
**SYSTEMATIC STUDY OF AMPHIPSOCIDAE IN JAPAN (PSOCODEA:
'PSOCOPTERA': CAECILIUSETAE), WITH COMMENTS ON HIGHER
CLASSIFICATION WITHIN THE FAMILY**

By KAZUNORI YOSHIZAWA

Abstract

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The Japanese species of Amphipsocidae were revised. *Amphipsocus rubrostigma* Okamoto, 1910 was synonymized with *A. japonicus* (Enderlein, 1906). The genus *Kodamaius* was considered as a member of this family. *A. japonicus*, *Kolbia fusconervosa* Enderlein, 1906, *Matsumuraiella radiopicta* Enderlein, 1906 and *Kodamaius pilosus* Okamoto, 1907 were recognized from Japan and redescribed. The last species had once been considered as an invalid synonym of *Kodamaius brevicornis* Okamoto, 1907, but they were considered here as distinct species. Monophyly of Amphipsocidae and revised higher classification within the family were discussed.

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INTRODUCTION

The family Amphipsocidae comprises 20 genera and about 160 species known from all the zoogeographical regions. The species are mostly rather large, and some of them have very colorful body and forewings, so that the family is one of the most attractive psocopteran groups.

In Japan, five amphipsocid species classified into five genera have been recorded. All of them were described in early 1900's (Enderlein, 1906; Okamoto, 1907, 1910), and no studies on those species have been added except a paper on morphology, intraspecific variation and systematic position of *Matsumuraiella radiopicta* by Tsutsumi (1961). Therefore, some taxonomic problems have emerged for the Japanese species. For example, Mockford (1978) mentioned that *Dasypsocus japonicus* might be a member of *Amphipsocus* because of the similarity of the forewing venation, and Vishniakova (1986) transferred *D. japonicus* to *Amphipsocus* based on the specimens collected from the Far East Russia. However, Vishniakova (1986) provided no discussions about this taxonomic treatment. Moreover, any comparison between *A. japonicus* and *A. rubrostigma* Okamoto, 1910, another Japanese species of the genus, has not been done.

In the present paper, I provide redescriptions for all the known Japanese species of Amphipsocidae to clarify their taxonomic status, and propose a new specific synonymy. Additionally, the higher classification within the family is briefly discussed. Methods follow that of Yoshizawa (2001). Description of coloration is based on wet alcohol specimens unless specified. Specimens examined in this study are stored in the Hokkaido University Insect Collection unless specified.

SYSTEMATICS

Amphipsocidae

Diagnosis.

Middle to rather large-sized psocids. Vertex with pair of shallow concavities, deeper in male. Forewing veins with two or more rows of setae at least in basal half; venation variable; margin setose all around except basal half of posterior margin sometimes bare. Male and female genitalia basically as in infraorder Caeciliusetae.

Remarks. This family is considered as monophyletic supported by the following autapomorphies: vertex with pair of shallow concavities; forewing veins with more than one row of setae at least in basal half. As discussed later, *Kodamaius* is considered here as a member of Amphipsocidae because of sharing the above-mentioned apomorphies. In contrast, the genus cannot be assigned to the previously-founded subfamilies, so that *Kodamaius* is here classified to its own subfamily. See also DISCUSSION chapter below.

Kodamaiinae

Type genus: *Kodamaius* Okamoto, 1907.

Description.

This subfamily is represented only by *Kodamaius* and the generic diagnosis of *Kodamaius* provided below is exactly applicable to diagnose this subfamily. Monophyly

of this subfamily is supported by the following unique forewing venation: Rs and M connected by short cross vein; presence of Ms–CuA₁ cross vein (Figs. 1A, B). The forewing ciliation is also unique to this subfamily but seems rather plesiomorphic within Amphipsocidae.

Remarks. Mockford (2000) established the tribe Kodamaiini within the family Caeciliusidae. Kodamaiini in his sense contain seven genera of five subtribes, of which only the type genus *Kodamaius* is here transferred to the family Amphipsocidae. I examined *Pericaecilius weneri* Mockford, 2000, a member of Kodamaiini, but could not find any synapomorphy suggesting a close relationship between *Pericaecilius* and Amphipsocidae. Judging from the published descriptions and illustrations, all other members of Kodamaiini also lack the important autapomorphic forewing ciliation of Amphipsocidae. Therefore, they cannot be considered as members of Amphipsocidae and are kept in the family Caeciliusidae. Since the type genus of Kodamaiini is removed from Caeciliusidae, a new tribal name is proposed for four subtribes previously assigned in Kodamaiini (see APPENDIX 2). The subfamily name Kodamaiinae is first used in this paper.

Kodamaius Okamoto

Kodamaius Okamoto, 1907: 138. (Type species: *Kodamaius brevicornis* Okamoto, 1907, subsequent designation by Smithers, 1967.)

Stenepipsocus Badonnel, 1946: 155. (Type species: *Stenepipsocus collarti* Badonnel, 1946: 155, by monotypy.)

Epikodamaius Kuwayama, 1961: 203. (Type species: *Epikodamaius ikomai* Kuwayama, 1961: 204, by original designation.)

Diagnosis.

This genus can be distinguished from the other genera of the family by the following character states in forewing (Figs. 1A, B): veins with two rows of setae in basal half only, distal half with one row of setae; pterostigma strongly expanded posteriorly; Rs and M connected by short cross vein; M–CuA₁ cross vein present.

Kodamaius pilosus Okamoto

Kodamaius pilosus Okamoto, 1907: 139; Morimoto, 1989: 63; Tomita & Haga, 1991: 38, 50.

Kodamaius brevicornis: Okamoto, 1932: 1994 (partim); Matsumoto, 1941: 128 (partim); Smithers, 1967: 52 (partim).

Redescription.

Syntype female (dried specimen). Head dark brown; eye black, IO/D=3.0; ocellar region black. Antennae broken except scapes and pediceli; scape and pedicel dark brown. Mouthparts dark brown. Thorax dark brown. Legs dark brown; femora darker; hind legs absent except femur coxae and trochanters. Forewing (Fig. 1A) brown, with hyaline or paler pigmented area along top of pterostigma, around CuA₂, and around distal end of CuP; veins dark brown except CuA₂ hyaline; pterostigma strongly extended posteriorly; Rs–M cross vein very short; angle of top of areola postica almost 90°. Hindwings lacked. Abdomen (soaked with KOH) pale brown. Genitalia (soaked with KOH) dark brown. Epiproct (Fig. 2A) trapezoidal, median region sparsely covered with short setae, posterior margin slightly



Fig. 1. Wings of Amphipsocidae from Japan and Taiwan. A, *Kodamaius pilosus* (forewing), syntype; B, *Kodamaius brevicornis* (forewing); C, *Matsumuraiella radiopicta* (C₁, forewing; C₂, hindwing).

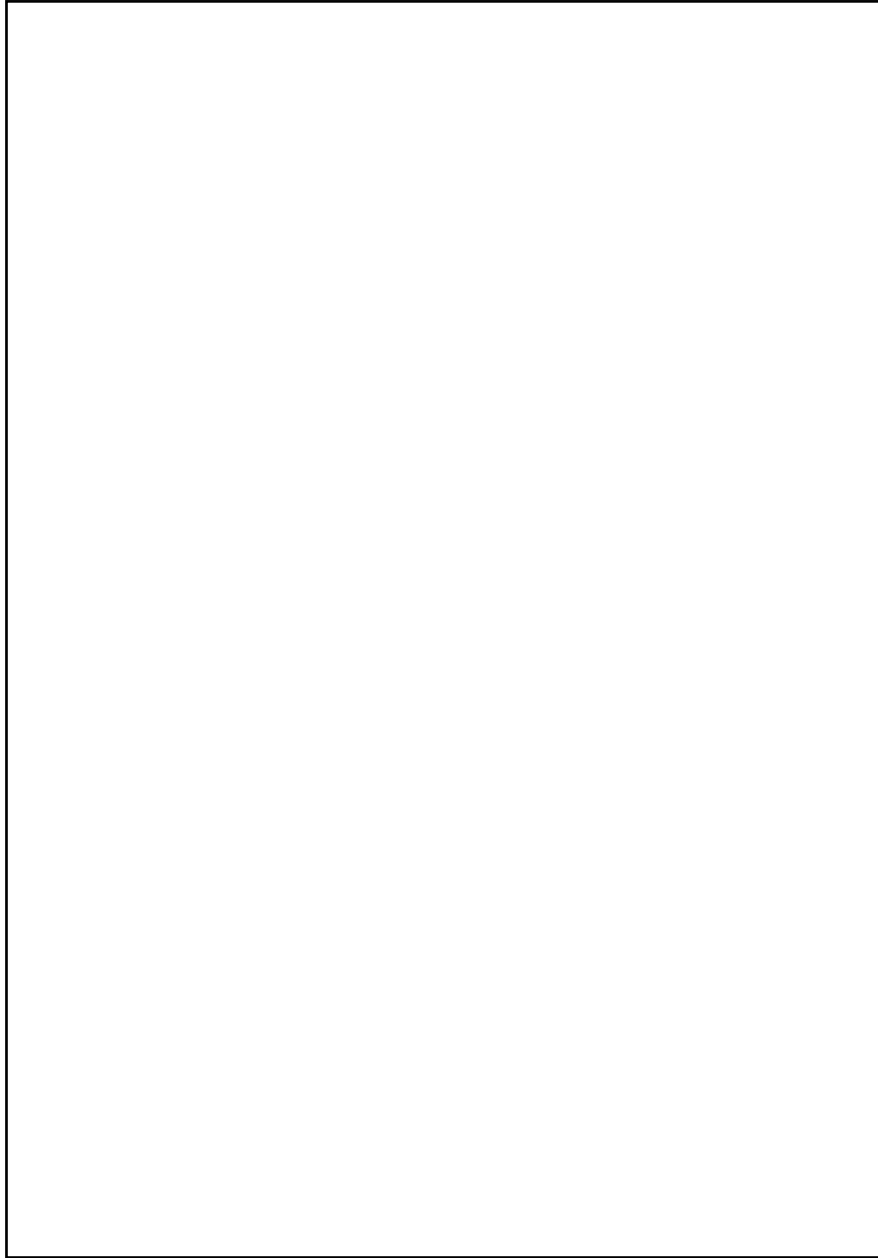


Fig. 1. Continue. D, *Kolbia fusconervosa* (D₁, forewing; D₂, hindwing); E, *Amphisocus japonicus* (E₁, forewing; E₂, hindwing).

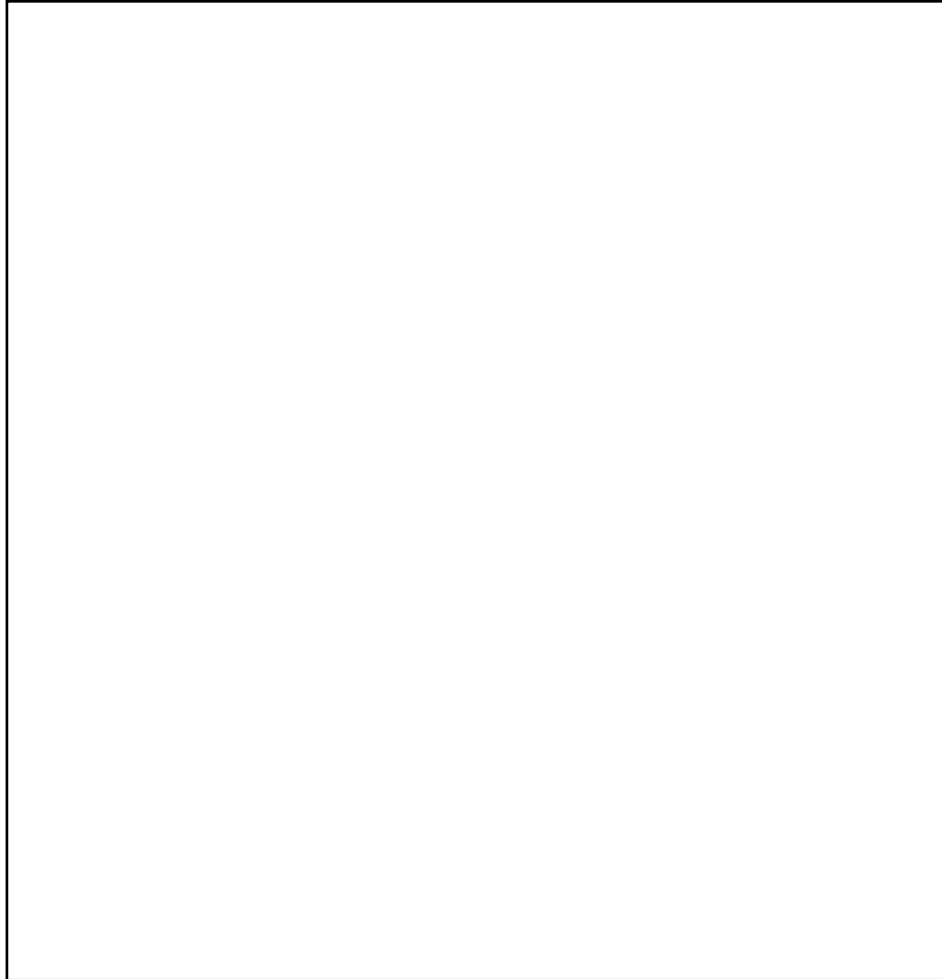


Fig. 2. Genitalia of the syntype female of *Kodamaius pilosus*. A, epipect, dorsal view; B, paraproct, lateral view; C, subgenital plate, ventral view; D, gonapophyses, ventral view; E, spermatheca. Scale. 0.25 mm.

arched, with small membranous region medially, and with some long setae. Paraproct (Fig. 2B) with circular field of 32 trichobothria, ventrolateral region densely covered with setae of various length. Subgenital plate (Fig. 2C) pointed apically, widely sclerotized and bilaterally divided by narrow membranous region. Gonapophyses (Fig. 2D): ventral valve almost straight, apically with minute setae; dorsal valve arched, apically directed inwardly; external valve indistinguishable. Spermathecal sac (Fig. 2E) heavily sclerotized, spherical, blackish brown in color, with long neck region; spermathecal duct long, covered with thin granular structure.

Length (in mm). Forewing (FW) 4.3.

Male. Unknown.

Material examined. Syntype female (Fig. 3B), labeled as “Akashi” (written in *KATAKANA*

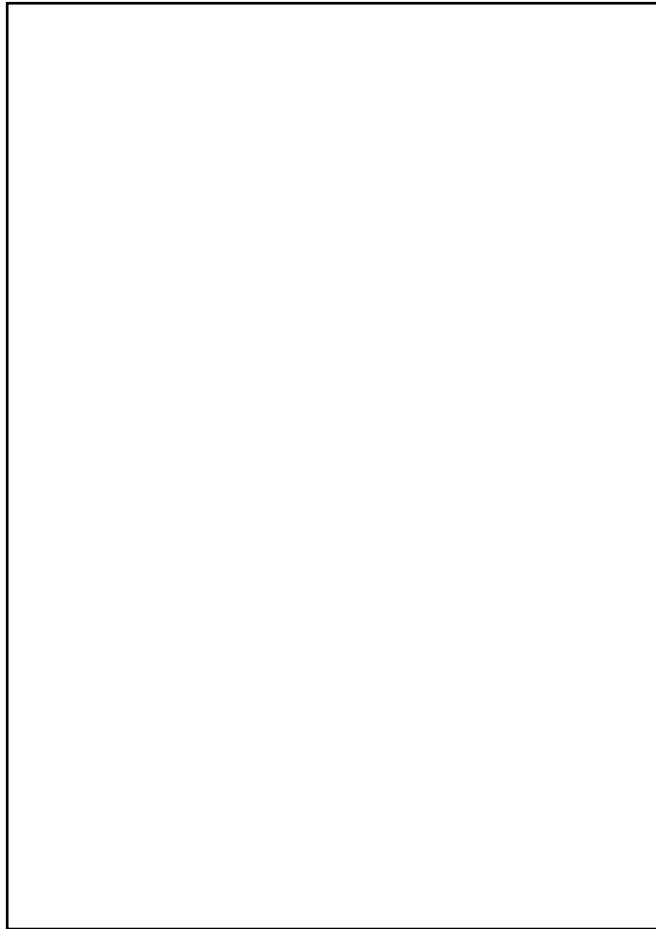


Fig. 3. A single survivor of the syntype specimens of *Kodamaius pilosus*. A, name label, under which the syntype specimen was pinned; B, habitus; C, label attached to the syntype.

character, Matsumura's hand writing: Fig. 3C). The specimen is pinned under the name label of "Kodamaius pilosus Okam." (probably Okamoto's hand writing: Fig. 3A).

Distribution. Japan: Honshu.

Remarks. In the original description, Okamoto (1907) provided the following information about the type specimens: Akashi (Juli, 1903, 1), gesammelt von Herrn Prof. Dr. S. Matsumura und 2 Exemplare aus Kyoto (Oct. 1906) gesammelt von Herrn M. Suzuki.

The label data of the above-examined specimen agree with the locality data of one of the syntypes of *Kd. pilosus* and calligraphy of the label can be considered apparently as Matsumura's hand writing. Additionally, the external features, including forewing venation and coloration, of the above-mentioned specimen agree with the original description and forewing illustration. Thus, the above specimen is undoubtedly one of the syntypes of *Kd. pilosus*. I could not find the other syntypes of *Kd. pilosus*.

Kd. pilosus was synonymized with the Taiwanese *Kd. brevicornis* by Smithers (1967)

without any comment. Although it is not clearly stated, Okamoto (1932) and Matsumoto (1941) also treated these species as a co-species by including Honshu (mainland of Japan) as a distributional area of *Kd. brevicornis*. Furthermore, judging from the forewing markings, the illustration provided by Okamoto (1932) as *Kd. brevicornis* is apparently based on *Kd. pilosus*. Mockford (2000) commented on the taxonomic treatment of these two species proposed by Smithers (1967) but did not follow this synonymy.

Kd. brevicornis was described by Okamoto (1907) together with *Kd. pilosus*. Although one of the types of the latter species is stored in the Hokkaido University Insect Collection, the type of the former species is not found. However, two identified specimens are pinned under the name label of “Kodamaius brevicornis Okam” (see APPENDIX below). External structures of one specimen agree with the original description of *Kd. brevicornis*, and the specimen was collected at the type locality of the species. Thus, I confidently identified the specimen as *Kd. brevicornis*. The other specimen is completely covered with fungi, and I could not examine its external features.

I examined this identified specimen to confirm the synonymy proposed by Okamoto (1932) and Smithers (1967). As a result, the following considerable differences between these two species could be detected in the forewing that can be considered as specific (Figs. 1A, B): *Kd. brevicornis* is much smaller than *Kd. pilosus*; cells r_1 , r_3 and r_5 excluding its base are unpigmented or pale in *Kd. brevicornis*, whereas unpigmented or pale area is restricted along the top of the pterostigma in *Kd. pilosus*; Rs–M cross vein is much longer in *Kd. brevicornis*. Thus, both species names should be treated as valid and the synonymy proposed by Okamoto (1932) and Smithers (1967) should be rejected. Genitalia of *Kd. brevicornis* were unavailable.

Dasydemellinae

Type genus. *Dasydemella* Enderlein, 1909.

Diagnosis.

The subfamily Dasydemellinae consists of four genera, of them only one genus, *Matsumuraiella*, is known from Japan. According to Mockford (1978) and my present observation, this subfamily is characterized by the combination of the following character states: broad internal ridge of epistomal suture; prominent anterior labral sensilla; broad lacinial tip; greatly reduced hindwing setae, retained only on margin of cell r_3 ; epiproct with group of short, stout setae (Figs. 4A, 5A); large paraproctal duplex spine (Figs. 4B, 5B); well-developed external valve of gonapophyses (Fig. 5D).

Matsumuraiella Enderlein

Matsumuraiella Enderlein, 1906: 248. (Type species: *Matsumuraiella radiopicta* Enderlein, 1906, by monotypy.)

Diagnosis.

This genus can be distinguished from the other genera of the family by the combination of the following character states: forewing Rs and Ms strongly arched (Fig. 1C₁); forewing membrane setose (Fig. 1C₁); distal margin of paraproct with duplex spine and associated bristles (Figs. 4B, 5B); phallosome open anteriorly (Fig. 4D); external valve of gonapophyses

well developed (Fig. 5D).

Matsumuraiella radiopicta Enderlein

Matsumuraiella radiopicta Enderlein, 1906: 248; Matsumoto, 1941: 128; Tsutsumi, 1961: 56; Smithers, 1967: 53; Vishniakova, 1986: 338; Morimoto, 1989: 63; Tomita & Haga, 1991: 38, 50.

Redescription.

Male. Head brown in basal color except vertex and gena pale brown; vertex with brown markings; frons with circular blackish brown marking; antennal socket narrowly bordered with blackish brown band; sutures blackish brown; eye black, IO/D=1.3; ocellar region blackish brown; postclypeus with ca.14 blackish brown stripes. Antenna brown, distal flagellar segments slightly darker. Mouthparts brown. Thorax blackish brown, prothorax slightly paler. All legs pale yellow in basal color; external surfaces of coxae and basal ends of tibiae blackish brown; femora with blackish brown spots; tarsi brown; claws black. Forewing (Fig. 1C₁) hyaline, with brownish tinge except posterodistal region hyaline, distal half with brown marking medially, paler along veins; veins brown to blackish brown, setae on veins in basal half stout, longer and thicker than those on distal veins; pterostigma

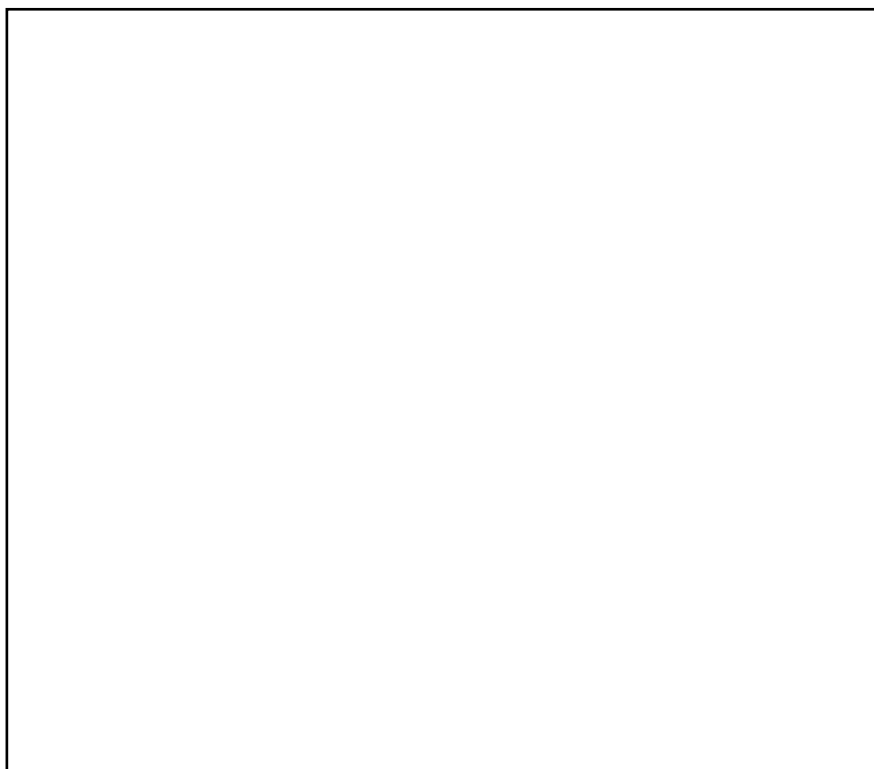


Fig. 4. Male genitalia of *Matsumuraiella radiopicta*. A, epiproct, dorsal view; B, paraproct, lateral view; C, hypandrium, ventral view; D, phallosome, ventral view; E, ditto, lateral view. Scale. 0.25 mm.

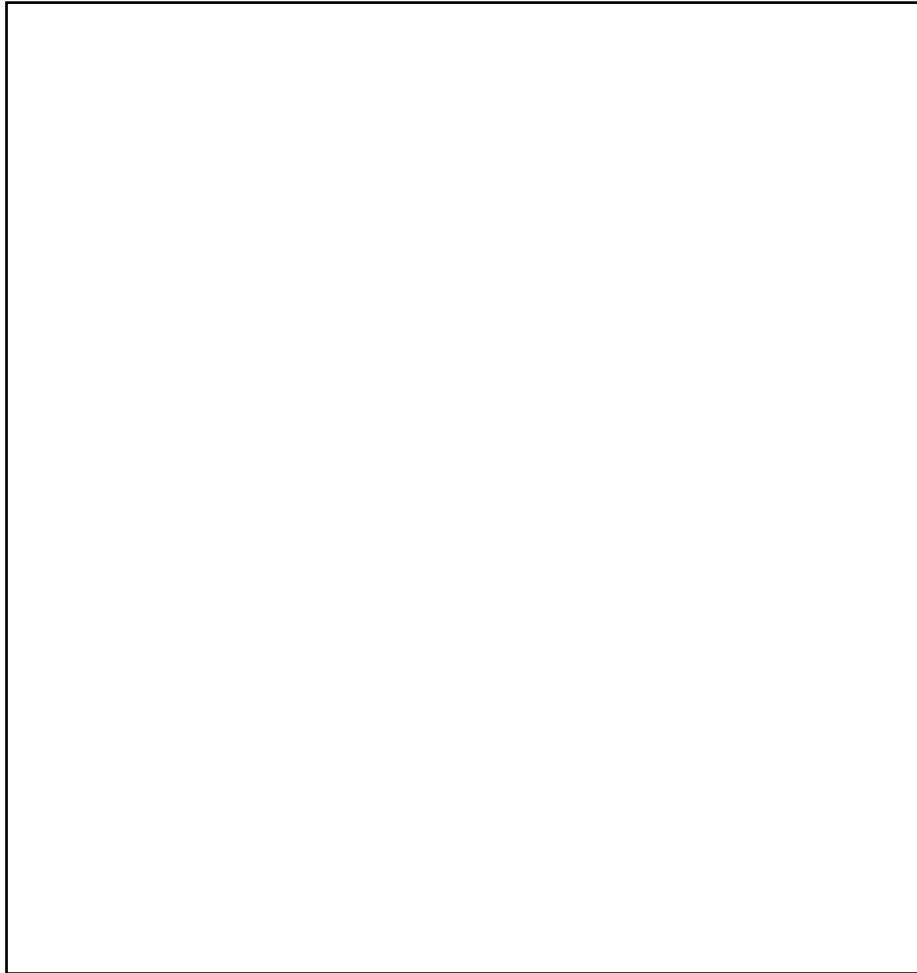


Fig. 5. Female genitalia of *Matsumuraiella radiopicta*. A, epiproct, dorsal view; B, paraproct, lateral view; C, subgenital plate, ventral view; D, gonapophyses, ventral view; E, spermatheca. Scale. 0.25 mm.

strongly extended posteriorly without spur vein; veins Rs and M fused for short distance or connected by short cross vein; areola postica high, free from or connected with M. Hindwing (Fig. 1C₂) hyaline with brownish tinge; veins blackish brown except A₁ pale brown. Abdomen pale yellow, basal three segments each with blackish brown irregular band. Genitalia (Fig. 4) blackish brown. Epiproct (Fig. 4A) small, triangular, with few bristles apically. Paraproct (Fig. 4B) with oval field of ca. 50 trichobothria; distal margin with spine and three associated bristles; dorsal margin slightly sinuated in lateral view; lateral surface with membranous area ventrally. Hypandrium (Fig. 4C) well sclerotized, smoothly rounded distally, evenly setose with short setae except anterior tip of sclerotized arm bare. Phallosome (Figs. 4D, E) much longer than width; aedeagus strongly arched in lateral view; paramere broad, strongly arched and slightly broadened apically in lateral view, apical region with some circular pores; phallobase opened anteriorly.

Length. Fw 3.6–4.2 hindwing (Hw) 2.5–3.0; first flagellomere (f1) 0.62–0.68; second flagellomere (f2) 0.58–0.64; hind femur (Hf) 0.86–0.92; hind tibia (Ht) 1.3–1.5; hind first tarsomere (t1) 0.34–0.38; hind second tarsomere (t2) 0.16–0.18.

Female. Almost as in male. Eye IO/D=2.8. Epiproct (Fig. 5A) semicircular, apically with few bristles. Paraproct (Fig. 5B) with circular field of 26–29 trichobothria; lateral surface with membranous region medially; distally with spine and three associated bristles; dorsal margin slightly sinuated in lateral view. Subgenital plate (Fig. 5C) well sclerotized in Π -shape, with posterior margin broadly truncated and slightly hollowed. Gonapophyses (Fig. 5D): ventral valve fine, pointed apically; dorsal valve short; external valve well developed. Spermathecal sac (Fig. 5E) sclerotized, brown to pale brown in color, onion-shaped; spermathecal duct short, with thick glandular structure.

Length. Fw 3.7–4.5; Hw 2.6–3.2; f1 0.38–0.50; f2 0.34–0.40; Hf 0.72–0.88; Ht 1.2–1.4; t1 0.28–0.38; t2 0.16–0.20.

Material examined. Formerly identified specimens as *Matsumuraiella radiopicta*, probably by Okamoto (Fig. 6B). 3 males 1 female, Tomakomai / 1903 (hand writing: Fig. 6C). Other specimens. [HOKKAIDO] 1 female, Kafukai, Rebunto Is., 30.vii.1994, K. Yoshizawa; 4 females, Kutsuzoko, Rishirito Is., 27.vii.1994, K. Yoshizawa; 1 female, Yamunai-sawa, Rishirito Is., 28.vii.1994, K. Yoshizawa; 1 female, same locality, 29.vii.1994, K. Yoshizawa; 2 females, Asahidake Spa, 11.viii.1994, K. Yoshizawa; 4 males 2 females, Mr. Rausudake, Shiretoko Pen., 27.vii.1997, N. Takahashi; 1 female, Jōzankei, Sapporo City, 3.viii.1996, N. Takahashi. [HONSHU] 3 males 1 female, Yagen – Oku-Yagen, Ohata Town, Aomori Pref., 12.vii.1998, N. Takahashi; 2 males 2 females, Yagen-Rindō – Nishinomata-Rindō, Ohata Town, Aomori Pref., 11.vii.1998, N. Takahashi; 1 male 1 female, Yagen mountain stream, Shimokita, Aomori Pref., 14.vii.1998, N. Takahashi; 1 male, Ōmagari, Mutsu City, Aomori Pref., 23.viii.1997, T. Ichita; 1 male 4 females, Usorisanko, Mutsu City, Aomori Pref., 28.ix.1994, C. Lienhard (Museum d’Histoire naturelle, Geneve: MHNG); 3 males 3 females, Mt. Kudoji-san, Aomori Pref., 27.vii.1996, N. Takahashi; 2 females, Inayama, Aomori City, 31.viii.1997, T. Ichita; 1 male 1 female, Yaegiku, Yokouchi, Aomori City, 6.vii.1997, T. Ichita; 3 males 1 female, Shimoyu, Aomori City, 19.vii.1997, T. Ichita; 3 males 3 females, 25.vii.1996, 7 males 7 females, 6.vii.1997, 1 female, 14.ix.1997, 3 males, 20.viii.2000, Tashirotai, Aomori City, T. Ichita; 5 males 1 female 1 nymph, Iwaizumi (170m alt.), NE of Morioka, Iwate Pref., 27.ix.1994, C. Lienhard (MHNG); 2 males, 20km north of Kuji (220m alt.), Iwate Pref., 27.ix.1994, C. Lienhard (MHNG); 1 male 7 females, Nikko, R120 entrance to Chuzenjiko & Yunoko, Tochigi Pref., 26.ix.1994, C. Lienhard (MHNG); 8 male 7 female, Togakushi Shrine, Togakushi Villa., Nagano Pref., 27.vii.1993, K. Yoshizawa; 3 female, Hakuba Villa., Nagano Pref., 6.vii.1997, K. Yoshizawa; 4 males, Masutomi Spa, Yamanashi Pref., 7.vii.1997, K. Yoshizawa; 3 males 8 females, Hirogawara, Yamanashi Pref., 7.vii.1997, K. Yoshizawa; 1 male 1 female, Hirogawara – Kitazawa Pass, Ashiyasu Villa., Yamanashi Pref., 20.vii.1997, N. Takahashi; 2 males 6 females, 29.x–5.xi.1996, 2 males 2 females, 5–12.xi.1996, 3 males, 13–19.xi.1996, 5 males, 20–26.xi.1996, 2 males, 27.xi–3.xii.1996, 2 males, 4–10.xii.1996, 4 males, 11–17.xii.1996, 2 males, 18–24.xii.1996, 1 females, 10–17.iv.1997, 15 males 6 females, 20–29.v.1997, 1male 7 females, 3–10.vi.1997, 1 male 7 females, 11–18.vi.1997, 2 females, 18–25.vi.1997, 12 males 9 females, 9–16.vii.1997, 14 males 8 females, 16–23.vii.1997, 5 males 11 females, 23–30.vii.1997, 1 male 4 females, 30.vii–6.viii.1997, 1 female, 13–20.viii.1997, 1 female, 20–27.viii.1997, 4 males 4 females, 27.viii–3.ix.1997, 7 males 2 females, 3–10.ix.1997, 1 female, 17–24.ix.1997, 2 males, 22–29.x.1997, 2 males 2 females, 29.x–5.xi.1997, 2 females, 5–12.xi.1997, 4 males 2 females, 12–19.xi.1997, Gōdaihata, Chiba Pref., M. Nitta; 2 males 2 females, Sengokubara, Hakone, Kanagawa Pref., 24.vi.1997, K. Yoshizawa; 1 male 3 females, Umegashima Spa, Shizuoka Pref., 22.vi.1997, K. Yoshizawa; 1 male, Hirugano, Gifu Pref., 15.vii.1996, N. Takahashi; 1 male 1 female, Hirugano –

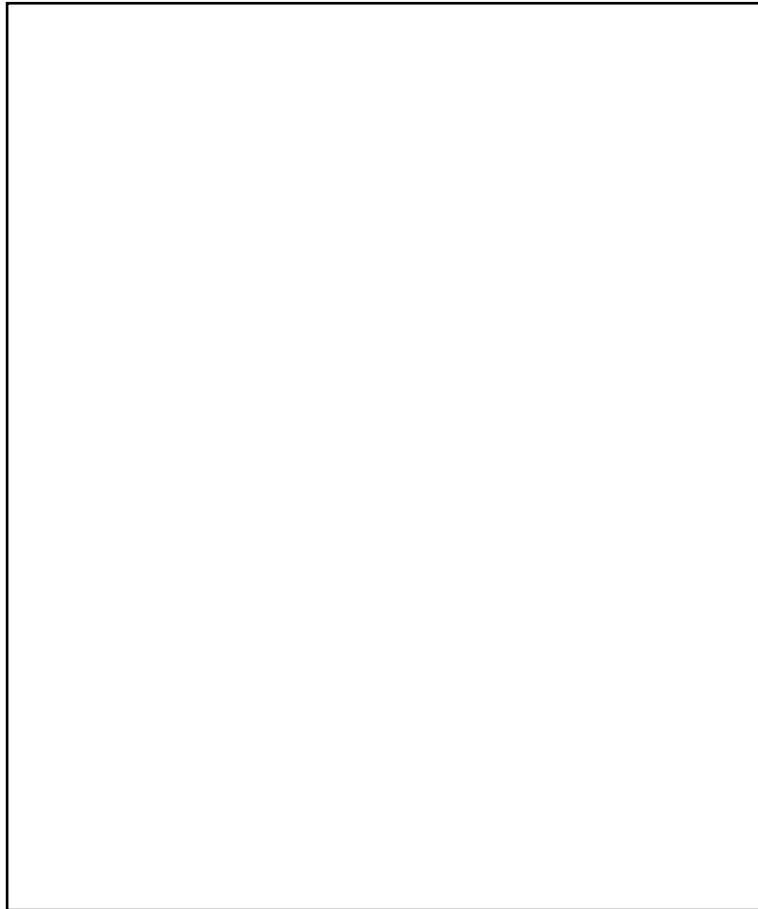


Fig. 6. Identified specimens of *Matsumuraiella radiopicta*. A, name label, under which specimens were pinned; B, habitus, female (left) and male (right); C, label attached to the specimens.

Amago-dani, Gifu Pref., 16.vii.1996, N. Takahashi; 2 males 4 females, 14.vii.1994, 1 female, 21.vi.1997, Mt. Horaijisan, Aichi Pref., K. Yoshizawa; 7 females, Chiiwa, Aichi Pref., 21.vi.1997, K. Yoshizawa; 1 female, 27.v-5.vi.1998, 1 female, 6.vi-16.vi.1998, 3 males 29 females, 18-28.vi.1998, 3 females, 27.vi-7.vii.1998, 3 males 12 females, 8-17.vii.1998, 2 males 6 females, 29.vii-11.viii.1998, 4 males, 12-22.viii.1998, 5 males 6 females, 22.viii-3.ix.1998, 2 females, 4-14.ix.1998, 1 female, 17-27.x.1998, Asahi (400m alt.), Yawata Shrine, Aichi Pref., K. Yamagishi; 1 female, 19-26.v.1998, 10 males 20 females, 27.v-5.vi.1998, 1 male 11 females, 6-16.vi.1998, 1 male 5 females, 17-26.vi.1998, 5 males 9 females, 8-17.vii.1998, 1 female, 27.vi-7.vii.1998, 7 males 34 females, 29.vii-11.viii.1998, 3 females, 12-22.viii.1998, 1 male 6 females, 22.viii-3.ix.1998, 1 female, 4-14.ix.1998, Yawata (650m alt.), Asahi, Aichi Pref., K. Yamagishi; 1 female, Kyoto, 5.viii.1980, C. Besuchet (MHNG); 20 males 12 females 4 nymphs, Mt. Hiei (850m alt.), Kyoto Pref., 2.x.1994, C. Lienhard (MHNG); 1 male 3 females, Mt. Obakodake, Nara Pref., 19.vi.1997, K. Yoshizawa; 1 female, Mt. Ungetsusan, Shimane Pref., 11.vii.1994, K. Yoshizawa; 5 males 1 females, Mt. Kakezuyama, Geihoku Town, Hiroshima Pref., 11.vii.1994, K. Yoshizawa; 3 males 1 female 2 nymphs, Mt. Garyûsan, Geihoku Town, Hiroshima Pref., 5.ix.1992, K. Yoshizawa. [SHIKOKU] 2 females, Omogo-kei, Ehime Pref.,

17.vi.1997, K. Yoshizawa; 1 male, Nishikuma-keikoku, Monobe Villa., Kochi Pref., 9.x.1994, N. Takahashi. [KYUSHU] 2 males, Mt Kujûsan, Oita Pref., 25.vi.1992, T. Ueno. [TSUSHIMA] 5 males 4 females, Mt. Ariakeyama, 28.v.1997, N. Takahashi; 2 males, Sumo, Mitsushima, 29.v.1997, N. Takahashi; 3 males 12 females, 27.v.1997, 5 males 3 females, 28.v.1997, Mt. Taterayama, N. Takahashi.

Distribution. Japan: Chishima Isls., Hokkaido, Honshu, Shikoku, Kyushu, Tsushima; Russian Far East, Sakhalin.

Remarks. *Matsumuraiella radiopicta* was described by G. Enderlein based on specimens collected by S. Matsumura. In the Hokkaido University Insect Collection, there are four identified specimens of *M. radiopicta*. Their label data exactly agree with those in the original description of *M. radiopicta* (Tomakomai. 1903: Fig. 6C). External feature of those specimens also exactly agree with the original description of the species (Fig. 6B). Thus, I confidently considered that those specimens were collected together with the type specimens of *M. radiopicta* and, of course, represent the same species. However, those identified specimens cannot be considered as the types of *M. radiopicta* because Enderlein (1906) mentioned in the original description of *M. radiopicta* that the type depository of this species was Königliches Zoologisches Museum zu Berlin (present Museum für Naturkunde, Institut für Systematische Zoologie).

Amphipsocinae

Type genus. *Amphipsocus* McLachlan.

Diagnosis.

According to Mockford (1978) and my present observation, this subfamily is characterized by the combination of the following character states: intermediate development of internal ridge of epistomal suture; prominent anterior labral sensilla; narrowed lacinial tip; forewing veins with ventral setae in distal half; hindwing veins with two rows of setae; distal and posterior margins of hindwing with continuous setae (Figs. 1D₂, E₂); external valve of gonapophyses reduced (Figs. 8D, 10D).

Kolbia Bertkau

Kolbia Bertkau, 1882: 129. (Type species: *Kolbia quisquiliarum* Bertkau, 1882: 129, by monotypy.)

Kolbea Enderlein, 1901: 538 (unjustified emendation: see Lienhard, 1985).

Diagnosis.

This genus can be distinguished from the other genera of the family by the combination of the following character states: pterostigma shallow (Fig. 1D₁); forewing cell r₅ parallel sided (Fig. 1D₁); hindwing without basal brush (Fig. 1D₂); ventral valve of gonapophyses forming acute angle with its basal stem (Fig. 8D); spermathecal duct with bulb distal to sheath (Fig. 8E).

Kolbia fusconervosa Enderlein

Kolbea fusconervosa Enderlein, 1906: 252; Matsumoto, 1941: 129; Smithers, 1967: 57;

Morimoto, 1989: 64; Tomita & Haga, 1991: 38, 50.

Redescription.

Male. Head uniformly pale brown; eye black, IO/D=0.7; ocellar region blackish brown; occipital suture blackish brown; postclypeus paler, with ca. 16 stripes. Antenna dark brown except pedicel, scape and 1st flagellomere pale brown, distal flagellomeres paler. Mouthparts pale yellow except apex of lacinia black and fourth maxillary palpomere brown. Thorax pale brown in ground color; each lobe of meso- and metascutum with large brown oval marking. Legs brown, coxae and femora of all legs excluding distal ends yellow, claws black. Forewing (Fig. 1D₁) hyaline with brownish tinge; veins blackish brown except around fork of Rs+M and R₁ surrounding pterostigma pale brown and CuA₂ hyaline; pterostigma flattened; veins Rs and M fused for long distance; R₂₊₃ and R₄₊₅ slightly sinuated; areola postica high. Hindwing (Fig. 1D₂) hyaline with brownish tinge; veins dark brown except R₁, basal section of Rs, CuP and A₁ pale brown. Abdomen pale yellow. Genitalia (Fig. 7) yellow except trichobothrial field blackish brown. Epiproct (Fig. 7A) small, semicircular, sparsely setose, setae along distal margin long. Paraproct (Fig. 7B) with oval and strongly swelling field of 33–36 trichobothria. Hypandrium (Fig. 7C) weakly sclerotized, unpigmented, distal margin somewhat pointed apically, posterolateral region with some long setae. Phallosome (Fig. 7D, E) rather wide; aedeagus strongly arched in lateral view; paramere narrow, strongly arched in lateral view, apically with few tiny circular pores; anterior margin of phallobase slightly arched or almost straight.



Fig. 7. Male genitalia of *Kolbia fusconervosa*. A, epiproct, dorsal view; B, paraproct, lateral view; C, hypandrium, ventral view; D, phallosome, ventral view; E, ditto, lateral view. Scale. 0.25 mm.

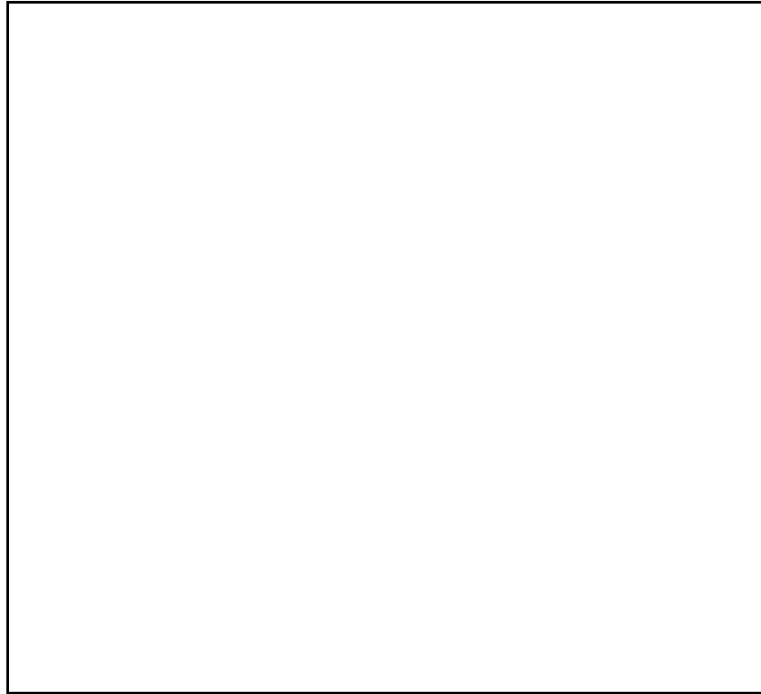


Fig. 8. Female genitalia of *Kolbia fusconervosa*. A, epiproct, dorsal view; B, paraproct, lateral view; C, subgenital plate, ventral view; D, gonapophyses, ventral view; E, spermatheca. Scale. 0.25 mm.

Length. Fw 4.1–4.7; Hw 2.9–3.4; f1 0.68–0.74; f2 0.64–0.70; Hf 0.90–0.96; Ht 1.4–1.6; t1 0.44–0.48; t2 0.16–0.18.

Female. Almost as in male, no sexual dimorphism in wings. Eye IO/D=2.3. Epiproct (Fig. 8A) semicircular, sparsely setose, setae along distal margin long. Paraproct (Fig. 8B) with blackish brown, strongly swelling oval field of 25–28 trichobothria. Subgenital plate (Fig. 8C) weakly sclerotized, unpigmented, with posterior margin somewhat truncated and slightly sinuated. Gonapophyses (Fig. 8D): ventral valve long and narrow, its basal part strongly projecting anteriorly then bent to posteriorly in acute angle, apex slightly bent outwardly and covered with tiny denticles; dorsal valve narrow, short, strongly arched, apex covered with tiny denticles; external valve reduced to small tongue-like sclerite. Spermathecal sac (Figs. 8E) sclerotized, ball-shaped, with basal bulb; spermathecal duct short, with thick glandular structure.

Length. Fw 4.6–5.5; Hw 3.3–3.8; f1 0.70–0.90; f2 0.60–0.65; Hf 1.0–1.3; Ht 1.4–1.8; t1 0.50–0.61; t2 0.17–0.20.

Material examined. [HOKKAIDO] 5 females, Mt. Asahidake (800–1000m alt.), 9.viii.1994, K. Yoshizawa; 1 female, Kariba Villa., Setana Town, 30.vii.1996, N. Takahashi; 1 female, Tôroko Lake, Shibeche Town, 31.vii.1997, N. Takahashi; 3 females, Mt. Rausu-dake, Shiretoko Pen., 27.vii.1997, N. Takahashi; 1 female, Ônuma, 24.viii.1994, K. Yoshizawa. [HONSHU] 3 females, Yagen-Rindô – Nishinomata-Rindô, Ohata Town, Shimokita, Aomori Pref., 11.vii.1998, N. Takahashi; 1 female, Kotaki-numa, Kizukuri Town, Nishi-Tsugaru-Gun, Aomori Pref., 15.ix.1997, T. Ichita; 9 females,

Obuchi-numa, Rokkasho Villa., Kamikita-Gun, Aomori Pref., 3.viii.1997, T. Ichita; 2 females, Ômagari, Mutsu City, Aomori Pref., 23.viii.1997, N. Takahashi; 1 male 4 females, Shimashima-dani, Nagano Pref., 15.vii.1997, N. Takahashi; 4 males 23 females, Mt. Mizugaki, Yamanashi Pref., 18.vii.1997, N. Takahashi; 4 males 10 females, Hirogawara, Yamanashi Pref., 7.vii.1997, K. Yoshizawa; 1 female, Masutomi Spa, Yamanashi Pref., 7.vii.1997, K. Yoshizawa; 5 female, Yunosawa Pass, Yamanashi Pref., 21.vii.1997, N. Takahashi, 2 females, Amou-tôge, Kawai Villa., Gifu Pref., 17.vii.1992, K. Yoshizawa; 1 female, Shiudo-dani-rindô, Shoukawa Villa., Gifu Pref., 17.vii.1996, N. Takahashi; 2 males, Asahi, Yawata (650m alt.), Aichi Pref., 8–17.vii.1998, K. Yamagishi. [IZU SHOTÔ] 2 females, Tairô-ike, Miyakejima Is., 27.iv.1998, N. Takahashi. [KYUSHU] 2 males 2 females, Mt. Kujû-san, Ôita Pref., 25.vi.1992, T. Ueno.

Distribution. Japan: Kunashiri-to, Hokkaido, Honshu, Shikoku, Kyushu.

Remarks. Although I did not examine the type specimens of this species, external features of the specimens listed above completely agree with the original description. Furthermore, all other Japanese psocids collected during my extensive faunal investigations of Japan failed to agree with the original description of *Kl. fusconervosa*. Thus, I identified the above-mentioned specimens as *Kl. fusconervosa*.

Monophyly of the genus *Kolbia* is supported by an autapomorphy, the bulb distal to sheath of spermathecal duct (Mockford, 1978). By the present examination, this apomorphic feature is clearly observed in *Kl. fusconervosa* (Fig. 8H).

Amphipsocus McLachlan

Amphipsocus McLachlan, 1872: 76. (Type species: *Amphipsocus pilosus* McLachlan, 1972: 77, by monotypy.)

Rosega Navas, 1931: 132. (Type species: *Rosega pictus* Navas, 1931: 132, by monotypy).

Diagnosis.

Although monophyly of this genus is less supported, it can be distinguished from the other genera of the family by the combination of the following character states: anterior femur with row of cones; forewing veins and margin with long setae (Fig. 1E₁); pterostigma angled (Fig. 1E₁); areola postica high, free from M (Fig. 1E₁); hindwing (Fig. 1E₂) with basal brush; paraproct without duplex spine (Fig. 10B); spermatheca without basal bulb (Fig. 10E).

Amphipsocus japonicus (Enderlein)

Dasypsocus japonicus Enderlein, 1906: 251; Matsumoto, 1941: 130; Smithers, 1967: 57; Morimoto, 1989: 64; Tomita & Haga, 1991: 38, 50.

Amphipsocus rubrostigma Okamoto, 1910: 194; Smithers, 1967: 56; Morimoto, 1989: 64; Tomita & Haga, 1991: 38, 50. **New synonymy.**

Amphipsocus japonicus: Vishniakova, 1986: 339.

Redescription.

Male. Head pale brown, with brown markings on vertex, frons and around eye; eye black, IO/D=1.6; ocellar region pale brown. Antenna brown; pedicel, scape and 1st flagellomere slightly paler; both ends of all flagellomeres white. Mouthparts pale yellow

except apex of lacinia and apical tip of fourth maxillary palpomere pale brown. Thorax pale yellow in ground color; meso- and metanotum blackish brown except sutures, posterior end of median lobe, posterior surface of lateral lobe and median region of postnotum pale yellow; prealar arm, anterior margin of anepisternum, precoxal bridge, dorsal half of epimeron of mesopleuron, anepisternum, and dorsal margin of epimeron of metapleuron brown. Legs pale yellow; distal ends of femora and basal ends of tibiae of all legs with brownish tinge; claws black. Forewing (Fig. 1E₁) hyaline, proximal half with irregular faint brown markings; distal half of pterostigma with pale brown marking extending to cell r₁; pale brown band along distal half of R₂₊₃; distal margin of areola postica bordered with brown band; veins brown to pale brown except R₁ white; pterostigma strongly extended posteriorly without spur vein; veins Rs and M fused for short distance; R₄₊₅ strongly sinuated;



Fig. 9. Male genitalia of *Amphipsocus japonicus*. A, epiproct, dorsal view; B, paraproct, lateral view; C, hypandrium, ventral view; D, phallosome, ventral view; E, ditto, lateral view. Scale. 0.25 mm.

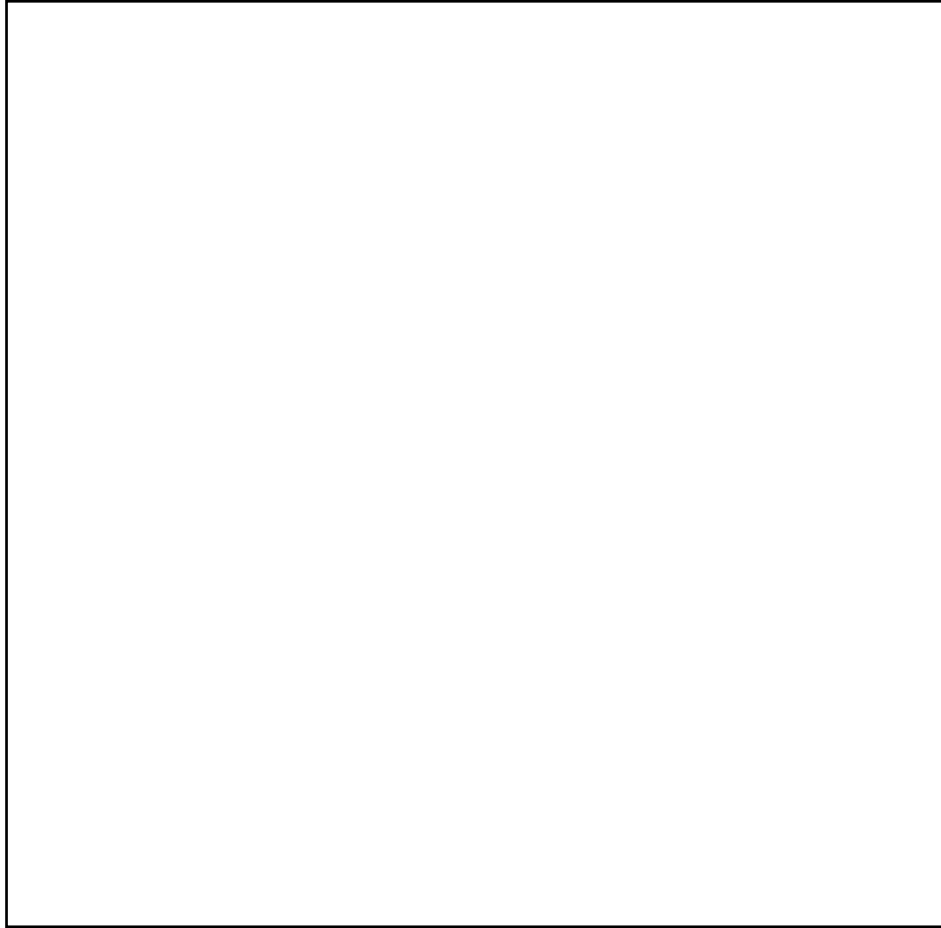


Fig. 10. Female genitalia of *Amphipsocus japonicus*. A, epiproct, dorsal view; B, paraproct, lateral view; C, subgenital plate, ventral view; D, gonapophyses, ventral view; E, spermatheca. Scale. 0.25 mm.

M_{1+2} long and sinuated; areola postica high. Hindwing (Fig. 1E₂) hyaline with brownish tinge; veins pale to dark brown except CuP almost hyaline. Abdomen pale yellow except first segment pale brown. Genitalia (Fig. 9) pale brown. Epiproct (Fig. 9A) triangular, sparsely setose, dorsal surface slightly hollowed medially. Paraproct (Fig. 9B) rounded posteriorly, with circular field of 22–25 trichobothria. Hypandrium weakly sclerotized, unpigmented except anterolateral region pale brown; posterior margin with weak projection medially; posterolateral corner densely covered with long setae (Fig. 9C). Phallosome (Figs. 9D, E) much longer than width; aedeagus strongly arched in lateral view; paramere broad basally, apical region strongly bent and broadened in lateral view, slightly sinuated in ventral view, anterior region with few tiny oval pores; anterior margin of phallobase rounded.

Length. Fw 4.0–4.7; Hw 2.9–3.5; f1 0.67–0.70; f2 0.58–0.62; Hf 0.82–0.90; Ht 1.3–1.5; t1 0.38–0.46; t2 0.16–0.18.

Female. Almost as in male. Eye IO/D=3.3. Epiproct (Fig. 10A) trapezoidal, distal

margin densely with long setae. Paraproct (Fig. 10B) with oval field of 19–21 trichobothria. Subgenital plate (Fig. 10C) weakly sclerotized, unpigmented except anterolateral region pale brown, with posterior margin slightly hollowed at middle and bearing long marginal setae. Gonapophyses (Fig. 10D): ventral valve long, apex slightly bent outwardly; dorsal valve almost membranous, basally with short fine sclerite, apex slightly bent outwardly; external valve reduced to small triangular sclerite. Spermathecal sac (Fig. 10E) sclerotized, onion-shaped, neck region strongly bent; spermathecal duct long, with thick glandular structure.

Length. Fw 4.4–5.3; Hw 3.3–3.8; f1 0.66–0.72; f2 0.44–0.50; Hf 0.86–0.96; Ht 1.4–1.6; t1 0.38–0.42; t2 0.16–0.19.

Material examined. Formerly identified specimens as *Dasypsocus japonicus*, probably by Okamoto (Fig. 12B). 3 males 4 females, 10/VIII 1903 / Kagoshima (Matsumura's handwriting: Fig. 12C). Syntypes of *Amphipsocus rubrostigma* (Fig. 11). 1 male (Fig. 11B), Japan / Matsum (upper surface, typed: Fig. 11C), 18/vii 1906 / Moji (under surface, Matsumura's handwriting: Fig. 11D); 2 males 3 females (Fig. 11E), viii / Takasago (upper surface, handwriting, probably Suzuki's: Fig. 11F). Other specimens. [HOKKAIDO] 1 female, Pепенai-gawa, Kyôgoku Town, 2.viii.1996, N. Takahashi; 3 females, Mt. Asahidake (800–1000m alt.), 9.vii.1994, K. Yoshizawa; 1 female, Jôzankei, Sapporo City, 3.viii.1996, N. Takahashi; 1 female, Nopporo, Ebetsu City, 4.viii.1996, N. Takahashi. [HONSHU] 7 males 8 females, Yagen-Rindô – Nishinomata-Rindô, Ohata Town, Shimokita, Aomori Pref., 11.vii.1998, N. Takahashi; 1 male 1 female, Yagen – Oku-Yagen, Ohata Town, Shimokita, Aomori Pref., 12.vii.1998, N. Takahashi; 2 males, Yagen Mountain Stream, Ohata Town, Shimokita, Aomori Pref., 14.vii.1998, N. Takahashi; 1 female, Lake Usoriyama, Ohata Town, Shimokita, Aomori Pref., 13.vii.1998, N. Takahashi; 1 male 1 female, Yaegiku, Yokouchi, Aomori City, 6.vii.1997, T. Ichita; 1 female, Okiura, Kuroishi City, 13.vii.1997, T. Ichita; 1 male 1 female, Kurokumanotaki, Ajigasawa Town, Nishitsugaru-gun, Aomori Pref., 30.vii.1995, T. Ichita; 1 female, Hanakatsuchô, Okeya Town, Onda-gun, Miyagi Pref., 14.viii.2000, T. Ichita; 5 females, Utsunomiya (R119), Tochigi Pref., 26.ix.1994, C. Lienhard (MHNG); 3 males 2 females, Shimashima-dani, Nagano Pref., 15.vii.1997, N. Takahashi; 1 female, 18.vii.1994, 2 females, 19.vii.1994, 1 male 2 females, 7.vii.1997, Masutomi Spa, Yamanashi Pref., K. Yoshizawa; 6 males 4 females, Aokigahara-jukai, nr Motosu, Kamikuisshiki Villa., Yamanashi Pref., 9.vii.1997, K. Yoshizawa; 1 female, Sengokubara, Hakone, Kanagawa Pref., 17.vii.1994, K. Yoshizawa; 1 male, Shiudo-dani-rindô, Shoukawa Villa., Gifu Pref., 17.vii.1996, N. Takahashi; 2 females, 5–12.xi.1996, 1 female, 13–19.xi.1996, 1 female, 20–26.xi.1996, 2 females, 27.xi–3.xii.1996, 1 female, 4–10.xii.1996, 1 female, 3–10.vi.1997, 7 females, 11–18.vi.1997, 2 males 2 females, 18–25.vi.1997, 4 males 2 females, 16–23.vii.1997, 2 males, 23–30.vii.1997, 1 male 1 female, 30.vii–6.viii.1997, 1 male, 27.vii–3.ix.1997, 3 males 5 females, 3–10.ix.1997, 1 male, 17–24.ix.1997, 2 females, 22–29.x.1997, 1 female, 29.x–5.xi.1997, 1 male, 5–12.xi.1997, 1 female, 12–19.xi.1997, Gôdaihata, Chiba Pref., M. Nitta (Malaise Trap); 3 males 4 females, 14.vii.1994, 3 males 7 females, 21.vi.1997, Mt. Hôrai-ji-san, Aichi Pref., K. Yoshizawa; 3 females, 27.v–5.vi.1998, 4 males 17 females, 18–28.vi.1998, 1 female, 27.vi–7.vii.1998, 5 males 3 females, 8–17.vii.1998, 3 male 6 females, 29.vii–11.viii.1998, 5 males 11 females, 12–22.viii.1998, 4 males 9 females, 22.viii–3.ix.1998, 1 female, 4–14.ix.1998, 1 male, 15–25.ix.1998, 1 male 1 female, 26.ix–6.x.1998, 2 females, 7–16.x.1998, 2 males 5 females, 17–27.x.1998, Asahi (400m alt.), Yawata Shrine, Aichi Pref., K. Yamagishi (Malaise Trap); 2 females, 27.v–5.vi.1998, 2 females, 17–26.vi.1998, 3 females, 27.vi–7.vii.1998, 2 males 1 female, 4–14.ix.1998, 1 female, 15–25.ix.1998, 2 males 1 female, 26.ix–6.x.1998, Asahi, Yawata (650m alt.), K. Yamagishi (Malaise Trap), 1 male 2 females, Mt. Obakodake, Nara Pref., 19.vi.1997, K. Yoshizawa; 4 females 1 nymph, Akiyoshida, Yamaguchi Pref., 11.x.1994, C. Lienhard (MHNG). [SHIKOKU] 2 females, Terauchi, Koyadaira Villa., Tokushima Pref., 18.vi.1997,

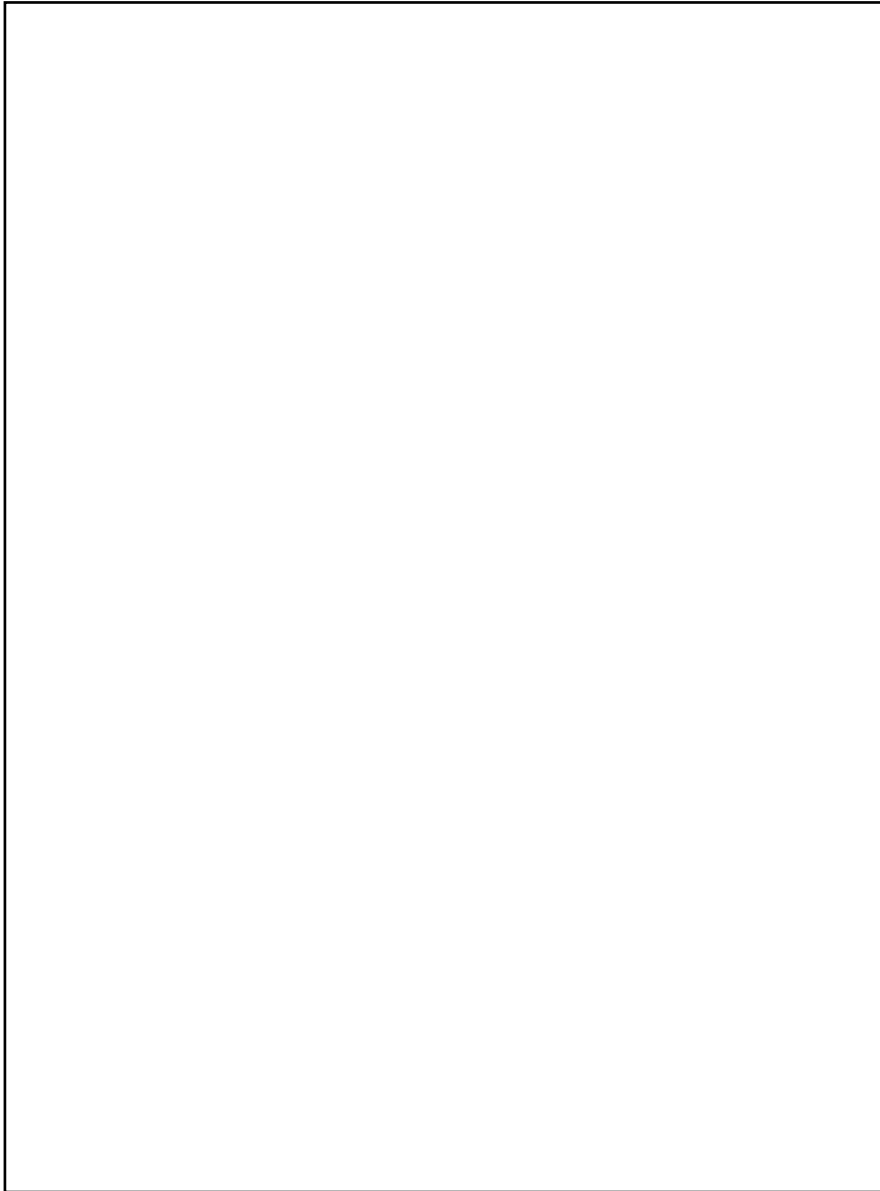


Fig. 11. Syntypes of *Amphipsocus rubrostigma* Okamoto. A, name label under which specimens are pinned; B, a male syntype collected at Moji, habitus; C, label attached to the specimen B, upper surface; D, ditto, under surface; E, female (left) and male (right) syntypes collected at Takasago, habitus; F, label attached to the specimens E.

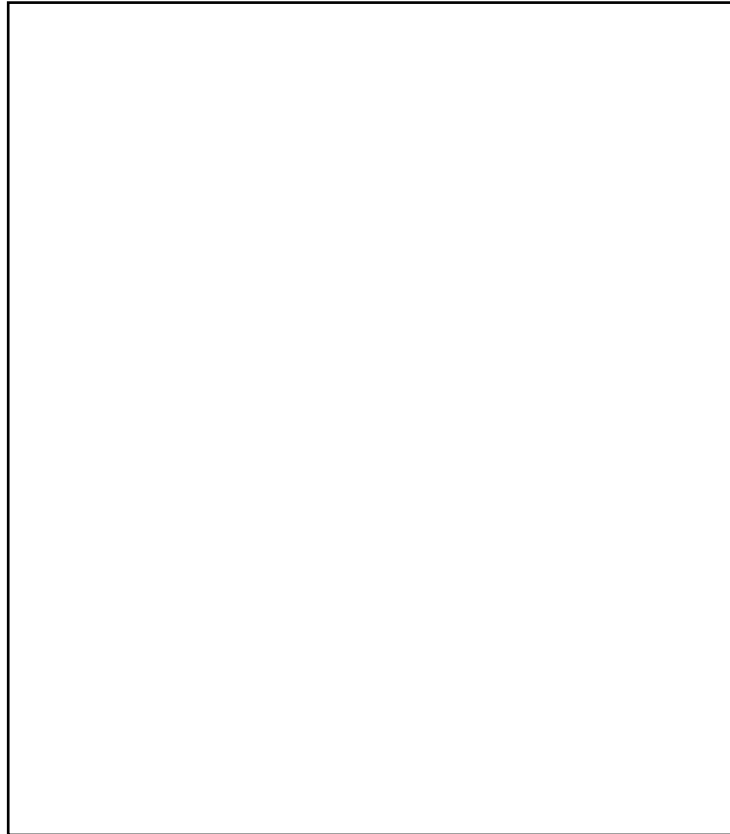


Fig. 12. Identified specimen of *Amphipsocus japonicus* (Enderlein). A, name label under which the specimens are pinned; B, a male specimen, habitus; C, label attached to the specimen.

K. Yoshizawa; 2 females, Sameura-Dam, Kochi Pref., 17.vi.1997, K. Yoshizawa. [KYUSHU] 6 males 9 females, Nogôchi, Fukuoka City, 7.vi.1997, K. Yoshizawa; 2 females, North of Haki Town, Entrance of R211 (200m alt.), Fukuoka Pref., 12.x.1994, C. Lienhard (MHNG); 2 males 8 females, Notôge, Mt. Hikosan, Oita Pref., 12.x.1994, C. Lienhard (MHNG); 1 male 2 females, Ebino, Kagoshima Pref., 21.x.1997, H. Amano. [TSUSHIMA] 3 males 1 female, Sumo, Mitsushima, 29.v.1997, N. Takahashi. [RYUKYUS] 1 female, Sumiyô, Amami-Ôshima Is., 28.iv.1996, K. Yoshizawa; 1 male, Mt. Yonahadake, Okinawajima Is., 11.xi.1994, K. Yoshizawa; 1 female, Gesashi, Okinawajima Is., 17.iv.1996, K. Yoshizawa.

Distribution. Japan: Hokkaido, Honshu, Shikoku, Kyushu, Tsushima, Yakushima, Amami-Ôshima, Okinawajima; Far East Russia.

Remarks. In the original description of *A. rubrostigma*, Okamoto (1910) provided the following information as collecting data of the type specimens of the species: Moji, am 18. Juli 1906; Takasago, im Aug. 1904 und Kyoto in 1907, mehrere Exemplare von Herrn Prof. Dr. S. Matsumura und Herrn M. Suzuki gesammelt.

In the Hokkaido University Insect Collection, I found 15 specimens pinned under the name label of “*Amphipsocus rubrostigma* Okam” (Okamoto’s handwriting: Fig. 11A). Of them, the label data and the external features of the above-mentioned five specimens are in

complete agreement with those in the original description (Figs. 11C, D, F). Thus, those specimens are apparently syntypes of *A. rubrostigma*. No specimens from Kyoto, which was also used in the original description of *A. rubrostigma*, have been found.

Dasypsocus japonicus was described by G. Enderlein based on specimens collected by S. Matsumura. In the Hokkaido University Insect Collection, some identified specimen of *D. japonicus* are stored, and label data of four of them exactly agree with those in the original description of *D. japonicus* (Kagoshima. 10. Juli 1903: Fig. 12C). External features of those specimens are also in complete agreement with the original description of the species (Fig. 12B). Thus, I confidently considered that those specimens were *D. japonicus* and were collected with the type specimens. However, those identified specimens are not considered as the type series of *D. japonicus* because Enderlein (1906) mentioned the type depository of this species as Königliches Zoologisches Museum zu Berlin (present Museum für Naturkunde, Institut für Systematische Zoologie).

Then, by comparing those specimens with the present syntypes of *A. rubrostigma*, I confirmed that there is no definite specific difference between them. Therefore, *A. rubrostigma* should be considered as a junior synonym of *Dasypsocus japonicus*.

D. japonicus was transferred to the genus *Amphipsocus* by Vishniakova (1986), but she did not provide any comment about this taxonomic placement. *Amphipsocus* is classified into the tribe Amphipsocini, whereas *Dasypsocus* constitute a monotypic tribe Dasypsocini (Mockford, 1978). Monophyly of Amphipsocini is supported by an autapomorphy, presence of row of cones on anterior femur, and *Dasypsocus* lacks this apomorphy. By the present examination, a row of cones on the anterior femur is observed in *D. japonicus*. This character state suggests that the species should be excluded from *Dasypsocus* and must be included in the tribe Amphipsocini.

Alternatively, as mentioned by Mockford (1978), no apomorphic state supporting a monophyly of *Amphipsocus* has been detected, and the genus is possibly a paraphyletic group. External features of *Dasypsocus japonicus* agree with the current definition of *Amphipsocus* and there is no other suitable genus for *D. japonicus*. In the present paper, following to Vishniakova (1986), *Dasypsocus japonicus* is treated under the genus *Amphipsocus*, although monophyly of *Amphipsocus* is unclear at this moment.

KEY TO THE JAPANESE SPECIES OF AMPHIPSOCIDAE

1. Forewing Ms–Cu₁ cross vein absent, Rs and M fused (Figs. 1C₁–E₁) 2
- Forewing Ms–Cu₁ cross vein present, Rs and M connected by short cross vein (Fig. 1A)
..... *Kodamaius pilosus*
2. Forewing membrane with pale brown markings (Figs. 1C₁, E₁) 3
- Forewing membrane without any markings, only with yellowish tinge (Fig. 1D₁)
..... *Kolbia fusconervosa*
3. Paraproct without duplex spine (Fig. 10B) *Amphipsocus japonicus*
- Paraproct with duplex spine (Fig. 5B) *Matsumuraiella radiopicta*

DISCUSSION

Mockford (1993) raised the status of Dasydemellidae from the subfamilial level within Amphipsocidae, but this taxonomic treatment was not followed by Smithers (1996). Both Dasydemellidae and Amphipsocidae (sensu Mockford, 1993) were considered as monophyletic (Mockford, 1978; Yoshizawa, 1999) and, as discussed below, they are

considered to compose a monophyletic group together with *Kodamaius*. However, *Kodamaius* cannot be included in neither group and thus, there are two possibilities about the taxonomic treatment of these three groups: (1) include all three groups within a single family Amphipsocidae (sensu Smithers, 1996); (2) treat each group as an independent family.

A conspicuous morphological gap is observed between Dasydemellidae and other groups in the shape of the external valve of the gonapophyses. However, this cannot be considered as family level because such variation in the shape of the external valve is observed in a single genus, *Stenopsocus* (Stenopsocidae). A conspicuous gap between *Kodamaius* and other groups is observed in unique forewing venation, but forewing venation is highly variable within Amphipsocidae (sensu Mockford, 1993). Therefore, I consider that it is more practical to treat those three groups as a single family, Amphipsocidae (sensu Smithers, 1996).

Monophyly of Amphipsocidae is supported by two autapomorphies: presence of pair of concavities on vertex (Yoshizawa, unpublished data); forewing veins with two rows of setae (Yoshizawa, 1999). Although the latter character state is also observed in some other families and seems rather homoplastic, this character state is stable within a family or superfamily levels. For example, forewing veins with two rows of setae was regarded as autapomorphic for each Pseudocaecilioidea, Philotarsidae, Epipsocetae, and Amphipsocidae and no reversal has been deduced (Yoshizawa, 1999). Within the infraorder Caeciliusetae, only Amphipsocidae possess this character state. A pair of concavities on vertex is unique to this family.

Taxonomic placement of *Kodamaius* has been unstable by authors, regarded as a member of Stenopsocidae (Smithers, 1972; Badonnel, 1981), Amphipsocidae (Smithers, 1990), or Caeciliusidae (Badonnel, 1946; Mockford, 1993, 1999; Yoshizawa, 1997). Here, I treat the genus as a member of Amphipsocidae because species of the genus clearly have a pair of shallow concavities on the vertex and two rows of setae on the forewing veins, although two rows of setae are restricted to the basal half. I found out no synapomorphy suggesting a relationship between *Kodamaius* and Stenopsocidae or Caeciliusidae.

As discussed above, two major clades, Dasydemellinae and Calocaeciliinae + Amphipsocinae (= Amphipsocidae sensu Mockford, 1993), have been recognized within the family Amphipsocidae. Mockford (1978) considered the presence of the basal brush of hindwing as one of autapomorphies of Calocaeciliinae + Amphipsocinae clade. In *Kodamaius*, the basal brush of hindwing is observed, and this may indicate a relationship between *Kodamaius* and Calocaeciliinae + Amphipsocinae clade. However, state of this character is highly unstable within Amphipsocinae. Except for the basal brush, *Kodamaius* lacks autapomorphies of both clades and cannot be assigned to either of them. Consequently, four subfamilies, Kodamaiinae, Dasydemelliinae, Calocaeciliinae and Amphipsocinae, are herein recognized in the family. Monophyly of Kodamaiinae is supported by its unique forewing venation. Phylogenetic affinity among three major clades in Amphipsocidae are so far unclear.

Kodamaius was once considered to compose the tribe Kodamaiini together with six other caeciliusid genera (Mockford, 2000). None of them, excluding *Kodamaius*, have two rows of setae on the forewing veins nor, as far as I have examined (*Pericaecilius*), a pair of concavities on the vertex. Nomenclatural treatment for the remaining member of Kodamaiini is discussed in APPENDIX 2.

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REFERENCES

- Badonnel, A. (1946) Psocoptères du Congo belge. *Revue de Zoologie et de Botanique africaines* 39: 137–196.
- Badonnel, A. (1981) Psocoptères (Insecta: Psocoptera) de l'Inde. Mission Besuchet-Löbl (1978) et voyage entomologique Löbl 1979. *Revue suisse de Zoologie* 88: 381–411.
- Bertkau, P. (1882) Über den Geschlechtsdimorphismus und die Speicheldrüsen der Psociden und ein Verzeichniss der bisher bei Bonn beobachteten Arten. *Verhandlungen des Naturhistorischen Vereins der preussischen Rheinlande und Westfalens* 39: 127–233.
- Enderlein, G. (1901) Neue deutsche und exotische Psociden, sowie Bemerkungen zur Systematic. *Zoologische Jahrbücher Abteilung Systematik* 14: 537–548.
- Enderlein, G. (1906) Die Copeognathen-Fauna Japans. *Zoologische Jahrbücher Abteilung Systematik* 23: 243–256.
- Kuwayama, S. (1961) Corrodentia of Thailand. *Nature and Life in Southeast Asia* 1: 203–205.
- Lienhard, C. (1985) Vorarbeiten zu einer Psocopteren-Fauna der Westpaläarktis. II. Die europäischen Arten der Gattung *Elipsocus* Hagen, 1866 (Psocoptera: Elipsocidae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 58: 113–127.
- McLachlan, R. (1872) Descriptions of a new genus and five new species of exotic Psocidae. *Entomologist's Monthly Magazine* 9: 74–78.
- Mockford, E. L. (1978) A generic classification of family Amphipsocidae (Psocoptera: Caecilietae). *Transactions of the American Entomological Society* 104: 139–190.
- Mockford, E. L. (1993) North American Psocoptera. Sandhill Crane Press Inc., The Netherlands.
- Mockford, E. L. (2000) A classification of the psocopteran family Caeciliusidae (Caeciliidae Auct.). *Transactions of the American Entomological Society* 125: 325–417.
- Morimoto, K. (1989) Psocoptera. In Hirashima, Y. (ed.), *A check list of Japanese insects I*: 62–65. Fukuoka.
- Navás, L. (1931) Insects du Congo Belge (Ser. VI). Névroptères. *Revue de Zoologie et de Botanique africaines* 21: 123–144.
- Okamoto, H. (1907) Die Psociden Japans. *Transactions of the Sapporo Natural History Society* 2: 113–147.
- Okamoto, H. (1910) Die Caeciliiden Japans. *Annales Historico-naturales Musei nationalis hungarici* 8: 184–212.
- Okamoto, H. (1932) Psocoptera. In *Iconographia Insectorum Japonicorum: 1991–2001*. Hokuryûkan, Tokyo. (In Japanese.)
- Smithers, C. N. (1967) A catalogue of the Psocoptera of the World. *Australian Zoologist* 14: 1–145.
- Smithers, C. N. (1972) The classification and phylogeny of the Psocoptera. *Memoires of the*

- Australian Museum 14: 1–349.
- Smithers, C. N. (1990) Keys to the families and genera of Psocoptera (Arthropoda: Insecta). Technical Report of the Australian Museum 2: 1–82.
- Tomita, Y. and K. Haga (1991) A check-list of Psocoptera (Insecta) from Japan with keys for identification. Bulletin of the Sugadaira Montane Research Center 12: 35–54.
- Tsutsumi, C. (1961) Notes on the Psocoptera of Japan 1. On the familial character of a psocid species, *Matsumuraiella radiopicta* Enderlein (Psocidae). Kontyû 29: 56–60.
- Vishniakova, V. N. (1986) Psocoptera (Copeognatha). In Ler, P. A. (ed.), Identification of the Insects of the Far East of the USSR, 1: 323–357. Leningrad.
- Yoshizawa, K. (1997) Psocoptera of Bangladesh collected by Prof. Emer. Katsura Morimoto, with descriptions of four new species. Esakia 37: 15–24.
- Yoshizawa, K. (1999) Morphology, Phylogeny and Higher Classification of the Suborder Psocomorpha (Insecta: Psocoptera). Unpublished PhD thesis, Kyushu University.
- Yoshizawa, K. (2001) A systematic revision of Japanese *Trichadenotecnum* Enderlein (Psocodea: 'Psocoptera': Psocidae: Ptyctini), with redefinition and subdivision of the genus. Invertebrate Taxonomy 15: 159–204.

APPENDIX 1. NON-JAPANESE SPECIES EXAMINED.

The following species was examined to clarify the taxonomic status of *Kd. pilosus* and *Kd. brevicornis*.

Kodamaius brevicornis Okamoto

Kodamaius brevicornis Okamoto, 1907: 139.

Material examined. Formerly identified specimen as *Kodamaius brevicornis* (Fig. 1B). 1 female, Formosa / Matsumura (upper surface, typed), Tainan / 2.IV '07 (under surface, Matsumura's handwriting).

Distribution. Taiwan.

APPENDIX 2. PROPOSAL OF NEW CAECILIUSID TRIBAL NAME.

In this paper, the tribe Kodamaini with only the type genus is transferred to Amphipsocidae. Therefore, a new tribal name is required for the remaining members. All four other subtribes previously assigned to Kodamaini were established simultaneously, so that the replacement name cannot be decided by the principle of priority. Here, I propose Austrocaeciliini for them because the name is based on the oldest genus name within the tribe.

Family Caeciliusidae

Subfamily Caeciliusinae

Tribe Austrocaeciliini

(Type genus: *Austrocaecilius* Smithers, 1981: 68)

Subtribe Pericaeciliina

Subtribe Thorntoniellina

Subtribe Austrocaeciliina

Subtribe Lienhardiellina

