



Title	Taxonomic Study on the Family Pseudocaeciliidae (Psocoptera: Psocomorpha) of Japan : 3. Genera Allocaecilius, Ophiodoperma and Pseudoscottiella
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Taxonomic Study on the Family Pseudocaeciliidae
(Psocoptera: Psocomorpha) of Japan
3. Genera *Allocaecilius*, *Ophiodoperma* and *Pseudoscottiella*¹⁾

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Abstract The genera *Allocaecilius*, *Ophiodoperma* and *Pseudoscottiella* of Japan are dealt with. *Allocaecilius sinensis* and *Ophiodoperma glyptocephalum* are newly recorded from Japan and redescribed. A new species, *Pseudoscottiella sakishimensis*, is described. Male and female genitalia are illustrated for these species as far as the materials are available. Diagnostic characters of the three genera and a key to Japanese genera of the family are provided. This paper is the final part of the study of the Japanese Pseudocaeciliidae.

Key words: *Allocaecilius*; *Ophiodoperma*; *Pseudoscottiella*; Pseudocaeciliidae; Psocoptera; taxonomy; Japan.

This paper is the final part of a revisional study of the Japanese Pseudocaeciliidae, and deals with the genera *Allocaecilius*, *Ophiodoperma* and *Pseudoscottiella*.

The genus *Allocaecilius* LEE et THORNTON, 1967, is morphologically similar to the genus *Heterocaecilius* LEE et THORNTON, 1967, and characterized by the forewing markings and venation. The genus includes nine species and is distributed in the Oriental Region. Six species are distributed in Malaysia and one species each in India, in Hong Kong, and in China.

The genus *Ophiodoperma* ENDERLEIN, 1908, is characterized by the forewing markings and venation and fore tibia with a comb of short bristles on its apical half. The genus had once been treated as a subgenus of the genus *Pseudocaecilius* by ROESLER (1944), and SMITHERS (1967) followed this treatment. However, LEE & THORNTON (1967) treated *Ophiodoperma* as a good genus and later all of the authors have followed this treatment. The genus includes seven species and is distributed in Sri Lanka (2 species), Malaysia (4 species), the Philippines (2 species), Taiwan (1 species), and New Guinea (1 species).

The genus *Pseudoscottiella* BADONNEL, 1946, is characterized by the 2-branched median vein, depressed areola postica and thickened costal margin of the forewing. The genus had been known to be endemic to Africa until

¹⁾ Contribution from Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University, Fukuoka (No. 4).

THORNTON *et al.* (1972) described nine new species of the genus from Micronesia. They mentioned that the species of the genus from Micronesia are different from those from Africa in the following features: shape of areola postica of forewing, length of branches of radial fork of forewing, structure of hypandrium, phallosome and subgenital plate, and shape of external valve of gonapophyses. Then, SMITHERS (1973) described a new species from Kermadec Islands and NEW (1974) described three new species from southeastern Australia. NEW (1974) mentioned that the African species are considerably different from the Pacific species including Australian one in the following morphological characters: rod-like sclerites on endophallus absent in the African species, while present in the Pacific species; shape of subgenital plate considerably differing from each other. And he suggested the necessity of establishment of a new genus for the Pacific ones. Since then, 20 additional species were newly described in the genus, and it is represented by 40 species known from Africa, Indonesia, Malaysia, Pacific Islands, Australia and Jamaica. Based on the description and illustration of the additional species, I confirm the morphological differences detected by New are found extensively in these species. Although I consider that the morphological differences are generic, I follow to NEW's treatment in this study because I have not examined any species of the genus except the species described below which belongs to the Pacific species group.

In the present paper, *Allocaecilius sinensis* and *Ophioperma glyptocephalum* are newly recorded from Japan and redescribed. A new species, *Pseudoscottiella sakishimensis*, is described. The genera *Allocaecilius* and *Pseudoscottiella* are hitherto unknown from Japan. The male and female genitalia are illustrated as far as the materials are available. Diagnostic characters of the three genera treated in this paper and a key to Japanese genera of the family are provided.

The depositories of the specimens are abbreviated in the text as follows: BLKU: Biosystematics Laboratory, Kyushu University; ELKU: Entomological Laboratory, Kyushu University; TC: TOMITA collection, Nara Pref.; YC: YOSHIZAWA collection.

Genus *Allocaecilius* LEE et THORNTON, 1967

Type species: *Allocaecilius heterothorax* LEE et THORNTON, 1967, Pacific Ins. Monog., 16: 17.
Allocaecilius LEE et THORNTON, 1967, Pacific Ins. Monog., 16: 12.

Diagnosis. Forewing hyaline with brown markings in basal half and in pterostigma; venation of *Caecilius* type; Rs and M fused for a long distance; Rs arched; areola postica high; vein ends with a brown spot. Hypandrium usually with a pair of lateral sclerites. Phallosome with rod-like sclerites on endophallus.

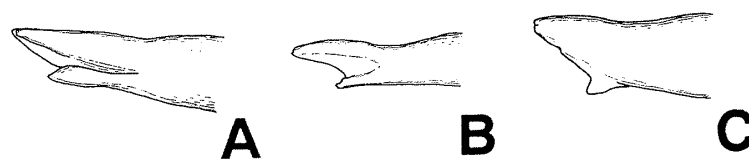


Fig. 1. Apices of laciniae, anterior aspect. — A, *Allocaecilius sinensis*; B, *Ophiodoperma glyptocephalum*; C, *Pseudoscottiella sakisimensis*.

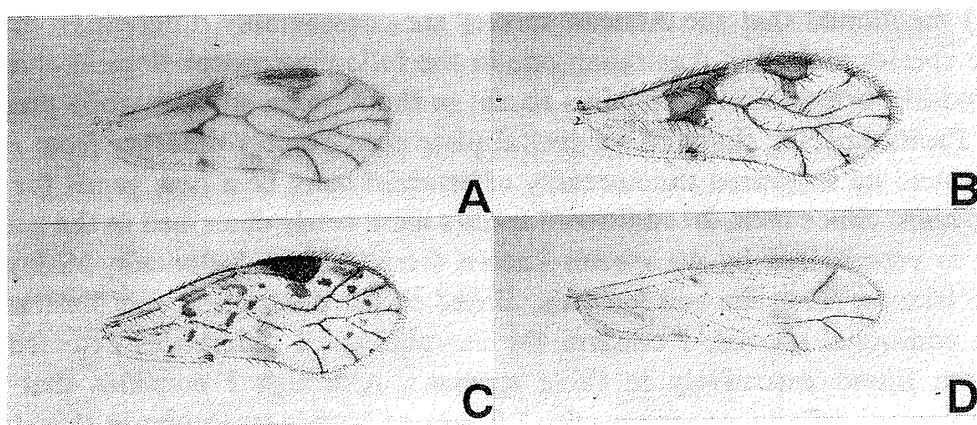


Fig. 2. Forewings. — A, *Allocaecilius sinensis*, male; B, ditto, female; C, *Ophiodoperma glyptocephalum*; D, *Pseudoscottiella sakishimensis*.

Female genitalia: Subgenital plate bilobed, each lobe bearing a few setae; external valve somewhat narrow; dorsal and ventral valves each with lobe and style.

Allocaecilius sinensis LEE et THORNTON, 1967

Allocaecilius sinensis LEE et THORNTON, 1967, Pacific Ins. Monog., 16: 22, (Type locality: Victoria Peak (300 m), Hong Kong Island).

Male. Coloration: Head yellowish brown, with faint markings on vertex; gena and occiput dark brown; eye black to dark gray; ocelli pale and encircled with dark brown; clypeus brown, with pale brown striae. Antenna pale brown, scape and pedicel darker. Mouth parts brown; inner margin of mandible black; maxillary palpus dark brown. Meso- and metanotum pale yellowish brown, with dark brown markings at anterior part of each lobe of mesoscutum and posterior margin of metanotum; rest of thorax dark brown. Forewing (Fig. 2A) hyaline, with brown markings on anterior portion before the middle, median part of pterostigma and distal angle of cu_2 ; veins brown, CuA and CuP pale brown. Hindwing hyaline, anterior margin except median part brown; veins brown. Legs pale yellowish white; apical 1/3 of femora, tibiae and tarsi of all legs brown; claws dark blackish brown. Abdomen pale yellowish brown, pleural areas of first four segments and all sterna blackish brown; genital segments pale brown.

Structure: Eye ratio $IO:D=1.0:1.0$. Vertex and frons with black bristles, clypeus and gena densely with pale brown setae; frons with a small concavity at the middle. Antenna with brown setae. Lacinial tip slender; median cusp small (Fig. 1A). Mesonotum with brown bristles. Pro- and metathorax glabrous. First tarsomere of hindleg with 11–14 ctenidiobothria. Forewing (Fig. 2A) Rs and M fused for a long distance; Rs sinuous; R_{2+3} and R_{4+5} long; areola postica high. Hindwing setose all around margin; veins R_{4+5} and M setose. Last tergite with two fields of papillae on hind margin. Epiproct wrinkled at median area. Paraproct with a field of 10 or 11 trichobothria.

Genitalia (Fig. 3): Hypandrium (Fig. 3C) wholly sclerotized, without posterior projection, its median part setose. Phallosome (Fig. 3D, E); paramere broad in lateral aspect; apex of aedeagus as in Fig. 3F; endophallus with three pairs of rod-like sclerites (Fig. 3G, H).

Dimensions: B 1.78 (1.56–1.90); Fw 2.15 (2.00–2.28); Hw 1.64 (1.57–1.71); f1 0.45 (0.42–0.49); f2 0.32 (0.29–0.33); Hf 0.43 (0.40–0.45); Ht 0.77 (0.72–0.83); t1 0.22 (0.20–0.25); t2 0.10 (0.90–0.11)

Female. Coloration: Almost as in male. Median marking of forewing (Fig. 2B) large and quadrate, extending from costa to $M+Cu$, and occupying apical $1/3$ of r , basal portion of r_1 and m_3 , and somewhat faded medially.

Structure: Almost as in male. Eye ratio $IO:D=1.4:0.5$. Antennal flagellar segments about half as thick as those of male. First tarsomere of hindleg with 12–14 ctenidiobothria. Last tergite without papillae. Paraproct with a field of 10 trichobothria.

Genitalia (Fig. 4): Subgenital plate (Fig. 4B) well sclerotized, with a transverse median row of setae; its apical portion bilobed, each lobe not strongly projected posteriorly and bearing an apical and a subapical setae. Gonapophyses (Fig. 4C–E); external valve oval; dorsal valve lobed, its style broad at base; ventral valve broad at base, and weakly lobed apically.

Dimensions: B 2.21 (2.05–2.35); Fw 2.24 (2.15–2.35); Hw 1.67 (1.57–1.75); f1 0.33 (0.32–0.35); f2 0.23 (0.21–0.25); Hf 0.45 (0.42–0.47); Ht 0.77 (0.72–0.83); t1 0.22 (0.20–0.24); t2 0.10 (0.10–0.11).

Specimens examined: [Kyushu] 1 female, Kashii, Fukuoka C., Fukuoka Pref., 8. vi. 1993, K. YOSHIZAWA (YC); 3 females, Mt. Aburayama, Fukuoka C., Fukuoka Pref., 14. xi. 1993, S. MIYAMOTO (YC); 1 female, same locality, 20. iii. 1993, S. MIYAMOTO (YC); 1 female, Mt. Tachibanayama, Fukuoka C., Fukuoka Pref., 30. iv. 1993, K. YOSHIZAWA (YC); 1 female, Kashii, Fukuoka C., Fukuoka Pref., 12. vi. 1993, K. YOSHIZAWA (YC); 6 males 11 females, Satamisaki, Kagoshima Pref., 29. v. 1994, K. YOSHIZAWA (YC); [Ryukyus] 1 female, Mt. Yuwandake, Amami-Ōshima Is., Kagoshima Pref., 30. iii. 1993, K. YOSHIZAWA (YC); 2 males 8 females, Sumiyō, Amami-Ōshima Is., Kagoshima Pref., 31. iii. 1992, K. YOSHIZAWA (ELKU and YC); 3 females, same locality,

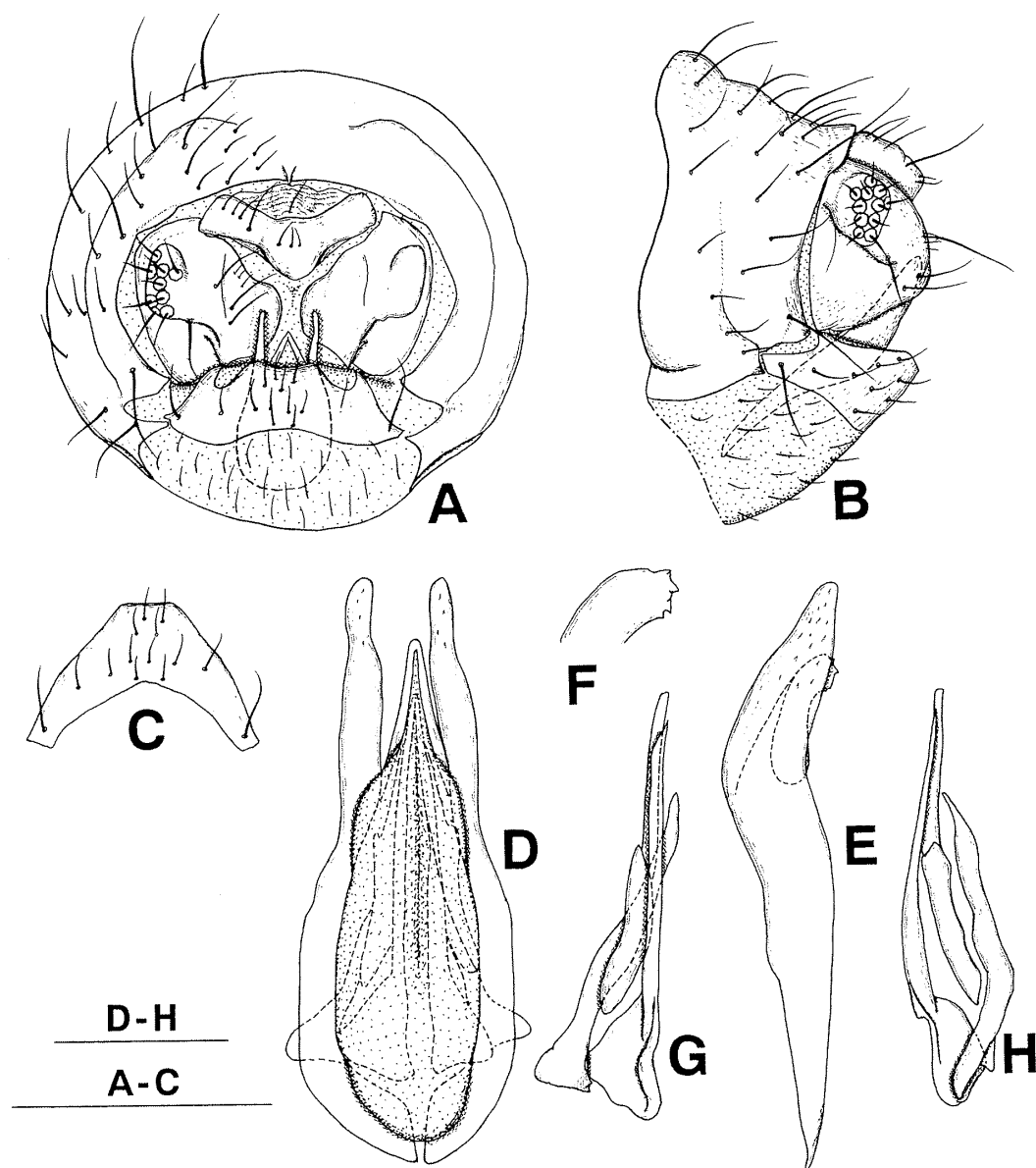


Fig. 3. Male genitalia of *Allocaecilius sinensis*. — A, terminalia, posterior aspect; B, ditto, lateral aspect; C, hypandrium, ventral aspect; D, phallosome, ventral aspect; E, ditto, lateral aspect; F, apex of aedeagus, lateral aspect; G, sclerites on radula, ventral aspect; H, ditto, lateral aspect. Scale: 0.2 mm for A–C, 0.05 mm for D–H.

29. v. 1993, K. YOSHIKAWA (YC); 2 females, Mt. Yonahadake, Okinawajima Is., Okinawa Pref., 21. v. 1993, K. YOSHIKAWA (YC).

Habitat: This species was caught on evergreen broadleaved trees and dried dead foliage in many localities in Japan, while in Sumiyô, Amami-Ôshima Is, it was also found on *Kandelia cande* (Rhizophoraceae).

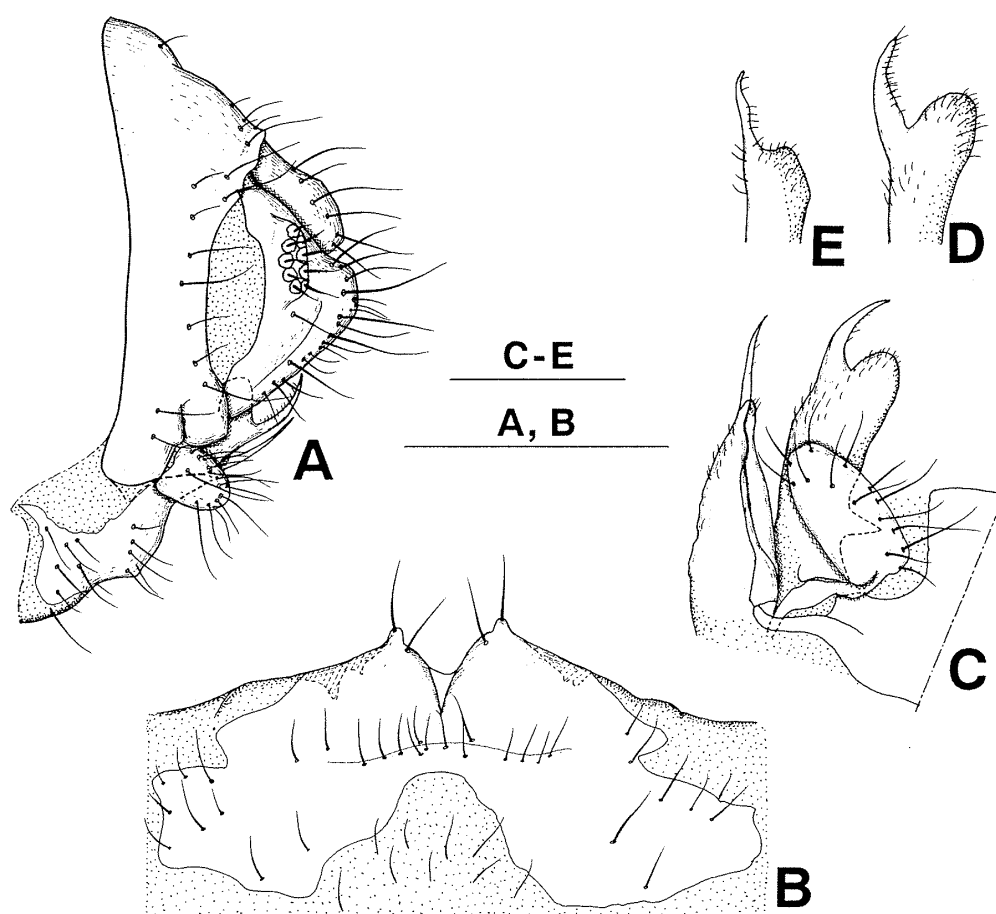


Fig. 4. Female genitalia of *Allocaecilius sinensis*. — A, terminalia, lateral aspect; B, subgenital plate, ventral aspect; C, gonapophyses, ventral aspect; D, apex of dorsal valve, lateral aspect; E, apex of ventral valve, lateral aspect. Scale: 0.2 mm for A, 0.1 mm for B, 0.1 mm for C-E.

*Distribution*²⁾: Japan* (Kyushu, Amami-Ôshima Is., Okinawajima Is.); Hong Kong.

Genus *Ophiodoperma* ENDERLEIN, 1908

Type species: *Ophiodoperma ornatipenne* ENDERLEIN, 1908, Zool. Anz., **33**: 767.

Ophiodoperma ENDERLEIN, 1908, Zool. Anz. **33**: 767; ROESLER, 1944, Stett. ent. Ztg., **105**: 152; LEE et THORNTON, 1967, Pacific Ins. Monog., **16**: 10.

Diagnosis. Forewing hyaline, with dark spots; venation of the *Caecilius* type; Rs and M fused for a short distance; Rs strongly sinuous; areola postica high. Hindwing R_{2+3} and Rs met at right angle. Apical half of foretibia with a

²⁾ An asterisk means a new record.

comb of short thick bristles. Subgenital plate bilobed. Dorsal and ventral valves of gonapophyses each with lobe and style.

Ophiodoperma glyptocephalum LIENHARD, 1985

Ophiodoperma glyptocephalum LIENHARD, 1985, Zool. Scripta, **14**(4): 313, (Type locality: East Malaysia, Sabah, Crocker Range, Kimanis Road, 16 miles from Keningau, 1400 m).

Ophiodoperma sp. TOMITA et HAGA, 1991, Bull. Sugadaira Montane Res. Cen., **12**: 40, 52.

Female. Coloration: Head brown, with dark blackish brown markings on median part of vertex and each side of anterior part of vertex along eye margin; coronal suture black; eye black; antennal socket dark brown; clypeus dark brown with brown striae. Antenna pale brown, scape and pedicel dark brown. Mouth parts brown; molar and teeth areas of mandible black; maxillary palpus dark brown. Prothorax dark brown. Meso- and metathorax yellowish white; anterior part of each lobe of mesoscutum, posterior margin of metanotum and sclerites surrounding coxae brown; scutellum pale brown. Legs dark brown; apices of femora pale brown; claws dark blackish brown. Forewing hyaline with brown markings as in Fig. 2C, no marking at areola postica; veins brown except Rs and M bases, median portions M and CuA and entire An pale. Hindwing hyaline except r_1 and r_3 pale brown; veins white except apical half of Rs, entire R_{2+3} and R_{4+5} , apical 1/3 of M and apical end of CuA brown. Abdomen yellowish white; genital segments pale brown.

Structure: Eye ratio $IO:D=1.4:0.5$; ocelli absent. Vertex and frons with pale brown bristles, clypeus densely with pale brown setae; anterior part of vertex slightly concave and with some wrinkles; frons with a small concavity at middle; epistomal suture only laterally distinctive. Antennal flagellum fine, sparsely with brown setae. Lacinal tip as in Fig. 1B. Mesonotum with pale brown bristles; anterior part of scutum densely with fine pale brown setae. Pro- and metanotum glabrous. Apical half of foretibia with a comb of short thick bristles. First tarsomere of hindleg with 8–9 ctenidiobothria. Forewing (Fig. 2C) R_1 strongly arched in distal half; Rs and M fused for a short distance; Rs strongly arched in distal half; basal angle of r_3 almost 90° ; areola postica high. Hindwing setose all around margin except basal half of anterior margin; veins bare except apical half of R_{4+5} with a few setae. Paraproct with a field of 10 trichobothria.

Genitalia (Fig. 5): Subgenital plate (Fig. 5B) well sclerotized, apically bilobed; each lobe weakly and roundly produced posteriorly and with an apical seta. Gonapophyses (Fig. 5C–E); external valve elongate, slightly narrowing apically; dorsal valve with triangular lobe and hooked style; style of ventral valve almost straight.

Dimensions: B 1.87 (1.75–2.00); Fw 2.03 (1.95–2.08); Hw 1.55 (1.52–1.63); fl 0.25 (0.22–0.27); f2 0.17 (0.15–0.18); Hf 0.38 (0.36–0.42); Ht 0.68

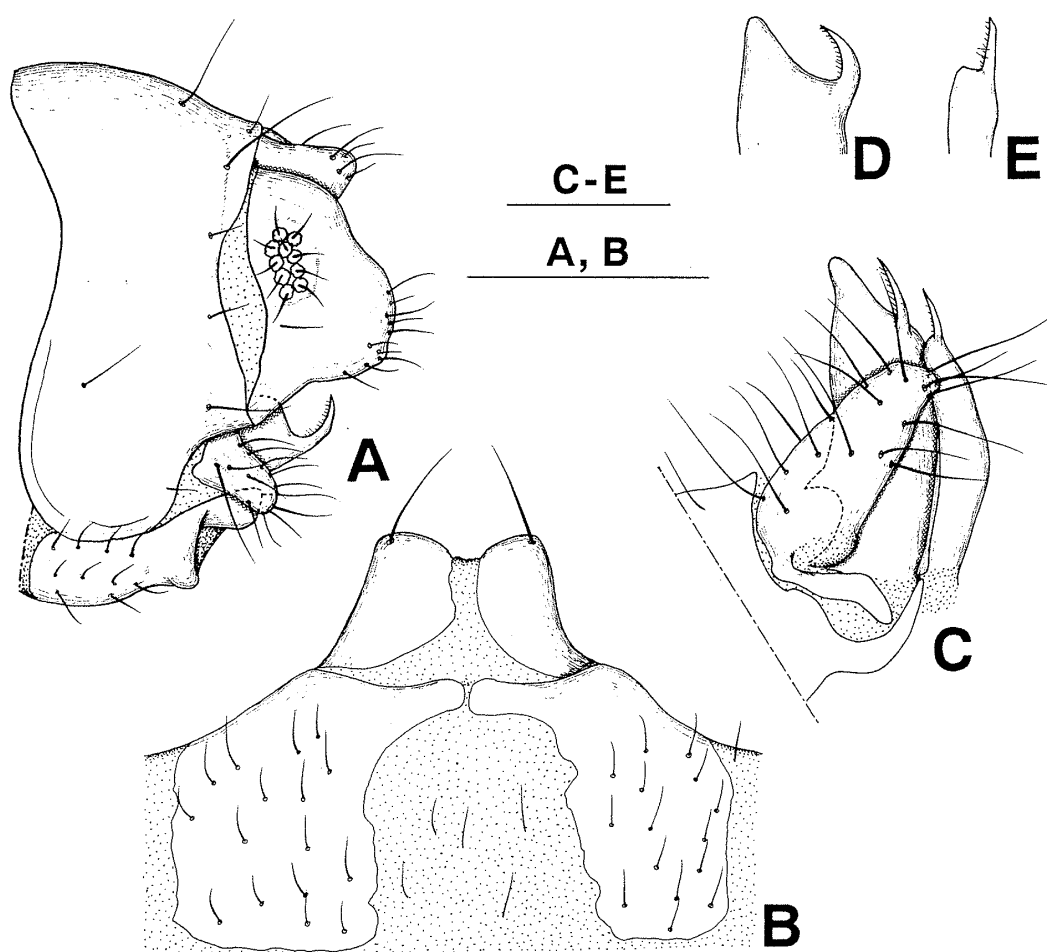


Fig. 5. Female genitalia of *Ophiodoperma glyptocephalum*. — A, terminalia, lateral aspect; B, subgenital plate, ventral aspect; C, gonapophyses, ventral aspect; D, apex of dorsal valve, lateral aspect; E, apex of ventral valve, lateral aspect. Scale: 0.2 mm for A, 0.1 mm for B, 0.1 mm for C-E.

(0.63–0.73); t1 0.19 (0.18–0.20); t2 0.09 (0.08–0.10).

Male. Not examined.

Specimens examined: [Honshu] 2 females, Mt. Tsukubasan, Ibaraki Pref., 30. vii. 1990, Y. TOMITA (TC); 1 female, Tsukuba C., Ibaraki Pref., 7. xi. 1990, T. TSUTSUMI (YC); [Bonin Isls.] 9 females, Mt. Chibusayama, Hahajima Is., 15. iv. 1993, K. YOSHIZAWA (ELKU and YC); 17 females, same locality, 18. iv. 1993, K. YOSHIZAWA (YC); 6 females, same locality, 20. iv. 1993, K. YOSHIZAWA (YC); [Kyushu] 1 female, Nita, Tsushima Is., Nagasaki Pref., 24. ix. 1993, K. YOSHIZAWA (YC).

Distribution: Japan* (Honshu, Bonin Isls., Tsushima Is.); Malaysia (Borneo).

Habitat: On dead leaves of *Castanopsis sieboldii* and *Quercus glauca* (Fag-

aceae) (Honshu), *Livistona chinensis* var. *boninensis* (Arecaceae) (Hahajima Is.) and *Cryptomeria japonica* (Taxodiaceae) (Tsushima Is.).

Remarks: In the original description of this species, LIENHARD mentioned the presence of two setae on each lobe of the subgenital plate. But in all specimens examined in this study, only one seta was recognized on each lobe of the subgenital plate. But the general features surely correspond to the original description.

Genus *Pseudoscottiella* BADONNEL, 1946

Type species: *Pseudoscottiella megops* BADONNEL, 1946, Rev. Zool. Bot. afr., **39**: 170.

Pseudoscottiella BADONNEL, 1946, Rev. Zool. Bot. afr., **39**: 170.

Diagnosis. Forewing M 2-branched; Rs and M fused for a distance; areola postica flattened; costa thickened in distal half. Hypandrium well sclerotized. Phallosome with or without rod-like sclerite on endophallus. Subgenital plate rounded or bilobed. Dorsal and ventral valves of gonapophyses usually with lobe and style.

Pseudoscottiella sakishimensis sp. nov.

Male. Coloration: Head pale yellowish white, with faint markings on vertex; posterior margin of orbit dark brown; antennal socket pale brown; eye black; ocelli pale, indistinctive. Antenna pale brown, scape and pedicel darker. Mouth parts white, molar and teeth areas of mandible brown, 4th segment of maxillary palpus pale brown. Thorax pale yellowish white; pleura of prothorax, anterior margin of mesoscutum and posterior margin of scutum, scutellum and postnotum of meso- and metanotum pale blackish brown. Legs white; tibia, tarsus and apical 1/3 of femur of foreleg pale brown; claws black. Forewing (Fig. 2D) hyaline, with pale brown markings in r_3 , median portion of r_5 , at the top of areola postica, basal angle of cu_1 and distal angle of cu_2 ; veins yellow, R_{2+3} , R_{4+5} , distal half of M including branches, and CuA_1 brown. Hindwing hyaline; veins pale yellowish brown. Abdomen including genital segments pale yellowish white.

Structure: Eye small, ratio IO : D = 1.0 : 0.6. Vertex, frons and clypeus with pale brown setae. Antenna with pale brown setae; frons with a small concavity at middle. Lacinal tip as in Fig. 1C, median cusp small. Pronotum with two bristles on anterior margin. Mesonotum with pale brown bristles; anterior margin of scutum densely with fine setae. Metathorax glabrous. First tarsomere of hindleg with 12–14 ctenidiobothria. Forewing (Fig. 2D) Rs and M fused for a relatively long distance; Rs and R_{4+5} almost straight; basal angle of r_3 obtuse; areola postica small. Hindwing setose all around margin except basal 1/3 of

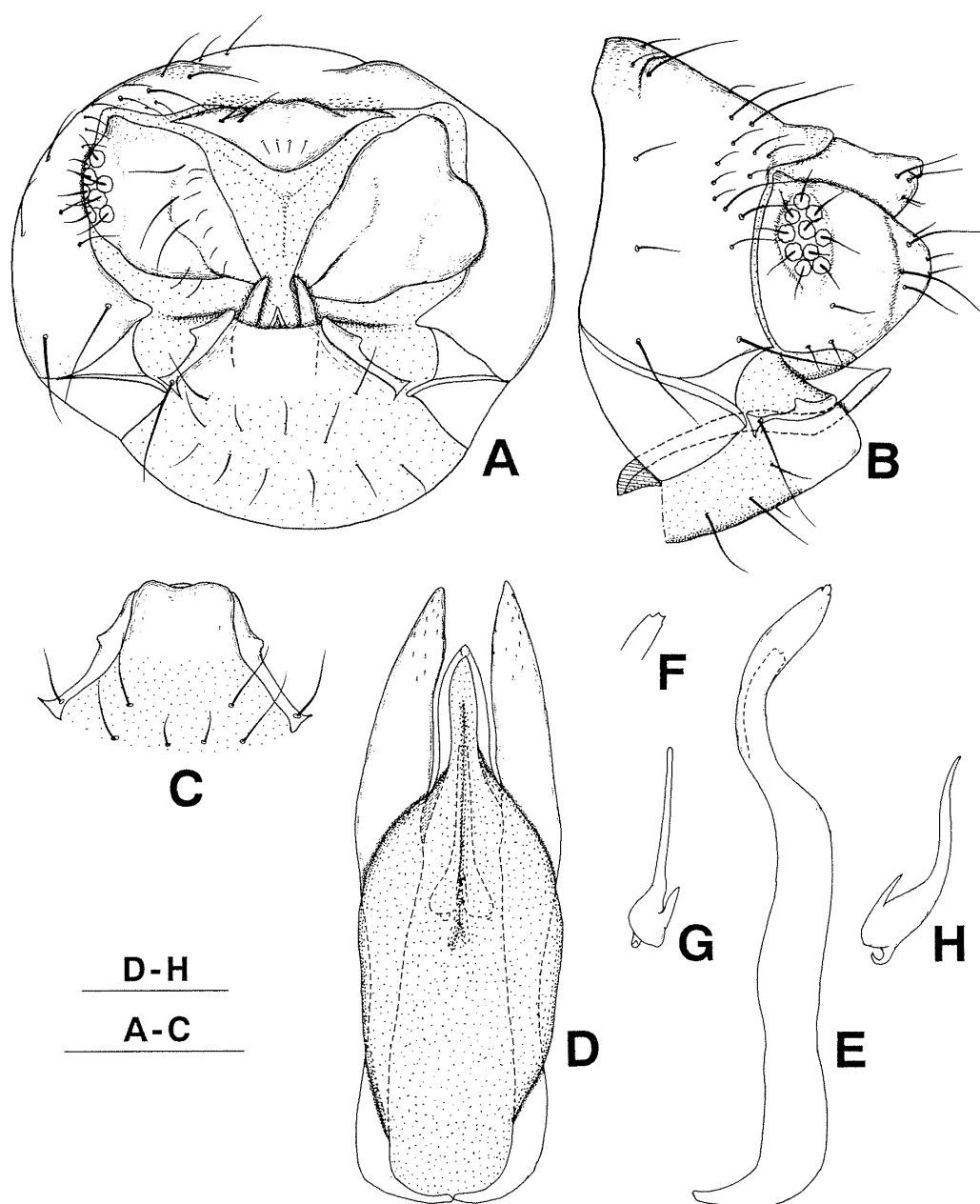


Fig. 6. Male genitalia of *Pseudoscottiella sakishimensis*. — A, terminalia, posterior aspect; B, ditto, lateral aspect; C, hypandrium, ventral aspect; D, phallosome, ventral aspect; E, ditto, lateral aspect; F, apex of aedeagus, lateral aspect; G, sclerite on ladula, ventral aspect; H, ditto, lateral aspect. Scale: 0.2 mm for A–C, 0.05 mm for D–H.

anterior margin; veins bare. Paraproct with a field of 10 trichobothria.

Genitalia (Fig. 6): Hypandrium (Fig. 6C) with lateral sclerites but not so projected posteriorly; median part weakly sclerotized. Phallosome (Fig. 6D, E); paramere broad in ventral aspect and strongly arched in lateral aspect; apex of

aedeagus as in Fig. 6F; endophallus with a pair of sclerites as in Fig. 6G, H.

Dimensions: B 1.79 (1.68–1.85); Fw 1.98 (1.88–2.05); Hw 1.54 (1.50–1.58); f1 0.37 (0.35–0.38); f2 0.25 (0.24–0.27); Hf 0.41 (0.40–0.43); Ht 0.69 (0.68–0.71); t1 0.20 (0.19–0.20); t2 0.08 (0.07–0.09).

Female. Coloration: Almost as in male. Head pale yellowish white. Foreleg yellowish white.

Structure: Almost as in male. Eye ratio $IO:D=1.4:0.4$. First tarsomere of hind leg with 10–12 ctenidiobothria. Paraproct with a field of 10 trichobothria.

Genitalia (Fig. 7): Subgenital plate (Fig. 7B) not bilobed, roundly produced posteriorly, and with two setae at apex. Gonapophyses (Fig. 7C, D); external valve constricted in middle, basal half broader than apical half; dorsal valve lobed, style broad; ventral valve narrowing apically, unlobed, pointed at apex.

Dimensions: B 2.07 (2.02–2.30); Fw 2.11 (2.03–2.20); Hw 1.62 (1.55–1.70); f1 0.25 (0.24–0.27); f2 0.19 (0.18–0.21); Hf 0.42 (0.40–0.46); Ht 0.67 (0.62–0.70); t1 0.18 (0.18–0.19); t2 0.08 (0.08–0.09).

Holotype male (BLKU), Kuura, Ishigakijima Is., Okinawa Pref., 16. v. 1993, K. YOSHIKAWA.

Paratypes: 3 females, same data as for holotype (BLKU); 1 female, Mt. Omotodake, Ishigakijima Is., Okinawa Pref., 17. v. 1993, K. YOSHIKAWA (YC); 1 female, Funaura, Iriomotejima Is., Okinawa Pref., 10. v. 1993, K. YOSHIKAWA

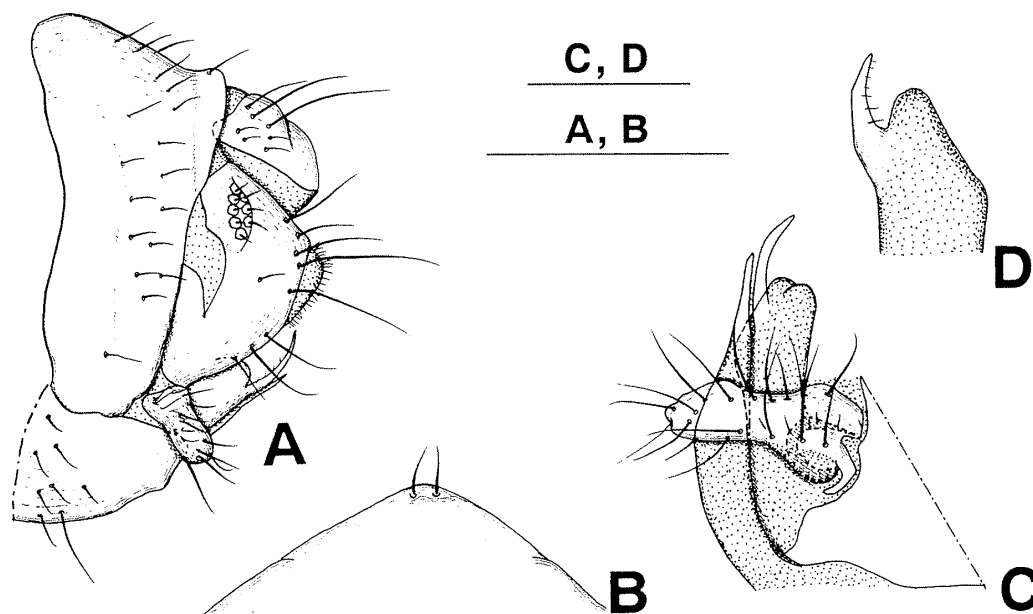


Fig. 7. Female genitalia of *Pseudoscottiella sakishimensis*. — A, terminalia, lateral aspect; B, subgenital plate, ventral aspect; C, gonapophyses, ventral aspect; D, apex of dorsal valve, lateral aspect. Scale: 0.2 mm for A; 0.1 mm for B; 0.1 mm for C, D.

(YC); 1 male, Haemida, Iriomotejima Is., 11. v. 1993, K. YOSHIZAWA (YC); 2 males, Monbanare, Iriomotejima Is., Okinawa Pref., 13. v. 1993, K. YOSHIZAWA (YC).

Distribution: Japan (Ishigakijima Is., Iriomotejima Is.).

Habitat: On ever green broad-leaved trees.

Remarks: This new species is similar to *P. suella* THORNTON, 1984 (from Bali and Lombok) in the forewing venation and shapes of hypandrium and subgenital plate, but can be distinguished by the colorations of body and forewings, and shapes of external valve of gonapophyses and phallosome.

Key to the Japanese genera of Pseudocaeciliidae³⁾

1. Forewing M 3-branched2
- Forewing M 2-branched*Pseudoscottiella*
2. Forewing Rs slightly sinuous or almost straight4
- Forewing Rs strongly sinuous3
3. Apical half of fore tibia with a comb of short thick bristles
.....*Ophiodoperma*
- Fore tibia without a comb of short thick bristles*Allocaecilius*
4. Male forewing without sense-papillae; endophallus not swollen; female
external valve of gonapophyses normal5
- Male forewing with sense-papillae; endophallus extended, with thorn-like
sclerites; female external valve of gonapophyses reduced
.....*Phallocaecilius*
5. Male endophallus with rod-like sclerites; dorsal and ventral valves of female
gonapophyses lobed*Heterocaecilius*
- Male endophallus without the sclerite; dorsal and ventral valves of female
gonapophyses unlobed*Pseudocaecilius*

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³⁾ The genus *Pseudocaecilius* was treated in YOSHIZAWA (1995), and the genera *Heterocaecilius* and *Phallocaecilius* were in YOSHIZAWA (1996).

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