

A NEW SPECIES OF *PROANOPLOMUS* SHIRAKI FROM BORNEO, WITH NOTES ON *P. CINEREOFASCIATUS* (DE MEIJERE) AND THE *ANOPLOMUS* GROUP OF GENERA (DIPTERA: TEPHRITIDAE: GASTROZONINI)

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Abstract

Proanoplomus tenompokensis sp. n. is described and illustrated from Sabah, East Malaysia. *P. cinereofasciatus* (de Meijere) is discussed and recorded from Sumatra and Java in Indonesia. *Sinanoplomus* Zia and *Rhaibophleps* Hardy are placed as new synonyms of *Anoplomus* Bezzi, resulting in three new combinations, viz. *A. fasciatus* (Walker), *A. seclusa* (Hardy) and *A. sinensis* (Zia). A revised key to *Proanoplomus* Shiraki and a key to the seven known *Anoplomus* species are provided.

Introduction

The identity of the Indonesian *Proanoplomus cinereofasciatus* (de Meijere) has become confused in recent years, with its correct generic placement only recently resolved (Kovac *et al.* 2006). Previous confusion has resulted from errors in the original description (de Meijere 1924) and an inaccurate comment that 'the wing markings and other details appear to be as in *P. laqueatus* [now *Pardalaspinus laqueatus* (Enderlein)]' by Hardy (1988). This has led to an inability to correctly identify specimens from Java, which has resulted in various misidentifications. Furthermore, the record from Sabah, East Malaysia (Hardy 1988) belongs to a different species, described below.

This study attempts to resolve the confusion surrounding this poorly known fly and facilitate proper identification in the future. A previous key to species (Hancock 1999) is also updated. In addition, the *Anoplomus* group of genera is discussed, with several synonymies and new combinations proposed. This study has been aided by the examination of both the Sabah specimen noted above and photographs of a male syntype of *P. cinereofasciatus* [one of four (2 males, 2 females) collected in Sumatra by E. Jacobson in May 1914], kindly provided by Keith Arakaki of the B.P. Bishop Museum and Herman de Jong of the University of Amsterdam, respectively.

Proanoplomus tenompokensis sp. n.

(Fig. 1)

Proanoplomus cinereofasciatus: Hardy, 1988: 108. (*partim*: Sabah specimen only). Misidentification.

Pardalaspinus cinereofasciatus: Hancock & Drew, 1994: 876. (*partim*: Sabah record only).

Ceratitoides cinereofasciatus: Hancock, 1999: 940. (*partim*: Sabah record only).

Proanoplomus cinereofasciatus: Kovac *et al.*, 2006: 189. (*partim*: Sabah record only).

Type. Holotype ♂, EAST MALAYSIA (SABAH): labelled 'British N. Borneo, Tenompok, 15.ii.1959 / T. C. Maa, Collector'. In B.P. Bishop Museum, Honolulu.

Description. Male (Fig. 1). Length of body 5.5 mm, of wing 6.0 mm. Head broad, higher than long; epistome slightly projecting; fulvous except face yellow and occiput black above and between the swollen, yellowish-white occipital lobes; setae black but largely abraded: two pairs frontals (third pair abraded?) and two pairs orbitals; ocellars abraded; postocular row thin and dark. Antennae shorter than face; second segment with fine, red-brown setulae; third segment blackened, apically rounded and slightly upturned at tip; arista short-plumose. Thorax shining blackish-brown to black, without whitish-tomentose areas on scutum; microsetae black except whitish on anepisternum; with yellow areas as follows: narrow edge to postpronotal lobes except ventrally, a pair of very short and barely discernable postsutural vittae, broad anepisternal stripe reaching postpronotal lobe dorsally, parts of anatergite and katatergite; notopleural calli and suture with a dark fulvous tinge. Scutellum swollen, rounded and entirely black. With a full complement of setae, including postpronotal, presutural, dorsocentral and prescutellar; four scutellars; one anepisternal. Legs with femora mostly black; tibiae, tarsi and apices of fore femora fulvous; mid tibiae with one long spine at apex.

Wing typical of genus; hyaline with blackish-brown markings as follows: a broad subbasal area reaching middle of pterostigma [cell sc] and divided medially from middle of cell c; an oblique band from apex of vein A_1+Cu_2 , crossing centre of cell dm and enclosing R-M crossvein, connecting with a broad costal band from beyond apex of cell sc that is confluent with vein R_{4+5} except at apex where it enters cell m; a narrow, oblique subapical band from near middle of costal band to wing margin below the apex of vein M; a triangular band across DM-Cu crossvein that expands posteriorly to wing margin and very faintly extends anteriorly as a curved band to or near the band across R-M crossvein. Veins R_1 and R_{4+5} setose; costal setulae slightly thickened above apex of cell c but no distinct seta above tip of vein Sc. Abdomen blackish-brown, with tergites II and IV densely whitish tomentose; tergites II-V normal in shape, neither enlarged nor reduced.

Female unknown.

Distribution. Only known from Sabah, East Malaysia.

Etymology. Named after the type locality.

Comments. This species differs from both *P. formosanus* (Shiraki) from Taiwan and *P. cinereofasciatus* from Indonesia in having the postpronotal lobes dark brown to black with yellow margins. It also differs from *P. cinereofasciatus* in lacking pale microsetae or tomentose bands on the scutum and from *P. formosanus* in the broader whitish-tomentose bands on abdominal tergites II and IV. From *P. nigroscutellatus* Zia from SW China and NE India, *P. tenompokensis* differs in the yellow-margined postpronotal lobes and the less conspicuously convergent wing bands across the R-M and DM-Cu crossveins towards the wing margin posteriorly.

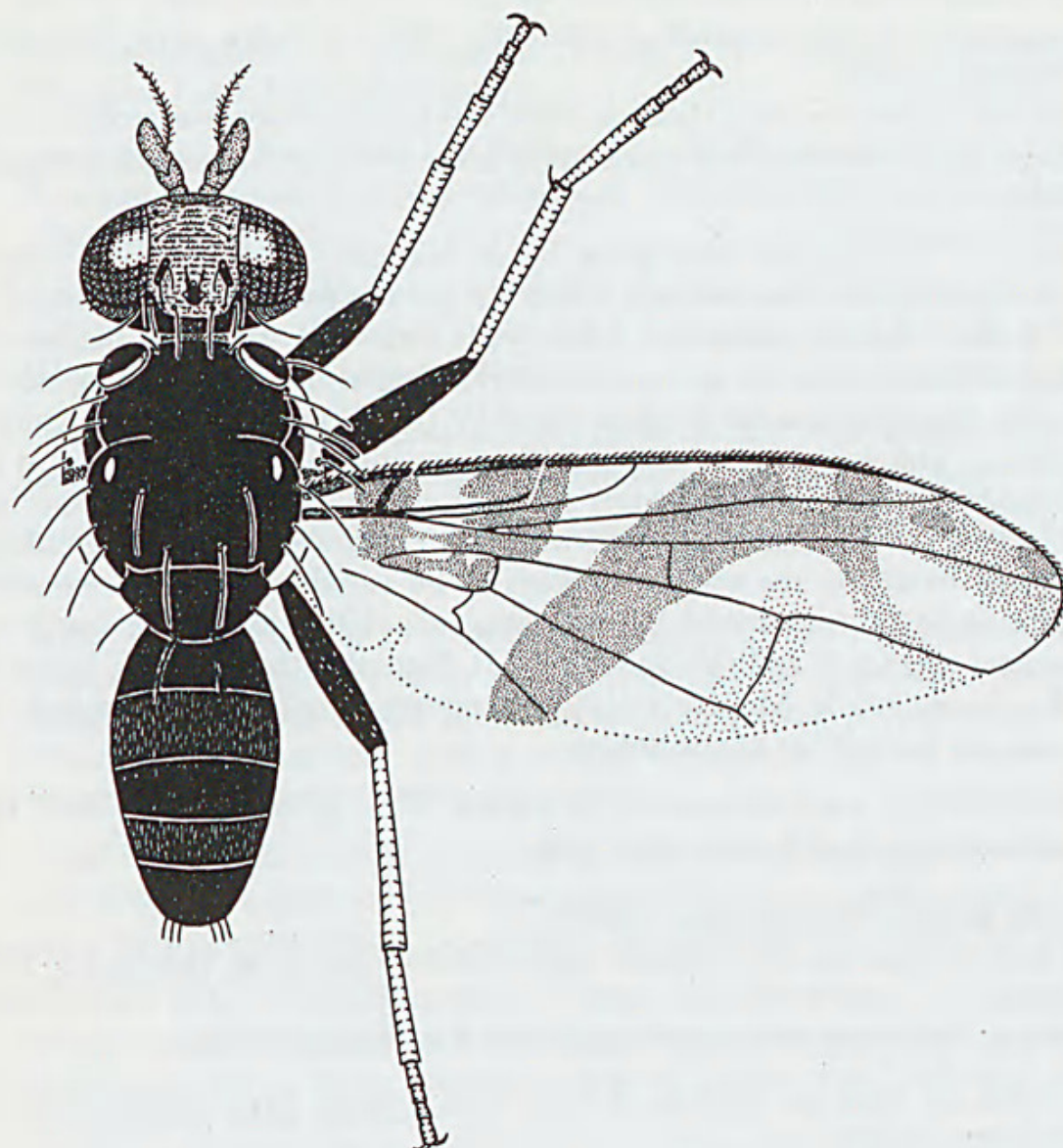


Fig. 1. *Proanoplomus tenompokensis* sp. n. Habitus of holotype male.

***Proanoplomus cinereofasciatus* (de Meijere)**

Carpophthoromyia cinereofasciata de Meijere, 1924: 37. (Tandjung Andalas, Sumatra, Indonesia).

Paranoplomus formosanus: Hering, 1952: 285. (Mt Gede & Idjen, Java, Indonesia). Misidentification.

Proanoplomus cinereofasciatus: Hardy, 1988: 108. (*partim*: type specimens only).

Proanoplomus sp. near *japonicus*: Hardy, 1988: 108. (Mt Gede & Idjen, Java, Indonesia). Misidentification.

Pardalaspinus cinereofasciatus: Hancock & Drew, 1994: 876. (*partim*: Indonesian records only).

Proanoplomus sp. [near *omeiensis*]: Hancock & Drew, 1994: 880. (Mt Gede & Idjen, Java, Indonesia). Misidentification.

Proanoplomus sp. near *intermedius*: Hancock, 1999: 937. (Idjen, Java, Indonesia). Misidentification.

Ceratitoides cinereofasciatus: Hancock, 1999: 940. (*partim*: Indonesian records only).

Proanoplomus cinereofasciatus: Kovac *et al.*, 2006: 189. (*partim*: Indonesian records only).

Comments. The original description by de Meijere (1924) contains several errors. The scutum is not entirely black but has the postpronotal lobes and a pair of short, lateral postsutural vittae yellowish. The wing has the brown subapical band across the apex of vein M ending at the wing margin, not at the vein. The abdomen has tergites II and IV (not II and III) broadly whitish tomentose. The wing pattern and scutellum are inseparable from those of *P. tenompokensis* but other characters differ as noted under the latter species. The extent of the pale (greyish-white or yellowish-grey) longitudinal tomentose bands on the scutum appears to be variable and *P. formosanus* appears to be best separated by the narrower whitish-tomentose bands on abdominal tergites II and IV (Shiraki 1933). Note that the figure '5' given at the beginning of de Meijere's (1924) description refers to the month of capture, not the number of specimens.

Distribution. *P. cinereofasciatus* is known with certainty only from the Indonesian islands of Sumatra and Java.

Revised key to *Proanoplomus* species

This key to *Proanoplomus* Shiraki species is modified from Hancock (1999) to include *P. cinereofasciatus* and *P. tenompokensis*. It also incorporates additional characters noted by Wang (1998) for Chinese species.

- 1 Scutellum white or yellow, at most with a black basal band and three marginal black spots 2
- Scutellum largely or entirely black 6
- 2 Scutellum with one apical and a pair of basolateral black spots; scutum without postsutural lateral yellow vittae; wing with pterostigma [cell sc] almost entirely dark brown; ocellar setae weak, hair-like (China [Yunnan]) *P. caudatus* (Zia)*
- Scutellum with three apical/subapical black spots; scutum with a pair of short, postsutural lateral yellow vittae; wing with apical half of pterostigma [cell sc] hyaline; ocellar setae well developed 3
- 3 Wing with brown band across DM-Cu crossvein connected to transverse band across R-M crossvein (China [Zhejiang]) *P. affinis* Chen
- Wing with brown band across DM-Cu crossvein not connected to transverse band across R-M crossvein 4

- 4 Fore femora yellow with a brown apical mark; mid and hind femora yellow basally, dark brown to black apically 5
 - All femora black (China [Yunnan, Guangxi], NE India [Assam], Burma, Thailand, Laos, Indonesia [Java]) *P. yunnanensis* Zia
- 5 Apex of costal band broad, extending two-thirds distance between veins R_{4+5} and M; oviscape almost cylindrical, more than twice as long as wide (Taiwan) *P. cylindricus* (Chen)**
 - Apex of costal band narrow, extending half distance between veins R_{4+5} and M; oviscape flattened, about 1.3-1.5 times as long as wide (Japan [Hokkaido, Honshu, Shikoku, Kyushu]) *P. japonicus* Shiraki
- 6 Scutellum with a transverse whitish band on disc, sometimes darkened medially, surrounded by black (NE Burma) *P. longimaculatus* Hardy
 - Scutellum black on disc, with or without narrow lateral yellow bands 7
- 7 Wing with apical half of pterostigma [cell sc] brown and brown band across vein M isolated from costal band; ocellar setae thin, hair-like; scutum with postpronotal lobes brown and lateral postsutural yellow vittae absent; scutellum with a narrow basolateral yellow streak; fore femora yellow-brown (southern Vietnam) *P. spenceri* Hardy
 - Wing with apical half of pterostigma [cell sc] hyaline and brown band across vein M connected (sometimes weakly) to costal band; ocellar setae well developed; scutum, scutellum and femora not with the above combination of characters 8
- 8 Scutellum with a broad median black longitudinal band and a pair of basolateral black spots, leaving a curved yellow band on each side; postpronotal lobes yellow 9
 - Scutellum entirely black, without yellow markings; postpronotal lobes either yellow or largely or entirely dark brown to black 11
- 9 Fore femora yellow except brown medially; hind femora yellow basally, brown distally; wing with brown band across DM-Cu crossvein short, ending at vein M (China [Fujian]) *P. intermedius* Chen
 - All femora dark brown to black; wing with brown band across DM-Cu crossvein extending distinctly above vein M 10
- 10 Wing with brown band across DM-Cu crossvein connected to band across R-M crossvein in cell r_{4+5} and distinctly broadened below vein Cu_1 (Japan [Honshu]) *P. arcus* (Ito)
 - Wing with brown band across DM-Cu crossvein not connected to band across R-M crossvein in cell r_{4+5} and of even width, not distinctly broadened below vein Cu_1 (China [Sichuan]) *P. omeiensis* Zia

- 11 Postpronotal lobes largely or entirely dark brown to black; scutum black, with lateral yellow postsutural vittae absent or vestigial 12
 - Postpronotal lobes yellow; scutum black with lateral yellow postsutural vittae short but distinct 13
- 12 Scutum with vestigial lateral yellow postsutural vittae; postpronotal lobes with distinct yellow margins (East Malaysia [Sabah]) *P. tenompokensis* sp. n.
 - Scutum without lateral yellow postsutural vittae; postpronotal lobes without distinct yellow margins (China [Yunnan], NE India [Assam]) *P. nigroscutellatus* Zia
- 13 Scutum with pubescence pale, often forming longitudinal bands; abdomen with tergite IV broadly whitish tomentose (Indonesia [Sumatra, Java]) *P. cinereofasciatus* (de Meijere)
 - Scutum with pubescence black, without pale areas; abdomen with tergite IV narrowly whitish tomentose on posterior half (Taiwan) *P. formosanus* (Shiraki)

* *P. caudatus* (Zia) was included in *Anoplomus* Bezzi by Wang (1998), largely on the basis of its weak ocellar setae, dorsoapically pointed third antennal segment and long-plumose arista. However, it has only one long midtibial spine and a typical *Proanoplomus*-like wing pattern and is included here in the latter genus. ** Contrary to Kovac *et al.* (2006) [and others], *P. cylindricus* (Chen) was originally described in *Paranoplomus* Shiraki.

Discussion

Proanoplomus tenompokensis and *P. cinereofasciatus* belong to a group of flies (the *Anoplomus* group) believed to breed in grasses (Poaceae) (Hancock and Drew 1994, Hancock 1999, Kovac *et al.* 2006). They are currently referred to the tribe Gastrozonini in subfamily Dacinae, with larval characters (particularly the presence of a ridge on the ventral tubercle of the caudal segment) recently confirming that the tribes Dacini, Ceratitidini and Gastrozonini form a recognisably monophyletic group (Kovac *et al.* 2006).

Proanoplomus differs from other Asian genera placed in the *Anoplomus* complex in having only a single long spine at the apex of the mid tibiae and generally well developed ocellar setae (weak in *P. caudatus* (Zia) and *P. spenceri* Hardy). The other genera, *Anoplomus* Bezzi, *Sinanoplomus* Zia and *Rhaibophleps* Hardy, all have two (or more) long midtibial spines and rudimentary, hair-like ocellar setae. These genera have been separated largely on setal characters (particularly the presence or absence of postpronotal, presutural and dorsocentral setae) and wing pattern differences. These are poor generic characters, highlighted by the recent description of *Anoplomus hainanensis* Wang (Wang 1998), which has the postpronotal seta present (as in *Sinanoplomus*) and an *Anoplomus*-like wing pattern.

The absence of postpronotal setae in other *Anoplomus* species links that genus with *Rhaibophleps*, which also lacks presutural and dorsocentral setae. *Sinanoplomus* and *Rhaibophleps* are linked by a very similar, elongate and apically truncate aculeus (Hancock 1999), while all three genera have a moderately to very broad dark band across the DM-Cu crossvein and apices of cells dm and cu₁ that reaches the wing margin throughout its length. Numbers of frontal setae (2-3 pairs) and anepisternal setae (1-2) are also variable and useless in defining genera. Separation can thus no longer be maintained or justified and the three genera are combined here as *Anoplomus* Bezzi, 1913 (= *Sinanoplomus* Zia, 1955, syn. n.; = *Rhaibophleps* Hardy, 1973, syn. n.). Seven species are included:

- Anoplomus cassandra* (Osten Sacken) (= *flexuosus* Bezzi)
- Anoplomus fasciatus* (Walker), **comb. n.** [ex *Sinanoplomus*]
- Anoplomus hainanensis* Wang
- Anoplomus nigrifemoratus* Hardy
- Anoplomus rufipes* Hardy
- Anoplomus seclusa* (Hardy), **comb. n.** [ex *Rhaibophleps*]
- Anoplomus sinensis* (Zia), **comb. n.** [ex *Sinanoplomus*]

Host plants for both *Anoplomus* and *Proanoplomus* remain unconfirmed but panicoid grasses such as *Panicum* and *Pennisetum* appear likely (Hardy 1973, Hancock 1999). Unlike other Asian species of Gastrozonini, which breed in bamboo shoots (Hancock and Drew 1999, Chua 2003), they are not readily (if at all) attracted to cut bamboo and appear to be closely related to the Afrotropical genera *Bistrispinaria* Speiser, *Leucotaeniella* Bezzi and *Clinotaenia* Bezzi [including *C. superba* (Bezzi) and *C. angusticeps* (Bezzi), which have a '*Sinanoplomus*'-like wing pattern: Hancock 1999, De Meyer 2006]. All have distinct, broad, whitish-tomentose bands on abdominal tergites II and IV. Grass breeding has been confirmed only for *Bistrispinaria* (Hancock 1999, Copeland 2007).

The relationships of an additional Southeast Asian genus usually referred to this group, *Pardalaspinus* Hering, remain especially uncertain. It appears to be the sister genus to the Afrotropical *Ceratitoides* Hendel (Hancock 1999) but no host information is available. *Pardalaspinus* and *Ceratitoides* have similar wing patterns but were recently separated by Kovac *et al.* (2006) as, contrary to Hancock (1999), only *Pardalaspinus* has abdominal tergite II enlarged and tergites III and IV reduced [but *c.f.* *Acrotaeniostola* Hendel, which shows similar variation (Hancock and Drew 1999)]. In characters such as wing pattern and abdominal shape, these two genera appear to be more closely allied to *Acroceratitis* Hendel and its allies than to *Anoplomus* and its allies and, like the former group, might also be bamboo breeders. The listing of *P. maai* (Chen) from India (Sikkim) by Kovac *et al.* (2006) appears to be an error, Sikkim being the type locality of *P. sikhimensis* (Hancock).

Key to *Anoplomus* species

The redefined genus *Anoplomus* may be recognised by the presence of two (or more) long apical spines on the mid tibia and vestigial ocellar setae. Hyaline streaks in and below wing cell c are generally weak or indistinct and the brown band in the apical part of cell cu₁ broadly reaches the wing margin. The seven included species (all Indo-Australian) may be identified by the following key.

- 1 Scutellum entirely yellowish-white; presutural, dorsocentral and postpronotal setae absent; 1 anepisternal seta; wing pattern largely brown posterodistally, without a narrow brown band across apex of vein M and with a narrow, isolated or almost isolated brown band at apex along costa (Thailand, Laos, Cambodia) *A. seclusa* (Hardy)
- Scutellum yellowish-white with 3 (rarely 1) dark, oval or quadrate spots posteriorly; presutural and dorsocentral setae present, postpronotal seta present or absent; 1 or 2 anepisternal setae; wing pattern not as above, with a narrow brown band present across apex of vein M and without a narrow, isolated or almost isolated apical band along costa 2
- 2 Wing broadly brown anteriorly, without an obliquely transverse hyaline band reaching costa within and/or just beyond cell sc; postpronotal seta present; 2 anepisternal setae [only females known] 3
- Wing with an obliquely transverse hyaline band reaching costa within and/or just beyond cell sc; postpronotal seta absent except in *A. hainanensis*; 1 or 2 anepisternal setae 4
- 3 Wing with costal band extending well beyond apex of cell bcu and dark band in cell cu₁ not reaching vein A₁+Cu₂ (China [Guangdong]) *A. sinensis* (Zia)
- Wing with costal band not extending beyond apex of cell bcu and dark band in cell cu₁ crossing vein A₁+Cu₂ (East Malaysia [Sarawak, Sabah], Indonesia [Kalimantan]) *A. fasciatus* (Walker)
- 4 Wing with pterostigma [cell sc] entirely dark brown; lateral scutellar spots small, not visible from above (Laos) *A. nigrifemoratus* Hardy
- Wing with apex of pterostigma [cell sc] broadly hyaline or pale yellow; lateral scutellar spots distinct and visible from above 5
- 5 Mid and hind femora predominantly yellow, browner in females; wings apically narrowed (females) or sharply pointed (males); cell c broadly hyaline medially (Thailand, Laos) *A. rufipes* Hardy
- Mid and hind femora predominantly dark brown to black; wings normal, not apically narrowed or pointed; cell c at most weakly hyaline or subhyaline medially 6

- 6 Postpronotal seta present; 2 anepisternal setae (China [Hainan]) *A. hainanensis* Wang
- Postpronotal seta absent; 1 anepisternal seta (India, Burma, China [Yunnan], Thailand, Laos, Philippines [Busuanga, Culion], Indonesia [Java]*) *A. cassandra* (Osten Sacken)

* There are no records of *A. cassandra* from Indonesia since Macquart (1848) reported it (as '*Tephritis fasciventris* Macquart') from Java and this locality, while not unlikely, requires confirmation.

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References

- CHUA, T.H. 2003. New bamboo-shoot flies from Peninsular Malaysia (Diptera: Tephritidae: Ceratitidinae). *Journal of Natural History* 37: 463-472.
- COPELAND, R.S. 2007. On the occurrence of *Bistrispinaria*, grass-breeding fruit flies (Diptera, Tephritidae), in Kenya, with an addition to the tephritid checklist of Kakamega Forest. *Journal of East African Natural History* 96(1): 95-102.
- DE MEIJERE, J.C.H. 1924. Studien über südostasiatische Dipteren. XV. Dritter Beitrag zur Kenntnis der sumatranischen Dipteren. *Tijdschrift voor Entomologie* 67(Supplement): 1-64.
- DE MEYER, M. 2006. Systematic revision of the fruit fly genus *Carpophthoromyia* Austen (Diptera, Tephritidae). *Zootaxa* 1235: 1-48.
- HANCOCK, D.L. 1999. Grass-breeding fruit flies and their allies of Africa and Asia (Diptera: Tephritidae: Ceratitidinae). *Journal of Natural History* 33(6): 911-948.
- HANCOCK, D.L. and DREW, R.A.I. 1994. Notes on *Anoplomus* Bezzi and related genera (Diptera: Tephritidae: Ceratitinae) in Southeast Asia and Africa. *Raffles Bulletin of Zoology* 42(4): 869-883.
- HANCOCK, D.L. and DREW, R.A.I. 1999. Bamboo-shoot fruit flies of Asia (Diptera: Tephritidae: Ceratitidinae). *Journal of Natural History* 33(5): 633-775.
- HARDY, D.E. 1973. The fruit flies (Tephritidae-Diptera) of Thailand and bordering countries. *Pacific Insects Monograph* 31: 1-353, 8 pls.
- HARDY, D.E. 1988. Fruit flies of the subtribe Gastrozonina of Indonesia, New Guinea, and the Bismarck and Solomon Islands (Diptera: Tephritidae: Trypetinae: Acanthonevrini). *Zoologica Scripta* 17(1): 77-121.
- HERING, E.M. 1952. Fruchtfliegen (Trypetidae) von Indonesien (Dipt.). *Treubia* 21(2): 263-290.
- KOVAC, D., DOHM, P., FREIDBERG, A. and NORRBOM, A.L. 2006. Catalog and revised classification of the Gastrozonini (Diptera: Tephritidae: Dacinae). Pp 163-196, in: Freidberg, A. (ed.), *Biotaxonomy of Tephritoidea*. *Israel Journal of Entomology* 35-36: xii + 599 pp.

MACQUART, P.J.M. 1848. Diptères exotiques nouveaux ou peu connus. Suite du 2e supplément [i.e. 3e supplément]. *Mémoires de la Société des Sciences, de l'Agriculture et des Arts de Lille* 1847 (2): 161-237, 7 pls.

SHIRAKI, T. 1933. A systematic study of Trypetidae in the Japanese Empire. *Memoirs of the Faculty of Science and Agriculture, Taihoku Imperial University* 8(Entomology 2): 1-509, 14 pls.

WANG, X.-J. 1998. The fruit flies (Diptera: Tephritidae) of the East Asian Region. *Acta Zootaxonomica Sinica* 21 (Supplement): viii + 338 pp, 265 figs, 41 pls.



Hancock, D L. 2008. "A new species of *Proanoplomus shiraki* from Borneo, with notes on *P. cinereofasciatus* (de Meijere) and the anoplomus group of genera (Diptera: Tephritidae: Gastrozonini)." *The Australian Entomologist* 35(3), 97–106.

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