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## NOTES ON THE COCKROACHES OF THE GENUS *EUCORYDIA* FROM THE RYUKYUS, TAIWAN, THAILAND AND NEPAL

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The cockroaches of the genus *Eucorydia* are generally metallic blue insects and now belong to the primitive family Homoeogamiidae (*sensu* Princis 1963) or Polyphagiidae (*sensu* McKittrick 1964). About twelve species are known from tropical Southeast Asia but none has been recorded from Japanese faunal limits.

During recent surveys to the Ryukyu Islands one small species was discovered by Japanese entomologists from two islands of the Yayeyama group, Ishigaki and Iriomote. In the present paper this species will be described as new to science together with comments on three other South-Asiatic representatives of the same genus.

### I Description of a new *Eucorydia* from the Ryukyus

*Eucorydia yasumatsui* sp. nov. [Japanese name: Ruri-gokiburi]

♂: A small species with entirely dark blue body; length of the body 10 mm, that of the forewing 10-11 mm.

Head brownish black, shining; labrum and clypeus paler, ocelli distinct, antenna moniliform, consists of 35-45 segments with subapical three or four segments whitish; top of head sparsely haired and almost entirely concealed under the pronotal sclerite.

Prothoracic tergite broad, dull bluish with distinct punctures, and covered entirely with black hairs. Meso- and metatergites black and shining. Underside of thorax brownish black.

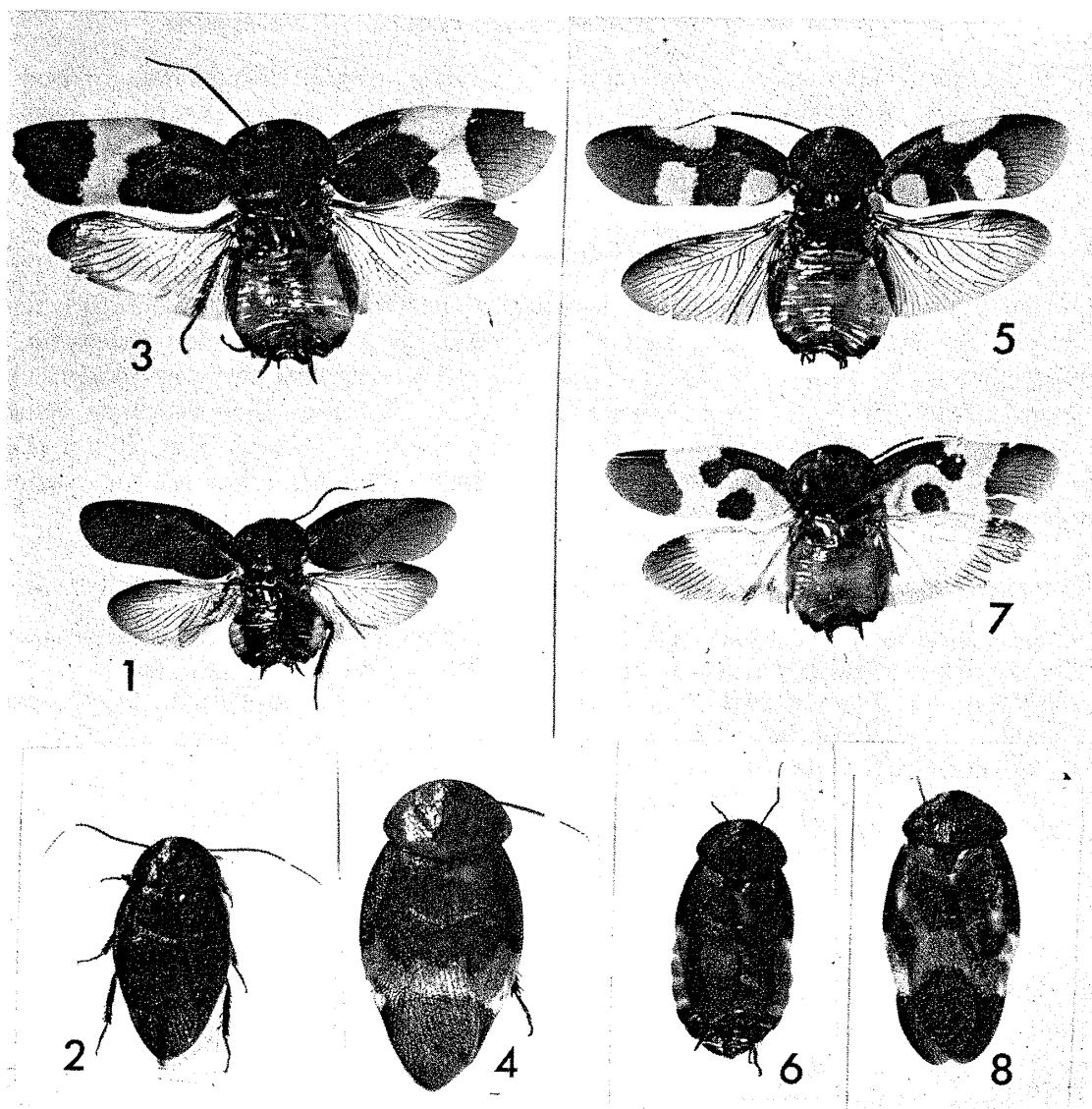
Forewing metallic dark blue, minutely punctured and entirely covered with fine hairs; hindwing pale brown, darker along the costal area, vein M simple.

Abdomen ovoid in outline, dorsal side shining brownish black with lateral area of 4-6 segments distinctly demarcated by yellow. Underside of abdomen black with the lateral area of 3 (distal portion only) and 4-6 segments dull yellow, but the outlines are not so clear as those of dorsal side. Cercus black and hairy, 8-segmented. Supraanal plate broad, and widely bilobed; subgenital plate shorter than the supraanal, roundly produced with numerous setae at the median portion, styli of moderate length, setaceous; the phallosomes R 2 and R 3 are round processes, R 1 is slender and knobbed, the phallosome L 3 is a slender claw, hooked with a constricted apex. (Fig. 9)

♀: Unknown.

Material examined: Holotype (♂), Omotodake, Ishigaki Island, 6. VII. 1964, leg. H. Konishi; Paratype 1♂, Shirahama, Iriomote Island, 21. V. 1963, leg. K. Arita, Coll. Ehime Univ.; Paratype 1♂, Iriomote Island, 10. VI. 1932, leg. S. Hirayama, Coll. National Taiwan Univ.; 1 larva, Shirahama, Iriomote Island, 4. VIII. 1962, leg. M. Sato & Y. Arita, Coll. Ehime Univ.

Remarks: In the small body size this is allied to the Malayan *Eucorydia forceps* (Hanitsch), but the latter has a small orange patch on the anterior margin of forewing and the general colouration is more greenish with a large and somewhat 8-shaped silvery pattern on the wings. I checked a pair of specimens of *forceps* identified by Bruijning and preserved in the Rijksmuseum van Natuurlijke Historie, Leiden (1♂, Aur Kumans, Sumatra; 1♀, Forster Belang, Sumatra). In the British Museum (N.H.) collection I found



- Fig. 1. *Eucorydia yasumatsui* sp. nov. Holotype ♂, Omotodake, Ishigaki Island.  
 Fig. 2. " " Paratype ♂, Shirahama, Iriomote Island.  
 Fig. 3. *Eucorydia dasytoides* (Walker). ♂, Nanshanchi, Taiwan.  
 Fig. 4. " " ♂.  
 Fig. 5. *Eucorydia aenea* (Br. v. W.). ♂, Doi Pui, N. Thailand.  
 Fig. 6. " " ♀, Doi Pui, N. Thailand.  
 Fig. 7. *Eucorydia plagiata* (Walker). ♂, East Nepal.  
 Fig. 8. " " ♂, Dahran, Nepal.

unidentified small *Eucorydia* specimens (1♂1♀) from Thailand which seemed very close to the present new species. They have still a small yellow patch on the wing margin and the female has an almost entirely yellowish abdomen. For comparison with larger species refer to subsequent descriptions.

The most reliable taxonomic structure in this species may be the left phallosome L 3 which is a slender claw ending in a constricted end-claw.

The specific name of the new species is dedicated to Dr. Keizō Yasumatsu in commemoration of his long research career devoted to basic as well as economic entomology.

## II Notes on three Southasiatic species of *Eucorydia*

A well-known Taiwanese species named *Corydia zonata* Shiraki was revised and synonymized with *dasytoides* by Princis. Together with this species, two other species at my hand taken in Thailand and Nepal are redescribed, and a consideration is made of the taxonomic status of these three species.

### 1. *Eucorydia aenea* from North Thailand

During our visit to Thailand in 1965, under a research project of US-Japan Science Cooperation Program, we took a pair of specimens of a metallic blue *Eucorydia* at a mountain summit of North Thailand. From the body structure and the locality these are referred to the Indo-Burmese *Eucorydia aenea* (Br. v. W.), the female specimen coincides fairly well with the picture of Br. v. Wattenvyl's specimen taken from Palon (Pegu), Lower Burma, not far from the site of our specimens.\* The followings are the synonymy and a description of *E. aenea*.

#### *Eucorydia aenea* (Brunner von Wattenvyl)

*Corydia aenea* Br. v. W., Nouv. Syst. Blatt., p. 340, 1865, ♂, "Indes orientales (col. Fieber)".

*Corydia aenea*: Walker, Cat. Derm. Salt. & Suppl. Blatt. Brit. Mus., p. 126, 1869.

*Corydia aenea*: Br. v. W., Ann. Mus. Civ. Genova, 33, p. 39, t. 1, f. 15, 1893, ♀, "Palon (Pegu)".

*Corydia aenea*: Kirby, Cat. Orth., 1, p. 167, 1904.

*Corydia aenea*: Shelford, Tr. ent. Soc. London, 1906, p. 504, (1907), "Burma".

*Corydia aenea*: Hanitsch, J. Siam. Soc. N.H., Suppl. 7, p. 41, 1927, "Pegu".

*Corydia aenea*: Princis, Ark. Zool. (2), 1, p. 203, 1950.

*Eucorydia aenaea*(!): Hebard, Proc. Ac. Nat. Sci. Philad. 81, p. 98, 1929.

*Eucorydia aenea*: Princis, Cat. Blatt. II, p. 81, 1963, "Birma".

1♂1♀, Doi Pui, 1,685 m, N. Thailand, 17. VI. 1965, leg. S. Asahina & Y. Miyatake.

♂ (Dried specimen, Fig. 5, 12). Body length 14.5 mm, forewing length 13 mm.

Head shining black with some bluish tint on dorsum; antenna about 37 segments, subapical 3-4 segments whitish.

Prothoracic tergite entirely metallic bluish, dorsum of meso- and metathorax shining black, underside of thorax black. Forewings metallic bluish, paler and less shining on the distal half, maculated with orange yellow as in Fig. 5; hindwing palely enfumed with deeper marginal area, a small ambiguous yellowish spot present on the costal border; vein M simple but divided at the apical portion.

Abdomen almost orange yellow on dorsum, lateral border of segments 1, 8 and 9 black, segment 10 and supraanal plate black; ventral side of abdomen also orange yellow, lateral portion of 8 and whole 9 segment black; subgenital plate, cerci and styli black.

The hidden phallosomes have not been examined by means of relaxing preparation, but one of the left phallosomes L 3 was seen extruding from the abdominal end. It has a strongly recurved terminal hook, presumably characteristic for this species. (Fig. 12)

♀ (Dried specimen, Fig. 6). Body length 14 mm, forewing length 9 mm.

Head structure and colouration as those of the male insect. Thoracic structure and colour pattern similar to those of the male. Forewing much shorter than that of male but the colour pattern is the same. Compared with the illustration of Br. v. Wattenvyl (1893, Fig. 15) the apical part of forewing darker in our specimen.

Abdomen surpassing the wing apices as the abdomen was, in this specimen, rather extended artificially. Dorsal side of abdomen broadly orange yellow with dark areas on

\* Pegu is a district of Lower Burma, Palon is a town about 80 km north of Rangoon, the distance between Palon and Changmai is about 400 km.

the side of 6 and 7; 8, 9 and supraanal plate black, the supraanal plate roundly produced but without incision, excepting a longitudinal median furrow. On the ventral side the ground colour of abdomen orange yellow, darkened except on the marginal area; sub-genital plate rounded and black, cercus 9-segmented, black.

## 2. *Eucorydia plagiata* (= *elegans*) from Nepal

Two male specimens were brought from eastern Nepal. These are determined to be same with *E. elegans* (Br. v. W.) taken from "Carin, Cheba (900–1100 m)" of Burma.

Princis synonymized *elegans* with Indo-Burmese *plagiata*, which has priority over *elegans*, but a specimen of Bengalen (Chapra) *plagiata* in the British Museum (N.H.) has yellow spots on both sides of protergite, while another specimen from Darjeeling with a label "Stockholm Museum, Staudinger" has no yellow spots and is more allied to our present specimens. The synonyms of *E. plagiata* and a description of Nepalese material may be as follows:

### *Eucorydia plagiata* (Walker)

*Corydia plagiata* Walker, Cat. Blatt. Br. Mus., p. 58, 1868, ♂[=♀], "Hindustan, from Mr. Wooley's collection."

*Corydia plagiata*: Kirby, Syn. Cat. Orth. 1, p. 167, 1904.

*Corydia plagiata*: Hanitsch, J. Siam. Soc. N.H. Suppl. 7, p. 41, 1927, "India, Burma" [list].

*Eucorydia plagiata*: Princis, Ark. Zool. (2), 1, p. 203, 1950.

*Eucorydia plagiata*: Princis, Opus. Ent., 22, p. 90, 1957 [3♀♀, Lectotype] [= *elegans*].

*Eucorydia elegans*: Princis, Cat. Blatt., II, p. 83, 1963, "India, Burma".

*Corydia elegans* Br. v. Wattenvyl, Ann. Mus. Civ. Genova, 33, p. 39, t. 1, f. 16, 1893, ♂♀, "Patria: Carin Cheba (900–1100 m)".

1♂, East Nepal, 27. VI. 1963; 1♂, Dharan, at Grkha camp, Nepal, 3. VI. 1964, leg. R. Kano.

♂ (Dried specimen, Fig. 7, 8, 10). Body length 11–12 mm, forewing length 12–13 mm. A male specimen was illustrated by Br. v. Wattenvyl (1893).

Head black, anterior part of labrum and the anterior one-third of clypeus paler; antenna black, ca. 32 segments, with subapical 3–5 segments whitish.

Prothoracic tergite metallic bluish, punctured and pubescent as in the preceding species, mesothoracic tergite shining black but the metathoracic tergite entirely orange yellow; underside of thorax and legs black. Wings orange yellowish rather than bluish black, maculated as in Fig. 7 and 8, apical one-third dark enough whereas this part is lighter in Br. v. Wattenvyl's figure. Hindwings hyaline, veins orange yellow, broadly margined with pale black; vein M simple.

Abdomen entirely orange yellow; on the dorsal side, lateral border of 7 and 8, and whole 9 segment black; supraanal plate broadly excavated and black, cercus 9-segmented. The genitalia (Fig. 10) allied to those of the preceding species, but the phallosome L 3 is simply tapered to a curved claw.

## 3. *Eucorydia dasytoides* (= *zonata*) from Taiwan

Shiraki (1907/08) described the beautiful "*Corydia zonata*" from Taiwan, which was, in recent Catalogue of Princis, synonymized with South Chinese *dasytoides* (Walker). This identity is very probable from the generic distribution and the adjacency of the localities. Shiraki later (1931) named a pair of specimens with an interrupted yellowish band on the forewings as "*zonata* var. *taitoensis*." This was also synonymized by Princis (1963) with *Eucorydia purpuraris* (Kirby). I examined the type specimens and found that "*taitoensis*" is nothing but an individual variation of *zonata* (= *dasytoides*). The Tonkinese *Corydia*

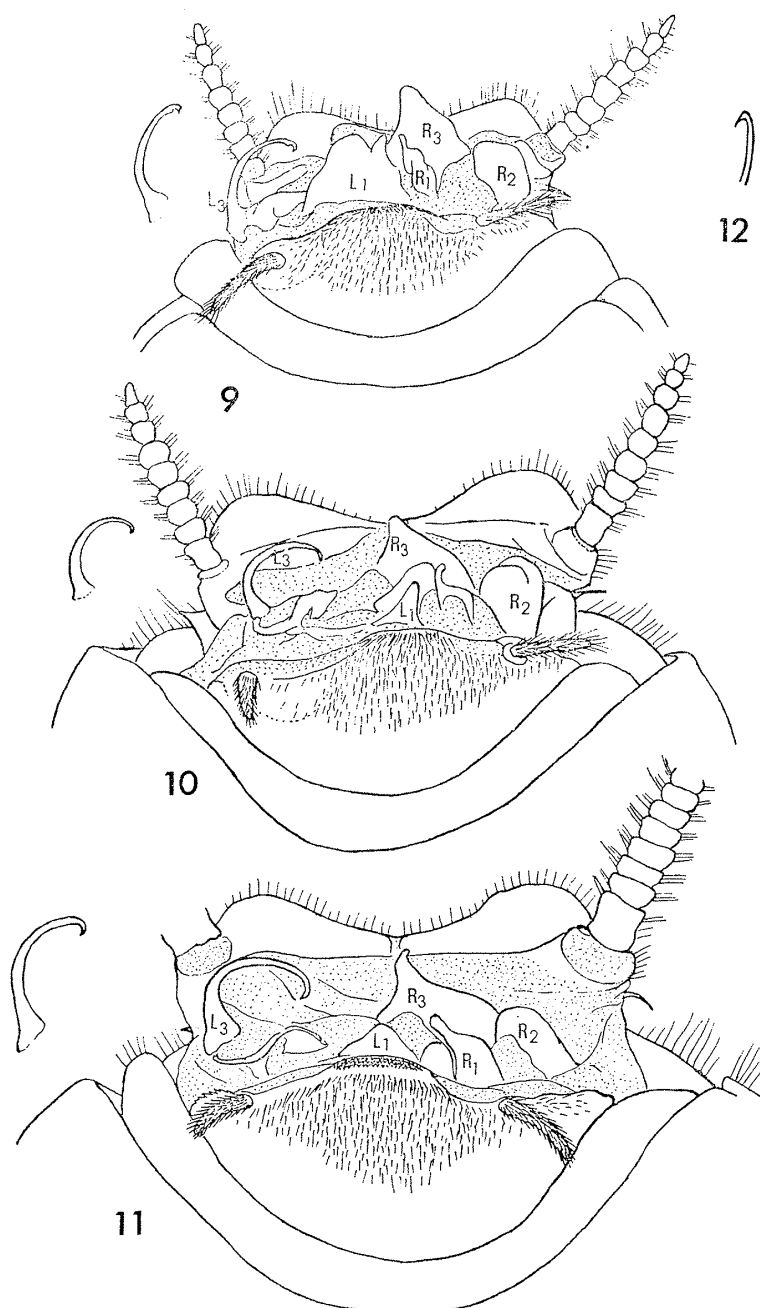


Fig. 9. *Eucorydia yasumatsui* ♂, Genitalia, ventral view.

Fig. 10. *Eucorydia plagiata* ♂, Genitalia, ventral view.

Fig. 11. *Eucorydia dasytoides* ♂, Genitalia, ventral view.

Fig. 12. *Eucorydia aenea* ♂, Phallosome L 3.

*tonkinensis* Kirby was synonymized by Kirby himself with *dasytoides* Walker. A synonymic list based on these facts and a description of Taiwanese specimens will be given below:

***Eucorydia dasytoides* (Walker)**

*Euthyrrhapha dasytoides* Walker, Cat. Blatt. Brit. Mus., p. 191, 1868, ♀, "Amoy".

*Corydia dasytoides*: Kirby, Syn. Cat. Orth., 1, p. 167, 1904.

*Corydia dasytoides*: Shelford, Tr. ent. Soc. London, 1906, p. 503, (1907), ♀, "Amoy."

*Corydia dasytoides*: Hanitsch, J. Siam. Soc. N.H. Suppl. 7, p. 41, 1927, "Amoy, Tonkin".

- Eucorydia dasytoides*: Hebard, Pr. Acad. Nat. Sci. Philad. 81, p. 98, 1929 [note].  
*Eucorydia dasytoides*: Chou, Ent. Sinica, 4 (1:6), p. 5, 1950, "Chan-Chiakang, Shensi".  
*Eucorydia dasytoides*: Princis, Opus. Ent., 17, p. 35, 1952 [list].  
*Eucorydia dasytoides*: Princis, Opus. Ent., 22, p. 90, 1957 [2♀♀, Lectotype, one is "*tonkinensis*"].  
*Eucorydia dasytoides*: Princis, Cat. Blatt., II, p. 82, 1963, "China, Tonkin, Formosa".  
*Corydia tonkinensis* Kirby, Ann. Mag. Nat. Hist. (7), 11. p. 405, 1903, ♀, "Hab. Tonkin (Fruhstorfer)" [two ♀ specimens].  
*Corydia tonkinensis*: Kirby, Syn. Cat. Orth., II, p. 167, 1904 [= *dasytoides* Walker].  
*Eucorydia tonkinensis*: Hebard, Pr. Acad. Nat. Sci. Philad. 81, p. 97, 1929 [note].\*  
*Corydia zonata* Shiraki, Tr. Sapporo. N.H. Soc. 2, p. 110, 1907/08 [1♂, Horisha, Formosa].  
*Corydia zonata*: Matsumura, Thous. Ins. Japan, Addit., p. 15, t. 2, f. 14, 1913 [Hori, Taiwan].  
*Corydia zonata*: Karny, Suppl. Ent., 4, p. 62, 95, 1915, "Fuhosho 3♀♀; Hoozan 10♂♂1♀; Polisha 2♂; Horisha IV. 1910 1♂; Taihorin 1911, 3♂2♀".  
*Corydia zonata*: Hanitsch, J. Siam. Soc. N.H. Suppl., 7, p. 41, 1927, "Formosa".  
*Corydia zonata*: Shiraki, Ins. Matsumurana, 5, p. 175, 1931, "Formosa-Hozan (IV), Horisha (IV), Kosempo (XI), Taihorin (VI), Musha (V, VI), Fuhosho (VI)".  
*Corydia zonata*: Shiraki, Iconogr. Ins. Jap. p. 204, 1932.  
*Corydia zonata*: Chou, Ent. Sinica, 4 (1:6), p. 5, 1950, "Chan-Chia-Kang, Shensi".  
*Corydia zonata* var. *taitoensis* Shiraki, Ins. Mats., 5, p. 176, 1931, "Formosa-Taito (II, III)".  
*Eucorydia purpularis* var. *taitoensis*: Princis, Cat. Blatt. II, p. 82, 1963.  
1♂, Keitao, Taiwan, 3. V. 1934, leg. S. Asahina; 1♂, Hori, Taiwan, VI. 1926 (Coll. Nat. Inst. Agr. Sci.); 1♂, Wulai, Taiwan, 9. IV, 1926, leg. T. Kano (Coll. Nat. Sci. Mus., Tokyo); 1♀, Momoyama, Taiwan, 9. IV. 1926, leg. T. Kano (Coll. Nat. Sci. Mus., Tokyo); 3♂, Kwantochi, Taiwan, 13-14. V. 1968 (Coll. Tokyo Agr. Univ.); 1♂, Nanshanchi, Taiwan, 6. V. 1965, leg. T. Shirozu.

♂ (Dried specimens, Fig. 3, 4, 11). Body length 14-17 mm, forewing length 15-16 mm.

Head black, anteclypeus and labrum paler; antenna 40-44 segments, subapical four segments whitish.

Prothoracic tergite broad, 7.5-8.0 mm, dark metallic blue with usual punctures and pubescence. Meso- and metathorax entirely shining black; legs black. Forewing with a broad yellowish band, the situation of which exactly corresponds to the location of the yellow markings in the other species; hindwing palely enfumed, veins dark brownish and apical one-fourth of the wing darkened. Vein M divided at the apex.

Abdomen broadly orange yellow; on the dorsal side, base of segment 1, sides of 7, 8 and 9, and entire supraanal plate black; on the ventral side the lateral portion of 6 and whole 7, and the subgenital plate black, styli and cerci black, the latter composed of ten segments.

The genitalia (Fig. 11) allied closely to those of the preceding species with the L 3 smoothly curved and sharply hooked as that of the preceding species but the apex appears slightly more strongly hooked.

♀ (Dried specimen). Body length 13 mm, forewing length 11 mm. As the wings are shorter than those of the male insect the entire body looks quite roundish.

Head same as in the male insect, antenna 41 segments, its subapical five segments whitish; thoracic structure and colouration same as in the male; wing apices ending roundly with an orange coloured transverse band as that of male insect, but apical one-third tinted more yellowish; dorsal side of abdomen appears entirely yellowish excepting the apical portion. Ventral side of abdomen dull orange brownish, darker medially, final segment and subgenital plate brownish black, the latter produced medially and rounded; cercus 8-segmented and tapered.

\* Hebard noted "a male of *tonkinensis* Kirby is also in the same collection taken at Chapa Tonkin, May 8, 1918, by Jeanvoine. It appears to be distinct from *dasytoides* (Walker) though it was synonymized under that species by Kirby in 1904".

### III Taxonomic considerations

Among the material at hand, the newly described species from the Yayeyama Islands of the Ryukyus seems a distinct one as the body colour pattern and the structure of left phallosome are peculiar. This is found isolated in the Yayeyama Islands where a number of endemic insects have been known.\*

The other three species, *aenea*, *plagiata* and *dasytoides* (= *zonata*) appear allied very closely to each other, being almost the same in the abdominal colouration and forming a sequence passing from *dasytoides* through *plagiata* to *aenea* in the pattern of the forewing. This sequence agrees with their distribution, Taiwan–South China–Tonkin–Thailand–East India – Nepal, a pattern known as the West Chinese-Himalayan distribution. Besides the body colouration the phallosome L 3 is quite identical in *dasytoides* and *aenea*, while it is more acutely clawed at the apex in *plagiata*. I am now inclined to the opinion that these three forms are neighbouring geographical races, but it is not yet certain whether they form a cline of a single species or not. Further material including the other named species and careful examinations of their genitalia are necessary in order to arrive at a more gratifying conclusion. After all, the three forms and their localities may hypothetically be given as follows.

<i>Eucorydia aenea aenea</i>	.....E. India; Burma; Nepal.
<i>Eucorydia aenea plagiata</i>	....India; Burma; Thailand.
<i>Eucorydia aenea dasytoides</i>	....South China; Tonkin; Taiwan.

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\* Examples of endemic insects to Yayeyama Islands: *Rhinocypha uenoi* Asahina (Odonata, Libellaginidae); *Pachyrrhinchus infernalis* Fairmaire (Coleoptera, Curculionidae).

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### NOTES ON THE JAPANESE LEAF-MINERS OF THE GENUS PEGOMYA ROBINEAU-DESVOIDY, WITH DESCRIPTIONS OF TWO NEW SPECIES (DIPTERA: ANTHOMYIIDAE)

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So far as I am aware, of the genus *Pegomya* Robineau-Desvoidy three species, namely *Pegomya bicolor* (Wiedemann, 1817), *Pegomya hyoscyami* (Panzer, 1809) and *Pegomya betae* (Curtis, 1847), have been known to be leaf-miners in Japan (Kato, 1941; Suwa, 1970). On this occasion are added to the fauna of Japan six other leaf-miners, of which two are new to science and the rest new to Japan.

Before going further I have pleasure to express my sincere thanks to Prof. C. Watanabe for his continuous guidance.

#### 1. *Pegomya bicolor* (Wiedemann)

*Anthomyia bicolor* Wiedemann, 1817, Zool. Mag. 1: 77. *Pegomyia bicolor sapporensis* Kato, 1941, Kontyū 15: 62. Syn. nov.

The Japanese form differs from the European and North American ones by the