

RESEARCH PAPER

## *Pygolampis amamiko* (Hemiptera: Heteroptera: Reduviidae), a new assassin bug species from the Amami Islands, Japan

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**Abstract.** A new species of the assassin bug of the genus *Pygolampis* Germar, 1817 (Hemiptera: Heteroptera: Reduviidae: Stenopodainae), *P. amamiko* sp. nov., collected from the Amami Islands, Japan, is described and its morphological characters, including the genital structures, are illustrated. A key to the Japanese species of the genus is provided.

**Key words.** Hemiptera, Heteroptera, Reduviidae, Stenopodainae, new species, Amami-Ôshima Island, Ryukyu Islands, Ukejima Island, Japan

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### Introduction

*Pygolampis* Germar, 1817 is the second largest genus in the assassin bug subfamily Stenopodainae (Hemiptera: Heteroptera: Reduviidae), with 92 species described in all the zoogeographical regions (MALDONADO CAPRILES 1990, GUPTA & KAUNTEY 2003, TOMOKUNI & CAI 2003, SWANSON & CHORDAS 2018). The diagnostic characters of *Pygolampis* can be summarized as follows: 1) general body color brown; 2) body elongate; 3) pronotum trapezoid; 4) fore femur without a row of spines; 5) first visible labial segment longer than second and third labial segments combined; and 6) fore tarsi 3-segmented (TOMOKUNI & CAI 2003, ISHIKAWA & MIYAMOTO 2012).

In Japan, only three described species, *P. bidentata* (Goeze, 1778), *P. foeda* Stål, 1859, and *P. striata* Miller, 1940, have been recorded to date (ISHIKAWA & MIYAMOTO 2012, OKUDA 2021). In addition to these species, two unidentified species have been reported in Japan (TANAKA et al. 2013, OKUDA 2020, YAMAMOTO 2022); therefore, there is still space for further research. One of the unidentified species was first found on Ukejima Island of the Amami Islands, the Ryukyu

Islands (TANAKA et al. 2013), and was later discovered also on Amami-Ôshima Island by the second author of the present paper.

The Amami Islands consist of eight inhabited islands and are characterized by a subtropical climate and a combined area of approximately 1,231 km<sup>2</sup> (AMAMI-ÔSHIMA WORLD HERITAGE CONSERVATION CENTER 2024). Because of their largely unspoiled and unique habitats, approximately 3400 insect species, including more than 500 endemic species, have been recorded on the islands, while many other species remain undescribed (e.g., MIZUTA 2016, NISHIKAWA 2021, WATANABE et al. 2021).

Based on a thorough examination of the morphology of one of the unidentified species from the Amami Islands in comparison with the previously described species we concluded that it was an undescribed taxon. In this study, the species *Pygolampis amamiko* sp. nov. is described and its morphological characters, including the genital structures, are illustrated. On the other hand, the other unidentified species (originating from Honshu, Japan) is not treated in this paper because its identity has not yet been clarified due to lack of specimens.



## Material and methods

Specimens were collected, dried and preserved at the Laboratory of Entomology, Faculty of Agriculture, Tokyo University of Agriculture, Atsugi, Kanagawa, Japan (TUA) and Saitama Museum of Natural History, Nagatoro, Saitama, Japan (SMNH). Morphological observations and measurements were performed using a stereomicroscope (Olympus SZ-40; Olympus, Tokyo, Japan) equipped with a micrometer. Photographs of the specimens were taken using a single-lens reflex camera (Canon 7D Mark-II, Canon, Tokyo, Japan) equipped with a macro lens (Canon macro lens 100 mm). Digital images were edited using Adobe Photoshop 2021. To examine the structure of genitalia, terminalia were soaked in hot 10% KOH solution for approximately 5 minutes. In males, the phallus and parameres were extracted from the pygophore, whereas in females, styloides were extracted from the apical part of the abdomen. After observation, the genitalia were preserved in small glass tubes containing glycerin and pinned under the respective specimens. The distribution map was constructed using SimpleMapp (SHORTHOUSE 2010) and 3kaku-K (INOUE 2023). All morphological terminology used herein was adopted from HA et al. (2022). Related specimens including types were deposited in TUA and SMNH.

## Taxonomy

### *Pygolampis amamiko* sp. nov.

*Pygolampis* sp.: TANAKA et al. (2013): 15 (listed, survey of Ukejima Island, Japan).

**Type locality.** Japan: Ryukyus: Amami-Ōshima Is.: Toen, Yamato-son, approximately 28°20'16.8"N 129°20'03.1"E.

**Type material.** HOLOTYPE: ♂, JAPAN: RYUKYUS: AMAMI-ŌSHIMA IS.: "Toen, Yamato-son / 16.vi.2013 / H. Ishii" (TUA). PARATYPES: JAPAN: RYUKYUS: AMAMI-ŌSHIMA IS.: 1 ♂, "Mt. Yuwan-dake / 4.viii.1996 / M. Uchida" (SMNH); 1 ♂, "Aoku, Sumiyō-son / 25.vi.2003 / S. Hatsushiba" (TUA); 1 ♀, "Toen, Yamato-son / 21.vi.2013 / H. Ishii" (TUA); 1 ♂, "Oganeku, Yamato-son, Ōshima-gun / 19.v.2017 / A. Yoshikawa" (TUA); 1 ♀, "Oganeku, Yamato-son, Ōshima-gun / 9.vi.2017 / A. Yoshikawa" (TUA); 1 ♂, "Oganeku, Yamato-son, Ōshima-gun / 6.vii.2017 / A. Yoshikawa" (TUA); 1 ♀, "Oganeku, Yamato-son, Ōshima-gun / 22.vii.2017 / A. Yoshikawa" (TUA); 1 ♀, "Oganeku, Yamato-son, Ōshima-gun / 17.ix.2017 / A. Yoshikawa" (TUA); 1 ♂, "Oganeku, Yamato-son, Ōshima-gun / 10.xi.2017 / A. Yoshikawa" (TUA); 1 ♀, "Yui, Setouchi-chō / 29.iv.2018 / A. Yoshikawa" (TUA); 1 ♂, "Naon, Yamato-son, Ōshima-gun / 12.iv.2021 / A. Yoshikawa" (TUA); 2 ♂♂ 1 ♀, "Nesebu, Naze, Amami-shi / 10.v.2022 / T. Matsuta" (TUA); 1 L5 (5th nymph), "Naze-nishinakatsu, Amami-shi / 23.ix.2022 / by Shifting / T. Matsuta" (TUA). UKEJIMA IS.: 1 ♂, "Mt. Ōyama / 10.ix.2012 / K. Ogaki & Y. Tanaka" (TUA).

**Diagnosis.** This new species can be easily distinguished from other species of *Pygolampis* using a combination of the following features: body length 18.0–19.2 mm in male and 21.5–22.0 mm in female; general color dark brown to reddish-brown; ocelli not elevated; antennal scape approximately 1.3 times as long as head, with long erect setae ventrolaterally; anteroventral spines of prothorax long, acute, curved upward, and subequal to length of eye in dorsal view; male hind femora exceeding apex of abdomen. **Description.** *Male* (holotype). *Coloration.* General color dark brown to reddish-brown (Figs 1a–c), laterally with

longitudinal yellowish-brown stripe on thorax. Head dark brown. Compound eyes black; ocelli reddish-brown. First visible labial segment pale brown; second and third visible labial segments dark brown. Antennal scape and pedicel dark brown; first and second flagellomeres dark brown. Pronotum mostly reddish-brown, with pair of yellowish-brown spots along posterior margin. Fore and middle coxae dark brown in basal 2/3 and yellowish-brown in apical 1/3; hind coxae yellowish-brown, with brownish spots. Trochanters yellowish-brown. Fore and middle femora dark brown, gradually paler base, with irregular yellowish-brown spots; hind femora reddish-brown, with apical 1/7 blackish. Fore and middle tibiae yellowish-brown, with blackish annulations on base, basal 2/5 and apex; hind tibiae reddish-brown, with blackish annulation on base. Tarsi yellowish-brown. Hemelytra dark brown (Fig. 3a). Abdomen dorsally reddish-brown and ventrally pale brown, with black spots along anterior margin of sternites II to VII (Fig. 1b); connexiva dark brown; spiracle black.

**Vestiture.** Body covered with pale fine decumbent setae. Compound eyes sparsely covered with erect setae. First visible labial segment sparsely covered with fine suberect setae dorsally. Antennae covered with fine suberect setae; scape with long erect setae ventrolaterally. Scutellum without setae. Legs covered with suberect setae; fore femora with row of dense short erect setae ventrally. Hemelytra covered with pale fine decumbent setae on coria and glabrous on membranes.

**Structure.** Body approximately 6.0 times as long as its maximum width. Head (Fig. 4a) cylindrical, approximately 2.2 times as long as width across eyes, approximately 0.9 times as long as pronotum, furnished with setigerous tubercles on apex of clypeus (tylus) and along posterior and ventrolateral margins; antecular area approximately 1.7 times as long as postocular area, nearly parallel-sided in dorsal view; clypeal process moderately long, well exceeding apex of head (labrum), bilobate at apex. Ocelli not elevated. First visible labial segment (Fig. 4b) curved at base, extending to postocular area; proportional lengths of segments I to III: 6.3 : 1.5 : 1.0. Antennal scape approximately 1.3 times as long as head; proportional lengths of segments I to IV: 5.7 : 7.0 : 1.0 : 1.7.

Pronotum trapezoidal, 2 times as long as its maximum width; humeri round; posterior angle weakly convex; posterior margin weakly concave in middle; anterior pronotal lobe with three pairs of shallow glabrous areas. Anteroventral spines of prothorax thick, acute, curved upward, and subequal to length of eye in dorsal view (Fig. 1a). Scutellum triangular, approximately 1.3 times as long as its basal width, swollen upward. Fore femora slightly robust, approximately 10 times as long as its maximum width; hind femora slightly exceeding apex of abdomen. Hemelytra rather short, reaching middle of abdominal tergite III.

Abdomen fusiform, widest at segment V, approximately 3.3 times as long as its maximum width. Posterolateral projections of tergite VII (Figs 3b, 4c) triangular, as long as its width, apically round; posterior margin of tergite VII wholly concave roundly.

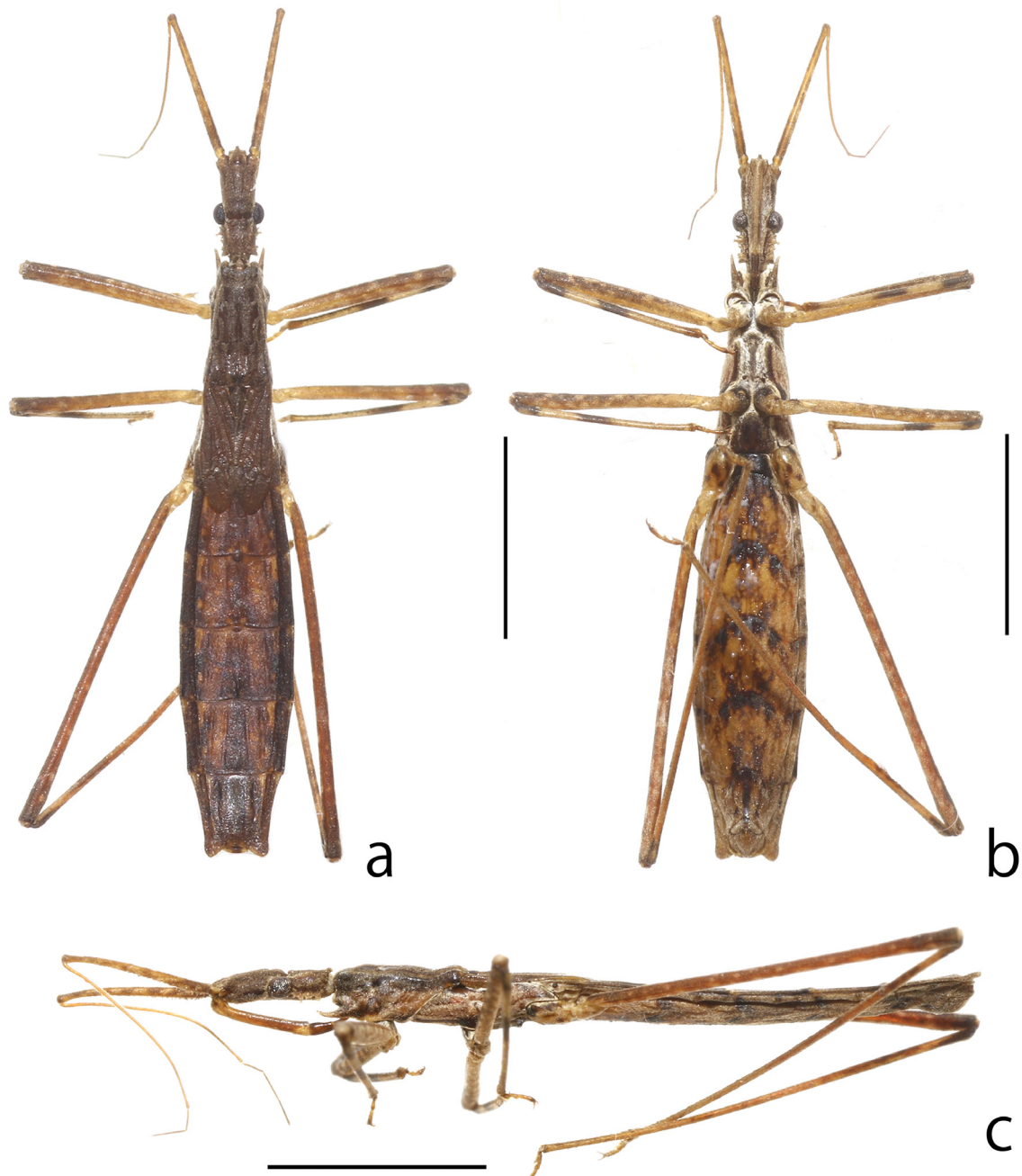


Fig. 1. *Pygolampis amamiko* sp. nov., male habitus: a – dorsal view; b – ventral view; c – lateral view. Scale bars = 5 mm.

**Genitalia.** Pygophore (Figs 4c–f) oval in ventral and lateral views, approximately 1.5 times as long as its maximum width, with short sparse setae ventrally; median process (Fig. 4g) long, bent inward, slightly widened at apex in posterior view. Parameres (Fig. 4h) widened in apical half, apically round, approximately 3 times as long as its maximum width, ventrally and dorsally covered with erect setae, and with large tooth on apical 1/5 dorsally. Phallus (Figs 4i–j) elongate when not extended; basal plate approximately 0.6 times as long as phallus when not extended; struts parallelly running to each other, apically curved inwards, close to each other at apex, with apices acute. Endosoma (Fig. 4k) membranous, simple in structure.

**Female.** General aspects as in male (Figs 2a–c), except for the following characters: body approximately 7 times as long as its maximum width; hind femora extending to abdominal segment VII; median extension of abdominal sternite VII reaching middle of sternite VI (Fig. 4d); abdominal segment IX (Fig. 3c) strongly projected, gradually narrowed posteriad; styloids tongue-shaped, incised at apex, submarginally covered with short setae arranged in row (Fig. 4l); apical incision of styloids 0.15 times as long as styloids.

**Measurements.** See Table 1.

**Comparative note.** The general appearance of this new species is very similar to *Pygolampis breviptera* Ren, 1981 found in China and Vietnam (REN 1981, OKUDA & CHEN

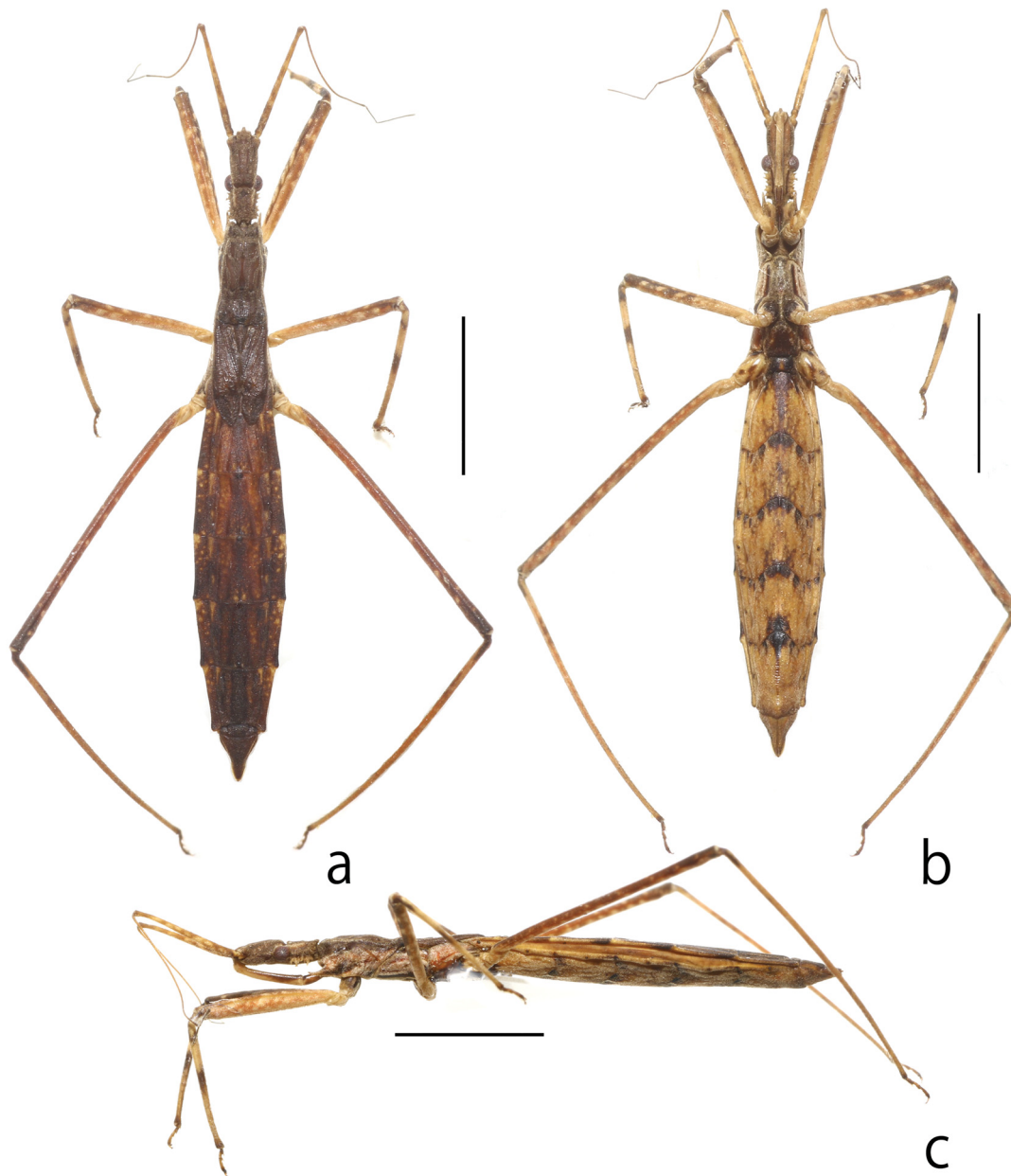


Fig. 2. *Pygolampis amamiko* sp. nov., female habitus: a – dorsal view; b – ventral view; c – lateral view. Scale bars = 5 mm.



Fig. 3. *Pygolampis amamiko* sp. nov., details: a – male hemelytra; b–c – apical parts of abdomen, dorsal view (b – male, c – female). Scale bars = 2 mm.

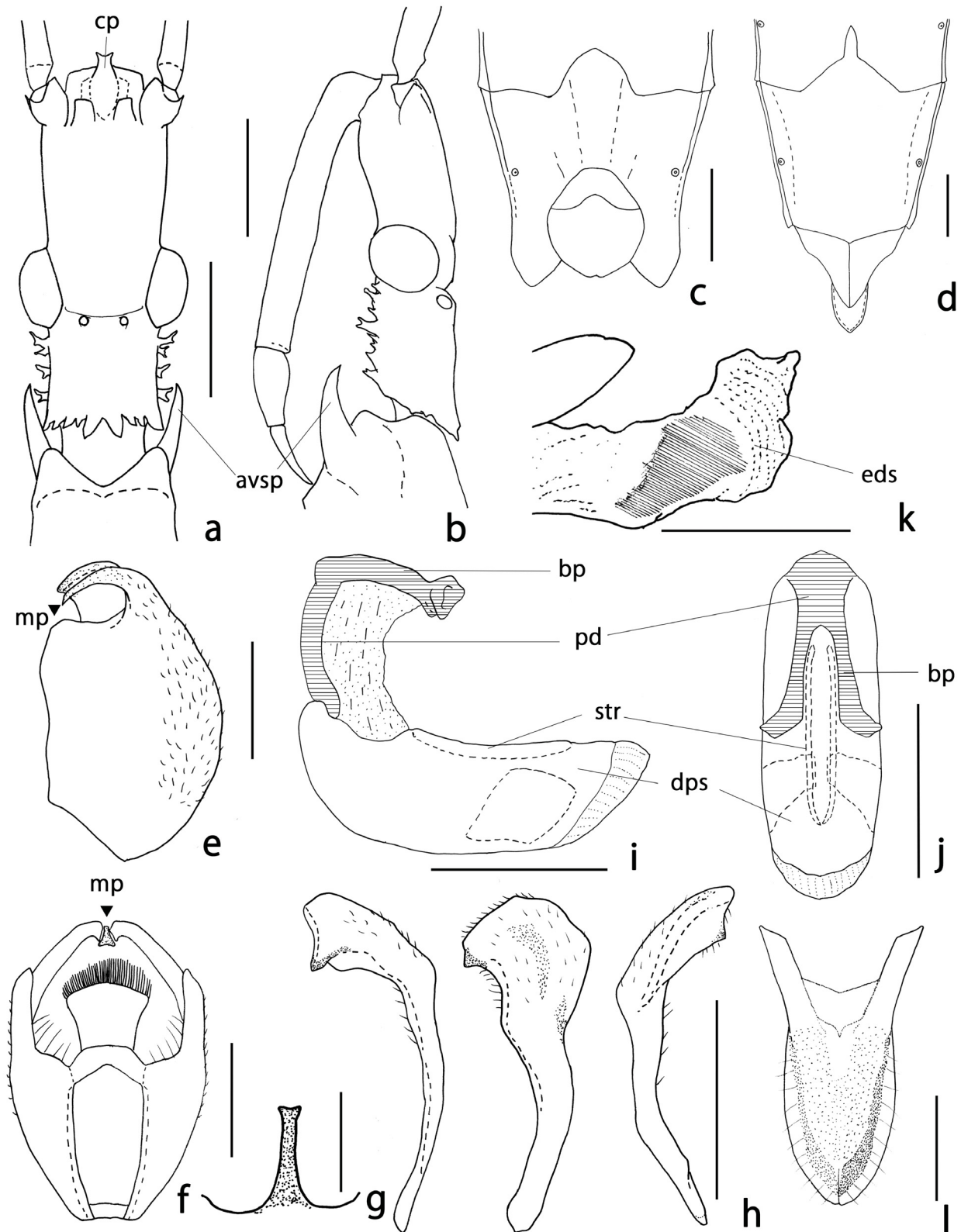


Fig. 4. Diagnostic characteristics of *Pygolampis amamiko* sp. nov. (setae omitted in a–d). a–b – male head (a – dorsal view, b – lateral view); c–d – apical parts of abdomen, ventral view (c – male, d – female); e–f – pygophore (e – lateral view, left paramere omitted; f – dorsal view); g – median process of pygophore, posterior view; h – left paramere, diverse views; i–j – phallus, not everted (i – lateral view, j – ventral view); k – endosoma, everted condition, lateral view; l – styloides, dorsal view. Scale bars = 1 mm for a–d; 0.5 mm for e, f, h–l; 0.25 mm for g. Abbreviations: avsp – anteroventral spines of prothorax; bp – basal plates; cp – clypeal process; dps – dorsal phallosomal sclerite; eds – endosoma; mp – median process; pd – pedicel; str – struts of phallus.

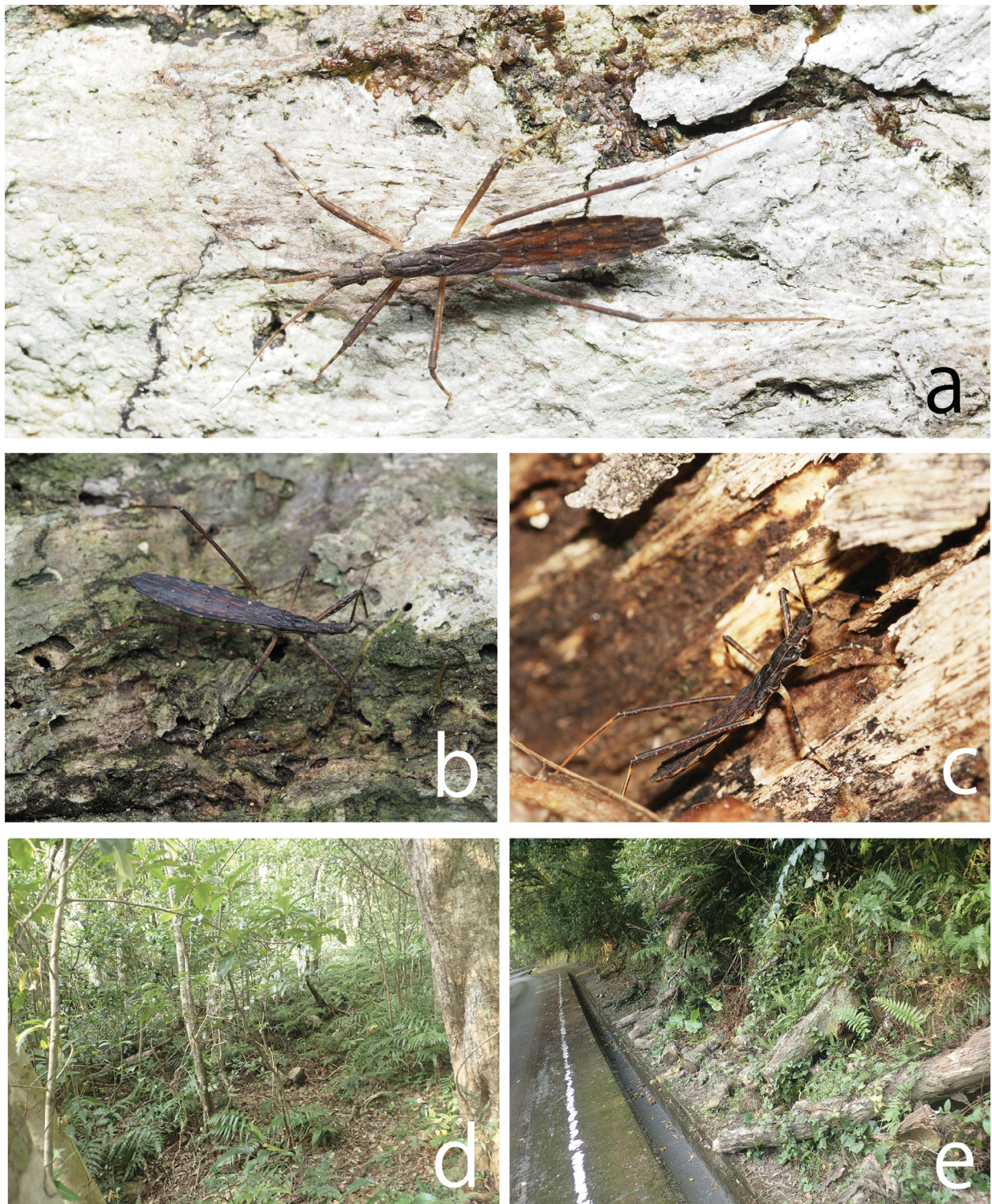


Fig. 5. *Pygolampis amamiko* sp. nov., living individuals on a fallen tree. a – adult male; b – adult female; c – 5th instar nymph; d – e – habitats (c: photographed by Takahiro Komatsu).

2021), and *P. aptena* Swanson, 2018 from Belize (SWANSON & CHORDAS 2018). However, it can be distinguished from *P. breviptera* by the antennal scape with long erect setae ventrolaterally (which are absent in *P. breviptera*), the hemelytra extending to the middle of abdominal tergite III (reaching the posterior portion of tergite IV or V in *P. breviptera*), and the abdomen with black spots along the anterior margin of sternites II to VII (without black spots in

*P. breviptera*). It can also be distinguished from *P. aptena* by the posterolateral projections of abdominal tergite VII apically round (in *P. aptena*, acute), the hemelytra not extending to the posterior portion of abdominal tergite III (reaching a posterior portion of tergite III in *P. aptena*), and the abdomen fusiform to oval, ventrally pale brown, with black spots along the anterior margin of sternites II to VII (abdomen oval, weakly expanded; uniformly dark brown in

Table 1. Measurements (mm) of *Pygolampis amamiko* sp. nov.

Measurements	Male holotype	Male (N=9)				Female (N=6)			
		Maximum	Minimum	Mean	male SD	Maximum	Minimum	Mean	Female SD
Body length	18.20	19.20	18.00	18.68	0.483	22.50	21.50	22.00	0.500
Lengths of head	3.20	3.20	3.00	3.14	0.080	3.25	3.15	3.20	0.050
Width across eyes	1.40	1.45	1.35	1.40	0.032	1.50	1.45	1.48	0.025
Length of anteculus	1.50	1.55	1.45	1.51	0.037	1.65	1.50	1.58	0.075
Length of postoculus	0.85	0.90	0.80	0.85	0.045	1.05	1.00	1.03	0.025
Lengths of labial segments I	2.50	2.50	2.40	2.45	0.032	2.60	2.50	2.55	0.050
Lengths of labial segments II	0.60	0.70	0.60	0.65	0.045	0.80	0.70	0.75	0.050
Lengths of labial segments III	0.40	0.40	0.30	0.38	0.040	0.45	0.40	0.43	0.025
Lengths of antennal segments I	4.00	4.15	3.95	4.04	0.066	4.10	3.95	4.03	0.075
Lengths of antennal segments II	5.00	5.00	4.75	4.95	0.100	5.10	5.05	5.08	0.025
Lengths of antennal segments III	0.70	0.70	0.65	0.69	0.020	0.70	0.65	0.68	0.025
Lengths of antennal segments IV	1.15	1.40	1.15	1.30	0.084	1.40	1.30	1.35	0.050
Length of pronotum anterior part	2.50	2.55	2.50	2.51	0.020	2.75	2.65	2.70	0.050
Length of pronotum posterior part	0.95	0.95	0.80	0.87	0.051	1.20	1.05	1.13	0.075
Length of hemelytra	1.75	1.85	1.70	1.79	0.058	1.85	1.75	1.80	0.050
Length of scutellum	0.90	0.90	0.80	0.88	0.040	1.00	0.95	0.98	0.025
Maximum width of scutellum	3.40	3.40	3.05	3.31	0.136	3.40	3.25	3.33	0.075
Lengths of abdomen	10.00	10.50	9.95	10.11	0.201	12.70	11.50	12.10	0.600
Maximum width of abdomen	3.00	3.10	2.90	3.00	0.071	3.40	3.25	3.33	0.075
Lengths of foreleg femur	4.90	5.35	4.50	5.07	0.330	5.50	5.20	5.35	0.150
Lengths of foreleg tibia	4.50	4.85	4.25	4.55	0.207	5.00	4.80	4.90	0.100
Lengths of foreleg tarsus	0.80	0.80	0.75	0.78	0.024	0.95	0.75	0.85	0.100
Lengths of middle leg femur	5.50	5.50	4.75	5.24	0.271	5.50	5.35	5.43	0.075
Lengths of middle leg tibia	5.00	5.00	4.50	4.88	0.194	5.00	4.70	4.85	0.150
Lengths of middle leg tarsus	0.85	0.85	0.75	0.79	0.037	0.85	0.80	0.83	0.025
Lengths of hindleg femur	10.00	10.50	9.00	9.92	0.495	11.00	10.05	10.53	0.475
Lengths of hindleg tibia	11.05	11.05	10.05	10.83	0.391	11.05	11.00	11.03	0.025
Lengths of hindleg tarsus	1.10	1.20	1.05	1.12	0.068	1.20	1.15	1.18	0.025

*P. aptena*). The differences from the other Japanese species are given in the identification key below.

**Etymology.** The present species is named after the Ryukyuan mythical goddess Amamiko who created the Amami Islands, the type locality of the new species; a noun in apposition.

**Biology.** *Pygolampis amamiko* sp. nov. was found only on the relatively humid forest floor with fallen trees and underbrush at night (Figs 5a–e), suggesting it is nocturnal.

**Distribution.** Japan: Amami Islands (Amami-Ōshima Island, Ukejima Island) (Fig. 6).

#### Key to the species of the genus *Pygolampis* from Japan

1 Anteroventral spines of prothorax subequal to length of eye in dorsal view; hemelytra micropterous, reaching middle of abdominal tergite III. ....

- ..... *P. amamiko* sp. nov.
- Anteroventral spines of prothorax shorter than length of eye in dorsal view; hemelytra brachypterous to macropterous, reaching at least posterior margin of abdominal tergite V. .... 2
- 2 Antennal scape 1.0–1.1 times as long as head; hemelytra without two whitish spots on distal cell. .... 3
- Antennal scape more than 1.2 times as long as head; hemelytra with two whitish spots on distal cell. ....
- ..... *P. foeda* Stål, 1859
- 3 Body pale brown; thorax laterally with three longitudinal rows of whitish pubescence. ....
- ..... *P. striata* Miller, 1940
- Body dark brown; thorax laterally without longitudinal rows of whitish pubescence. ....
- ..... *P. bidentata* (Goeze, 1778)



Fig. 6. Distribution map of *Pygolampis amamiko* sp. nov.

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