c-d) [note, in the genitalia figure the apex of the aedeagus has been broken off].

Length: Body, 4.75-5 mm; wings, 5.0-5.4 mm.

♀. Fitting description of ♂ in most respects. Abdomen marked with yellow on sides of terga 1-4 and on basolateral margins of 5. Sixth tergum equal or slightly longer than 5th. Basal segment of ovipositor reddish brown, tinged with black; elongate, curved downward and equal in length to terga 2-6, measured on venter 4.0 mm long. Piercer long, slender, sharp-pointed (fig. 148a), about 1.75 mm long. Spermathecae elongate, pointed apically (fig. 148b).

Holotype ♂ (BISHOP 9994), THAILAND: Chiangmai Prov., Doi Suthep, 28-31.III.1958,

T. C. Maa. Allotype ♀, same locality and collector, 1278 m, 29.III.-4.V.1958. Nine paratypes, 6 ♂♂, 3 ♀♀, from the following localities: Thailand: same as type; Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa. S VIETNAM: 6 km SW Dalat, 1550 m, 11.IX.1960, J. L. Gressitt; Dilinh (Djiring), 1200 m, 22-28.IV.1960, L. W. Quate. CAMBODIA: Kiri Rom, 700 m, 31.III.-7.IV.1961, N. R. Spencer.

Type, allotype, some paratypes in B. P. Bishop Museum. Other paratypes in collections of U.S. National Museum and University of Hawaii.

**Platensina quadrula** Hardy, new species Fig. 149a-d

This species is differentiated from all other known *Platensina* by the large quadrate hyaline markings in cell  $R_1$ , in combination with other details of wing markings (fig. 149b) and markings on face.

♂. *Head*: About 1/5 higher than long, predominantly yellow, tinged with brown on upper median portion of occiput. Front very faintly tinged with brown in ground color, gray pollinose

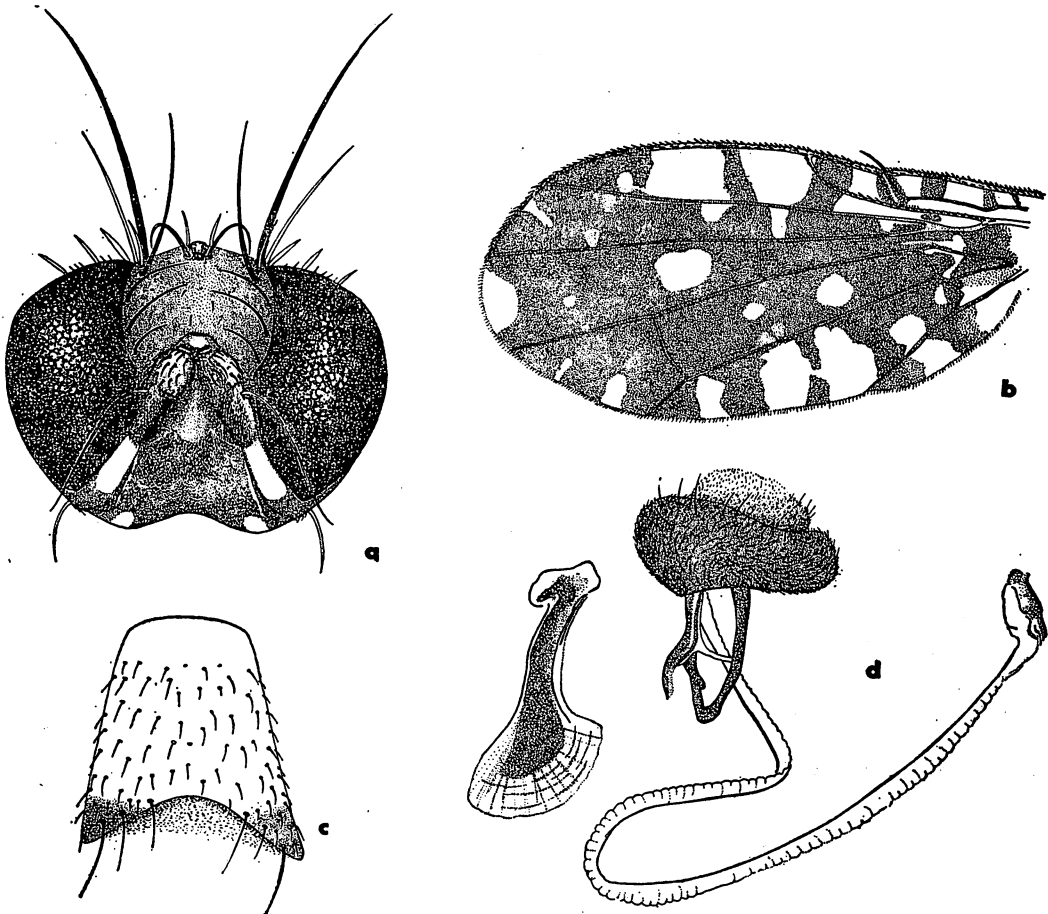


Fig. 149. *P. quadrula* n. sp. a. head; b. wing; c. ♂ 5th sternum; d. ♂ genitalia.

along orbits, golden pollinose in median portion. Lower inferior fronto-orbital and upper superior fronto-orbital bristles yellow, tinged faintly with brown, other frontal bristles, also ocellar bristles and inner vertical bristles brown. Ocellar bristles strong, equal in development to upper inferior fronto-orbitals. Face almost vertical, slightly raised down middle portion and swollen very slightly on the lower 1/2; this slightly gibbose portion is opaque orange. The upper portion of the face is yellow in background, lightly covered with silver-gray pubescence. An oblong silver spot is present on each side of face at the eye margin and another silver spot is present on each side near lower margin (fig. 149a). The sides of the oral margin, the vibrissal area, are very densely short black setose. Genal bristle well developed. Palpi long and slender, with a few scattered black setae near apical portion on posterior surface. *Thorax*: Largely brown to black in ground color, densely gray pollinose and covered with scale-like yellow setae. Humeri and propleura yellow, remainder of pleura brownish yellow. Metapleura, pleuroterga, metanotum and postscutellum black in ground color; the metanotum more thinly pollinose, subshining. Scutellum brown to black on disc, yellow on the margin and on venter. Halteres pale yellow. *Legs*: Entirely yellow. *Wings*: As in fig. 149b. The hyaline marks in cell  $R_1$  fill basal 2/3 of cell and a smaller oblong hyaline spot is present just beyond 2nd quadrate mark. The marks in  $R_1$  extend into cell  $R_3$ . Cell  $R_3$  with a small elongate hyaline spot at upper apex. Cell  $R_5$  with a large oval spot beyond r-m crossvein, occupying almost 2/3 the width of cell and with a semicircular spot occupying apex of cell. Cell 2nd  $M_2$  with only 2 hyaline marks; these are represented by streaks extending inward from margin. Cell 1st  $M_2$  has 2 prominent hyaline spots plus an indication of 1 or 2 other faint spots. Cell  $M_4$  with 4 large hyaline spots extending from margin, 3 of these completely traverse the cell. Anal cell with 2 large spots. The r-m crossvein situated at about apical 3/5 of cell 1st  $M_2$ . *Abdomen*: Shining black, yellow on the sides from the base to posterior margin of 3rd tergum, yellow-brown over 1st tergum and basal portion of 2nd and with a faint indication of a rufous vitta extending down median portion onto 3rd tergum. Bases of abdominal terga 3-4 narrowly yellow in ground color and with a faint indication of a yellow vitta extending on to 4th tergum and with a tiny yellow spot in middle of 5th at extreme base. These may be obscured unless the specimen is cleared. Fifth sternum distinctly longer than wide, concave on posterior margin (fig. 149c). Genitalia as in fig. 149d. The epandrium yellow-brown, rather thick and short, with the surstyli not attenuated and 10th sternum completely hidden from lateral view.

Length: Body and wings, 4.5-4.7mm; width of wings, 2.35 mm.

♀. Unknown.

Holotype ♂, THAILAND: Bangkhen, 5.IX.1964, no collector given. Paratypes, 1 ♂, Thailand: Phu Kae, 14.VIII.1964; 1 ♂, CAMBODIA: Kiri Rom, 700 m, 31.III.-7.IV.1961, N. R. Spencer. One ♂ specimen is on hand from S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer which apparently belongs here. It is in very poor condition and is not being designated as a paratype.

Type returned to Kasetsart University, paratypes and the S Vietnam specimen in the B. P. Bishop Museum.

**Platensina tetrica** Hering Pl. 5, fig. 44.

*Platensina tetrica* Hering, 1939, *Verh. VII Intern. Kongr. Ent.* Berlin 1938 1: 179, fig. 14. Type-locality: Trichinopoly, S India. Type ♂ in Museum National d'Histoire Naturelle, Paris. I have studied the type.

Specimens on hand from Vietnam and Malaya appear to fit here. They are differentiated from all known species of *Platensina* from Southeast Asia by having the hy-

aline marks in basal portion of cell  $R_1$  small, confined to wing margin (pl. 5, fig. 44). The specimens are slightly atypical in that cell  $R_1$  has 3 small hyaline marks on margin, rather than 2, and only 1 small hyaline spot is present in middle of cell  $M_4$ , rather than 2. Hering in his original description indicated that the sides of the abdomen are reddish. In the specimens at hand the first 2 terga are tinged with red on sides, the other terga are entirely black. The species is readily differentiated by the wing markings as shown in pl. 5, fig. 44.

Length: Of the specimens on hand, body and wings, 3.75-4.0 mm. Hering measured the type wing as 5.0 mm.

♀. Unknown.

Two ♂ specimens from S VIETNAM: Blao (Balao), 500 m, 14-21.X.1960, C. M. Yoshimoto and 1 ♂ from W MALAYSIA: Kuala Lumpur, 12.I.1936, H. M. Pendlebury.

***Platensina zodiacalis* (Bezzi)** Fig. 150a-c; pl. 5, fig. 45.

*Tephritis zodiacalis* Bezzi, 1913, *Mem. Ind. Mus.* 3: 165, pl. 10, fig. 65. Described from India. Type-locality: Calcutta. Type ♀ in Zoological Survey of India collection.

It has been recorded from a number of localities in India, Nepal, Ceylon and Malaya. Specimens are on hand from Thailand, Cambodia, and Laos.

The species is differentiated from all other known *Platensina* by having only 2

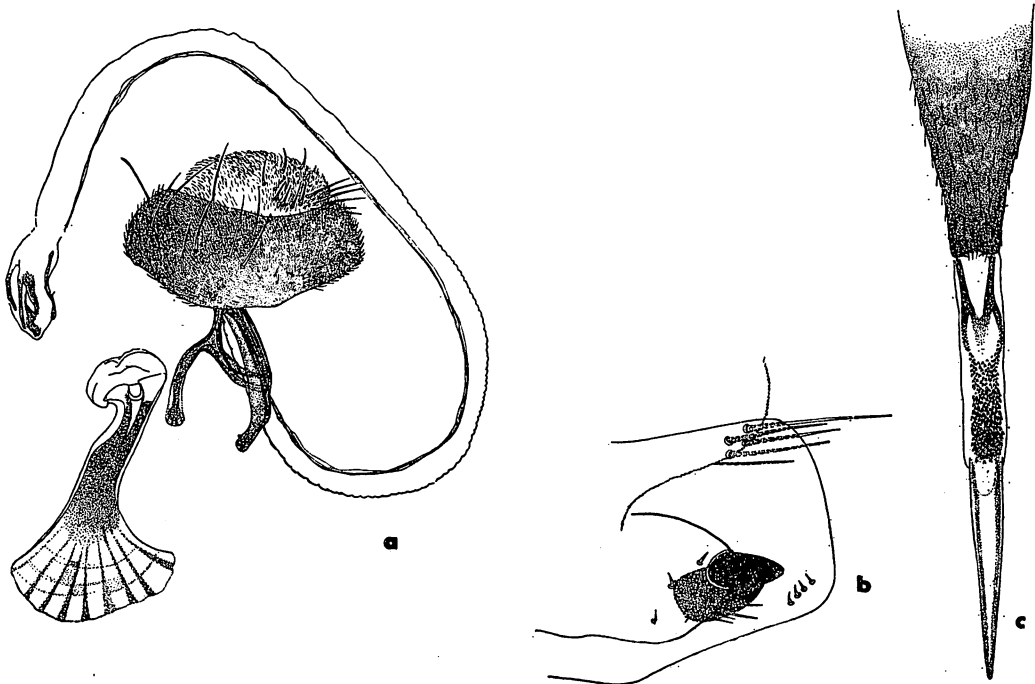


Fig. 150. *P. zodiacalis* (Bezzi). a. ♂ genitalia; b. ♂ surstylus and 10th sternum; c. ovipositor.

scutellar bristles. The specimens on hand differ slightly from Bezzi's original by lacking a hyaline spot in cell  $R_5$  before r-m crossvein; and by the spot at apex of cell  $R_5$  not filling entire cell. Cell 2nd  $M_2$  has 1 (pl. 5, fig. 45) or 2 small hyaline spots on margin in specimens at hand and lacks the small spot shown near base of cell in Bezzi's figure. I believe these are probably variable characters and it will be necessary to examine a much larger series to determine the range of variability. The wing markings (pl. 5, fig. 45) are identical or nearly so with *ampliennis* (Walker), although the wing is not so noticeably broadened as in that species, and yet it is readily differentiated by having 4 scutellar bristles rather than 2. Fifth sternum of ♂ as wide as long and rather deeply concave on posterior margin. ♂ genitalia as in fig. 150a-b with the surstyli very broad and rounded, equal in width to epandrium. Sixth tergum of ♀ about equal in length to 5th. Basal segment of ovipositor dark reddish brown, tinged with black, almost equal in length to terga 3-6 and measured on venter, 1.5 mm long. Piercer evenly tapered to apex (fig. 150c), 1.2 mm long. Extended ovipositor 3.5 mm.

Nine specimens are on hand from the following: CAMBODIA: Kiri Rom, 700 m, 31.III.-7.IV.1961, N. R. Spencer. LAOS: Dong Dok, 8.I.1966, native collector. THAILAND: Khorat Prov., Sakaerat, 300 km NE Bangkok, 300-400 m, 2.III.1968, dry dipterocarp forest, D. E. Hardy; Sathorn Road, 26.XI.1933, W. R. S. Ladell.

#### Tribe TEPHRELLINI

This tribe includes those Tephritinae which have the wings dark brown to black, with hyaline wedges on anterior and posterior margins (fig. 153a and pl. 5, fig. 46); and the thorax and abdomen shining black, in combination with having the occipital setae white, scale-like. All of the genera studied to date have 2 spermathecae in the ♀.

Hering (1947: 14) et al. placed Tephrellini under Aciurinae because of the body coloration and wing markings. On the basis of head chaetotaxy and the flat scale-like, recumbent setae on the mesonotum I prefer to treat this under Tephritinae. Because of the all-black, sharply-pointed postorbital (occipital) setae I am treating Aciurini under Trypetinae.

Three Oriental genera fit my concept of Tephrellini.

#### Genus *Indaciura* Hering

*Indaciura* Hering, 1942, *Mitt. Zool. Mus. Berl.* 25 (2): 283. Type-species: *Aciura formosae* Hendel, by original designation.

As pointed out by Hering, this genus is borderline between Trypetinae and Tephritinae. The species at hand has flat, white, occipital setae (bristles) and postocellar bristles and scapular hairs lacking, typical of Tephritinae, but lacks recumbent, gray-white setae over mesonotum and the 6th abdominal segment of the ♀ is distinctly shorter than the 5th as in Trypetinae. In the type of the genus, *formosae* (Hendel), the upper occipital setae are thin and black; these setae are flat and white in *xanthotricha* (Bezzi).

This genus, based upon the species at hand, is readily differentiated from other genera known from Southeast Asia by the all-black thorax and abdomen and flat, white postocellar and at least upper occipital setae; in combination with 3 pairs inferior fronto-orbital and 1 to 2 pairs superior

fronto-orbital bristles; lacking recumbent white, scale-like setae on the mesonotum; only 2 scutellar bristles; base of wing dark brown except for a hyaline spot in 2nd costal cell; 2 hyaline wedges on anterior margin of wing and 3 or 4 on posterior margin and 2 isolated hyaline spots in middle of the wing; and the 6th tergum of the ♀ shorter than 5th.

An Oriental genus containing 3 known species: *basivitta* Hering, S. India; *formosae* (Hendel), Formosa, Okinawa; and *xanthotricha* (Bezzi), India, Burma, Thailand, Vietnam and Java.

#### KEY TO KNOWN SPECIES OF INDACIURA

1. Base of wing dark brown except for a hyaline spot in 2nd costal cell. ....2  
Wing with a complete hyaline band across base from middle of 2nd costal cell to the alula.  
South India. ....*basivitta* Hering
2. Occipital setae (bristles) black, except for a pair of white setae on each side of upper lateral margins. Four hyaline marks on hind margin of wing (ref. fig. 1, p. 61, Shiraki 1968). Formosa, Okinawa. ....*formosae* (Hendel)  
Occipital setae flattened and white. With only 3 hyaline marks in hind margin of wing (pl. 6, fig. 51). India, Burma, Ceylon, Java, Thailand and Vietnam. ....*xanthotricha* (Bezzi)

***Indaciura xanthotricha* (Bezzi)** Fig. 151a; pl. 6, fig. 51.

*Aciura xanthotricha* Bezzi, 1913, *Mem. Ind. Mus.* 3: 151, pl.10, fig. 55. Type-locality: Dhikata., Gharwal District, W Himalayas, India. Type in Zoological Survey of India collection.

*Indaciura xanthotricha* (Bezzi), Hering, 1942, *Mitt. Zool. Mus. Berl.* 25(2): 284.

Distribution: India and Tenasserim, Lower Burma (Bezzi, loc. cit.); Ceylon (Hardy 1971: 5); Java (de Meijere 1914: 257); Thailand and Vietnam.

This species is readily recognized by the generic and key characters given above. Wings as in pl. 6, fig. 51. Basal segment of ovipositor (fig. 151a) approximately as long as remainder of abdomen, 1.4 mm long, measured on ventral margin. Piercer slender, tapered to a long thin point (fig. 151a), 1.0 mm long. Extended ovipositor about 3.7 mm. Two pear-shaped spermathecae.

Length: Body, 3.0 mm; wings, 3.2 mm.

Two specimens are on hand, 1 each from S VIETNAM: Ban Me Thuot, 500 m, 16.V.1960, S. & L. Quate and THAILAND: Trang Prov., Khaochang, Khaophappa, 200-400 m, 3.I.1964, G. A. Samuelson.

#### Genus *Isoconia* Munro

*Isoconia* Munro, 1947, *Mem. Ent. Soc. S. Afr.* 1: 100.

Type-species: *ghenti* Munro, by original designation.

According to Hering's classification (1947:

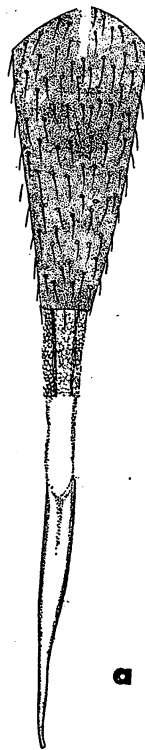


Fig. 151. *Indaciura xanthotricha* (Bezzi). a. ovipositor.

15), fitting in the subfamily Aciurinae, Tribe Aciurini. Munro (loc. cit.), in his treatment of genera fitting between Trypetinae and Tephritinae, treated this as a Trypetinae with no scapular bristles; he stated "it is not thought necessary at this stage to name tribes and subtribes and the genera have been divided into series and groups." *Isoconia* would fit in his group II with the genus *Aciura* and others. I would prefer to place this in the tribe Tephrellini under Tephritinae.

Shining black species with prominent hyaline wedges through anteromedian and posteromedian margins of wing. Munro (op. cit.: 88) diagnosed this genus as follows: "wings of peculiar shape (fig. 148-163), the costa broadly indented over stigma; argents [hyaline wedges from wing margin] strongly developed, the apical oblique stripe crossing second vein into marginal cell; dorsum of thorax and body generally lightly dusted and shining like polished steel; head oval, frontal, facial angle wide; postocular bristles brown to black and white; aedeagus (fig. 286-290) with strong sclerotization, end of seminal tube usually an apicoventral funnel."

Wings with 2 large wedge-shaped hyaline marks on anterior margin in basal 1/2 to 2/3 of cell R extending to or beyond vein  $R_{4+5}$ , and 3, rarely 2 (*bifaria* Munro from India), elongate hyaline marks on posteromedian margin of wing extending about 2/5 the distance across wing. Also, with shining silvery spots, or areas with a definite silvery sheen on the brown background, best viewed from an oblique position.

The genus contains 18 African species and 2 from India. One specimen has been recorded from Thailand by Ito (1964: 437).

Munro (1947: 100-127) has monographed this genus.

***Isoconia reinhardi* (Wiedemann) Fig. 152a-d; pl. 5, fig. 46.**

*Trypeta reinhardi* Wiedemann, 1824, *Anal. Ent.* p. 54. Type-locality: East India. Type in Universitetets Zoologiske Museum, Copenhagen. I have seen the type.

*Tephrostola reinhardi*: Bezzi, 1913, *Mem. Ind. Mus.* 3: 154.

*Isoconia reinhardi*: Munro, 1947, *Mem. Ent. Soc. S. Afr.* 1: 119, fig. 10e, 17, and 159.

*Isoconia* sp., Ito, 1964, *Nat. and Life in S. E. Asia* 3: 438, fig. 1.

This species has been recorded from India, Pakistan and Ceylon. It is also no doubt the species which Ito recorded as *Isoconia* sp. from 1 ♀, Ping Kong, Thailand. I have studied a good series of specimens from Thailand and they fit, in all respects, the redescription of *reinhardi* by Munro (loc. cit.), and with specimens in the British Museum from Ceylon and Pakistan. This species is readily differentiated from other Tephritidae known from the Oriental region by the distinctive wing markings (pl. 5, fig. 46); the all-black, gray pollinose body; the distinct indentation of the costal margin above costal cell; and by the genital characters (fig. 152a and 152c-d). It differs from the only other known Oriental species (non-African) of *Isoconia* (*bifaria* Munro from South India) by having 3 hyaline indentations along hind margin of wing rather than 2, as well as by other characteristics as pointed out by Munro (1947: 111, fig. 12, 82 and 153). Thorax and abdomen polished black in ground color, except for the rufous humeri, and rather densely gray pollinose. The species was adequately described by Munro, except for genital characters.

The 5th sternum of ♂ is expanded posteriorly; at widest point it is as wide as long, moderately concave and bearing about 10 small bristles on hind margin. ♂ genitalia dark brown, except for yellow anal plates, shaped as in fig. 152c-d with surstyli short, thick, broadly rounded at apices and completely hiding 10th sternum. Head of aedeagus not greatly enlarged, seminal tube opens at the apex. ♀ with 2 rather pear-shaped spermathecae (fig. 152b) with short, curved



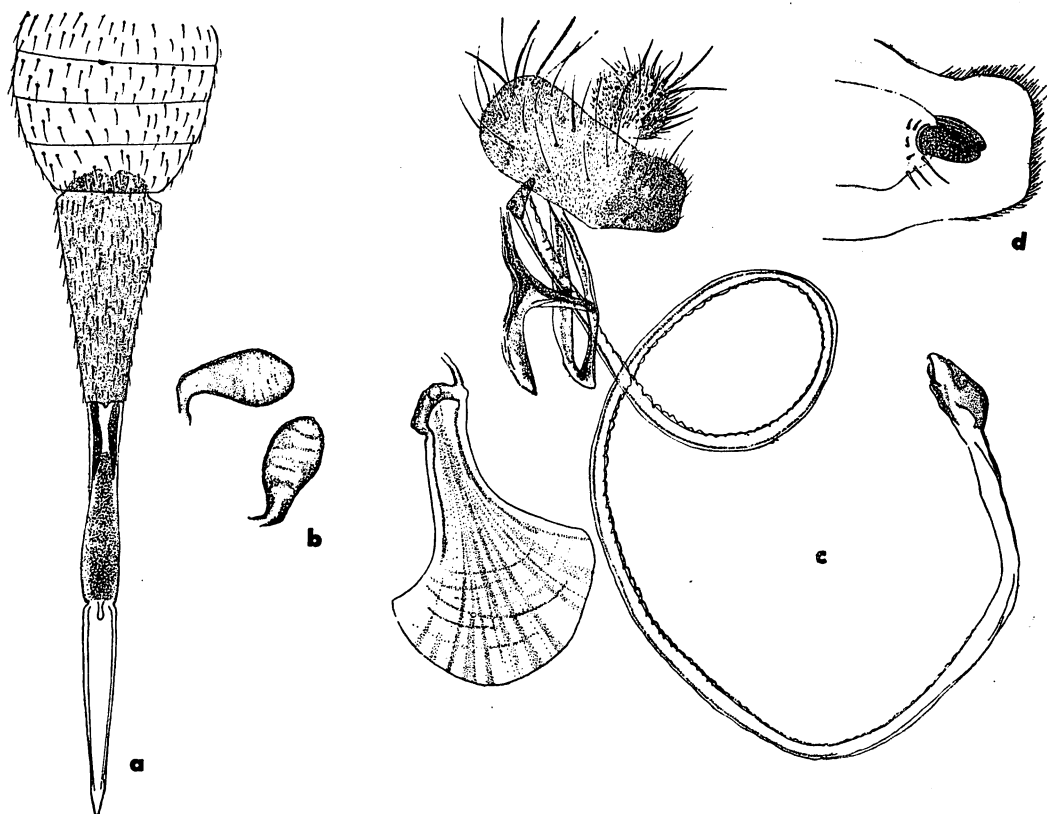


Fig. 152. *Isoconia reinhardi* (Wiedemann). a. ovipositor; b. ♀ spermathecae; c. ♂ genitalia; d. ♂ surstylus and 10th sternum.

necks. Basal segment of ovipositor subequal in length to remainder of abdomen; measured on ventral margin it is 1.7 mm. The piercer tapers to a sharp point (fig. 152a) and measures 1.4 mm in length. The extended ovipositor (fig. 152a) measures 4.5 mm.

Fourteen specimens on hand from the following localities in THAILAND: Chiang-mai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa; Chiangmai Prov., Doi Suthep, 1278-1300 m, 29.III.-4.V.1958, T. C. Maa and 8.VI.1965, P. D. Ashlock. Also 5 specimens from CAMBODIA: Kiri Rom, 700 m, 31.III.-7.IV.1961, N. R. Spencer; and 2 from BURMA: Chin Hills, Mt Victoria, 1000 m, VII.1938, G. Heinrich.

#### Genus *Spathulina* Rondani

*Spathulina* Rondani, 1856, *Dipt. Ital. Prodr.* 1: 113. Type-species: *sicula* Rondani (nom. nud.), by original designation. The type species was not described by Rondani until 1871. It has been treated as a synonym of *Tephritis tristis* Loew by Hendel (1927: 117).

On the basis of the flattened scale-like, white, postocular setae, lack of vertical suture separating mesopleuron, and the elongate 6th tergum of the ♀, I prefer to treat this under Tephritinae, Tribe Tephrellini. Hering, in his personal card file, placed this as

"Aciurini-Tephrellini." He obviously was undecided concerning its placement. Shiraki (1968: 65) placed it under Tephritinae.

Members of this genus are characterized by having the wings dark brown with hyaline incisions along margin and at most 4 hyaline dots in the field; the abdomen shining black; the epistoma prominent, protruding; scutellum with only 2 bristles; and proboscis geniculate with spatulate labella and narrow mentum.

Munro (1947: 84) treats this in his group of genera fitting between the 2 major subfamilies Trypetinae and Tephritinae in series D "*Spathulina* series" and states that the limits of this series are still undefined. This is an African genus (approximately 15 species) with 1 species which ranges through Asia and the Pacific.

***Spathulina acroleuca*** (Schiner) Fig. 153a-g.

*Tephritis acroleuca* Schiner, 1868, *Reise Novara, Dipt.* p. 268. Type-locality: Sydney, Australia.

Type ♀ in Naturhistorisches Museum, Vienna.

*Trypeta undecimguttata* Thomson, 1869, *Eugen. Resa, Dipt.* p. 581. **New Synonymy**, based upon study of the type. Type-locality: Sydney, Australia. Type ♀ in Naturhistoriska Riksmuseet, Stockholm.

*Oxya parca* Bezzi, 1913, *Mem. Ind. Mus.* 3: 159, pl. 10, fig. 62. Type-locality: Calcutta, India.

Type ♂ in Zoological Survey of India collection.

*Oxya nigrifemorata* de Meijere, 1914, *Tijdschr. Ent.* 57: 220. Type-locality: Nondkodjadar, Java. Lectotype ♀ in Zoölogisch Museum, Amsterdam.

Distribution: Widespread throughout Africa and Asia, extending to Australia through much of the Pacific, Indonesia, Bonin Islands, Japan, Formosa, Ryukyu Islands, Solomon Islands, New Guinea, New Caledonia, Philippines, Fiji, and Micronesia.

Hosts: Breeds in the flower heads of various Compositae.

This is a small dark-colored species with largely dark brown to black wings, containing hyaline spots along margin, with the apical portion of wing completely hyaline or with just a tiny dark brown spot at extreme apex of cell  $R_3$  and with only 2 or 3 isolated hyaline spots in wing field (fig. 153a-b). The wing markings are somewhat variable and not always completely reliable. *S. parca* Bezzi was based upon the presence of a small spot at apex of cell  $R_3$  and this condition is for the most part typical of specimens from Asia and the Pacific, but the condition is extremely variable and not reliable as a character. The typical wing markings of specimens from Southeast Asia are as in fig. 153a-b. Vein  $R_{4+5}$  is bare except for a few inconspicuous setae at base. Fifth sternum of ♂ rather deeply concave on posterior margin, very sparsely setose, almost bare (fig. 153e). ♂ genitalia shaped as in fig. 153f. Two spermathecae present; these are large, rather elongate, with a distinctly curved neck. Ovipositor short; when fully extended measuring about 2.25 mm. The basal segment is 0.85 mm long by 0.61 mm, measured across hind margin. The piercer measures about 0.06 mm long by 0.15 mm at its widest point. The apex is slender, pointed as in fig. 153d.

Length: Body and wings, 3.0-3.5 mm.

For a detailed description and figures, refer to Shiraki (1968: 65, pl. 25), and Hardy & Adachi (1956: 24, fig. 13a-f).

A large series has been seen from the following: THAILAND: Chiangmai Prov., Mae Klang, 340 m, 11.VI.1965, P. D. Ashlock; Trang Prov., Khaochang, Khaophappa, 200-400 m, 3. I. 1964, G. A. Samuelson; Chiangmai Prov., Chiangmai, 17.VI.1965, P. D.

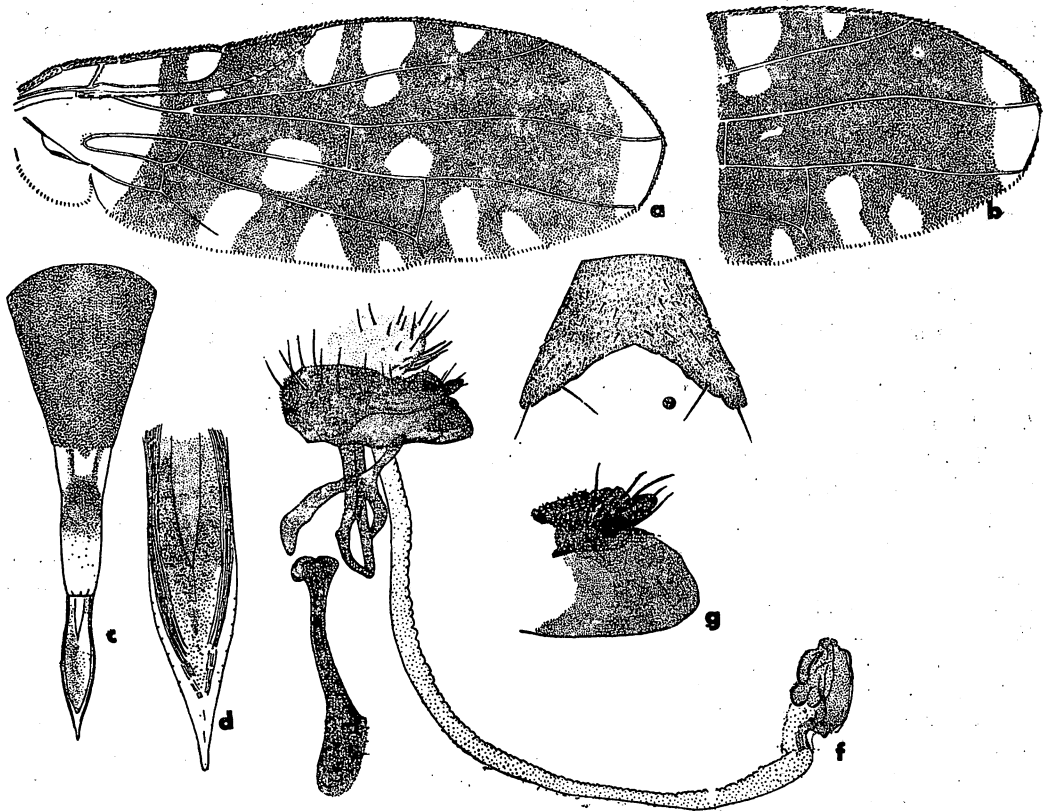


Fig. 153. *Spathulina acroleuca* (Schiner). a. wing; b. apex of wing; c. ovipositor; d. apex of piercer; e. ♂ 5th sternum; f. ♂ genitalia; g. ♂ surstylus and 10th sternum.

Ashlock. LAOS: Sedone Prov., Pakse, 11-23.V.1965, P. D. Ashlock. N VIETNAM: Tonkin, Hoa Binh. S VIETNAM: Danar, Karyu, 200 m, 13-28.II.1961, N. R. Spencer; Dalat, 6 km S, 1400-1500 m, 9.VI.-7.VII. 1961, N. R. Spencer.

#### Tribe TEPHRITINI

As used in this study this tribe is differentiated by having the abdomen densely gray pollinose, obscuring the ground color; vein  $R_{4+5}$  bare or with just a few setae at base; and wings normal in shape with markings as in fig. 156a and pl. 5, fig. 47.

Ten genera are represented in the area being studied.

#### Genus *Acanthiophilus* Becker

*Acanthiophilus* Becker, 1908, *Dipt. Kanar. Ins.* p. 136. Type-species: *Tetanocera walkeri* Wollaston from the Canary Islands, by original designation.

This genus is characterized by having 4 scutellar bristles; 3 inferior fronto-orbitals and 2 superior fronto-orbitals; front broad, equal or slightly wider than long and distinctly

wider than 1 eye; wings largely hyaline with faint irregular brown markings; vein  $R_{4+5}$  bare except for 1 or 2 setae at base; and 3rd antennal segment very slightly pointed at upper apex.

A rather large genus; at least 50 species have been described to date. These are predominantly Ethiopian, European, Asiatic, and 2 neotropical. One is on hand from Thailand.

**Acanthophilus helianthi** (Rossi) Fig. 154a-d; pl. 5, fig. 47.

*Acanthophilus helianthi* (Rossi), 1790, *Fauna Etrusca*. II, Liburni. For synonymy refer to Hendel (1927: 203). Type-locality and page reference not known; publication has not been seen.

This species is widespread over Europe, Asia, and North Africa, including the Canary Islands.

Hosts: *Centaurea nigra* L., *C. jacea* L., *Onopordon illyricum* L., *Cirsium lanceolatum* L., etc.

The species is readily differentiated from all other Tephritini by the predominantly pale wings with a few indistinct brown markings before apex, as in pl. 5, fig. 47.

Body black, densely covered with gray pollen and with humeri, notopleura and upper margins of mesopleura yellow in ground color. Front with 3 pairs inferior fronto-orbitals and 2 pairs of superiors. Ocellar bristles well developed. Face distinctly concave as seen from lateral view with oral margin protruding. Antennae tinged with brown, 3rd segment short, less than 1/2 longer than wide, slightly pointed at upper apex (fig. 154a). Wing markings and venation as in pl. 5, fig. 47. The subcostal cell comparatively long for a Tephritini and brown at apex. Vein  $R_{4+5}$  with 1 or 2 setae at base. Fifth sternum of ♂ about as long as wide and with a V-shaped concavity on posterior margin. ♂ genitalia as in fig. 154b, with surstyli black and sharply tapered to a point and not completely hiding 10th sternum, as seen from lateral view. The aedeagus is only slightly enlarged at apex. Basal segment of ovipositor shining black as seen from dorsal view, equal in length to terga 3-6. Measured on venter the basal segment is 2.3 mm in length. Piercer evenly tapered to the apex as in fig. 154c, 1.8 mm long. One small round spermatheca is present on the specimen studied; presumably 2 should be present.

Length: Body and wings, 4.5-4.75 mm.

Two specimens on hand from the following localities: THAILAND: Chiangmai Prov., Doi Suthep, 1300 m, 8.VI.1965, P. D. Ashlock; Chiangmai Prov., Doi Pui, 2.IV.1958, T. C. Maa.

**Genus *Craspedoxantha* Bezzi**

*Craspedoxantha* Bezzi, 1913, *Mem. Ind. Mus.* 3: 156. Type-species: *octopunctata* Bezzi, by original designation.

This genus was erected for 1 Oriental species. Four African species have been assigned under this name: *marginalis* (Wiedemann), *manengubae* Speiser, *polyspila* Bezzi, and *unimaculata* Bezzi.

Hering (1947: 15) placed this in the subfamily Tephrellinae. I do not see that the characters he uses are of subfamily importance and prefer to treat *Craspedoxantha* under Tephritinae. It fits this subfamily by having the postocellars and the occipital bristles white and flattened; the mesonotum densely covered with pale recumbent scale-like setae and the 6th abdominal tergum longer than the 5th. It differs from other Tephritinae I have studied by having a well-defined vertical suture over the hind portion of the

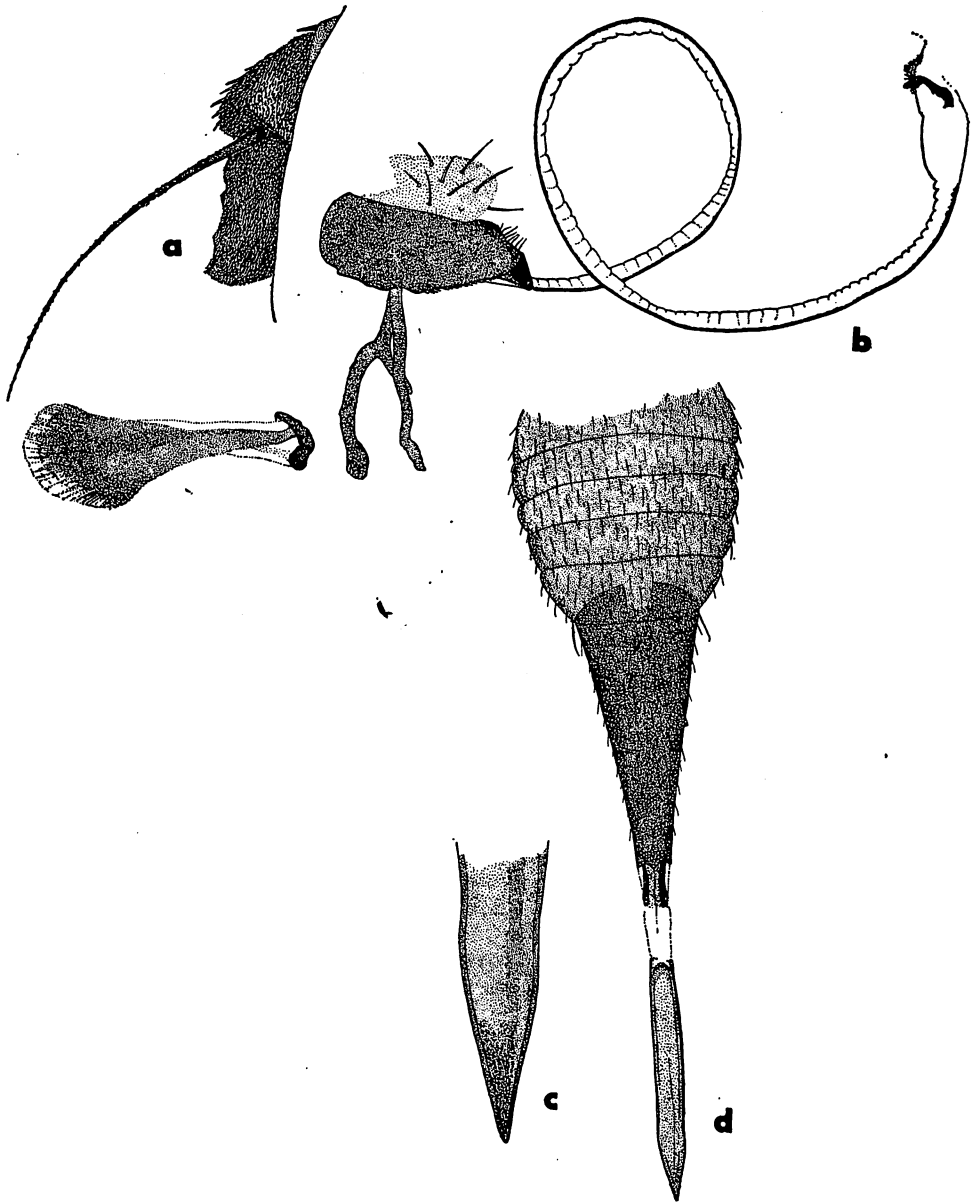


Fig. 154. *Acanthiophilus helianthi* (Rossi). a. antenna; b. ♂ genitalia; c. apex of piercer; d. ovipositor.

mesopleuron.

It is readily differentiated from other Oriental Tephritidae by having the bristles of head and thorax all yellow; by the yellow thorax with 8 conspicuous black spots on mesonotum and by the wing markings and venation as shown in pl. 5, fig. 48.

***Craspedoxantha octopunctata* Bezzi** Fig. 155a-d; pl. 5, fig. 48.

*Craspedoxantha octopunctata* Bezzi, 1913, *Mem. Ind. Mus.* 3: 156, pl. 10, fig. 59. Type-locality: Dawna Hills, Tenasserim, Lower Burma. Type ♀ in Zoological Survey of India collection.

Distribution: Burma, India (Senior-White 1922: 98), Vietnam.

Host: Senior-White (loc. cit.) recorded it breeding in flower heads of *Gonicaulon glabrum* at Nagpur.

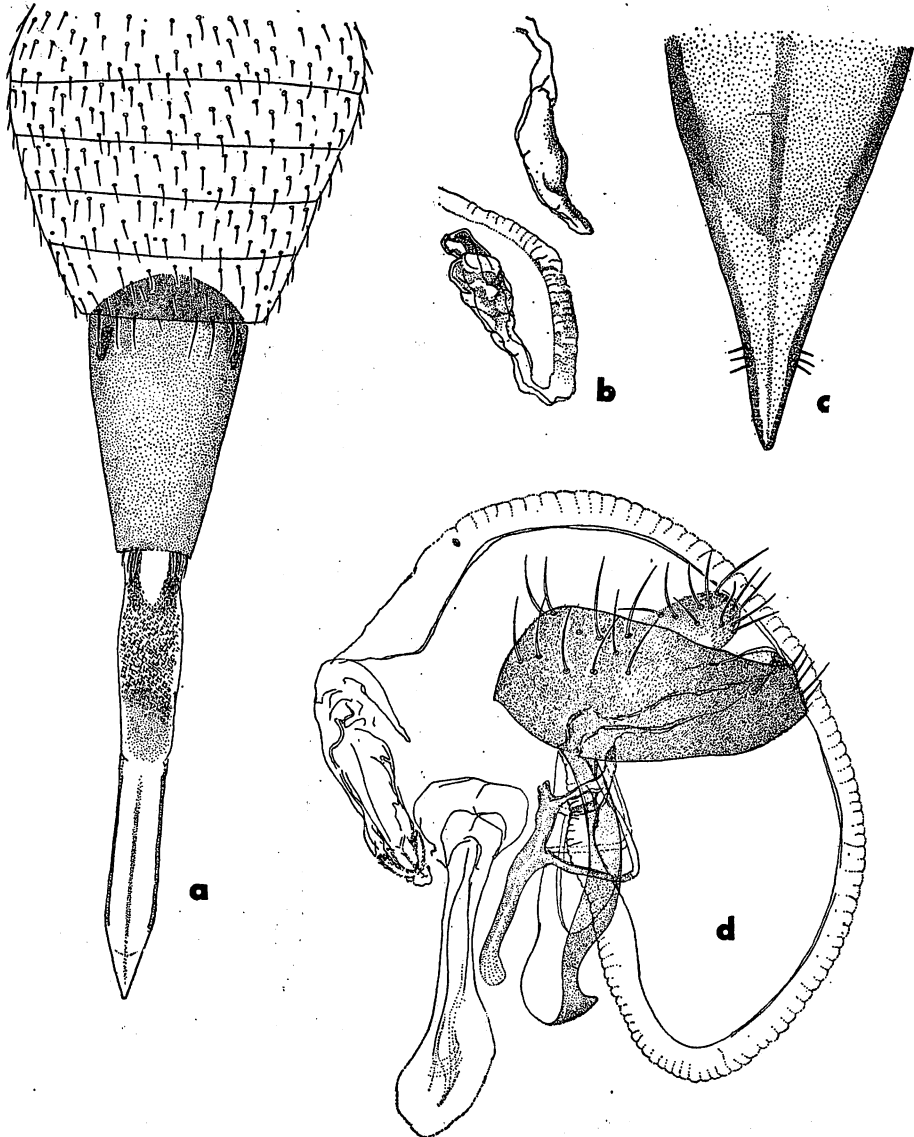


Fig. 155. *Craspedoxantha octopunctata* Bezzi. a. ovipositor; b. ♀ spermathecae; c. apex of piercer; d. ♂ genitalia.

The species can be recognized by the generic characters cited above. Actually 10 black spots are present on the mesonotum: 4 round, polished black spots at bases of dorsocentral bristles; 2 opaque, velvety black spots on each side in notopleural area; 1 inconspicuous spot on each side behind postalar bristle; and a tiny spot above each wing base. The wings have the entire costal margin yellow, tinged with brown. This band extends from base to apex in upper portion of cell 2nd  $M_2$ . Also a yellow streak extends along vein  $M_{3+4}$ . The wings are otherwise hyaline. The venation is as in pl. 5, fig. 48. Vein  $R_{4+5}$  bare except for a few setae at base. Head and appendages yellow. All head and thoracic bristles yellow. Third antennal segment about 1/2 longer than wide, broadly rounded at apex. Arista with microscopic pubescence. Legs entirely yellow. Abdomen yellow; in ♂ with base of 5th tergum tinged with brown in ground color and gray pollinose; also with a small dark brown to black spot on each posterolateral margin. The ♂ genitalia are yellow, shaped as in fig. 155d, with the 10th sternum plainly visible from lateral view. The ♀ abdomen is yellow except for a pair of small, submedian brown spots at apices of terga 4 and 5. Sixth tergum distinctly longer than 5th. Basal segment of ovipositor yellow except for a basolateral brown spot on each side; also the extreme apex is brown. Basal segment about equal to abdominal terga 3-6 and measured on venter it is 1.4 mm long. Piercer short, stout, pointed at apex (fig. 155c), 1.2 mm long. Extended ovipositor (fig. 155a) 3.5 mm. Two spermathecae present (fig. 155b).

Length: Body, 4.25 mm; wings 4.5 mm. Bezzi measured the type body, including ovipositor, as 6.0 mm, with the visible ovipositor measuring 1.5 mm.

Sixteen specimens have been seen from the following localities in S VIETNAM: Di Linh (Djiring), 900 m, 22-28.IV.1960, S. & L. Quate; Fyan, 900-1000 m, 11.VII-9.VIII.1961, N. R. Spencer; Dalat, 1400-1500 m, 29.IV.-7.VII.1960 and 1961, N. R. Spencer, S. & L. Quate; and Mt Lang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer.

### Genus *Dioxyna* Frey

*Dioxyna* Frey, 1944, *Comm. Biol. Soc. Fenn.* 8(10): 62. Type-species: *Trypeta sororcula* Wiedemann, by original designation.

As pointed out by Munro (1957a: 936) this appears to be a distinct genus differentiated from other Tephritini which have 2 scutellar bristles by the elongate head, with the length greater than the height and also by the absence of pre-aedeagal setulae. In *Stylia* Robineau-Desvoidy the head is short and the aedeagus has numerous setae just before the swollen apical portion. Four species have been placed in this genus, 1 tropicopolitan, 2 from North America and 1 from South America. Munro has treated these (1957a: 936). Also *conflicta* (Curran), from New Caledonia, *conflicta funalis* (Hering), from New Guinea, and *conflicta gemina* (Hering), from the Sunda Islands belong here. These have been keyed (under *Paroxyna*) by Hering (1944: 8).

#### *Dioxyna sororcula* (Wiedemann) Fig. 156a-c.

*Trypeta sororcula* Wiedemann, 1830, *Aussereur. Zweifl. Ins.* 2: 509. Type-locality: Teneriffe.

*Dioxyna sororcula*: Frey, 1944, *Comm. Biol. Soc. Fenn.* 8: 62.

This small species is readily characterized by having only 2 scutellar bristles and the head longer than high, longest on the lower margin, with the epistoma and sides of face protruded (fig. 156c).

Proboscis slender, elongate, geniculate, labella not fleshy and equal in length to lower margin

of head (fig. 156c). Two pairs of inferior fronto-orbital bristles are present and 2 pairs of superior fronto-orbitals; the upper superior fronto-orbitals are white. Body black in ground color, very densely yellow-gray tomentose and covered with white scale-like setae. Dorsocentral bristles situated distinctly in front of a line drawn between the anterior supraalar. Wings: characteristically marked as in fig. 156a. The subcostal cell is entirely dark brown. Base of ♀ ovipositor shining black, subequal in length to terga 4-6; the basal segment measures approximately 0.82 mm by 0.46 mm across the basal margin. The piercer measures approximately 0.62 mm long by

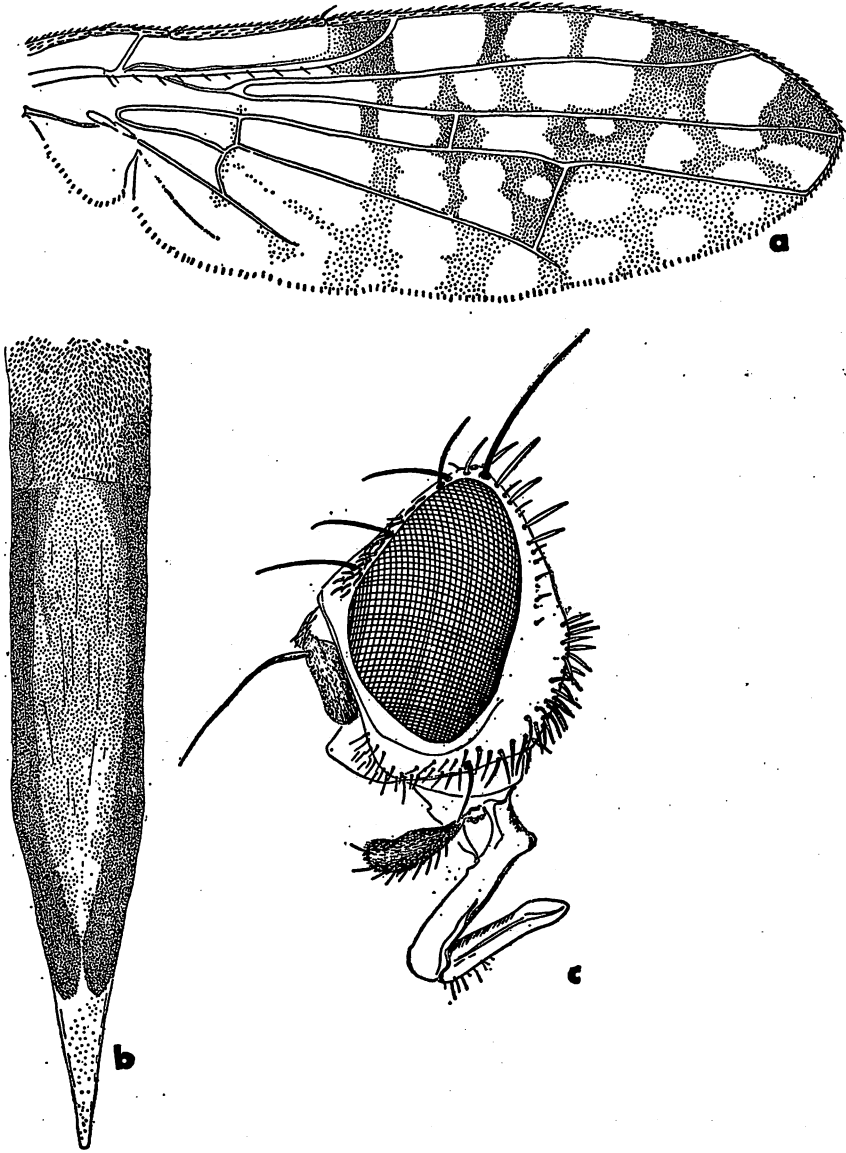


Fig. 156. *Dioxyna sororcula* (Wiedemann). a. wing; b. ovipositor; c. head.



0.1 mm at its widest point. The piercer is sharp-pointed as in fig. 156b.

Length: Body and wings, 2.5-3.0 mm.

Distribution: Widespread throughout the tropics and subtropics of the world.

Hosts: This is a seed infester, living in the flower heads of *Bidens*, *Coreopsis* and other Compositae.

A large series of specimens has been seen from the following localities: LAOS: Sayaboury Prov., Moung Sayaboury, 400 m, 2.XII.1967, F. G. Howarth; Sedone Prov., Paksong, 17-18.V.1965, P. D. Ashlock; Vientiane, 31.V.-3.VI.1960, S. & L. Quate. THAILAND: Doi Angka, nr Chiangmai, 2436 m, 9.IV.1953, Pholboon; Chiangmai Prov., Doi Suthep, 1278 m, 29.III.-4.V.1958, T. C. Maa. S VIETNAM: 18 km NW of Dalat, 1300 m, 4-5.V.1940, S. & L. Quate; Dak Song, 76 km SW of Ban Me Thuot, 870 m, 19-21.V.1960, S. & L. Quate; 45 km W of Dalat, 850 m, 5.V.1960, L. W. & S. Quate; 20 km S of Dalat, 1300 m, 12.IX.1960, J. L. Gressitt; Fyan, 1200 m, 11.VII.-9.VIII.1961, N. R. Spencer; Mt Lang Bian, 1500-2000 m, 19.V.-9.VI.1961, N. R. Spencer; Blao (Balao), 600 m, 14-21.X.1960, C. M. Yoshimoto; Di Linh (Djiring), 1200 m, 22-28. IV.1960, L. W. Quate; Ap Hung-Lam, 21 km NW of Di Linh, 1100 m, 29.IX.-5.X. 1960, C. M. Yoshimoto.

#### Genus *Elaphromyia* Bigot

*Elaphromyia* Bigot, 1859, *Rev. Mag. Zool.* ser. 2, 11: 314. Type-species: *melas* Bigot (monotypic), from Africa, equals synonym of *adatha* Walker.

*Paralleloptera* Bezzi, 1913, *Mem. Ind. Mus.* 3: 154. Type-species: *pterocallaeformis* Bezzi, by original designation.

This genus is readily differentiated from other Tephritinae by the long slender, parallel-sided wings, and the wing markings. The wings are approximately 3 × longer than wide and are covered with numerous subhyaline spots as in fig. 157a. The dorsocentral bristles are situated in line with the anterior supraalar. Scutellum with 4 bristles; the apical pair are small compared to the lateral bristles. Three pairs of inferior fronto-orbitals present. Third antennal segment short, about 1/3 to 1/2 longer than wide. Arista pubescent. Abdomen yellow, with variously arranged spots on the terga, especially on the last 2. Piercer of ovipositor flattened laterally on apical portion. Two oblong, heavily sclerotized, spiny spermathecae present (fig. 157c).

*Elaphromyia* fits in the subfamily Tephritinae, Tribe Tephritini. It should be noted that Shiraki (1968: 90) placed this in the subfamily Euribiinae; this is not correct. The cubital cell is only slightly pointed but it fits all of the other characteristics of Tephritini.

Three species have been described from Africa, and 4 species plus 1 subspecies from the Orient. As pointed out by Munro (1935a: 262), these species fall into 2 groups, "those with black and those with yellowish pubescence on the dorsum of the thorax, those with black pubescence are *adatha* Walker and two Formosan species described by Shiraki, *multisetosa* and *incompleta* (also *incompleta punctata* Shiraki, 1968: 90); those with yellow pubescence are *pterocallaeformis* Bezzi, *siva* Frey, and the African *pallida* Bezzi."

***Elaphromyia pterocallaeformis* (Bezzi) Fig. 157a-d.**

*Paralleloptera pterocallaeformis* Bezzi, 1913, *Mem. Ind. Mus.* 3: 155, pl. 10, fig. 58. Type-locality:

Simla Hills, India. Type ♀ in the Zoological Survey of India collection.

*Elaphromyia pterocallaeformis* (Bezzi), Hendel, 1915, *Ann. Hist. Nat. Mus. Nat. Hung.* **13**: 462.

Distribution: Ranging from India to the Philippines and Formosa and probably does occur in Thailand and throughout Southeast Asia. One ♀ specimen on hand from Pakhang, Laos, 28. XII. 1914, R. Vitalis de Salvaza, is close to this species, but appears to be distinctive since the 6th tergum has only 2 brown spots rather than 4. On the basis of this alone, however, I would hesitate to describe it and would treat it as species? close to *pterocallaeformis*. The wing of this species is as in fig. 157a. The

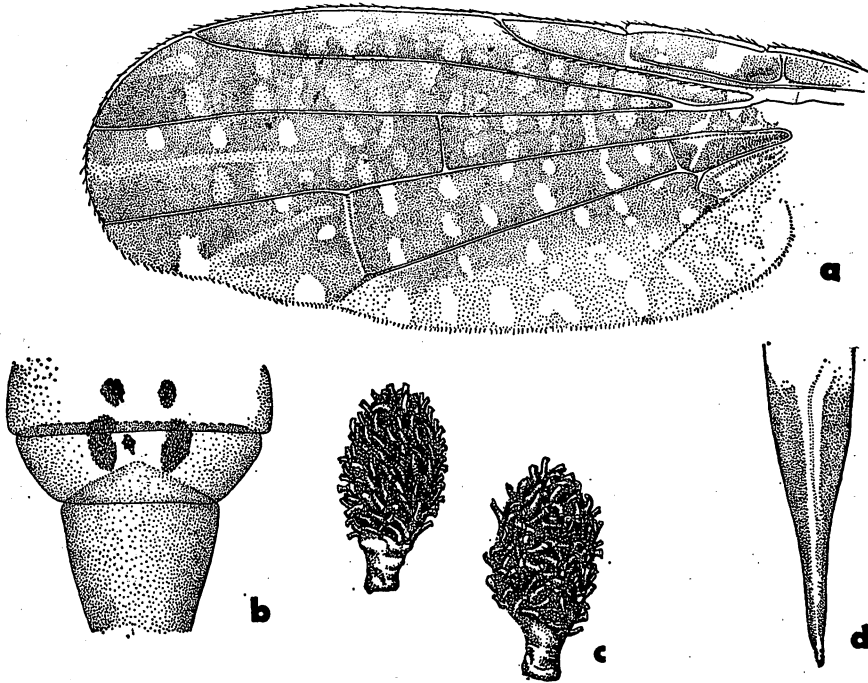


Fig. 157. *Elaphromyia pterocallaeformis* (Bezzi). a. wing; b. ♀ abdomen; c. ♀ spermathecae; d. apex of piercer.

markings on the abdomen and the ♀ ovipositor are as in fig. 157b. The piercer is sharp-pointed, shaped as in fig. 157d. Two spermathecae are present; these are oblong with a stout, short neck with the surface densely spiculated (fig. 157c). The markings on the abdomen are very similar to those of *E. incompleta punctata* Shiraki from Okinawa (1968: 90, plate 34), except that no brown spots are present on the 4th tergum on the specimen at hand; also *incompleta* has the thorax black setose.

#### Genus *Scedella* Munro

*Scedella* Munro, 1957, *Brit. Mus. (Nat. Hist.), Ruwenzori Exped. 1934-35*, Trypetidae **2**(9): 988.

Type-species: *Trypeta caffra* Loew, by original designation.

This genus was erected for 14 African and 1 Oriental species, *spiloptera* (Bezzi), from India and Ceylon. It fits in the group of genera related to *Styilia* Robineau-Des-

voidy (*Paroxyna* Hendel is a synonym) by having 4 scutellar bristles; the proboscis elongate and geniculate, etc. It is differentiated by having the apical scutellars large, almost equal in size to the basal; the labella about 1/2 as long as oral opening; and dorso-central bristles situated behind the suture, about 1/3 the distance to the supraalars.

I am placing *Euribia formosella* Hendel under this combination.

### ***Scedella formosella* (Hendel), new combination**

*Euribia formosella* Hendel, 1915, *Ann. Hist. Nat. Mus. Nat. Hung.* **13**: 465. Type-locality: Formosa.

Type in Hungarian National Museum, Budapest.

*Tephritis formosella*: Shiraki, 1933, *Mem. Fac. Sci. Agr. Taihoku Imp. Univ.* **8**: 422.

This species is differentiated by the wing markings: apical portion of 2nd costal cell and basal portion of cell Sc hyaline; 3 hyaline spots in cell R<sub>1</sub>; 1 spot on margin in upper apex of cell R<sub>3</sub>; and a large hyaline spot filling apex of R<sub>5</sub>. Refer to fig. 14a, Hardy & Adachi (1956: 27); also for further description refer to this reference and to Shiraki (loc. cit.).

Previously recorded (other than Formosa) from Micronesia. I have seen specimens from the Philippines and specimens are on hand from Kuantan, Pahang, Malaya, VIII. 1948, ex *Wedelia biflora* flowers, N. L. H. Krauss. It is probably widespread over Southeast Asia and surely must occur in Thailand.

### Genus ***Sphenella*** Robineau-Desvoidy

*Sphenella* Robineau-Desvoidy, 1830, *Mém. Près. Acad. Roy. Sci. Inst., France* **2**: 773. Type-species: *linariae* Robineau-Desvoidy, by monotypy. Equals synonym of *marginata* (Fallén), refer to Loew (1862: 76).

*Sinevra* Liroy, 1864, *Atti Ist. Veneto*, ser. 3, **9**: 1024. Type-species: *Tephritis marginata* Fallén, by monotypy.

*Sinevra*, emend., or error.

This genus has been treated in detail by Munro (1957b: 25). He says of the species which can be identified 1 is European, 1 Oriental, 1 Australian, and 11 are African; including 3 subspecies of *marginata* (Fallén) which range from Europe, to Africa and Australia. He also says *S. nigropilosa* de Meijere from Java, "does not seem to be a *Sphenella*." I have seen the type in the Zoological Museum, Amsterdam; it is in poor condition, but from the wing it does appear to fit in this genus.

*Sphenella* is differentiated from other Southeast Asian Tephritini by the distinctive wing markings: i. e., apex brown, with a complete, broad, hyaline band extending transversely over wing at level of r-m and m crossveins (pl. 5, fig. 49); also by having the the median portion of front with numerous flat, scale-like setae; and the anterior dorso-central bristles about in line with the supraalars, in combination with having 4 scutellar bristles and the proboscis slender and geniculate.

Only 1 species is known from the area being studied.

### ***Sphenella sinensis*** Schiner Fig. 158a; pl. 5, fig. 49.

*Sphenella sinensis* Schiner, 1868, *Reise österr. Freg. Novara*, Zool. **2**(1), Sect. V: 267. Type-locality: Shanghai. Type ♀ in Naturhistorisches Museum, Vienna.

*Sphenella indica* Schiner, 1868, *Reise österr. Freg. Novara*, Zool. **2**(1), Sect. V: 267. Type-locality:

Madras, India. Type ♂ in Naturhistorisches Museum, Vienna.

*Trypeta sinensis* Thomson, 1869, *Kongl. Sv. Vet.-Akad. Freg. Eugeris Resa* 2, Zool. Sect. 1, Insek., p. 585. Type-locality: China. Type ♂ in Naturhistoriska Riksmuseet, Stockholm. I have studied the types and confirmed the synonymy by Munro (1957b: 41). Also refer to Hardy (1968: 140).

This species differs from other Tephritini by having a complete white fascia extending across wing just beyond m crossvein, with a complete brown stripe encompassing the r-m and m crossveins and by having comparatively few hyaline spots in the brown background as in pl. 5, fig. 49.

♂. Head slightly higher than long with the front gently sloping and the antennae situated near upper 3/5 of eye height (fig. 158a). Head entirely yellow except for dark reddish brown

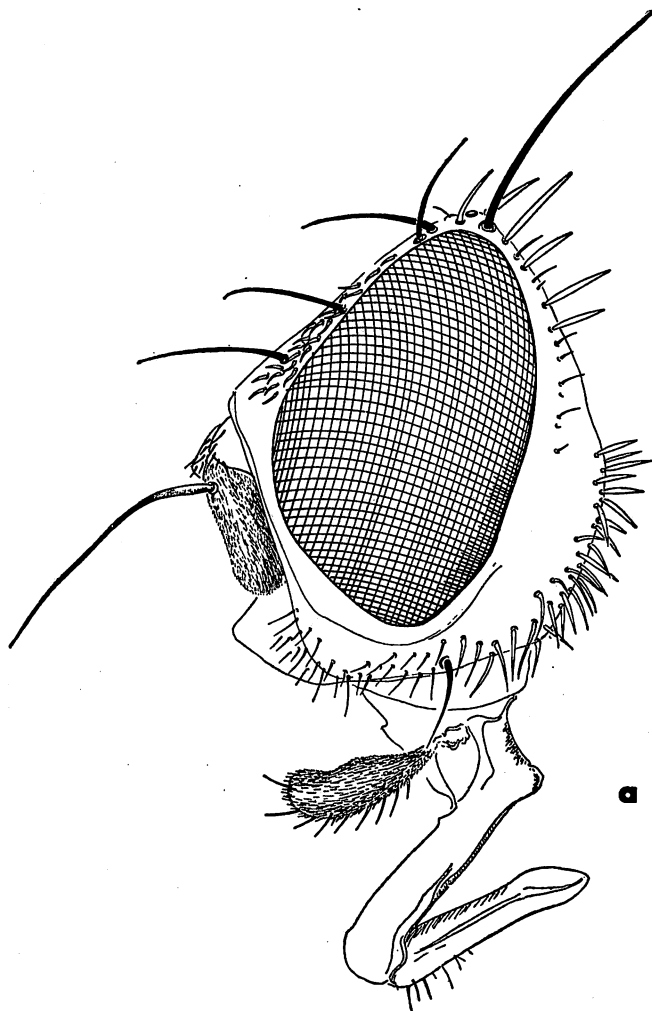


Fig. 158. *Sphenella sinensis* Schiner. a. head.

compound eyes, the brown to black ocellar triangle and dark brown to black ground color of upper 1/2 of occiput. Front, pale yellow; silvery gray pubescent over ocellar triangle, on vertical plates, and along eye orbits, the latter are continuous over the face and as seen in lateral view with the epistomal margin distinctly produced (fig. 158a). Measured down median portion, compared to its greatest width, the front is approximately as wide as long, distinctly narrowed anteriorly and bearing numerous flat, yellow, scale-like setae down median portion and on lateral margins. Two pairs inferior fronto-orbitals situated rather close together, the anterior bristle is just slightly below a line drawn across front at margin of lower ocellus. All frontal bristles black except upper superior fronto-orbital which is white. Ocellar bristles strong, black, slightly stronger than frontal bristles. Inner vertical bristles long and black; all other bristles white, flattened, with the exception of the black genal bristle; this is about equal in length to frontal bristles. Bases of antennae distinctly separated by a narrow carina which is about 1/2 greater than width of arista. Genae rather thickly covered with mixed black and yellow-white setae. Palpi and mouthparts yellow, each palpus with about 5 short black setae at apex and inconspicuous yellow setae around margins. Labellum rather elongate, slender, thickly setose along margins and almost equal in length to lower margin of head. Thorax black in ground color, except for yellow humeri, notopleural calli, and alar sclerites. Densely gray pollinose (microscopically pubescent), and covered with flat recumbent yellow-white pile. No indication of brown markings on mesonotum. Scutellum largely yellow, tinged with brown on basomedian portion of disc and rather thickly covered with flat, yellow-white setae. All 4 scutellar bristles strong, equal in size and equal to postalar bristles. Halteres pale yellow. Legs yellow, tinged with rufous except for basal 2/3 of hind femora tinged dark brown to black and with a faint tinge of brown along venter of middle femur. Hind femur with a row of rather strong anteroventral bristles on apical 2/5. Wings with markings and venation as in pl. 5, fig. 49. Vein  $R_{4+5}$  bare except for 2 setae at base. Abdomen with bases of terga broadly black in ground color, densely gray pollinose and with apices yellow. The yellow mark on hind margin of 5th tergum is in the form of a broad V which extends almost 1/2 the length of segment on middle line. Sterna yellow medianly, brown on sides. The 5th sternum about 1/2 wider than long and with a shallow concavity in middle of hind margin. Epandrium brown, tinged with red. Surstyli yellow to rufous, tapered and curved inwardly at apices and with the extreme apices blunt. Tenth sternum produced into an elongate, slender, black, pointed lobe at apex; most of this is hidden from lateral view by the surstylus. Aedeagus bare.

Length: Body 3.8 mm; wings 3.5 mm.

♀. Fitting the description of ♂ in most respects. The 6th tergum is yellow with a black basal margin. Basal segment of ovipositor shining black, tinged with rufous just before apex; rather short, as seen from direct dorsal view less than the length of terga 5+6 and measured on the venter the base is about 0.75 mm long.

Length: Body, excluding ovipositor, and wings, 3.5 mm.

Three specimens on hand from the following localities in S VIETNAM: Ban Me Thuot, 500 m, 20-24.XII.1960, C. M. Yoshimoto; 20 km S of Dalat, 1300 m, 12. XI. 1960, J. L. Gressitt; Dai Lanh, N of Nha Trang, 30.XI-5.XII.1960, C. M. Yoshimoto.

### Genus *Stylia* Robineau-Desvoidy

*Stylia* Robineau-Desvoidy, 1830, *Mém. Près. Acad. Roy. Sci. Inst., France* 2: 754. Type-species: *bidentis* Robineau-Desvoidy. Subsequent designation by Hering (1954: 167). Munro (1957a: 919) designated *S. mentharum* Robineau-Desvoidy as the type of *Stylia* "which thus remains a synonym of *Myopites*." This is an invalid designation since a type had previously been designated.

*Paroxyna* Hendel, 1927, in Lindner, *Die Fliegen der Palaearktischen Region, Trypetidae* 49: 146. Synonymy by Hering (loc. cit.). Type-species: *Trypeta tessellata* Loew, by original designation.

This is a very large, difficult genus; 189 species have been described to date. They are distributed over much of the world and breed in flower heads of Compositae and probably other flowers. The majority of the species are based upon characteristics of the wing markings; these are very complex and obviously do show considerable variations. Most species are known from very few specimens and the range of variations in the wing maculations is not understood. For the purpose of dealing with this group from Southeast Asia, it may be separated from other Tephritini which have 4 scutellar bristles and 2 pairs inferior fronto-orbital bristles by having the proboscis long, slender, geniculate (fig. 160a), with the labellum approximately equal in length to lower margin of head. Also by having the wings largely brown with prominent hyaline spots over the field and in the Oriental species with large hyaline spots along margin in cell  $R_1$  (pl. 5, fig. 50). Five species are recorded for the area being studied.

#### KEY TO KNOWN STYLIA FROM THAILAND AND SURROUNDING COUNTRIES

1. Apex of cell  $R_5$  brown except for a small hyaline spot (pl. 6, fig. 52). ..... 2  
Apex of R entirely hyaline. Posterior lobes of wing almost devoid of brown markings (fig. 159b). Vietnam. .... **apiciclara**, n. sp.
2. Femora predominantly black. ....3  
Femora entirely yellow or rufous. ....4
3. Cell  $R_3$  with 3 small, well-separated spots in apical portion, 2 on margin not fused with the spot in cell  $R_5$ . Five isolated spots present in cell 2nd  $M_2$  (pl. 6, fig. 56). Vietnam. .... **spenceri**, n. sp.  
Cell  $R_3$  with 1 large hyaline spot just beyond apex of vein  $R_{2+3}$  which extends across cell to upper 2/3 of cell  $R_5$  (3 spots joined in a line, and no hyaline spot on wing margin at apex of cell). Three large fused spots and 1 large isolated spot in cell 2nd  $M_2$  (pl. 5, fig. 50). Widespread over Europe, China, Siberia, Thailand. .... **parvula** (Loew)?
4. Wings mostly dark brown, with the hyaline spots sharply contrasting from the ground color. The hyaline marks from margin at level between r-m and m crossveins in form of a V extending through most of cell  $R_1$  (pl. 6, fig. 52). With distinct markings of brown basad of r-m crossvein extending into anal cell. Burma, Thailand, Vietnam. .... **iracunda** (Hering)  
Wing markings rather diffused, not sharply contrasting especially in basal 1/2 to 2/3 of wing and with marginal markings not arranged in a V as above, and with markings basad of r-m crossvein very faint except in anterior margin at level of subcostal cell. Also with an almost complete hyaline subapical band across wing at a level just beyond apex of vein  $R_{2+3}$ , formed by fusion of the hyaline spots (pl. 6, fig. 53). Thailand. .... **siamensis**, n. sp.

**Stylia apiciclara** Hardy, new species

Fig. 159a-b.

= *Parotyna orientalis* (de R.)

This species appears to resemble *occultella* Chen from China, but is differentiated from this as well as from other known *Stylia* from the Orient by having the apex of cell  $R_5$  entirely hyaline, rather than with a small round spot occupying only part of the apex of that cell. It further differs from *occultella* by having a broad brown mark through middle of 2nd costal cell and a hyaline spot at base of subcostal cell, rather than having just a faint marking of brown in middle of 2nd costal cell and with a hyaline spot in middle of subcostal cell. Also the first 2 hyaline spots in cell  $R_1$  are widely separated from one another, rather than close together and the basal segment

of the ovipositor is predominantly yellow, equal in length to terga 3-6, not black and distinctly shorter than terga 5-6.

♂. *Head*: Slightly higher than long, with front gently sloping and antennae situated near upper 2/3 of eye level. Front about as wide as long, measured on middle line, very slightly narrowed anteriorly with submedian portions yellow, the orbits gray and with a yellow-gray vitta extending down middle from ocellar triangle to front margin. Genal bristle white and genae covered with short white scale-like setae. Antennae entirely yellow. Head bristles otherwise as in other members of this genus. Labellum about 2/3 as long as lower margin of head. *Thorax*:

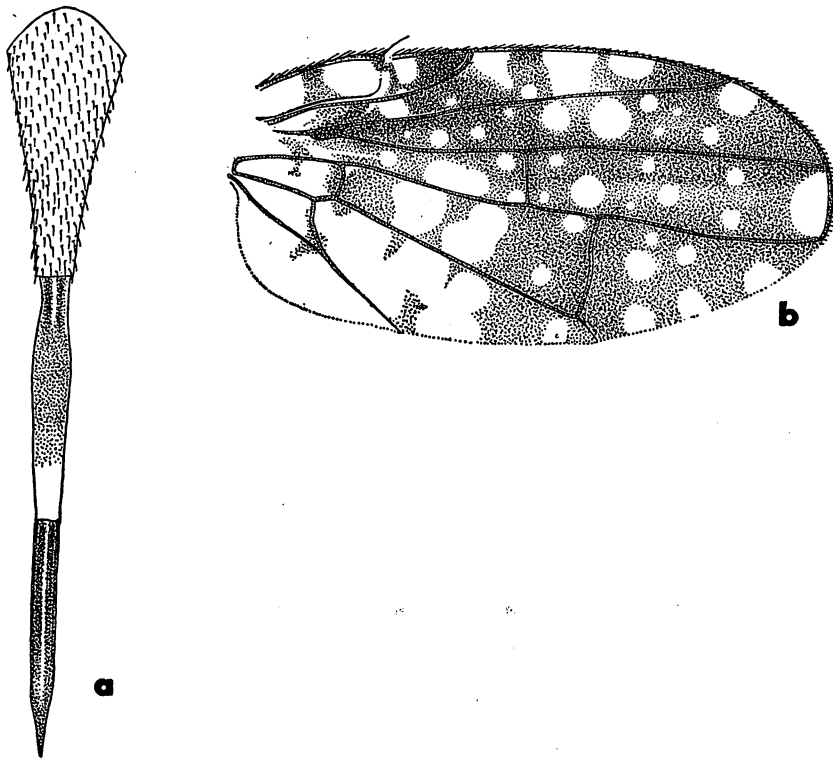


Fig. 159. *Stylia apiciclara* n. sp. a. ovipositor; b. wing.

Black in ground color, yellow on humeri and apex of scutellum and densely gray pollinose (microscopically pubescent), with 3 indistinct brown vittae extending down mesonotum. Anterior dorsocentral bristles situated distinctly in front of supraalars. *Legs*: Entirely yellow except for a tinge of brown near bases of hind femora. *Wings*: Marked as in fig. 159b. Vein  $R_{4+5}$  bare above and with 3 rather widely spaced black setae near base on ventral side. *Abdomen*: Black in ground color except for yellow apex of 5th tergum, rather densely gray pollinose and with a pair of small brown submedian spots at bases of terga 3-5. The genitalia are yellow; they have not been relaxed for study.

Length: Body, 3.0 mm; wings, 2.75 mm.

♀. Similar in most respects to the ♂ with the brown mesonotal vittae rather distinct and the brown spots on abdomen present on terga 3-6. Basal segment of ovipositor predominantly yellow to rufous, tinged with brown at apex and at extreme base and slightly longer than terga 3-6;

measured on the venter the basal segment is 1.5 mm long. Piercer evenly tapered to a sharp point at apex (fig. 159a), approximately 1.4 mm long. Extended ovipositor measures 4.5 mm.

Holotype ♂ (BISHOP 9995), S VIETNAM: 18 km N of Dalat, 1300 m, 4.V.1960, L. W. & S. Quate. Allotype ♀ and 1 ♀ paratype, S Vietnam: Dalat, 1500 m, 29.IV.-4. V.1960, L. W. Quate. One paratype ♂, 20 km S of Dalat, 1300 m, 12.XI.1960, J. L. Gressitt.

Type and allotype returned to the B. P. Bishop Museum. Paratypes in the University of Hawaii collection.

***Stylya iracunda* (Hering), new combination** Fig. 160a-d; pl. 6, fig. 52.

*Paroxyna iracunda* Hering, 1938, *Ark. Zool.* 30A(25): 55, fig. 59. Type-locality: Kambaiti, Burma.

Type ♀ in Naturhistoriska Riksmuseet, Stockholm. I have seen the type and have a color photograph.

This species is differentiated from others known from Southeast Asia by the triangular arrangement of rather large hyaline spots on anterior portion of wing just beyond

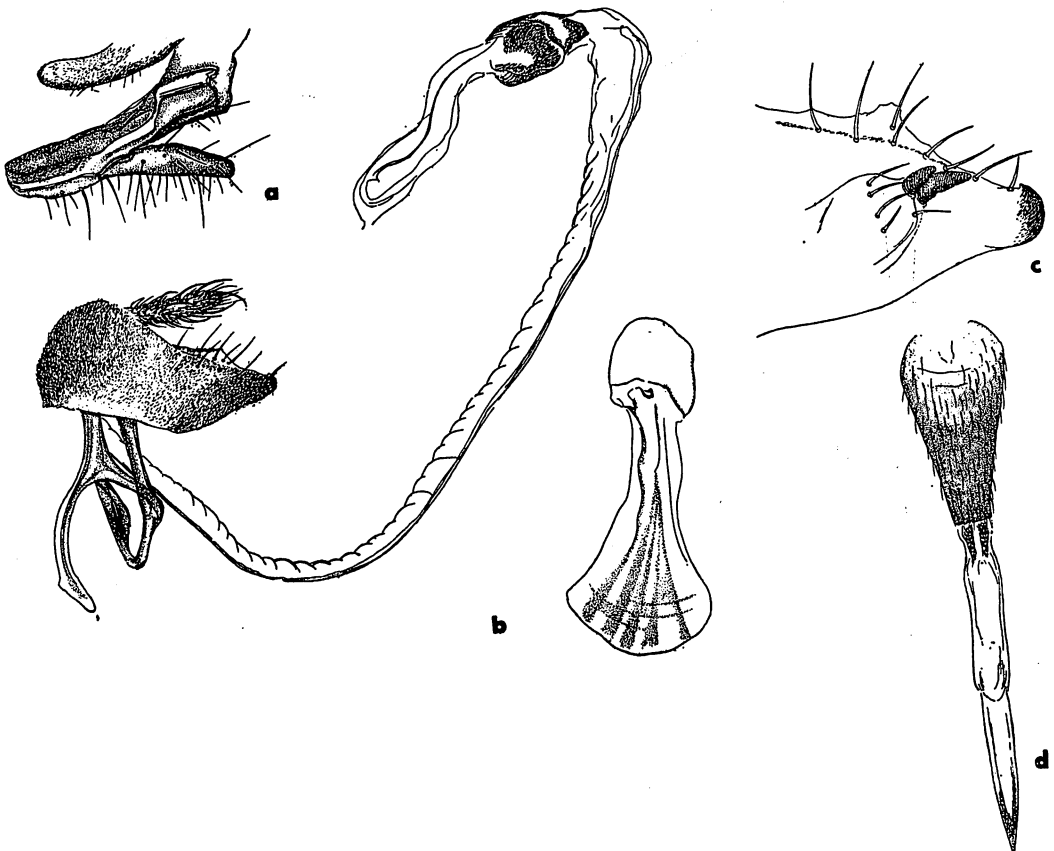


Fig. 160. *S. iracunda* (Hering). a. mouthparts; b. ♂ genitalia; c. ♂ surstylus and 10th sternum; d. ovipositor.



middle and by other markings as in pl. 6, fig. 52. In the series at hand the wing markings show some rather slight variations; usually 2 hyaline spots are present on margin in apex of cell  $R_3$ , sometimes only 1. It should be noted that the antennae are separated at the bases; this separation is rather slight but in some specimens a distinct carina is visible down the front and it is possible to confuse this with *Campiglossa* Rondani which is differentiated from *Styilia* by having the bases of antennae distinctly separated rather than near together. I have examined specimens of *Campiglossa* and the separation of the antennae is almost equal to width of basal segment. Hering in the original description says that *iracunda* is similar to *reticulata* Becker from the Canary Islands, and differs by having the femora yellow. It appears close to *Tephritis lyncea* (Bezzi) from Northern India, and I am not sure but what these may possibly turn out to be the same species. There seems to be some difference in the spotting in the middle of wing when comparing with Bezzi's figure, and these characters may be variable. Bezzi says that the hind femur of *lyncea* is blackish gray on apical 1/2; in specimens of *iracunda* on hand the legs are entirely yellow. ♂ genitalia as in fig. 160b-c with the surstyli narrowed but truncate at apices, just barely covering the large black apical lobes of 10th sternum. Fifth sternum of ♂ broader than long and gently concave on hind margin. Two spermathecae present in ♀; these are oval with short thick necks. Basal segment of ovipositor shining black, equal in length to last 3 abdominal terga and measured on the venter about 1.4 mm long. The ♀ ovipositor as in fig. 160d.

Two dozen specimens on hand, both sexes, from the following localities: S VIETNAM: 15 km NW of Dalat, 1850 m, 5.V.1960, S. Quate; Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer; Dalat, 1400-1500 m, 9.VI.-7.VII.1960, L. W. Quate; 6 km S of Dalat, 1400-1500 m, 9.VI.-7.VII.1961, N. R. Spencer. THAILAND: Chiangmai Prov., Doi Suthep, 1300 m, 8.IV.1965, P. D. Ashlock; Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa.

***Styilia parvula* (Loew)?, new combination** Pl. 5, fig. 50.

*Oxyina parvula* Loew, 1862, *Europ. Bohrf.* p. 89. Type-locality: N. Germany. Type in Zoologisches Museum, Berlin.

One ♀ specimen on hand from 6 km SW Dalat, Vietnam, 1550 m, 11.IX.1960, J. L. Gressitt appears to fit here; the only difference that I see in the specimen on hand is that the posterior notopleural bristles are black rather than white or yellow-white.

Fitting the general characteristics of related species with the basal portions of the femora blackened, the wing markings as in pl. 5, fig. 50, and the ♀ ovipositor about equal in length to the last 3 abdominal terga. Further material will have to be examined from Southeast Asia before the status of this can be clarified.

***Styilia siamensis* Hardy, new species** Fig. 161a-b; pl. 6, fig. 53.

This species fits near *S. defasciata* (Hering) from Manchuria. I have examined a large series of specimens from Manchuria in the Hering collection, British Museum (Natural History). *S. siamensis* has distinctly different wing markings; it is separated by having the hyaline spots arranged transversely across wing just beyond apex of vein  $R_{2+3}$  continuous, in a straight line and fused together or nearly so, forming a complete, or nearly complete, narrow, hyaline band across wing (pl. 6, fig. 53); also the brown mark-

ings basad of m crossvein are diffuse. In *defasciata* the hyaline spots across the wing are not fused together and are not in a straight line. The subcostal cell is dark brown and the brown markings basad of m crossvein are distinct. Also the ovipositor of *siamensis* is more elongate, the basal segment is equal or slightly longer than terga 3-6. The basal segment of the ovipositor of *defasciata* is approximately equal in length to terga 5-6.

♂. Similar in most respects to other *Styilia*. *Head*: Predominantly pale, shaped as in fig. 161a. *Thorax*: Densely gray pollinose, completely obscuring the ground color, thickly covered with white scale-like setae and with the scutellum yellow except for a broad brown to black band

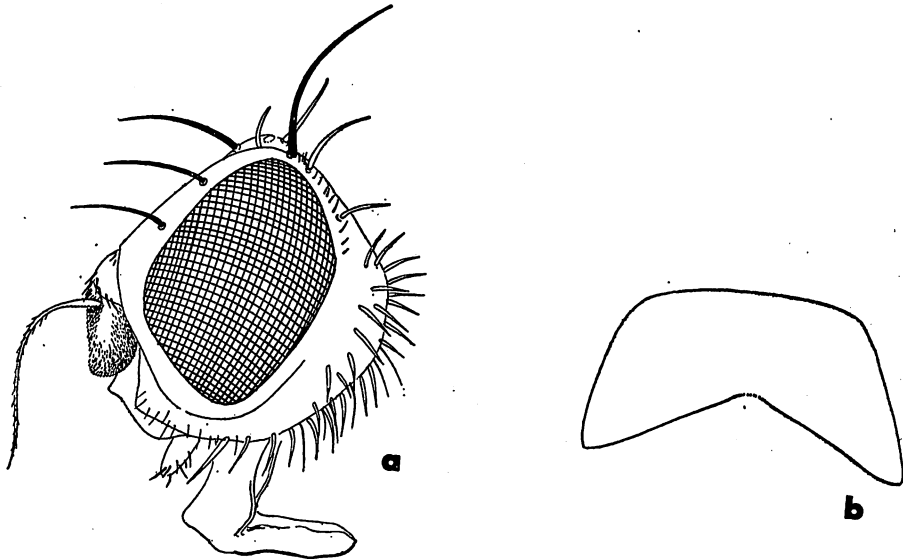


Fig. 161. *S. siamensis* n. sp. a. head; b. ♂ 5th sternum.

across basal portion. Anterior dorsocentral bristles situated just behind suture. Posterior notopleural bristles brown, uppermost mesopleural bristles black, sternopleurals black, and pteropleurals white. Apical scutellar bristles cruciate and approximately 1/2 as long as basal bristles. *Legs*: Entirely yellow, hind femora lacking ventral bristles. *Wings*: As in pl. 6, fig. 53. The markings rather diffused compared with most species of *Styilia*. *Abdomen*: Dark brown to black in ground color except for yellow apex of 5th tergum, densely gray pollinose and white setose with a row of about 8 black bristles at apex of 5th tergum. With very faint indistinct submedian brown spots on terga 3-5. Fifth sternum almost 2× wider than long, gently concave on posterior margin (fig. 161b). Genitalia with the apical portion of aedeagus very elongate.

Length: Body and wings, 4.0 mm.

♀. Fitting description of ♀ except for genital characters. The ovipositor is large and conspicuous. Basal segment of ovipositor polished black, distinctly longer than abdominal terga 3-6.

Holotype ♂ (BISHOP 9996), allotype ♀ and 4 ♂ paratypes from THAILAND: Doi Angka, nr Chiangmai, 2436 m, 9.IV.1953, Pholboon.

Type in B. P. Bishop Museum.

*Styilia spenceri* Hardy, new species Pl. 6, fig. 56.

Fitting close to *iracunda* (Hering). I see no distinct differences in the wing mark-

ings (pl. 6, fig. 56), but it differs by having the femora predominantly black and the basal segment of ♀ ovipositor shorter, about equal in length to last 2 abdominal segments and approximately 1.0 mm in length, rather than being slightly longer than last 3 abdominal segments, measuring 1.4-1.5 mm. Otherwise fitting the description of most *Styilia*.

♂. *Head*: Front largely yellow, tinged with brown on the vertical plates and with the front slightly narrowed anteriorly. The bases of the antennae are very close together, almost touching; these are more distinctly separated in *iracunda*. Epistomal margin distinctly protruded. Labella slightly thicker than remainder of rostrum and rather short compared to some other *Styilia*; they are about equal in length to the palpi and about  $2/3$  to  $3/4$  as long as lower margin of head. *Thorax*: Densely gray pollinose with no brown markings. Dorsocentral bristles situated at the suture. *Legs*: Apices of femora yellow, otherwise broadly black and densely gray pollinose. *Wings*: As in pl. 6, fig. 56. *Abdomen*: Dark brown to black in ground color, densely gray pollinose and densely covered with flat, yellow, recumbent setae and with a faint indication of a yellowish vitta in the ground color extending down median portion of 1st tergum onto basal portion of 4th tergum. The genitalia have not been dissected for study, the visible parts are black, the epandrium is densely gray pubescent, the surstyli are polished black.

Length: Body, 3.0 mm; wings, 3.2 mm.

♀. With faint indication of a pale line down middle, extending the full length of abdomen. Sixth tergum slightly longer than 5th. Basal segment of ovipositor shining black, about equal in length to last 2 abdominal segments and measured on the venter equals 1.0 mm in length.

Holotype ♂ (BISHOP 9997), allotype ♀ and 2 ♀ paratypes, S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V.-8.VI.1961, N. R. Spencer. One ♂ paratype, S Vietnam: Dalat, 6 km S, 1400-1500 m, 9.VI.-7.VII.1961, N. R. Spencer.

Type and allotype in B. P. Bishop Museum. Paratypes in the collections of the U.S. National Museum and the University of Hawaii.

### Genus *Tephritis* Latreille

*Tephritis* Latreille, 1804, *Now. Dict. d'Hist. Nat. Deterville* **24**: 196. Type-species: *Musca arnicae*

Linnaeus, by subsequent designation (Cresson 1914: 278).

*Euribia* Hendel, 1914, *Wien. Ent. Zeit.* **33**: 96; nec *Euribia* Meigen, 1800.

A widespread genus differentiated by having the wings brown with many scattered hyaline spots; vein  $R_{4+5}$  with a few setae only at base; and by the short thick proboscis. The species are predominantly gray pollinose with recumbent, flattened, white setae on the mesonotum. Two pairs of inferior fronto-orbitals and scutellar bristles are present. Aedeagus of ♂ bare, lacking setae before apex.

One species from Thailand apparently belongs here.

### *Tephritis lyncea* Bezzi Fig. 162a-c; pl. 6, fig. 54.

*Tephritis lyncea* Bezzi, 1913, *Mem. Ind. Mus.* **3**: 165, pl. 10, fig. 67. Type-locality: Darjiling, N. India. Type in Zoological Survey of India collection.

One ♀ specimen on hand from Vietnam appears to belong here; the wing markings differ slightly from Bezzi's figure but probably fall within the range of variations for that species. The only discrepancy which I note is that 2 pairs of inferior fronto-orbital bristles and 2 pairs of superior fronto-orbitals are present. Bezzi states "Or. 1. 2." This species is characterized by the predominantly brown wings with rather numerous hyaline

spots, with the spots in middle of anterior margin arranged roughly in the form of a triangle and with the 3rd costal section (stigma) dark brown with a hyaline spot in middle (pl. 6, fig. 54). The cleared abdomen of the ♀ has a small yellow median spot on posterior margin of each tergum and the narrow apex of 6th tergum is yellow in ground color. Two oval spermathecae present. These have short, straight necks (fig. 162b). Basal segment of ovipositor black; measured on the venter 1.4 mm long. Piercer rather sharply tapered at apex (fig. 162c), 1.25 mm long. Extended ovipositor (fig. 162a) 4.0 mm.

Hering in his card file placed this in *Paroxyna* but the labella are not elongated. It appears to fit near *Scedella* Munro because of the nature of the labella but Bezzi says the apical scutellar bristles are small, not crossed; they are broken on the specimen at hand. A ♂ specimen is not available for study of the genital characters.

The specimens at hand are from S VIETNAM: Mt Lang Bian, 1500-2000 m, 19.V-8.VI.1961, N. R. Spencer.

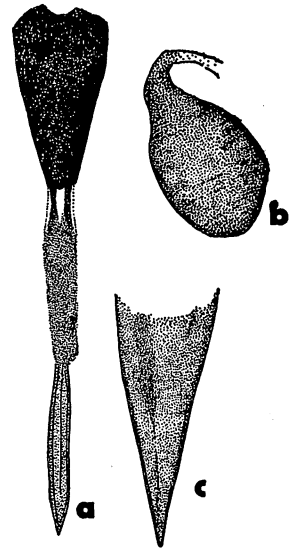


Fig. 162. *Tephritis lyncea* (Bezzi). a. ovipositor; b. ♀ spermatheca; c. apex of piercer.

### Genus *Trupanea* Schrank

*Trupanea* Guettard, 1762, *Mém. Acad. Roy. Sci. Hist. Mém. Math. Phys. Paris*, 1756, p. 170-73.

Unavailable name (author not binomial.)

*Trupanea* Schrank, 1795, *Naturh. u. ökonom. Briefe über Donaumoos*, Mannheim, p. 147. Type-species: *radiata* Schrank, by monotypy = *stellata* (Fuessley).

*Trypanea*, emendation.

*Urellia* Robineau-Desvoidy, 1830, *Mém. Près. Acad. Roy. Sci. Inst. France*, 2: 774. Type-species: *calcitratae* Robineau-Desvoidy, by subsequent designation (Coquillett 1910: 618) = *stellata* (Fuessley).

Members of this genus are characterized by having only 2 scutellar bristles, the wing markings usually limited toward the apex and typically of a stellate pattern (fig. 164a), a brown subapical central marking with radiating hyaline marks to the wing margin; but sometimes more extensively brown (fig. 163a); by having the abdomen entirely opaque; dorsocentral bristles near the suture and ♂ aedeagus terminating in a sclerotized spine-like process.

A large world-wide genus which infests flower heads, principally of Compositae. Approximately 3 dozen Oriental and Pacific species have been described. Five species are on hand from Thailand and surrounding countries.

### KEY TO KNOWN TRUPANEA FROM THAILAND AND SURROUNDING COUNTRIES

1. Basal 2/3 of wing hyaline or nearly so, apical portion with the stellate pattern of brown which is typical of most *Trupanea* (fig. 164a). .....2

- Wings predominantly brown, only basal 1/3 to 1/4 hyaline (fig. 163a and 166a). .....3
2. Apex of cell  $R_5$  hyaline except for a pair of converging brown streaks. Subcostal cell very short, about equal in length to r-m crossvein. ....4  
Apex of  $R_5$  brown, except for 2 isolated hyaline spots. Subcostal cell yellow, longer than r-m crossvein (fig. 165b). Vietnam. ....*isolata*, n. sp.
3. Wing dark brown beyond a level of forking of radial sector and media, except for a tiny hyaline spot in apex of cell  $R_3$ , 2 tiny spots in apical portion of  $R_5$ , and with posterior portion irregularly spotted as in fig. 163a; no hyaline spots in middle of wing or in subcostal cell or cell  $R_1$ . Thailand. ....*brunneipennis*, n. sp.  
Wing with prominent hyaline spots around margin and in middle of field as in fig. 166a. Thailand. ....*vernoniae*, n. sp.
4. Subcostal cell hyaline, faintly tinged with brown at apex, 2 hyaline spots in cell  $R_5$  just beyond r-m crossvein and with a narrow brown transverse band just before apex of cell 1st  $M_2$ . China and Malaya. ....*convergens* Hering  
Apical 2/3 of subcostal cell dark brown. A single large hyaline spot in cell  $R_5$  just beyond r-m; lacking a preapical band in 1st  $M_2$  but with a faint indication of a median band which extends into cell  $M_4$ . Vietnam. ....n. sp. near *convergens*

***Trupanea brunneipennis* Hardy, new species** Fig. 163a-c.

Because of the large brown mark covering the entire anterior portion of the wing beyond end of subcostal vein, this resembles *simplex* Malloch from the Marquesas Islands; the 2 are probably not related, however. *T. brunneipennis* is differentiated by having the wing much more extensively brown with 1 tiny hyaline spot in apex of cell  $R_3$ , 2 small spots in apical portion of  $R_5$ , and with posterior margin spotted as in fig. 163a. *T. simplex* has the entire posterior portion of wing below vein  $M_{1+2}$  hyaline except for a streak through apical portion of cell 2nd  $M_2$  and a brown streak along m crossvein. Compare wing in fig. 163a with fig. 42 of Malloch (1932: 147)

♂. *Head*: Entirely yellow, except for the reddish brown eyes, just slightly higher than long, with compound eye almost round. Genae rather broad, about 1/4 the height of eye. Front gently sloping, antennae situated at about upper 2/3 of head height. Three pairs inferior fronto-orbitals and 2 pairs superior fronto-orbitals. Antennae yellow, 3rd segment 1/2 longer than wide. Palpi yellow with 3 to 5 black setae around apex and rather thickly covered with yellow-white setae on sides and ventral surface. *Thorax*: Dorsum black in ground color, tinged with yellow on sides along suture. Pleura, humeri, scutellum, and notopleura yellow and ventral portion of sternopleura black in ground color, densely gray pollinose, entirely obscuring ground color. Postscutellum and metanotum black, covered with gray pollen. Halteres pale yellow. *Legs*: Yellow, front femur with a row of prominent yellow to brownish yellow posteroventral bristles and with posteroventral surface covered with strong brownish yellow setae. *Wings*: Predominantly brown beyond level of apex of subcostal vein, branching of radial sector, and the basal cells, with the venation and marks as in fig. 163a. Vein  $R_{4+5}$  bare except for a few setae near base. *Abdomen*: Black in ground color except for narrow, yellow apices of terga 2 and 5 and densely gray pollinose. Fifth tergum with about 8 strong yellow-brown bristles along each lateral margin and with smaller yellow bristles along posterior margin (fig. 163b). Fifth sternum with a rather deep V-shaped concavity in middle of hind margin, with an abundance of short, yellow setae scattered over the sclerite, and with several prominent yellow bristles on lateral margins. The genitalia have not been dissected for study; the visible parts are dark brown, tinged with rufous.

Length: Body and wings, 4.8-5 mm.

♀. Fitting description of ♂ except for sexual characters, also 1st and 2nd terga largely yellow on sides and 5th tergum entirely black in ground color but 6th with a yellow posterior margin.

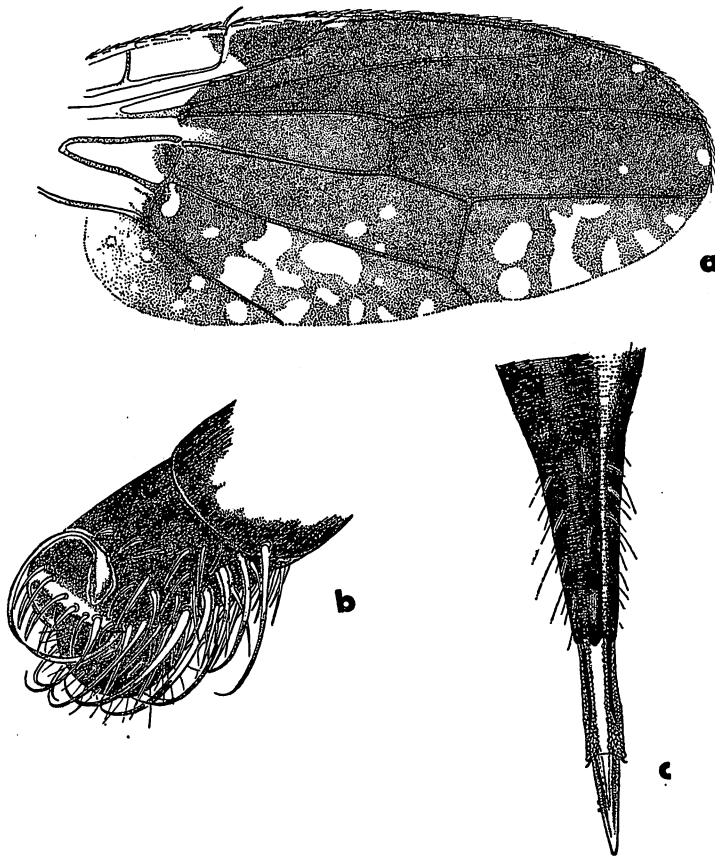


Fig. 163. *Trupanea brunneipennis* n. sp. a. wing; b. ♂ 5th tergum; c. ovipositor.

Sixth tergum equal to or slightly longer than 5th, basal segment of ovipositor polished black, about equal in length to terga 3-6. Measured on the venter the basal segment is 1.8 mm long. The piercer has not been relaxed for study but the apex is extruded on the allotype. The apical portion is tapered to a long slender point (fig. 163c).

Length: Body, excluding ovipositor, and wings, 4.6-4.8 mm.

Holotype ♂ (BISHOP9998) and allotype ♀, THAILAND: Chiangmai Prov., Doi Pui, 1360 m, 2.V.1958, T. C. Maa.

Type and allotype returned to the B. P. Bishop Museum.

***Trupanea convergens* Hering** Fig. 164a.

*Trupanea convergens* Hering, 1936, *Konowia* 15 (3-4): 188, fig. 8. Type-locality Charbin, Manchuria. Type ♀ in British Museum (Natural History).

*Trupanea cosmima* Hendel, 1938, *Ark Zool.* 30A: 9. **New Synonymy.** Type-locality: Kiangsu Prov., China. I have studied the type ♀ of *convergens* in the British Museum (Natural History) and have seen specimens of *cosmima* in the Natural History Museum, Vienna.

*Trupanea okinawaensis* Shiraki, 1968, *U.S. Nat. Mus. Bull.* 263: 63, pl. 24, appears to be a synonym

of *convergens*. Shiraki's description and figures would fit this species. I have not had an opportunity to study specimens from Okinawa. Type-locality: Yogi, Okinawa, Ryukyu Islands.

One ♀ specimen on hand from Malaya fits the description and figure, also my descriptive notes and color photograph, except for minor details in the wing markings as shown in Hering's fig. 8 (1936: 188). The specimen from Malaya has a small isolated hyaline spot before apex of cell  $R_5$ , the preapical brown band in cell 1st  $M_2$  is continuous across cell, and no small hyaline spot in cell  $R_3$  below the hyaline mark in middle of cell  $R_1$ . These are trivial characters and one would expect this much variability in markings.

This species is differentiated by having 2 brown convergent bands in apex of wing which fuse with the preapical brown markings; the subcostal cell short, hyaline or nearly so. Two hyaline marks in cell  $R_3$  just beyond r-m crossvein; and a preapical band of brown over cell 1st  $M_2$

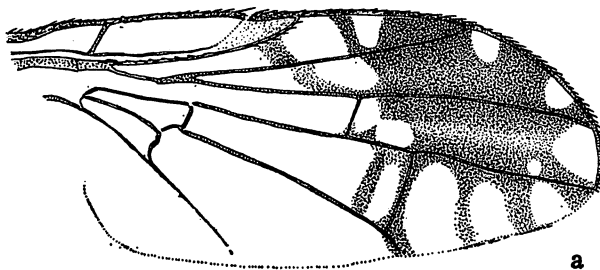


Fig. 164. *T. convergens* Hering. a. wing.

Otherwise fitting description of other species of this group. The ♀ ovipositor has not been extruded for study; the basal segment is shining black with yellowish setae on basal 2/5 and as seen from dorsal view about equal in length to terga 4-6.

One ♀ specimen from Kuantan, Pahang, Malaya, VIII.1948, reared from *Wedelia biflora* flowers, N. L. H. Krauss.

#### **Trupanea** new species, near *convergens* Hering

One specimen on hand, in poor condition, fits *convergens*, except cell  $R_5$  has a very large hyaline spot immediately beyond the r-m crossvein, rather than a small round spot; and no dark streak extends into cell 1st  $M_2$  just basad of m crossvein, but with a faint indication of a brown transverse streak over middle of cell 1st  $M_2$  continuous through 1/2 of cell  $M_4$ . This is absent in *convergens*. The subcostal cell is very short, scarcely equal in length to the r-m crossvein and is dark brown on apical 2/3.

The specimen on hand is from S VIETNAM: 15 km, Dalat, 1500 m, 29.IV.-5V.1960, S. Quate; sex unknown, poor condition. The specimen is in the B. P. Bishop Museum.

#### **Trupanea isolata** Hardy, new species Fig. 165a-b.

Seeming to fit nearest *convergens* Hering but differing by having 2 isolated hyaline spots in apex of cell  $R_5$ , rather than having the apex entirely hyaline except for the converging brown marks over apices of veins  $R_{4+5}$  and  $M_{1+2}$ ; by the hyaline streaks from wing margin in cell 2nd  $M_2$  not bisecting the cell except for the apical mark; and with faint indications of brown streaks through cell  $M_4$ , rather than having this cell completely hyaline.

♀. *Head*: Shaped as in fig. 165a, dorsal and ventral margins of head distinctly converging anteriorly, with front gradually sloping and antennae situated near upper 2/3 of eye height. Eyes almost round, slightly higher than long. Three pairs of inferior fronto-orbitals and 2 pairs of

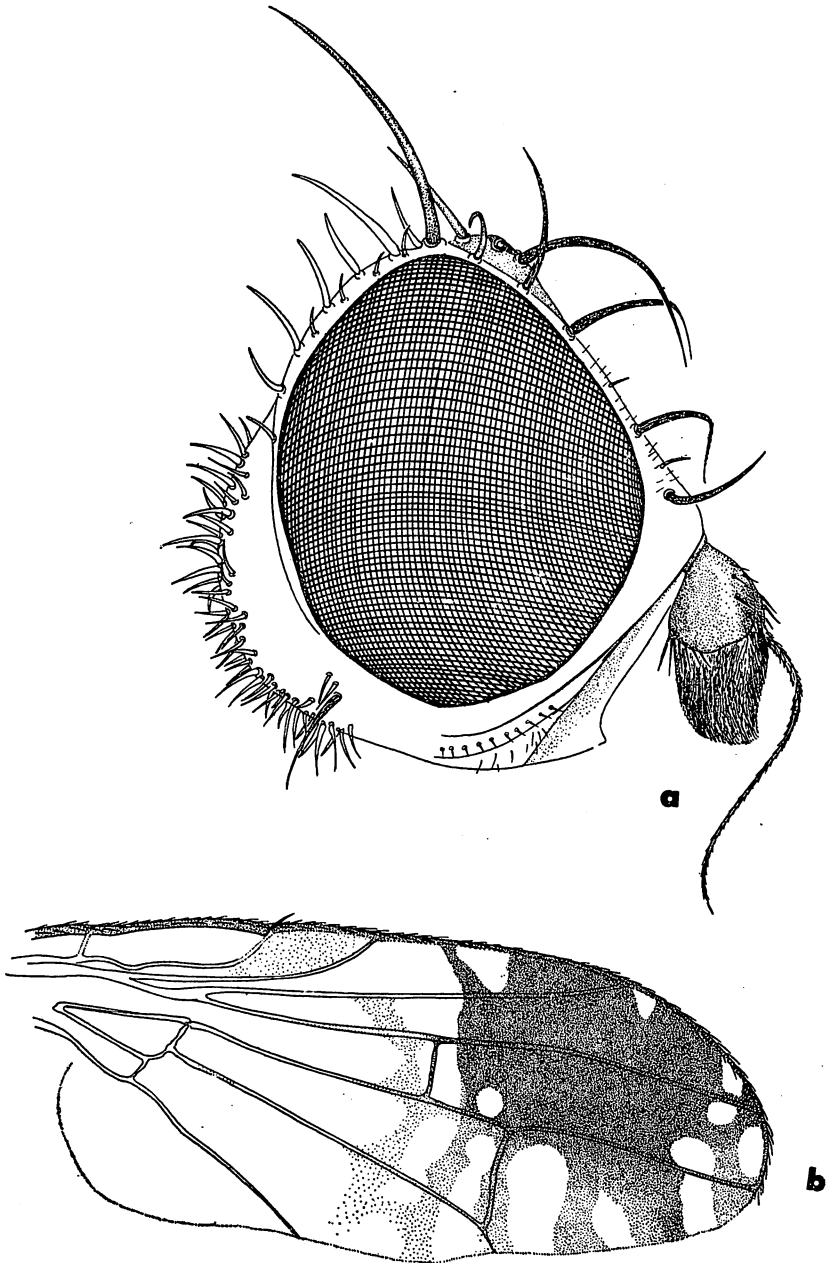


Fig. 165. *T. isolata* n. sp. a. head; b. wing.



superior fronto-orbitals; all orbitals are pale brown except for the white upper superior fronto-orbitals. Ocellar bristles strong. Antennae yellow, tinged faintly with brown at apex of 3rd. Third segment about 1/3 to 1/2 longer than wide, shaped as in fig. 165a. *Thorax*: Densely gray tomentose; the bristles are yellow-brown except for the white bristle on notopleural callus. *Legs*: Yellow. *Wings*: As in fig. 165b. Subcostal cell pale yellow, distinctly longer than r-m crossvein. Vein  $R_{4+5}$  bare except for 2 small setae at base. *Abdomen*: Entirely black, densely gray pollinose. Basal segment of ovipositor black, slightly longer than terga 5+6. Measured on venter the basal segment is 1.0 mm. The piercer has not been relaxed for study.

Length: Body, not including ovipositor, 3.5 mm; wings, 3.75 mm.

♂. Unknown.

Holotype ♀ (BISHOP 9999), S. VIETNAM: Dalat, 1500 m, 29.IV-4.V.1960 L.W. Quate.

Type in the B. P. Bishop Museum

***Trupanea vernoniae* Hardy, new species** Fig. 166a-f

This species resembles *stulta* Hering and *opprimata* Hering from the Lesser Sunda Islands, but differs by having the abdomen all yellow and with the wing markings distinctly different from these, or other known species of *Trupanea* (cf. fig. 166a with fig. 11 and 13, pl. 1, Hering 1941f). It is also differentiated by having 2 prominent basal spots in cell  $R_1$ , the 1st extending across cell  $R_3$  to vein  $M_{4+5}$ ; a prominent hyaline spot at upper apex of cell  $R_3$  just beyond vein  $R_{3+3}$ , and another preapical mark in lower portion of  $R_3$  extending into  $R_5$ , occupying entire of apex of cell  $R_5$  and upper apical portion of cell 2nd  $M_2$ , isolating a small brown spot at extreme apex of cell  $R_3$ ; other markings as in fig. 166a.

♂. *Head*: Just slightly higher than wide, entirely yellow except for compound eyes, golden pollinose over front and face. Front broad, as wide as long and slightly wider than 1 eye. Front distinctly sloping, antennae situated at approximately upper 2/3 of head height. Four pairs inferior fronto-orbital bristles present. Fronto-orbitals, except upper superior, also ocellars and inner vertical bristles, yellow, tinged faintly with brown; upper superior fronto-orbitals and other head bristles, also occipital setae, white, tinged faintly with yellow. Face short, very slightly concave in median portion with epistomal margin projecting. Antennae yellow, 3rd segment short, 1/3 to 1/2 longer than wide and very slightly pointed on upper apex (fig. 166d). *Thorax*: Predominantly dark brown to black in ground color, densely gray pollinose in ungreased specimens. Humeri clear yellow. Propleura, anterior margin of posterolateral margins of mesonotum yellow, tinged faintly with brown. Dorsocentral bristles situated nearer to suture than to anterior supraalar. Halteres with yellow-white stems, pale yellow on knobs. *Legs*: Entirely yellow. Middle tibia with 1 strong yellow, apical spur. *Wings*: As in fig. 166a and as described above. Vein  $R_{4+5}$  with 2 setae at extreme base. Subcostal cell yellow-brown. Cubital cell very slightly acute at apex. *Abdomen*: Entirely opaque yellow, covered with pale yellow setae. Fifth sternum approximately as wide as long, gently concave on posterior margin and with a prominent brownish yellow bristle on each side of hind margin (fig. 166b). Genitalia as in fig. 166c. Surstyli short and thick, curved inwardly and blunt at apices. Tenth sternum not visible from direct lateral view, but plainly visible from end view. Anal plates small, inconspicuous, longer than wide. Apex of aedeagus small, not strongly swollen.

Length: Body, 4.7 mm; wings, 4.5 mm.

♀. Fitting the description of ♂, except that the allotype has 6 or 7 inferior fronto-orbital bristles (4 or 5 prominent bristles plus 2 or 3 small bristles in inferior fronto-orbital row). The ♀ paratype has only 1 extra, small bristle developed, and the allotype may be aberrant in this regard. *Abdomen*: Entirely yellow, as in the ♂ and densely yellow-gray pubescent, covered with flat yellow setae. Sixth tergum slightly longer than 5th and predominantly brown, yellow only

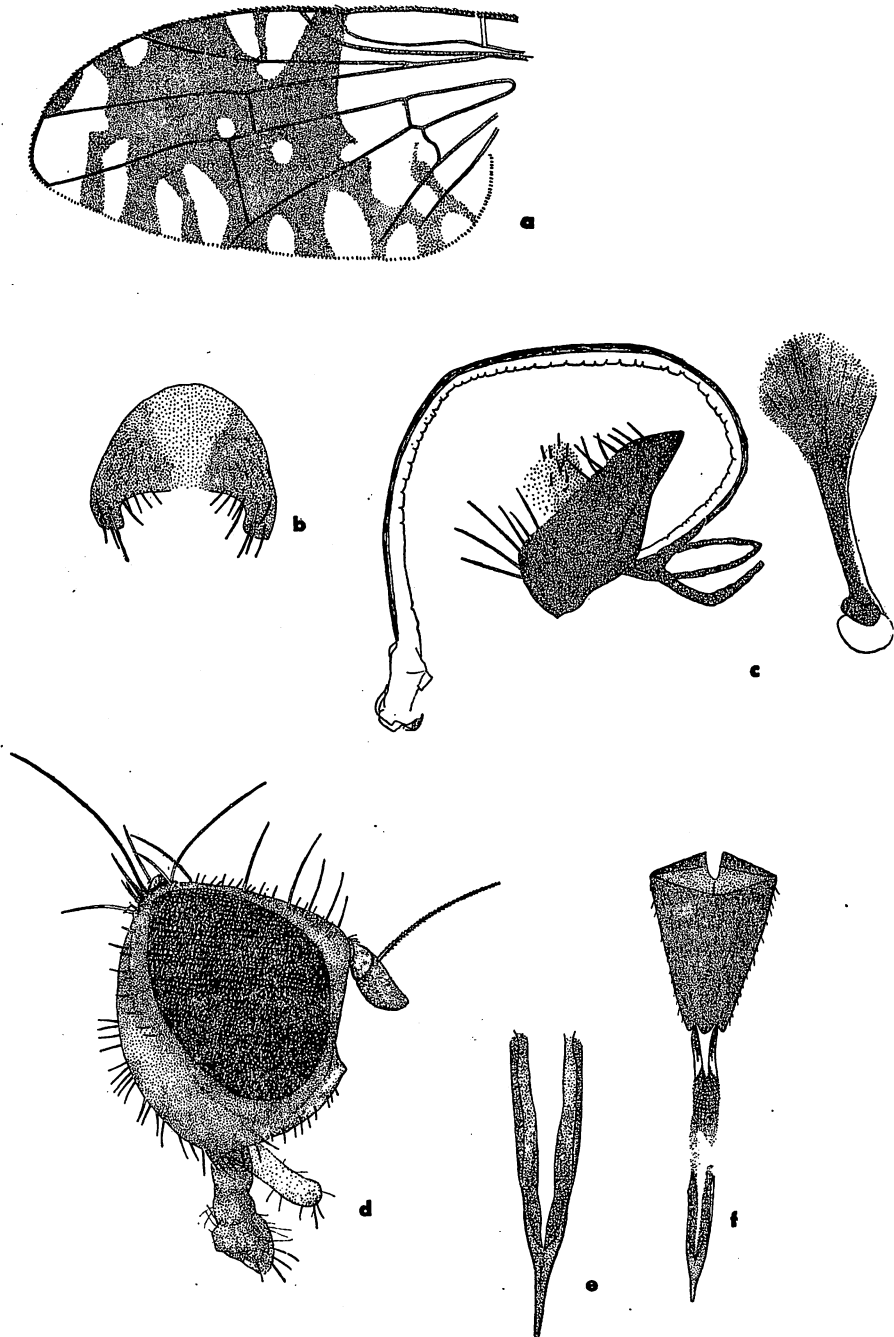


Fig. 166. *T. vernoniae* n. sp. a. wing; b. ♂ 5th sternum; c. ♂ genitalia; d. head; e. apex of piercer; f. ovipositor.

along basal margin. Base of ovipositor polished black, short, subequal to terga 5+6, 0.7 mm long as viewed from above. The spermathecae have not been observed for this species. The apodeme on inner ventral margin of 6th sternum extends about 2/3 the length of 5th sternum. The piercer is strongly tapered to a long narrow point at apex (fig. 166e).

Length: Body and wings, 4.5 mm.

Holotype ♂, THAILAND: Bangkok, Bangpo, 7. XII.1960, on *Vernonia elliptica*, P. Manichote. Allotype ♀, Thailand: Kanchanaburi, 15. VIII.1963, no collector given. Two paratypes, 1 ♂ and 1 ♀, same data as type.

Type returned to the Thailand Department of Agriculture collection. Allotype returned to the Kasetsart University collection. One paratype in B. P. Bishop Museum and 1 paratype in the University of Hawaii collection.

### Genus *Xyphosia* Robineau-Desvoidy

*Xyphosia* Robineau-Desvoidy, 1830, *Mém. Près. Acad. Roy. Sci. Inst. France*, 2: 762. Type-species: *Musca miliaria* Schrank, by subsequent designation (Rondani 1870: 8) = *Xyphosia cirsiarum* Robineau-Desvoidy.

*Oxyphora* Loew (partim), 1862, *Europ. Bohrfly.*, 81; nec Robineau-Desvoidy, 1830.

*Xiphosia* Aczél, 1938, *Allattani Közlemények* 63: 81. Error in spelling.

Members of this genus are supposed to be differentiated from related groups of Tephritinae by having the upper superior fronto-orbital bristles directed inward, except in *malaisei* Hering, in combination with the setose vein R<sub>4+5</sub>; having the dorsocentral bristles about opposite the supraalars; arista short pubescent; and wings spotted. In the 1 species on hand, *malaisei* Hering from Burma, the upper superior fronto-orbitals are reclinate as in other Tephritini and I am not sure that this character is reliable. On the basis of just the single species before me, I see no reason for separating this into a distinct tribe (Xyphosiini, of Hering and other authors) and would prefer to treat it under Tephritini. This is differentiated from *Tephritis* by having 3 pairs inferior fronto-orbital bristles; vein R<sub>4+5</sub> setose over most its length; wings brown with small hyaline marks around entire margin, with tiny brown hyaline spots in the field (pl. 6, fig. 57); and with small brown spots present at bases of mesonotal bristles. This is very similar to *Acinia* Robineau-Desvoidy but differs by having the dorsocentral bristles about apposite the supraalars and the arista short pubescent.

The genus presently contains 7 species; all but 1 are palaeartic in distribution.

#### *Xyphosia malaisei* Hering Fig. 167a-c; pl. 6, fig. 57.

*Xyphosia malaisei* Hering, 1938, *Ark. Zool.* 30A(25): 52, fig. 56. Type-locality: Kambaiti, Burma.

Type ♀ in Naturhistoriska Riksmuseet, Stockholm. I have studied the type and have a color photograph.

This species is differentiated from others which have been described under *Xyphosia* by the large number of tiny, round, hyaline spots in the wing field (pl. 6, fig. 57), in combination with hyaline marginal marks in apices of cells R<sub>3</sub> and R<sub>5</sub>. The ♂ has not been previously described.

♂. Predominantly black in ground color, densely gray pollinose, covered with flat recumbent yellow-white setae over mesonotum and with all bristles yellow, faintly tinged with brown except for upper superior fronto-orbitals, postocellars, postverticals, occipital row, and propleurals, which are white. Head shaped as in fig. 167a. Face slightly concave, epistoma projected. Head predom-

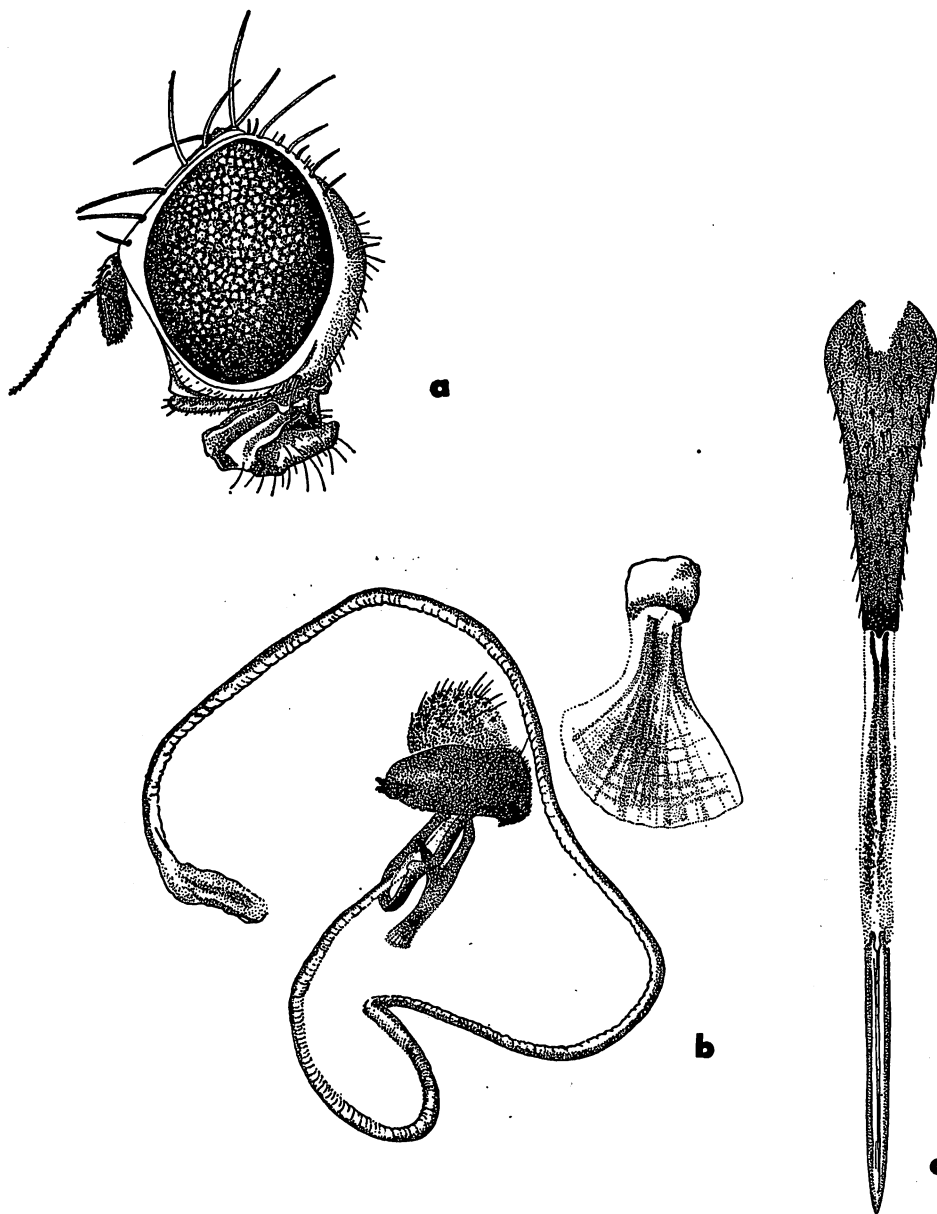


Fig. 167. *Xyphosia malaisei* Hering. a. head; b. ♂ genitalia; c. ovipositor.

inantly yellow, tinged faintly with brown in ground color and covered with gray pollen. Third antennal segment short,  $1/3$  to  $1/2$  longer than wide. Arista short pubescent. Palpi yellow, with short black setae around apical portion. Thorax densely gray pubescent with no indication of brown vittae but with a faint brown spot on each side at level with suture in line with dorsocentrals situated in front of a line drawn between supraalars, about  $2/5$  the distance from anterior supraalars to suture. Legs entirely yellow except for tinges of brown ventrally on middle and

hind femora. Wings as in pl. 6, fig. 57. Third costal section about  $\frac{3}{5}$  as long as 2nd section. Two rather prominent costal spines present at subcostal break. Vein  $R_{4+5}$  setose over most of its length. The r-m crossvein situated near apical  $\frac{1}{4}$  of cell 1st  $M_2$ . Lobe of cubital cell short, about equal in length to the transverse section of cubital vein which marks off apex of cell, and with vein  $Cu_1+1st A$  8 or  $9\times$  longer than the lobe of cubital cell. Abdomen predominantly densely gray pubescent with a pair of anterobasal submedian brown spots each on terga 2-5. Extreme apex of 5th tergum yellow. Sterna brownish yellow, 5th slightly longer than wide with hind margin nearly straight. Epanthrium dark brown; surstyli short and thick, subacutely pointed at apices (fig. 167b).

Length: Body, 4.5 mm; wings, 4.75 mm.

♀. Fitting description of ♂ except that the wing markings differ very slightly. Ovipositor elongate (fig. 167c), basal portion approximately  $\frac{1}{3}$  longer than remainder of abdomen and 3.0 mm long measured on venter. The piercer is long and slender, evenly tapered to apex (fig. 167c), 2.7 mm long. Extended ovipositor 8.2 mm.

Length: Body, excluding ovipositor, 4.7 mm; wings, 5.25 mm.

LAOS: Sayaboury Prov., Muong Sayaboury, 400 m, 25.XI.1967, collected along shaded stream margin, F. G. Howarth; Sedone Prov., Paksong, 17.V.1965, P. D. Ashlock; Pak Neun, 27.I.1918, R. Vitalis de Salvaza. THAILAND: Chiangmai Prov., Doi Suthep, 900 m, 14.XI.1957, J. L. Gressitt.

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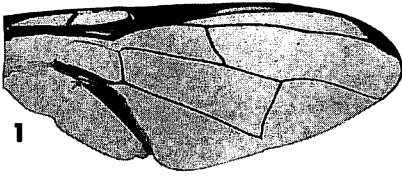
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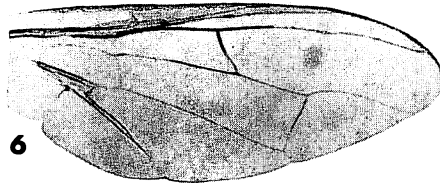


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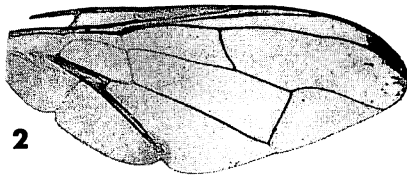
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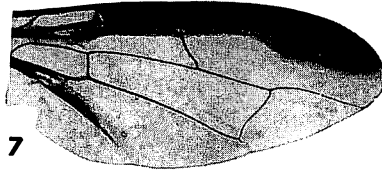
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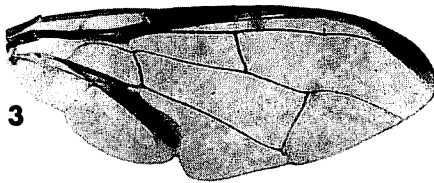
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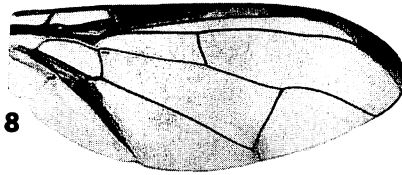
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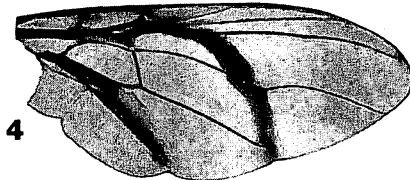
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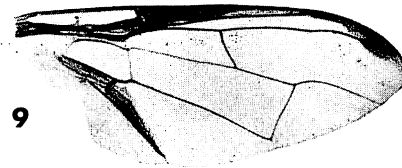
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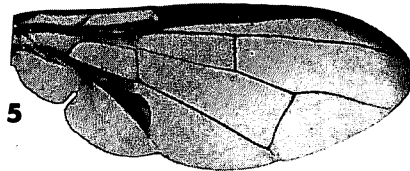
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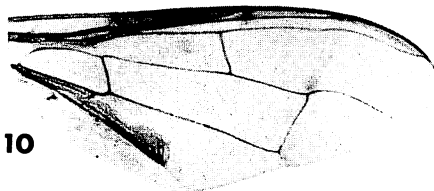
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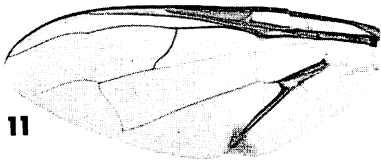
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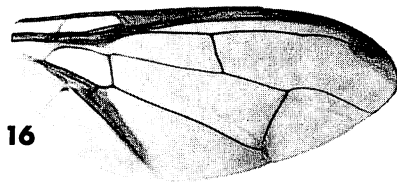
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4. *D. (S.) frauenfeldi* Schiner
5. *D. (S.) mcgregori* (Bezzi)

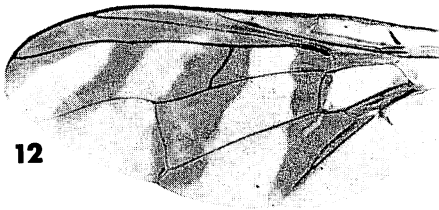
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9. *D. (Z.) caudatus* Fabricius
10. *D. (Z.) diaphoropsis* (Hering)



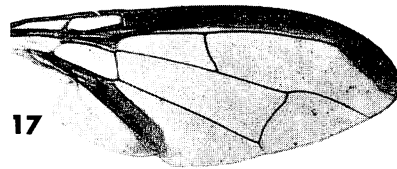
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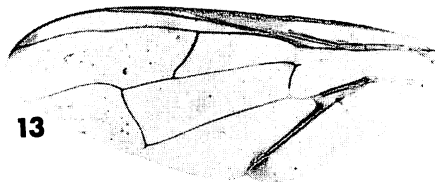
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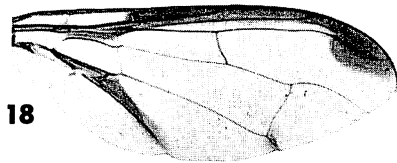
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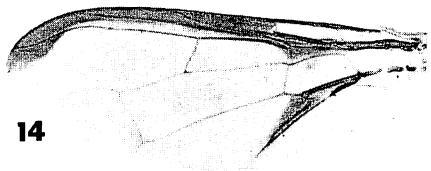
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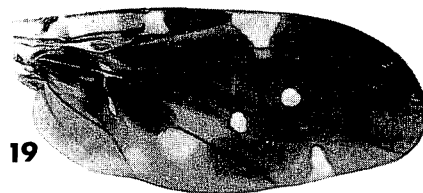
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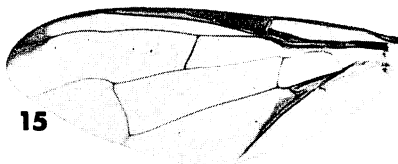
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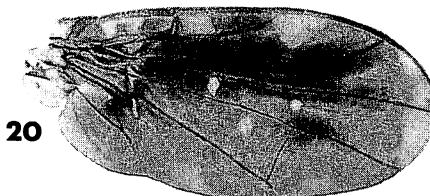
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19

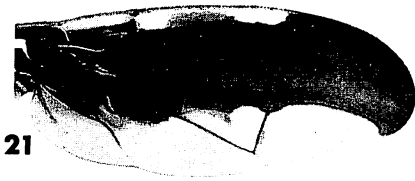


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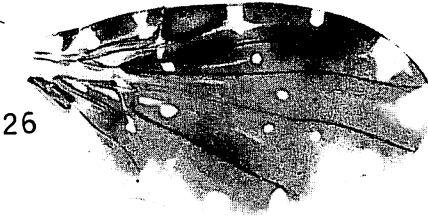


20

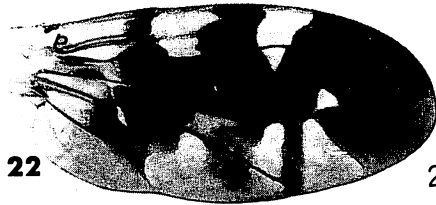
- |   |  |
|---|--|
| 11. <i>Dacus (Strumeta) aethriobasis</i> n. sp. | 16. <i>D. (Z.) maculatus</i> (Perkins)     |
| 12. <i>D. (S.) umbrosus</i> Fabricius           | 17. <i>D. (Z.) platamus</i> n. sp.         |
| 13. <i>D. (S.) zonatus</i> (Saunders)           | 18. <i>D. (Z.) tau</i> (Walker)            |
| 14. <i>D. (Zeugodacus) isolatus</i> n. sp.      | 19. <i>Acanthonevra desperata</i> (Hering) |
| 15. <i>D. (Z.) scutellaris</i> (Bezzi)          | 20. <i>A. fuscipennis</i> Macquart         |



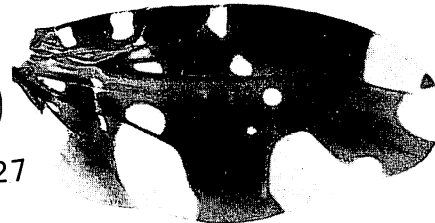
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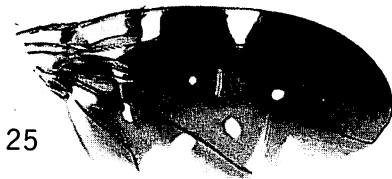
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24



29



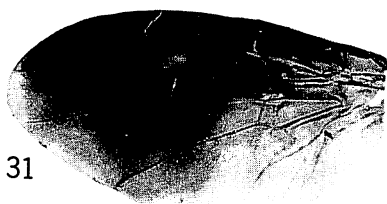
25



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21. *Acanthonevra hemileina* Hering  
22. *A. ochropleura* Hering  
23. *A. siamensis* n. sp.  
24. *A. solita* (Bezzi)  
25. *A. vaga* (Wiedemann)

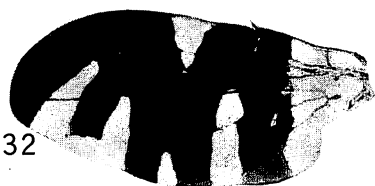
26. *Ectopomyia baculigera* n. sp. ♀  
27. *E. baculigera* n. sp. ♂  
28. *Hexacmia radiosa* (Rondani)  
29. *Rioxa parvipunctata* de Meijere  
30. *Themara hirtipes* Rondani



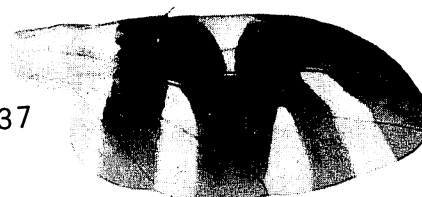
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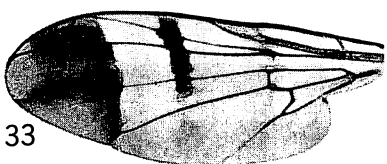
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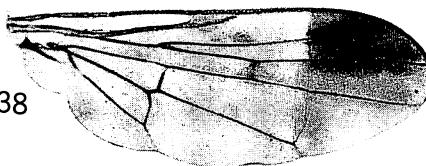
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37



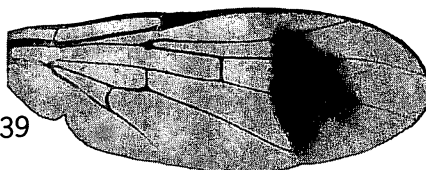
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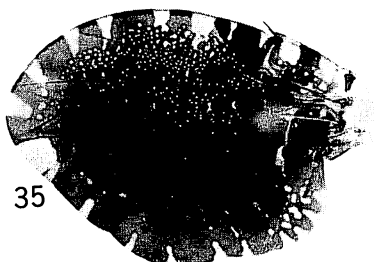
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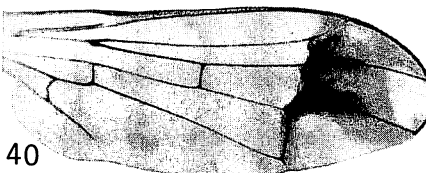
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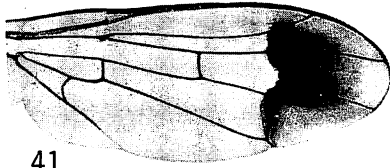
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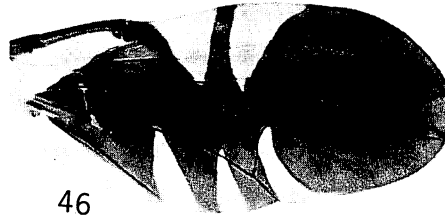
40

- 31. *Xarnuta leucotelus* Walker
- 32. *Sphaeniscus atilius* (Walker)
- 33. *Adrama determinata* (Walker)
- 34. *Rhabdochaeta venusta* de Meijere
- 35. *Dictyotrypeta longiseta* Hering

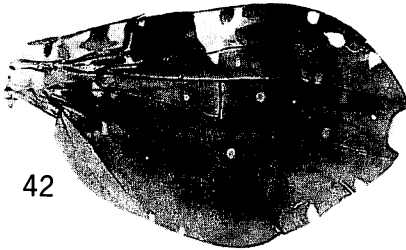
- 36. *Tritaeniopteron tetraspilotum* Hardy
- 37. *Sphaeniscus quadrincisus* (Wiedemann)
- 38. *Adramoides picta* n. sp.
- 39. *Meracanthomyia kotiensis* Kapoor
- 40. *M. intermedia* n. sp.



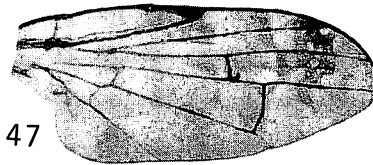
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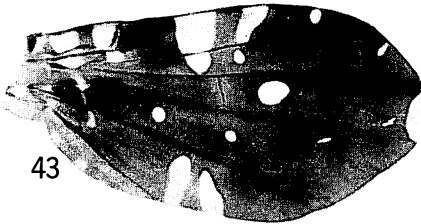
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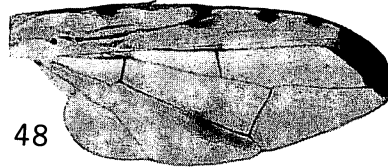
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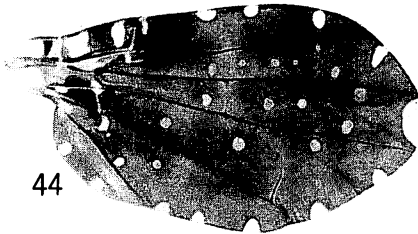
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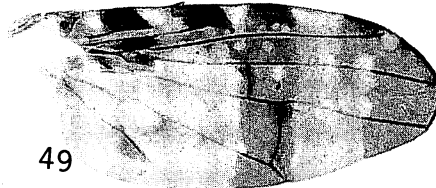
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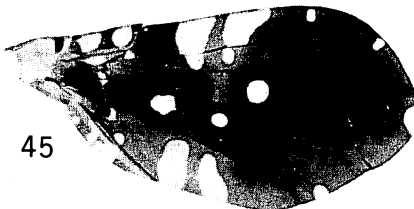
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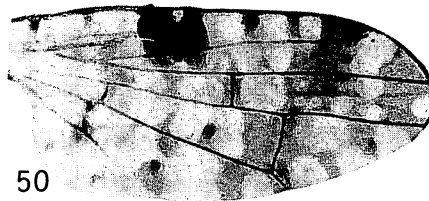
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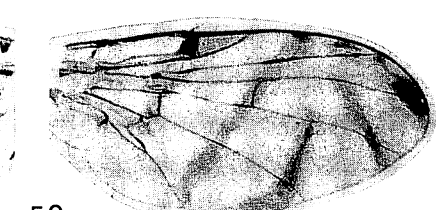
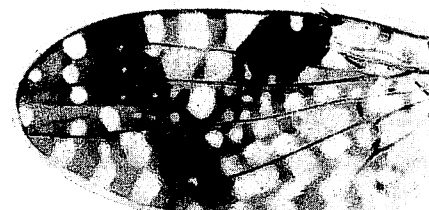
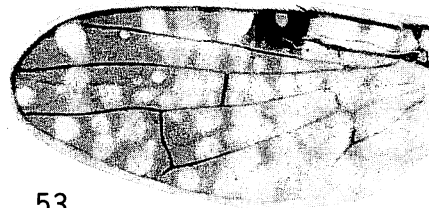
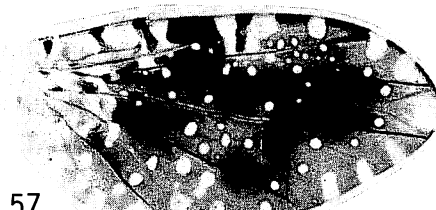
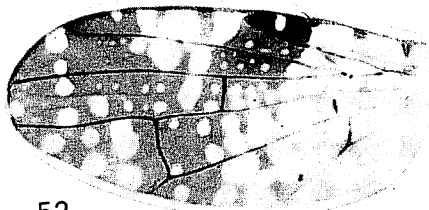
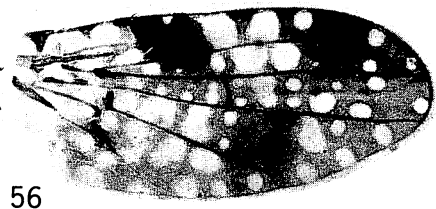
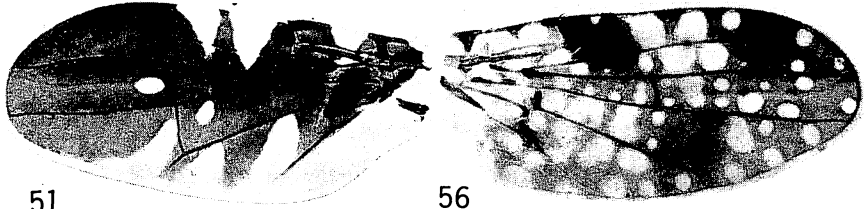


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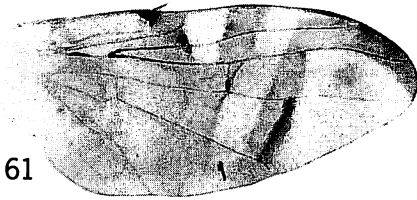
50

41. *Meracanthomyia nigrofemorata* n. sp. 46. *Isonia reinhardi* (Wiedemann)  
 42. *Platensina europtera* (Bezzi) 47. *Acanthiophilus helianthi* (Rossi)  
 43. *P. intacta* n. sp. 48. *Craspedoxantha octopunctata* Bezzi  
 44. *Platensina tetrica* Hering 49. *Sphenella sinensis* Schiner  
 45. *P. zodiacalis* (Bezzi) 50. *Styliia parvula* (Loew)

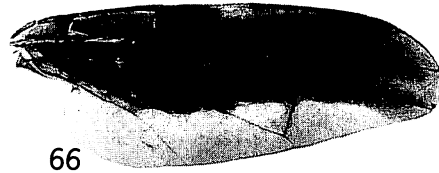


- 51. *Indaciura xanthotricha* (Bezzi)
- 52. *Styilia iracunda* (Hering)
- 53. *S. siamensis* n. sp.
- 54. *Tephritis lyncea* Bezzi
- 55. *Taeniosstola apicata* Hering

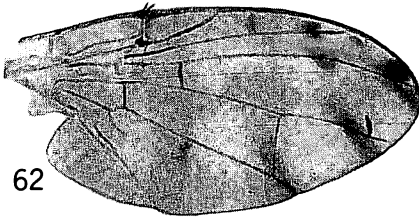
- 56. *Styilia spenceri* n. sp.
- 57. *Xyphosia malaisei* Hering
- 58. *Spilocosmia bakeri* Bezzi
- 59. *Taeniosstola limbata* Hering
- 60. Genus and species unplaced



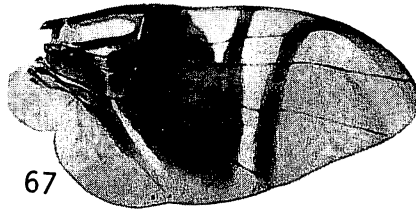
61



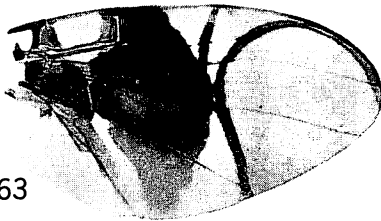
66



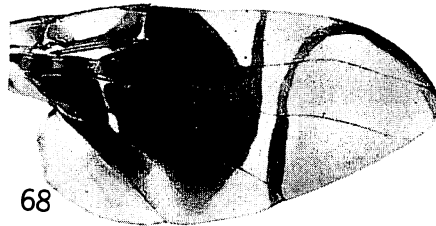
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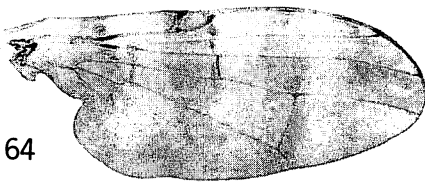
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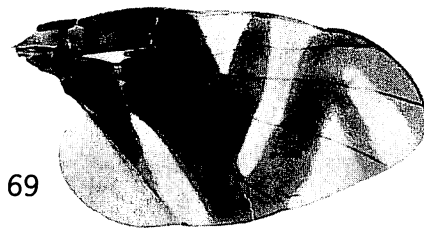
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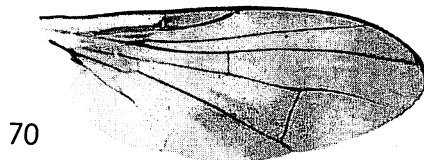
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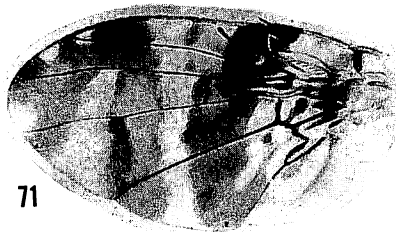


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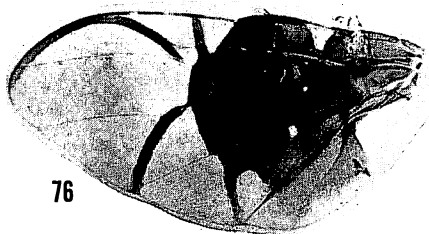
61. *Acidoxantha totoflava* n. sp.  
62. *Acroceratitis incompleta* n. sp.  
63. *Anomoia vana* (Hering)  
64. *Carpomomyia vesuviana* A. Costa  
65. *Hemilea araliae* Malloch

66. *Hemilea bipars* (Walker)  
67. *Myoleja fossata* (Fabricius)  
68. *M. ravidata* n. sp.  
69. *M. superflucta* (Enderlein)  
70. *Dimeringophrys bilineata* (Walker)

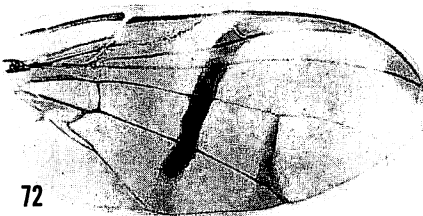




71



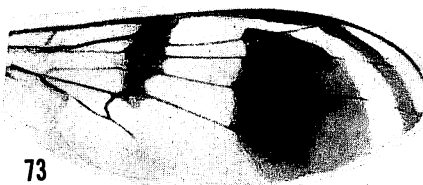
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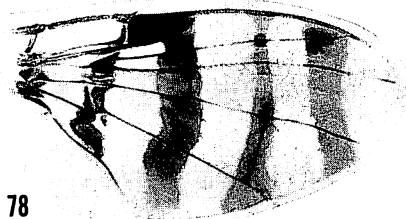
72



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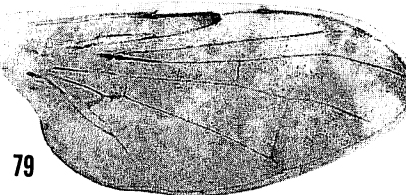
73



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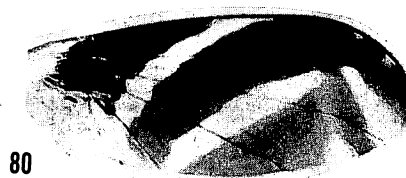
74



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- 71. *Acroceratitis plumosa* (Hendel)
- 72. *Gastrozona parviseta* n. sp.
- 73. *Euphranta (Euphranta) striatella* (v. d. Wulp)
- 74. *E. (Staurella) apicalis* Hendel
- 75. *Paraxarnuta anephelobasis* n. sp.

- 76. *Anomoia kraussi* n. sp.
- 77. *Felderimyia fuscipennis* Hendel
- 78. *Acrotaeniostola fuscinotum* Hering
- 79. *Chaetellipsis paradoxa* Bezzi
- 80. *Anoplomus nigrifemoratus* n. sp.