



Redescriptions of *Homoplectra japonica* (Banks 1906) and *H. albomarginata* (Ulmer 1907) (Trichoptera, Hydropsychidae), with descriptions of five new similar species from Japan

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Abstract

The two known Japanese species of the genus *Homoplectra*, *H. japonica* (Banks 1906) and *H. albomarginata* (Ulmer 1907), are redescribed, and five new similar species are described, *H. flagelliformis* **sp. nov.**, *H. shikoku* **sp. nov.**, *H. bicornis* **sp. nov.**, *H. kimi* **sp. nov.**, and *H. inazui* **sp. nov.** A lectotype is selected for *Arctopsyche japonica* Banks 1906 for nomenclatural stability. The adults of these species have distinct yellow and black markings on their wings, which are unique among known congeners. A diagnostic species group, the *Homoplectra japonica* Species Group, is recognized based on wing markings and venation and the shape of the male phallic apparatus. Descriptions are provided for males and females of all species, and the immature stages of *H. japonica* and *H. albomarginata*. Larvae of *H. japonica* and *H. albomarginata* were found in seeps and small flows in mountain areas.

Key words: male, female, immature stages, species group, lectotype designation

Introduction

Homoplectra Ross 1938 is a small genus comprising 24 species in the Nearctic, East Palearctic, and Oriental biogeographic regions; 10 species have been known from Japan (Morse 2024; Nozaki 2024). Banks (1906) described a new species, *Arctopsyche japonica* Banks 1906, based on specimens collected from two localities in Japan, Fukuoka, Kyushu Island, and Gifu, Honshu Island, describing only the head, thoracic features, and wings of this species with a figure of the striking yellow and black markings of the left forewing. Ulmer (1907) recognized this species as the first recorded Japanese species of the genus *Diplelectrona* Westwood 1839 and described the male genitalia as those of Banks' species based on specimens from Gifu. He also described a second species, *Diplelectrona albomarginata* Ulmer 1907, based on a female specimen (from an unknown locality in Japan) with dark brown forewings except for yellowish-white marginal cilia. Nozaki (2021) transferred these two species to the genus *Homoplectra* Ross 1938 based on photographs of a syntype male of *A. japonica* and the holotype female of *D. albomarginata*. Nozaki (2021) also reported a variation in female wing coloration of *H. albomarginata* (Ulmer 1907) based on his specimens, noting that, although females of this species occasionally lack the distinct markings on their wings (as, for example, in the holotype female), they usually have wings bearing markings similar to those of *H. japonica*. Thus, although several authors (Kawase and Morita 2014; Yamamoto and Ito 2014; Nojima 2017) recorded unidentified 'species' having wing markings similar to those of *H. japonica*, wing markings are not a reliable character for distinguishing these two species. Unfortunately, the more informative genital morphologies of the female of *H. japonica* and the male of *H. albomarginata* have not yet been described.

To solve these taxonomic problems, I examined abundant material including adults recorded as *D. japonica* or as unnamed 'species' of *Diplelectroninae* Gen. *japonica* Complex, *Diplelectrona japonica* Species Complex, and *Homoplectra japonica* Species Complex. In this paper, based on associated male, female, and immature stages, I redescribe associated males and females of *H. japonica* and *H. albomarginata*, describe the associated larvae and pupae of these species, and describe the males and females of five new species. Based on the unique character states of the wings and male genitalia of these species, I recognize a diagnostic species group, the *Homoplectra japonica* Species Group.

Material and methods

The associations of males and females were based on specimens which were collected together multiple times. Immature stages were associated with adults using the metamorphotype method (Milne 1938). Male and female genitalia were figured after they were cleared in a 10% solution of KOH. The descriptions of larvae are based on final instar specimens. The larval head width (hw) and length (hl) were measured at the widest part and on the midline in dorsal aspect, respectively (Fig. 11F).

The depositories of specimens used in this study are abbreviated as follows: Kanagawa Prefectural Museum of Natural History, Odawara, Kanagawa Prefecture, Japan (KPM); Museum of Natural and Environmental History, Shizuoka, Shizuoka Prefecture, Japan (SPMN); Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA (MCZ); Museum of Nature and Human Activities, Hyogo, Sanda, Hyogo Prefecture, Japan (MNHA); Shinshu University Museum of Natural Science, Matumoto, Nagano Prefecture, Japan (SUMNS); and the personal collections of K. Inazu (KI), N. Kawase (NK), N. Kuhara (KuN), K. Nojima (KN), K. Tanida (KT), and T. Torii (TT). Other specimens are deposited in the personal collection of the author (no indication).

Morphological terminology for immature stages follows Weaver *et al.* (1979) and Wiggins (1996). The morphological terms and abbreviations of adult genitalia mainly follow Nozaki (2019), and those used in the text and figures in this study are provided in the following list.

Annotated terminology of genitalia used in this study

IX = abdominal segment IX

X = abdominal segment X

Male

- ae. = aedeagus: long, with dorsal longitudinal groove, divided by a flange into an apical head and a basal stem.
- b.p.i.a. = basal plate of inferior appendages: forming the floor of the genital chamber.
- d.p.p. = dorsal processes of the phallosome: single or bifurcate.
- end. = endosoma: membranous.
- i.a. = inferior appendages: paired, one-segmented, each with its subapicomeres surface bearing short spine-like setae.
- i.p. = inner processes of the genital chamber: paired, arising from near the anterodorsal part of the lateral strip.
- l.p.p. = lateral processes of the phallosome: paired.
- l.s. = lateral strips of the genital chamber: paired, each extending from near the base of the phallosome to the posterolateral part of the genital chamber where segments IX and X are fused, sclerotized, or semimembranous. Similar to the sclerotized strips of segment IX in Leptoceridae and Psychomyiidae (Morse 1975; Li and Morse 1997).
- p.p.X = posterior processes of segment X: paired, each arising from a posterior margin of segment X.
- ph. = phallosome: sclerotized, large.
- p.l. = posteroventral lobe of segment IX.
- v.p.p. = ventral processes of the phallosome: paired.
- v.s.p. = ventral spine of the phallosome: short, arising basoventrally.

Female

- d.b.c. = duct of the bursa copulatrix.
- d.s. = duct of the spermatheca.
- l.l. = lateral lobes of sternum VIII: paired.
- m.l.IX = mesal lobes of segment IX: paired, arising near the genital opening laterally, sclerotized or semimembranous.
- s.r. = sclerotized ribs: paired, ventral external ribs of segment IX.
- v.a. = vaginal apparatus: sclerotized, large.
- v.s. = vulvar scale.

Homoplectra japonica Species Group

Diagnosis. Adults of this species group bear yellow and black markings on their wings (Figs 1A, 2A1–2A2, 7A) although females occasionally lack them. In the hind wings of both males and females, each median cell is closed by a medial crossvein (Fig. 1B). In male genitalia, the aedeagus lacks spines or processes (e.g., Figs 3D, 3E).

Species descriptions

Homoplectra japonica (Banks 1906)

(Figs 1A–1E, 3, 11A–11E, 13)

Arctopsyche japonica Banks 1906, pp 111, 113, color pattern of male forewing.

Diplectrona japonica (Banks): Ulmer 1907, pp 72–74, figs 114, 115, changed combination.

Diplectrona japonica (Banks 1906): Gytoku & Nozaki 1991, pp 74–75, pl. 9, male (photo).

Homoplectra japonica (Banks 1906): Nozaki 2021, pp 254, 255, male, changed combination.

Diagnosis. The male of this species is very similar to that of *Homoplectra flagelliformis* **sp. nov.** but is distinguishable from the latter by the characters given in the diagnosis for that species.

The female is easily distinguishable from those of other Japanese species by the shape of a pair of large round basoventral lobes on the vulvar scale (Figs 3H, 3I). Furthermore, female segment IX of this species has a pair of unique ventrolateral sclerotized plates that are oblong in dorsal and lateral aspects (marked with arrows in Figs 3G, 3I).

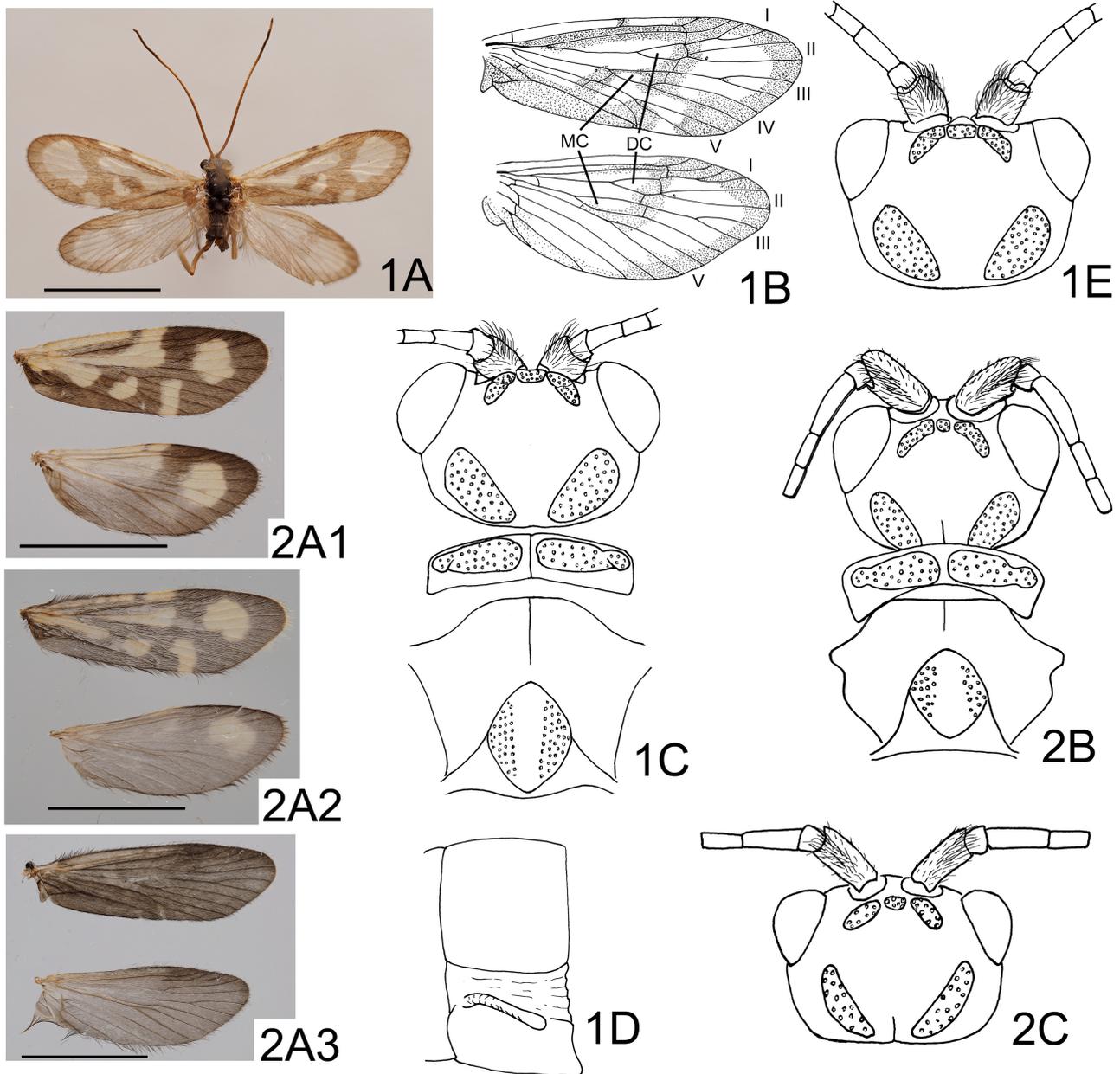
The larva is distinguishable from known Japanese larvae by the shape of anterior margin of the frontoclypeal apotome: Asymmetrical and sinuous in this species (Figs 11A, 11B); but symmetrical in *Homoplectra crassa* Nozaki 2019 and *Homoplectra tohokuensis* Nozaki 2019 (Nozaki 2019, figs 7A–7L, 8), bearing a small median triangular process in *Homoplectra gracilis* Nozaki 2019 (Kochi *et al.* 2023, figs 3g, 3i), and asymmetrical and evenly convex mesally in *H. albomarginata* (Figs 12A, 12B).

Description

Adult (Figs 1A–1E). Head and thorax mostly dark brown dorsally, but dorsal setal warts of head, pro-, and mesonota with golden hair; face light brown in male, dark brown in female; compound eyes slightly larger in male than those in female (Figs 1C, 1E). Legs mostly pale yellow to light brown; but middle and hind coxae of male and all coxae of female dark brown. Abdomen mostly dark brown, but pleural membranes pale yellow. Antennae light brown in male, dark brown in female, shorter than forewings; scapes thick, approximately as long as wide, with long hair-like setae dorsally (Figs 1C, 1E); pedicels shorter than scapes, basal segment of each flagellum longer than scape (Figs 1C, 1E). Wing venation similar in male and female. Forewings each 6.5–9.5 mm long in male (n = 11), 9.0–11.5 mm long in female (n = 10), 6.5 mm in male lectotype; yellow, with broad dark stripes (Fig. 1A); hind wings pale yellow with dark stripes (Fig. 1A); venation of both wings as in Figure 1B: with forks I, II, III, IV, and V in forewings and I, II, III, and V in hind wings; discoidal and medial cells closed in both wings. Tibial spurs 2-4-4. Abdominal sternum V with pair of finger-like processes associated with scent glands near anterolateral margins, slightly shorter than sternum (Fig. 1D).

Male genitalia (Figs 3A–3E). Ventrolateral sides of synsclerotized segment IX (IX) subtriangular in lateral aspect (Fig. 3A); posteroventral lobe (p.l.) trapezoidal in ventral aspect, with shallow median concavity (Fig. 3C); dorsal part of segment IX triangular with round and setose apex in dorsal aspect (Fig. 3B), fused with segment X (X) laterally (Fig. 3A). Segment X bilobed in dorsal aspect (Fig. 3B), with pair of large posterolateral setose areas (Figs 3A, 3B); each ventrolateral margin sclerotized, recessed into segment IX (Fig. 3A). Inferior appendages (i.a.) each without distal segment, long and finger-like in lateral aspect, dorsal margin weakly concave at apical 1/5 in lateral aspect, extending beyond apex of segment X (Fig. 3A); apex slightly enlarged mesally and truncate, with several short spine-like setae (Figs 3A–3C). Basal plate of inferior appendages (b.p.i.a) sclerotized, subrectangular in ventral aspect (Fig. 3C). Phallosome with dorsal process (d.p.p.), acicular in dorsal and lateral aspects, weakly

curved ventrad (Figs 3D, 3E); with pair of ventral processes (v.p.p), long, approximately same length as dorsal process of phallosome, each apex acute, curved dorsad and slightly mesad (Figs 3D, 3E). Aedeagus (ae.) arising from membranous endotheca (end.), evenly curved ventrad, with long head approximately 1/4 as long as basal stem (Fig. 3D); stem with lateral flanges, half-pipe-like, narrow at apical 3/4 and near base in dorsal aspect (Fig. 3E), with pair of apical swellings in dorsal and ventral aspects (Figs 3C, 3E).



FIGURES 1–2. Adults of *Homoplectra* spp. 1A–1E, *Homoplectra japonica* (Banks 1906): 1A, habitus, dorsal (Mt. Kosho, Fukuoka); 1B, male right wings, dorsal (Mt. Hiko, Fukuoka); 1C, male, head and pro- and mesonota, dorsal (same); 1D, male sternum V, left lateral (same); 1E, female, head, dorsal (same). 2A–2C, *Homoplectra albomarginata* (Ulmer 1907): 2A1–2A3, right wings, dorsal (Ibigawa-cho, Gifu): 2A1, male; 2A2, female; 2A3, female with indistinct markings; 2B, male, head and pro- and mesonota, dorsal (same); 2C, female, head, dorsal (same). Abbreviations: I, II, III, IV, V = apical forks I, II, III, IV, V; DC = discoidal cell; MC = median cell. Scales: 5 mm.

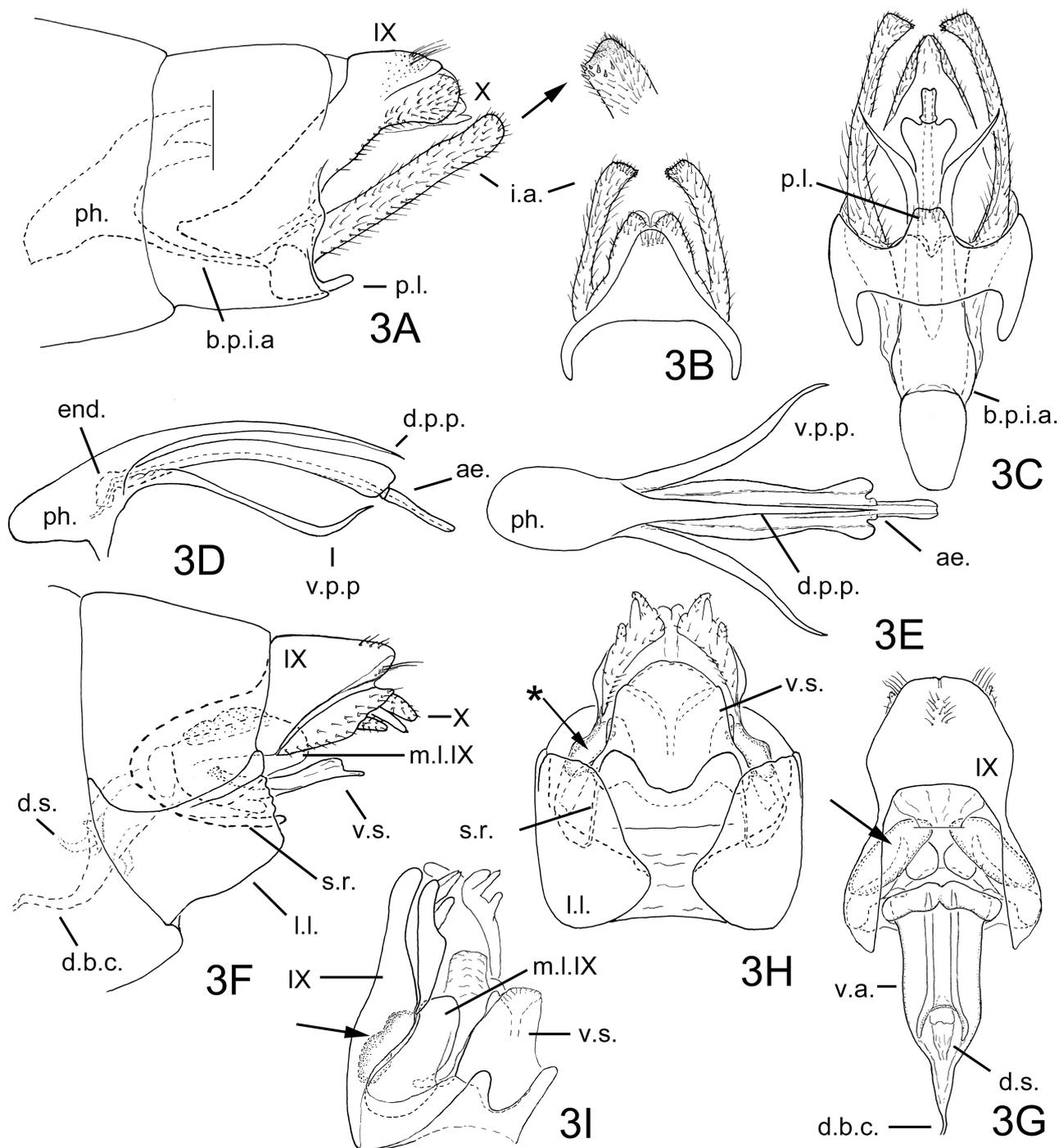


FIGURE 3. Adults of *Homoplectra japonica* (Banks 1906). 3A–3E, male genitalia, (Mt. Hiko, Fukuoka): 3A, left lateral, apicomeral part of inferior appendage enlarged; 3B, dorsal; 3C, ventral; 3D phallic apparatus, left lateral; 3E, same, dorsal. 3F–3H, female genitalia (Mt. Hiko, Fukuoka): 3F, left lateral; 3G, dorsal; 3H, ventral; 3I, left ventrolateral. Arrows on Figs 3G, 3H and 3I see text.

Female genitalia (Figs 3F–3I). Sternum VIII widely separated into pair of lateral lobes (l.l.) ventrally, each lobe bean-shaped in ventral aspect (Fig. 3H). Segment IX (IX) obliquely rectangular in lateral aspect (Fig. 3F), posterodorsal part trapezoidal in dorsal aspect (Fig. 3G); tergum with pair of ventrolateral sclerotized plates (marked with arrows in Figs 3G, 3I), weakly constricted at mid-length in lateral aspect (Fig. 3I), oblong in dorsal aspect (Fig. 3G); each mesal lobe (m.l.IX) sclerotized, bean-shape in lateral aspect (Figs 3F, 3I), forming large crevice between it and ventrolateral plate in ventral aspect (marked with arrow and asterisk in Fig. 3H); pair of sclerotized ribs (s.r.)

forming large round plate-like lobes on vulvar scale (v.s.) basoventrally (Figs 3H, 3I). Vulvar scale large, tongue-like in ventral aspect (Fig. 3H), semimembranous apically. Segment X slender in lateral aspect (Fig. 3F). Vaginal apparatus (v.a.) long-pentagonal in dorsal aspect (Fig. 3G), tapering to duct of bursa copulatrix (d.b.c.); with pair of peanut shape sclerites posterodorsally, with pair of longitudinal ridges dorsally, and with dark arched marking anterodorsally, partially surrounding opening of duct of spermatheca (d.s.).

Final instar larva (Figs 11A, 11B, 11F). Head 1.6 mm wide ($n = 1$), approximately as long as wide (Fig. 11F, hl, hw); frontoclypeal apotome asymmetrical in dorsal aspect (Fig. 11B inset), maximum width 1.2 mm, posterior angle about 90° , with anterior margin sinuous, left side recessed, very weakly concave in middle, with most secondary setae clavate. Mandibles each with 5 teeth. Pronotum with transverse sulcus on posterior 1/4 (Fig. 11A). Meso- and metathorax and abdominal segments bearing gills, with one pair of ventral tufts of gills on mesothorax and abdominal segment VII, with two pairs of subventral tufts of gills on metathorax and each of abdominal segments I to VI, with 1–3 sublateral conical gills on each of abdominal segments III to VII. Secondary setae on thoracic nota and abdominal segments mostly clavate.

Pupa (Figs 11C–11E). Body length 10 mm ($n = 1$). Mandibles slender, with 3 (right) or 4 (left) apical and subapical teeth, each mandible with stout mesal plate-like projection on apical 1/3. Middle tarsi bearing sparse hair-like setae. Abdominal segments with dorsal hook plates anterior on II to VIII, posterior on III and IV (Figs 11C, 11D). Abdominal segments bearing gills, with one pair of ventral tufts of gills on each of abdominal segments II to VI, with lateral conical gills on each of abdominal segments III to VII. Anal processes sclerotized, ventral surfaces covered by tiny spines; bifurcated, each apex acute, mesal branch longer than outer one (Fig. 11E).

Lectotype: Male (here designated, pinned: MCZ:Ent:11833): labeled “type”, “Hikosan, Buzen, Japan”, “Collection N. Banks”, “*Arctopsyche japonica* Banks/type”, “Type 11833”, “Trichoptera: *Diplectrona japonica* wings from Type/Det. H.H. Ross, 19/ILL. NAT. HIST. SUR (right wings in slide)” (<https://mczbase.mcz.harvard.edu/guid/MCZ:Ent:11833>; Nozaki 2021, fig. 5).

Specimens examined. JAPAN: HONSHU: Yamaguchi: 1 male, Nankai, Atojifukushima, Yamaguchi-shi, 17.v.1993, N. Kuhara. **KYUSHU: Fukuoka:** 1 female, Mt. Hiko-san, Soeda-machi, 31.v.1935, K. Yamauchi (KPM); 11 males, 9 females, same locality, 19.v.1993, N. Kuhara (6 males, 3 females: KuN); 1 male, 1 female, same locality, 9.vi.1994, T. Nozaki (1 male: SPMN); 1 male pupa with larval exuviae, 1 larva, same locality, 22.v.1996, T. Hattori (SPMN); 1 male, Mt. Kosho, Asakura-shi, 18.v.1969, N. Gytoku (KPM); 1 pupa, 2 pupal remnants with larval exuviae, Dobaru (alt. 200 m), Kokuraminami-ku, Kitakyushu-shi, 17.iv.2004, T. Hattori (SPMN). **Oita:** 1 male, Shimizubakuen, alt. 450 m, Mori, Kusu-machi, 18.iv.2004, T. Hattori (SPMN).

Distribution. Westernmost Honshu, northern Kyushu.

Biology. Larval and pupal specimens of this species were collected from small streams in hilly and mountainous areas.

Japanese name. Kimadara-shima-tobikera.

Remarks. Banks (1906) described *A. japonica* from Fukuoka, Kyushu and Gifu, central Honshu as “Hikosan, Buzen [now Fukuoka], Japan, 28 April; also from Gifu”, but no holotype was designated. Nozaki (2021) transferred this species to the genus *Homoplectra* based on examination of photographs of a syntype male (MCZ:Ent:11833) collected from Fukuoka and deposited in the Banks collection of MCZ. In this study, I examined photographs of another specimen also deposited in the Banks collection as a syntype (MCZ:Ent:648191) kindly provided Dr. C. W. Farnum (MCZ). Since this specimen had a handwritten label “Gifu Japan” (<https://mczbase.mcz.harvard.edu/guid/MCZ:Ent:648191>), the record from Gifu in the original description by Banks (1906) must have been based on it. Although I could not examine its genital morphology because of mold covered the abdomen, the length of the scape of left antenna (right antenna missing) was apparently longer than its width. Since the syntype male collected from Fukuoka has a short scape (Nozaki 2021, fig. 5A), these two specimens must belong to different species. Thus, I designate here the male collected from Fukuoka (MCZ:Ent:11833) as the lectotype to fix the status of the taxon name.

As a result of the lectotype designation of *A. japonica*, another specimen (MCZ:Ent:648191) becomes a paralectotype. Although I could not identify this specimen at the species level, *H. albomarginata* is widely distributed in Gifu Prefecture and the scape of each antenna (Figs 2B, 2C) is longer than that of *H. japonica* (Figs 1C, 1E). Ulmer (1907) recorded *H. japonica* (as *D. japonica*), also from Gifu; but it was a misidentification of *H. albomarginata* (see the Remarks for that species).

Homoplectra albomarginata (Ulmer 1907)

(Figs 2A–2C, 4, 5, 12A–12C, 13)

Diplectrona albomarginata Ulmer 1907, p. 74, holotype female, Museum of Natural Sciences of Belgium, Brussels.

Diplectrona japonica nec Banks 1906: Ulmer 1907, pp 72–74, pl. 4 fig. 19, male; Kobayashi 1968, p. 3; Hatta and Nozaki 1991, p. 200. **Misidentifications.**

Diplectrona sp. 2: Torii and Hattori 2006, pp 37–38.

Diplectroninae Gen. sp.: Morita 2009, pp 6–7; Kawase and Morita 2014, p. 5.

Diplectroninae Gen. *japonica* Complex: Nozaki *et al.* 2014, p. 61; Nojima 2017, p. 119 (in part).

Diplectrona japonica Species Complex: Watanabe 2021, pp 41–43, mating behavior.

Homoplectra albomarginata: Nozaki 2021, pp 254–256, figs 6A–6E, female, changed combination.

Homoplectra japonica Species Complex: Higuchi 2024, p. 19.

Diagnosis. Adults of this species and *H. japonica* are similar to each other in general morphology and coloration, but these species can be distinguished from each other by the length of the antennal scape: Each scape of this species is apparently longer than wide in this species (Figs 2B, 2C), but as long as wide in *H. japonica* (Figs 1C, 1E). The male and female of this species are similar to those of *Homoplectra inazui* **sp. nov.** in having long antennal scapes (Figs 2B, 2C); but are easily distinguishable from the latter by the following characters: In the male, the subapicomesal surface of each inferior appendage bears a small process with a few apical spine-like setae in *H. albomarginata* (Fig. 4A), but many spine-like setae arise directly from the apicomesal surface in *H. inazui* **sp. nov.** (Fig. 10A); in the female, tergum IX is broadly sclerotized ventrally in *H. albomarginata* (marked with an arrow in Fig. 4H) but semi-membranous in *H. inazui* **sp. nov.** (Fig. 10H). Furthermore, the vaginal apparatus bears an eye-glasses-shaped sclerite posterodorsally in this species (Fig. 4H) but lacks such a sclerite in *H. inazui*.

The larva is distinguishable from known Japanese larvae by the shape of anterior margin of the frontoclypeal apotome given in the diagnosis for *H. japonica*. Furthermore, abdominal segment VII is lacking the subventral tufts of gills in this species but bears them in the known Japanese species (Nozaki 2019; Kochi *et al.* 2023).

Description

Adult (Figs 2A–2C). General morphology and coloration similar to those of *H. japonica*, but scape of each antenna apparently longer than wide (Figs 2B, 2C). Yellow markings on female wings occasionally indistinct or lacking (Fig. 2A3). Holotype female lacking distinct markings of wings (Nozaki 2021, fig. 6A). Forewings each 7.0–9.5 mm long in male (n = 10), 8.5–11.5 mm long in female (n = 11), 10.3 mm long in female holotype. Antennae shorter than forewings; scape approximately 2 times longer than wide, with long hair-like setae dorsally, each pedicel about 1/4 length of its scape (Figs 2B, 2C).

Male genitalia (Figs 4A–4F). Ventrolateral side of synsclerotized segment IX triangular anteriorly in lateral aspect (Fig. 4A); posteroventral lobe triangular in ventral aspect (Fig. 4C); dorsal part of segment IX semicircular in dorsal aspect (Fig. 4B), broadly fused with segment X laterally (Fig. 4A). Segment X tapering to acute apex and bilobed posteriorly in dorsal aspect, pair of posterolateral setose areas protruding posterad (Figs 4A, 4B); ventral part membranous, with pair of posterior processes (p.p.X) thick and sword-like (Figs 4A, 4D) with base of each process fused with lateral strip (l.s.) of genital chamber (Figs 4A, 4D). Genital chamber with pair of lateral strips (l.s.) strongly sclerotized (Figs 4A, 4D), rarely with pair of tiny inner processes (i.p.) near base of phallosome (Fig. 4D). Inferior appendages long and finger-like, slightly bent upward at 2/5 from base, truncate apically in lateral aspect (Fig. 4A); each apex weakly depressed mesally, with short process bearing few tiny spine-like setae subapicomesally (Figs 4A inset, 4C). Basal plate of inferior appendages sclerotized, long rectangular in ventral aspect (Fig. 4C) and fused anteriorly with anteroventral edge of phallosome. Phallosome evenly curved ventrad (Figs 4A, 4E1, 4E2); with dorsal process (d.p.p.) and pairs of lateral and ventral processes (l.p.p. and v.p.p.), each apex acute, length of each process variable (Figs 4E1, 4E2); with thick ventral spine (v.s.p.) sub-basally (Figs 4C, 4E1, 4E2). Aedeagus (Fig. 4F) evenly curved ventrad; stem with lateral flanges, half-pipe-like; head approximately 1/10 of stem.

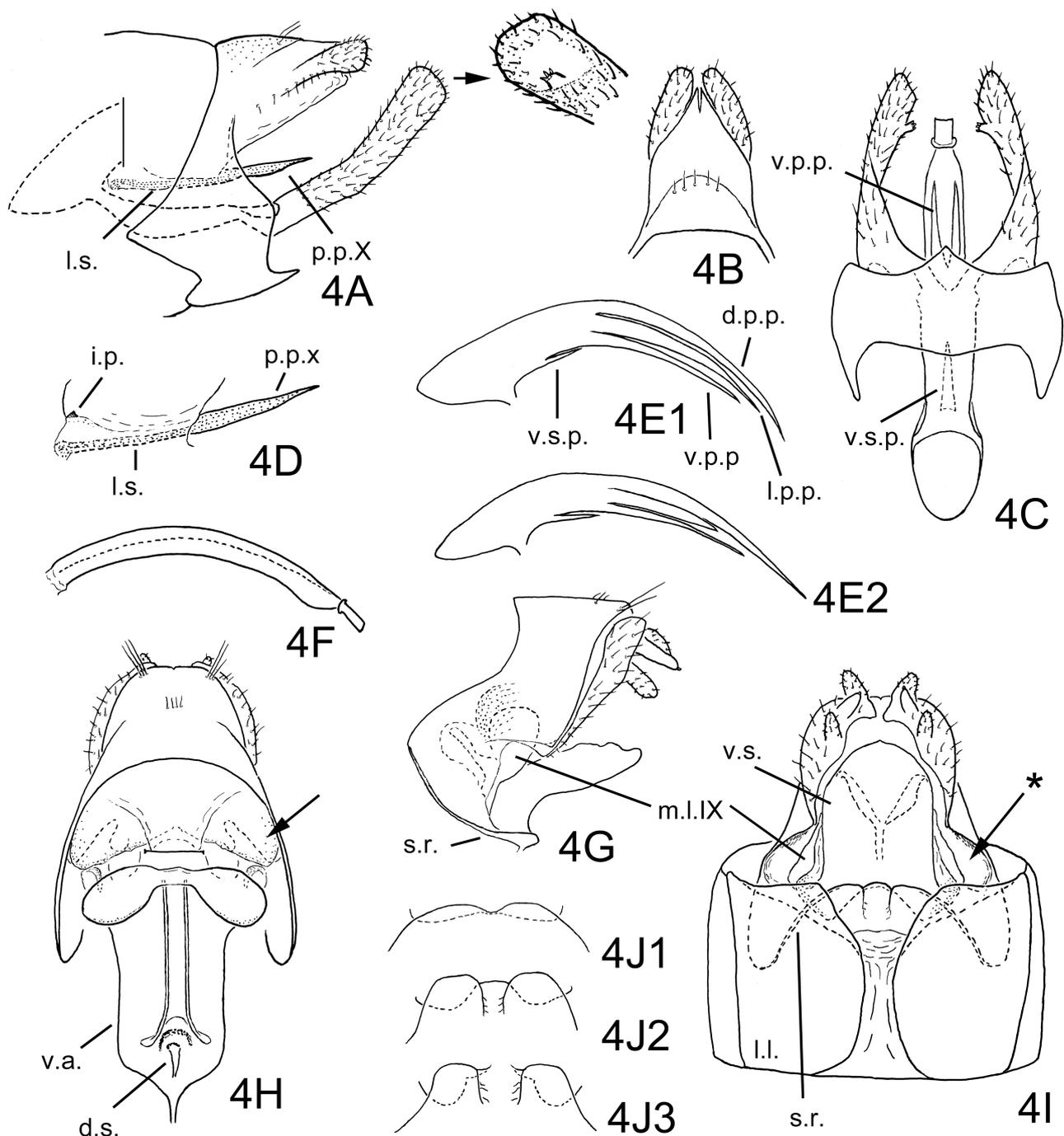


FIGURE 4. *Homoplectra albomarginata* (Ulmer 1907). 4A–4F: male genitalia (Sakauchi-sakamoto, Ibigawa-cho, Gifu): 4A, left lateral, apicomeres part of inferior appendage enlarged; 4B, dorsal; 4C, ventral; 4D, inner process, lateral strip and posterior process of segment X, left lateral, variation; 4E1–4E2, phallosome, left lateral, variations; 4F, aedeagus, left lateral. 4G–4J, female genitalia (Sakauchi-sakamoto, Ibigawa-cho, Gifu): 4G, left lateral; 4H, dorsal; 4I, ventral; 4J1–4J3, lobes formed by sclerotized ribs on vulvar scale, variations, ventral. Arrows on Figs 4H and 4I see text.

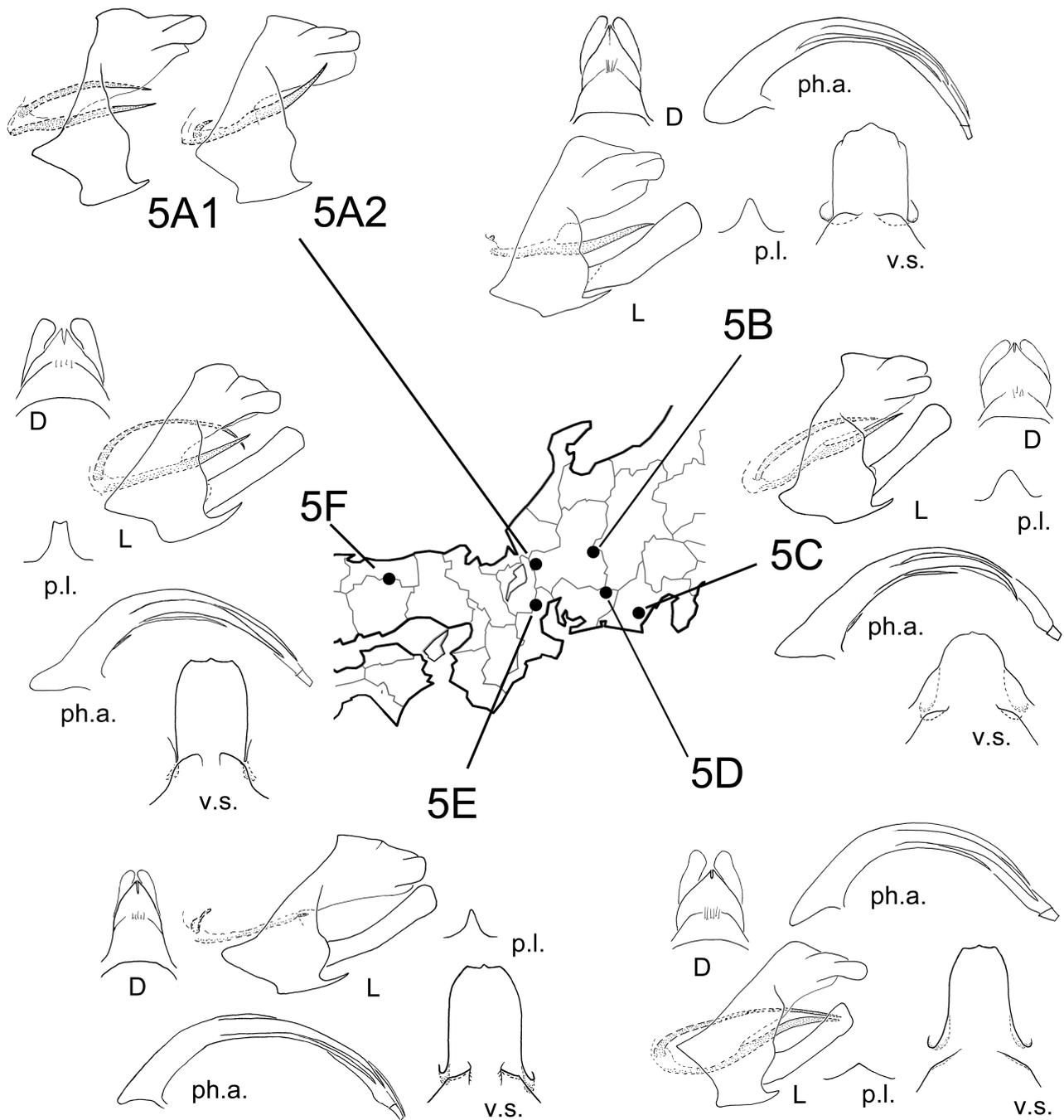


FIGURE 5. *Homoplectra albomarginata* (Ulmer 1907). Variations of male and female genitalia. 5A: male genitalia, left lateral, inferior appendage omitted: 5A1, Ozu, Ibigawa-cho, Gifu; 5A2, Tsurumi, Ibigawa-cho, Gifu. 5B–5F: male and female genitalia: 5B, Fudo-daki, Tsukechi-cho, Nakatsugawa-shi, Gifu; 5C, Ookaya-gawa, Kamiooka, Shimada-shi, Shizuoka; 5D, Mennoki-toge, Tsugu, Shitara-cho, Aichi; 5E, Miyazuma-kyo, Suizawa-cho, Yokkaichi-shi, Mie; 5F, Ombara, Kamisabara, Kagamino-cho, Okayama. Abbreviations: D = male segments IX & X, dorsal; L = same, right lateral; ph.a = phallic apparatus, left lateral; p.l. = posteroventral lobe of segment IX, ventral; v.s. = vulvar scale, ventral.

Female genitalia (Figs 4G–4J). Lateral lobes of sternum VIII (l.l.) widely separated from each other ventrally (Fig. 4I). Segment IX obliquely rectangular in lateral aspect (Fig. 4G), trapezoidal in dorsal aspect (Fig. 3H); ventral surface of tergum broadly sclerotized, wing-like in dorsal aspect (marked with an arrow in Fig. 4H); mesal lobe (m.l.IX) weakly sclerotized, oval in lateral aspect (Fig. 4G), each forming large pocket-like crevice between it and segment IX in ventral aspect (marked with an arrow and asterisk in Fig. 4I); pair of sclerotized ribs (s.r.)

forming pair of short round plate-like lobes on vulvar scale basoventrally (Fig. 4I), but shape of lobes variable (Figs 4J1–4J3). Vulvar scale (v.s.) large, tongue-like, its apical margin with small median protrusion (Fig. 4I); with pair of deep holes basolaterally. Segment X setose, tall and longitudinally shot in lateral aspect (Fig. 4G). Vaginal apparatus (v.a.) long pentagonal in dorsal aspect (Fig. 4H), tapering to duct of bursa copulatrix; with eye-glasses-shaped sclerite posterodorsally, with pair of longitudinal ridges dorsally, and with dark arched marking anterodorsally, partially surrounding opening of duct of spermatheca (d.s.).

Variations of male and female genitalia (Fig. 5). As described above, some of females collected from Moroka, Sakauchi-sakamoto, Ibigawa-cho, Gifu, have genitalia, especially a pair of basoventral lobes on the vulvar scale, very similar to those of the holotype female (Fig. 4I; Nozaki 2021, fig. 6C) although the shape is variable even at the same site (Figs 4J1–4J3). In males in this population, the lengths of the processes of the phallosome are also variable (Figs 4E1, 4E2). Furthermore, males collected nearby, in the same town, where females have their genitalia indistinguishable to those of the Moroka population, each bear a pair of distinct inner processes of the genital chamber, and the length of these processes is variable (Figs 5A1, 5A2). In other areas, different forms of the male genitalia are found not only in the above-mentioned characters but also in the shapes of segment X, the posteroventral lobe of segment IX, inferior appendages, the head of the aedeagus, and the presence or absence of the ventral spine of the phallosome. Females collected with these males often have genitalia slightly different from those of the Moroka population, especially in the shape of the vulvar scale and vaginal apparatus. Some examples of these male and female variations are shown in Figs 5B–5F; although these forms are often variable even in the same locality.

Final instar larva (Figs 12A, 12C). Head 1.3–1.8 mm wide ($n = 8$), slightly longer than wide (Fig. 12A); frontoclypeal apotome asymmetrical in dorsal aspect, anterior margin evenly convex mesally, concave laterally, left side recessed, secondary setae acicular (Fig. 12B, inset); posterior angle 82° – 85° , maximum width 0.9–1.2 mm. Meso- and metathorax and abdominal segments bearing gills, with one pair of ventral tufts of gills on mesothorax and abdominal segment VII, with two pairs of ventral tufts of gills on metathorax and each of abdominal segments I to VI, with 1–3 lateral conical gills on each of abdominal segments III to VII.

Pupa (Fig. 12C). Body length 9.5–12 mm ($n = 5$). Anal processes (Fig. 12C) sclerotized, not bifurcate, ventral surfaces covered by tiny spines, with apices acute and directed dorsad. Other characters similar to those of *H. japonica* (Figs 11C–11E).

Specimens examined. JAPAN: HONSHU: Niigata: 1 female, Mt. Amakazari, Itoigawa-shi, 26.vi.1955, K. Baba (KPM); 1 female, Mushi-gawa (alt. 170 m), Oyachi, Itoigawa-shi, 27.v.1995, T. Hattori (SPMN); 1 female, Fudo-no-taki (alt. 300 m), Oyachi, Itoigawa-shi, 27.v.1995, T. Hattori (SPMN). **Toiyama:** 1 male, Nashitani-gawa, Ainokura, Nanto-shi, 17.vi.2018, Y. Higuchi. **Ishikawa:** 3 male, 3 females, Hodatsushimizu-cho, 2–26.v.1990, I. Togashi (KT); 1 male, Sannomiya, Tsurugi, Hakusan-shi, 18.iv.1984, I. Togashi (KT); 1 male, Sunagozen, Hakusan-shi, 25.v.1980, I. Togashi (KT); 1 male, Odani, Chugu, Hakusan-shi, 28.v.2016, Y. Higuchi; 2 males, Ushikubi-gawa, Shiramine, Hakusan-shi, 8.vi.2021, Y. Higuchi; 1 female, small stream, Ushikubi-gawa, Shiramine, Hakusan-shi, 2.vii.2023, Y. Higuchi; 1 male, 2 females, Ohirasawa, Kanazawa-shi, v.1982, M. Eguchi (KT); 1 male, Nabetani, Nomi-shi, 29.iv.1990, Y. Sugie (KT); 20 males, same locality, 1.v–5.vi.1993, Y. Sugie (KT); 2 males, Dainichi R., Maruyama, Komatsu-shi, 17.vi.1982, K. Tanida (KT). **Fukui:** 2 males, 1 female, Kitadanicho-obara, alt. 1400 m, Katsuyama-shi, 27.vii.2003, K. Inazu; 1 male, Nyu, Mihama-cho, 21.v.2001, N. Kawase (NK); 2 males, 1 female, Misaka-dani, Oono-shi, 10.vi.2006, T. Torii (SPMN); 1 male, Shimoshinjo, Sabae-shi, 6.v.1986, H. Nishida (KT); 1 male, Nokatani (alt. 310m), Notaoi, Natasho, Ohi-machi, 25.iv.2010, T. Hattori (SPMN). **Nagano:** 1 male, Aoni-sawa (alt. ca. 850 m), Hakuba-mura, 11.vi.1995, T. Hattori (SPMN); 3 males, 2 females, Kamikochi, Azumi, Matsumoto-shi, alt. 1510 m, 4.vii.2010, K. Tojo (SUMNS); 1 male, 1 female, nr. Mizuki-sawa, Ogiso, Kiso-mura, alt. 1300 m, 13.vi.2012, T. Nozaki; 1 male, Chigono, Fukushima, Kiso-machi, 31.v.1993, N. Kuhara (KuN); 2 females, Komanoyu, Fukushima, Kiso-machi, 31.v.1993, N. Kuhara (KuN). **Gifu:** 5 males, Ozu, Ibigawa-cho, 14–16.v.2001, N. Kawase (NK); 10 males, 1 female, same locality, 13.v.2002, N. Kawase; 31 males, 4 female, 5 pupae, 2 prepupae, 1 larva, Hin-dani, Ibi-gawa (alt. 400 m), Ibigawa-cho, 3–4.v.1996, T. Hattori (SPMN); 4 males, 1 female, 1 larva, Nishimaenotani, Tsurumi, Ibigawa-cho, 10.iv–1.vi.2002, N. Kawase (NK); 5 males, 6 females, Moroka, Sakauchi-Sakamoto, Ibigawa-cho, 20.iv–8.v.2023, N. Kawase, Malaise trap (KPM); 2 males, 1 female, same data except collecting date 8.v–18.v.2023 (NK); 10 males, 8 females, same data except collecting date 18.v–12.vi.2023 (KPM); 1 female, same data except collecting date 12.vi–29.vi.2023 (NK); 3 males, 1 female, same locality, 9.v.2024, N. Kawase; 1 male, Meiho-kera, Gujo-shi, 2.v.1992, T. Hattori (SPMN); 2 females, 1 female, Iwai-machi (alt.

1220 m), Takayama-shi, 9.vi.2011, T. Hattori (SPMN); 1 female, Kokufu, Takayama-shi, 9.vi.2019, H. Suzuki; 1 female, Amou, Kawai-cho, Hida-shi, 20.vi.2020, N. Kawase (NK); 3 males, 1 female, Fudo-daki, Tsukechi-cho, Nakatsugawa-shi, 21.v.1996, T. Nozaki (KPM); 1 male, 1 female, Shinden, Fukuoka, Nakatsugawa-shi, 21.v.1996, T. Nozaki (KPM). **Shizuoka:** 2 males, Nishigochi-gawa, Umegashima, Aoi-ku, Shizuoka-shi, 1.v.2010, T. Torii (TT); 1 male, 1 female, Nyujima, Aoi-ku, Shizuoka-shi, 5.v.1997, T. Hattori (SPMN); 3 males, 3 females, same locality, 9.v.1999, T. Hattori (SPMN); 1 male, same locality, 9.v.2006, T. Torii (TT); 1 female, Hirano, Aoi-ku, Shizuoka-shi, 11.v.1996, T. Hattori (SPMN); 1 male, Yunno, Shizuoka-shi, 29.iv.1989, T. Hattori (SPMN); 1 male, Dainichi, Ikawa, Aoi-ku, Shizuoka-shi, 21.v.2003, T. Hattori (SPMN); 1 male, Uchimaki-gawa, Shizuoka-shi, 1.v.2001, T. Hattori (SPMN); 1 male, Sumata-kyo, Senzu, Kawanehon-cho, 4.vi.2007, T. Hattori (SPMN); 1 male, 4 females, same locality, 4.v.2010, T. Torii (TT); 1 male, Utoge-no-taki, Setonoya, Fujieda-shi, 2.viii.2001, T. Torii (TT); 1 male, same locality, 18.v.2003, T. Torii (TT); 2 females, Yamame-dani, Setonoya, Fujieda-shi, 8.v.2004, T. Torii (TT); 3 males, 1 female, Ookaya-gawa, Kamiooka, Shimada-shi, 26.iv.2002, T. Torii (TT). **Aichi:** 2 males, 1 female, 1 pupa, 8 larvae, Mennoki-toge, Tsugu, Shitara-cho, 27.v.1990, T. Nozaki (KPM); 3 males, same locality, 14.v.1991, T. Nozaki (KPM). **Mie:** 1 male, Mt. Nonobori, Kameyama-shi, 8.v.1994, H. Morita (KT); 7 males, 2 females, Miyazuma-kyo, Suizawa-cho, Yokkaichi-shi, 26.v.2009, H. Morita; 12 males, 1 female, Yunoyama, Komono-cho, 19.v.2005, H. Morita; 1 male, Kawachi-dani (alt. 300 m), Yamaguchi, Fujiwara-cho, Inabe-shi, 4.vi.2006, H. Morita, T. Nozaki & T. Hattori (SPMN). **Shiga:** 18 males, 1 female, Ibuki, Maibara-shi, 1.v.1985, H. Nishimoto (KT); 33 males, 22 females, Ojigahata, alt. 600 m, Taga-cho, Shiga, 10.v–8.vi.2008, H. Morita; 1 male, Ohara, Yogo-cho, Nagahama-shi, 17.v.2010, N. Kawase (NK); 4 males, 1 female, Nakanokawachi, Yogo-cho, Nagahama-shi, 17.v–26.vi.2010, N. Kawase (NK); 9 males, Shiratani, Makino-cho, Takashima-shi, 17.v.2014, N. Kawase; 3 males, 1 male pupa, Akebibara, Tsuchiyama-cho, Koka-shi, 15.v.1989, T. Nozaki (KPM); 5 males, 1 female, Okawara, Tsuchiyama-cho, Koka-shi, 14–30.v.2008, N. Kawase (NK); 2 males, 1 female, Buhei-toge, Okawara, Tsuchiyama-cho, Koka-shi, 13.v.2008, N. Kawase (NK); 2 males, Shirokura-dani, Okawara, Tsuchiyama-cho, Koka-shi, 17.v.2005, N. Kawase (NK); 1 male, 1 female, same locality, 30.iv.2007, N. Kawase (NK); 40 males, 45 females, Yuzurio, Eigenji-cho, Higashiomi-shi, 12–31.v.2009, N. Kawase (NK); 1 male, same locality, 12.v.2009, N. Kawase (NK); 4 males, Oishitomikawa-cho, Otsu-shi, 22.iv–16.v.2024, N. Kawase (NK). **Hyogo:** 3 males, 1 female, Soryu-no-taki, Santocho-kawakami, Asago-shi, 15.v.2015, K. Inazu (KI); 1 male, 2 females, Hyono-senrindo, alt. 911 m, Unawa, Sekimiya-cho, Yabu-shi, 2.vi.2007, K. Inazu (KI); 2 males, 1 female, same locality, 30.v.2022, K. Inazu; 1 male, seep, alt 965 m, Oyacho-yokoiki, Yabu-shi, 18.v.2023, K. Inazu (KI); 2 females, same locality, 28.vi.2023, K. Inazu (KI); 2 males, 2 females, Ichinomiyacho-sencho, Shiso-shi, alt. 800–900 m, 6.vi.2016, K. Inazu (1 male, 1 female: KI); 3 males, 1 female, Arinocho-karato, Kita-ku, Kobe-shi, 12.v.2020, S. Watanabe (MNHA). **Okayama:** 1 male, Ogaya, Nishiawakura-son, 28.v.2017, K. Nojima (KN); 9 males, 2 females, Ombara, Kamisaibara, Kagamino-cho, 23.v.2021, K. Nojima (6 males, 1 female: KN).

Distribution. Honshu (central to western).

Biology. Larvae of this species were collected from small spring flows or seeps in mountain areas. Adults were active in the daytime of late spring to early summer, and Watanabe (2021) reported a diurnal mating behavior.

Japanese name. Nagae-kimadara-shima-tobikera.

Remarks. Descriptions of male and female genitalia above are based on 17 males and 15 females collected using a Malaise trap in Moroka, Sakauchi-sakamoto, Ibigawa-cho, Gifu Prefecture. These females have genitalia similar to those of the holotype female (Nozaki 2021, fig. 6C). Ulmer (1907) described this species as a member of the genus *Dipletrona* based on a female specimen, and Nozaki (2021) transferred it to the genus *Homoplectra* based on the examination of photographs of the holotype.

Nozaki (2021) mistakenly wrote that the holotype female was collected from “an unknown locality in Gifu, central Honshu”; but in fact, Ulmer (1907) did not mention the precise name of the type locality other than “Japan.” Although the type locality of this species is not known, females which have similar genital morphology as those of the holotype were found in specimens collected from western Gifu and adjacent areas in central Honshu in this study (Fig. 4I and Nozaki 2021, fig. 6E).

In addition, Ulmer (1907) recorded males collected from Gifu as *Dipletrona japonica* [= *H. japonica*]; however, the male of *H. japonica* described above does not have a pair of long spine-like processes arising from the genital chamber as described and illustrated by Ulmer (1907, figs 114–115). According to Ulmer’s description, his male bears a tooth-like projection (eine zahnartige Erhebung) on the subapicomeral face of each inferior appendage. These characters suggest that his specimen must belong to *H. albomarginata*.

The male and female genitalia of *H. albomarginata* are very variable (Figs 4, 5). Although I treat them as individual and/or geographic variations in the single species *H. albomarginata*, further study with molecular data is needed to confirm their identity and phylogenetic relationships.

***Homoplectra flagelliformis* sp. nov.**

(Figs 6, 13)

Diplectrona japonica nec Banks 1906: Kawase & Hayashi 2010, p. 85. **Misidentification.**

Diplectroninae Gen. *japonica* Species Complex: Nojima 2017 (in part), p. 119.

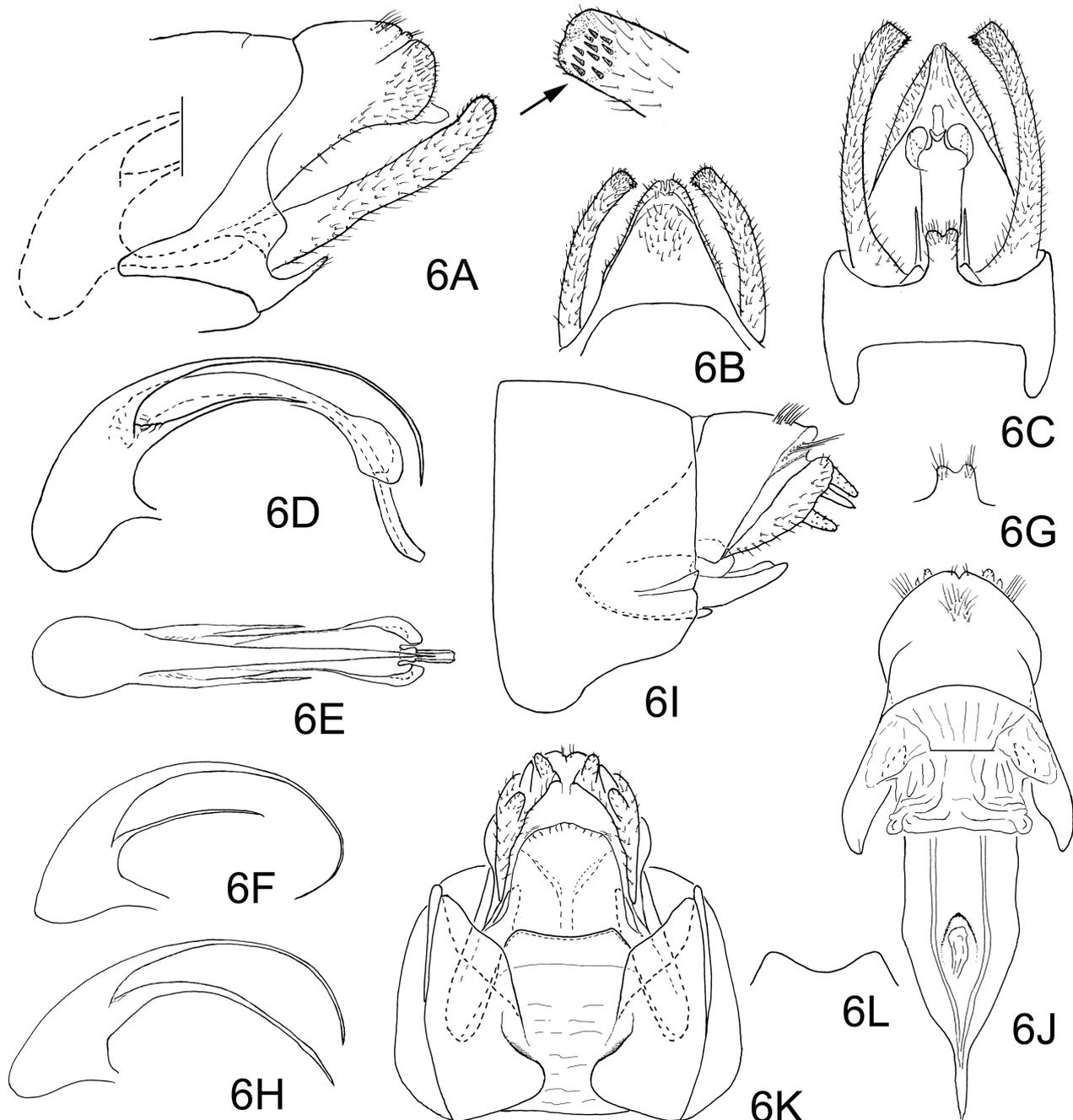


FIGURE 6. Adults of *Homoplectra flagelliformis* sp. nov. 6A–6F, male genitalia, type locality (Okuizumo-cho, Shimane): 6A, left lateral, apicomeres of inferior appendage, enlarged; 6B, dorsal, 6C, ventral; 6D, phallic apparatus, left lateral; 6E, same, dorsal; 6F, phallosome, treated by KOH, left lateral. 6G & 6H, variations of male genitalia (Hatsukaichi-shi, Hiroshima): 6G, posteroventral lobe of segment IX, ventral; 6H, phallosome, left lateral. 6I–6K, female genitalia, type locality: 6I, left lateral; 6J, dorsal; 6K, ventral. 6L, lobe formed by sclerotized ribs on vulvar scale, variation (Hatsukaichi-shi, Hiroshima), ventral.

Diagnosis. The male of this species is very similar to that of *H. japonica* in the short antennal scapes and the shape of the phallic apparatus; but can be distinguished by the shape of the ventral processes of the phallosome and aedeagus: In this species, the ventral processes of the phallosome are almost straight apically (Figs 6D, 6H), and the stem of the aedeagus bears a pair of round lobes apically in lateral aspect (Fig. 6D); but in *H. japonica*, the ventral processes of phallosome curve dorsomedially apically (Figs 3D, 3E), and the posterior margin of the aedeagal stem is truncate in lateral aspect (Fig. 3D).

The female of this species is similar to that of *Homoplectra shikoku* **sp. nov.**, in having a trapezoidal basoventral lobe on the vulvar scale but these species can be easily distinguished from each other by the shape of the lateral lobes of segment VIII: The mesal margin of each lateral lobe is concave in the middle in this species (Fig. 6K), but it is smoothly convex in *H. shikoku* **sp. nov.** (Fig. 7K).

Description

Adult. Length of antennal scape and general coloration of body and wings very similar to those of *H. japonica*. Wings occasionally uniformly dark brown in female. Forewings each 8.5–10 mm in male (n = 10), 10.5–13 mm in female (n = 10), 9.7 mm in male holotype.

Male genitalia (Figs 6A–6H). Ventrolateral sides of synsclerotized segment IX protruding anterad and round on each side in lateral aspect (Fig. 6A); posteroventral lobe long and rectangular in ventral aspect (Fig. 6C), its apex weakly bilobed in ventral aspect. Dorsal part of segment IX subtriangular, apically round in dorsal aspect (Fig. 6B), fused with segment X laterally (Fig. 6A). Segment X bilobed in dorsal aspect (Fig. 6B), with pair of large posterolateral setose areas (Fig. 6A); each ventrolateral margin sclerotized, recessed into segment IX (Fig. 6A). Inferior appendages each without distal segment, long and finger-like in lateral aspect (Fig. 6A), extending beyond apex of segment X, slightly curved upward apically; slightly convex subapically, with about 10 spine-like setae (Figs 6A–6C). In phallosome, long dorsal process thin, whip-like in lateral aspect (Fig. 6D), gradually curving posteroventrad (specimens macerated by KOH solution often strongly curved or recurved apically as in Fig. 6F); broad basally and tapering to acute apex in dorsal aspect (Fig. 6E); lateral processes absent; pair of ventral processes in lateral and dorsal aspect (Figs 6D–6F) slender, almost straight, approximately half as long as dorsal process. Aedeagus evenly curved ventrad in lateral aspect (Fig. 6D); stem half-pipe-like, with pair of posterior lobes, each lobe oval in lateral aspect (Figs 6D) and concave mesally (Fig. 6E); with head approximately 1/4 as long as basal stem (Fig. 6D).

Female genitalia (Figs 6I–6L). Lateral lobes of sternum VIII widely separated from each other in ventral aspect (Fig. 6K), each with mesal margin concave in middle. Segment IX oblique rectangular in lateral aspect (Fig. 6I), subpentagonal with round lateral and apical margins in dorsal aspect (Fig. 6J); pair of mesal lobes sclerotized, semicircular in lateral aspect (Fig. 6I); pair of sclerotized ribs forming wide trapezoidal lobe on vulvar scale basoventrally (Fig. 6K). Vulvar scale large, membranous and convex apically. Vaginal apparatus long pentagonal in dorsal aspect (Fig. 6J), tapering to duct of bursa copulatrix; posterodorsal part semimembranous, with complicated wrinkles, with pair of longitudinal ridges dorsally, opening of duct of spermatheca situated between ridges near middle, with dark inverted V-shaped mark dorsally, partially surrounding opening of duct of spermatheca (Fig. 6J).

Geographic variations of male and female genitalia (Figs 6G, 6H, 6L). In males collected from Okayama and Hiroshima Prefectures, the posteroventral lobe of segment IX is short (Fig. 6G). The ventral processes of the phallosome are approximately the same length as the dorsal process of the phallosome in specimens collected from Hiroshima Prefecture (Fig. 6H). In females collected from Hiroshima Prefecture, the posterior margin of basoventral lobe on the vulvar scale is shallowly concave (Fig. 6L).

Immature stages. Unknown.

Holotype. Male (in alcohol): Takezaki, Okuizumo-cho, Shimane, 35.1693°N, 133.1751°E, alt. 761 m, 16–28.v.2007, M. Hayashi, Malaise trap (KPM-NK TN00580).

Paratypes. 10 males, 5 females (in alcohol), same data as holotype (KPM-NK TN00590, KPM-NK TN00600).

Other specimens examined. JAPAN: HONSHU: **Tottori:** 1 male, 2 females, Funadani-gawa, Kofu-cho, alt. 750 m, 25.v.1993, N. Kuhara (KuN). **Shimane:** 25 males, 12 females, same data as holotype (20 males, 7 females:

NK). **Okayama:** 5 males, 1 female, Oosaooino, Niimi-shi, 8.v.2016, K. Nojima (KN); 3 males, 1 female, Hiruzen-kamifukuda, Maniwa-shi, 5.v.2016 (KN). **Hiroshima:** 1 male, 2 females, Yoshiwa, Hatsukaichi-shi, 11.v.1976, K. Baba (KPM); 3 males, Hosomi-dani, Yoshiwa, Hatsukaichi-shi, 11.v.2005, I. Mori.

Etymology. The species epithet (Latin adjective, whip-like) refers to the whip-like dorsal process of the phallosome.

Distribution. Western Honshu (Chugoku District).

Biology. Many adults of this species were collected in May using a Malaise trap over a small spring flow at the type locality (Kawase and Hayashi 2010).

Japanese name. Muchio-kimadara-shima-tobikera.

***Homoplectra shikoku* sp. nov.**

(Figs 7, 13)

“*Diplectrona*” *japonica* Complex: Yamamoto & Ito 2014, p. 13.

Diplectroninae Gen. *japonica* Species Complex: Nozaki 2016, pp 75, 348, female (photo); Yamamoto *et al.* 2021, p. 73.

Diagnosis. The male of this species is somewhat similar to those of *H. japonica* and *H. flagelliformis* sp. nov. in having a short antennal scape and in the shape of the phallic apparatus; but is easily distinguishable from those two species by bearing long inner processes of the genital chamber and posterior processes of segment X (Fig. 7C).

The female of this species is similar to that of *H. flagelliformis* sp. nov. in having a trapezoidal basoventral lobe on the vulvar scale, but they can be distinguished from each other by the character states given in the diagnosis for that species.

Description

Adult (Fig. 7A). General coloration of body and wings, and length of antennal scapes similar to those of *H. japonica*. Yellow markings on female wings rarely lacking. Forewings each 9.0–11.0 mm in male (n = 10), 9.8–13.0 mm in female (n = 10), 9.5 mm in male holotype.

Male genitalia (Figs 7C–7H). Ventrolateral sides of synsclerotized segment IX subtriangular in lateral aspect (Fig. 7C); posteroventral lobe trapezoidal in ventral aspect (Fig. 7E), usually with central shallow notch apically; dorsal part of segment IX triangular with round apex in dorsal aspect (Fig. 7D), broadly fused with segment X laterally (Fig. 7C). Segment X bilobed in dorsal aspect (Fig. 7D), pair of posterolateral setose areas thumb-like in lateral aspect (Fig. 7C); each with ventrolateral margin sclerotized; segment X with pair of posterior processes (p.p.X) having variable length, even in same locality (Figs 7H1–7H3), with few apical spine-like setae. Genital chamber with pair of weakly sclerotized lateral strips (l.s.); with pair of long spine-like inner processes (i.p.) evenly curved ventrad (Fig. 7C). Inferior appendages each without distal segment, long finger-like in lateral aspect (Fig. 7C), extending beyond apex of segment X, weakly bent upward in apical 1/3; subapicomesal apex weakly bulging mesally and with more than 10 spine-like setae (Figs 7C inset, 7D, 7E). Phallic apparatus arcuate in lateral aspect (Fig. 7F), dorsal process of phallosome acicular in lateral and dorsal aspects (Figs 7F, 7G), gently curved ventrad (Fig. 7F); pair of ventral processes of phallosome approximately 2/3 as long as dorsal process (Fig. 7F), but occasionally only slightly shorter than dorsal process. Aedeagal stem thick, half-pipe-like (Fig. 7G), moderately curved ventrad, with long head, approximately 1/4 as long as basal stem (Fig. 7F).

Female genitalia (Figs 7I–7K). Lateral lobes of sternum VIII cleft from base, mesal margins convex, posteromesal margin evenly curved laterad in ventral aspect (Fig. 7K). Segment IX subrectangular with round posterolateral corners in dorsal aspect (Fig. 7J), obliquely S-shaped in lateral aspect (Fig. 7I); pair of mesal lobes sclerotized, semicircular in lateral aspect (Fig. 7I); pair of sclerotized ribs forming wide trapezoidal lobes on vulvar scale basoventrally (Fig. 7K). Vulvar scale tongue-like in ventral aspect, membranous apically (Fig. 7K). Vaginal apparatus long triangular in dorsal aspect (Fig. 7J); with pair of sclerotized round bulges posterolaterally, and with dark M-shaped mark between pair of longitudinal ridges anteriorly, partially surrounding opening of duct of spermatheca.

Immature stages. Unknown.

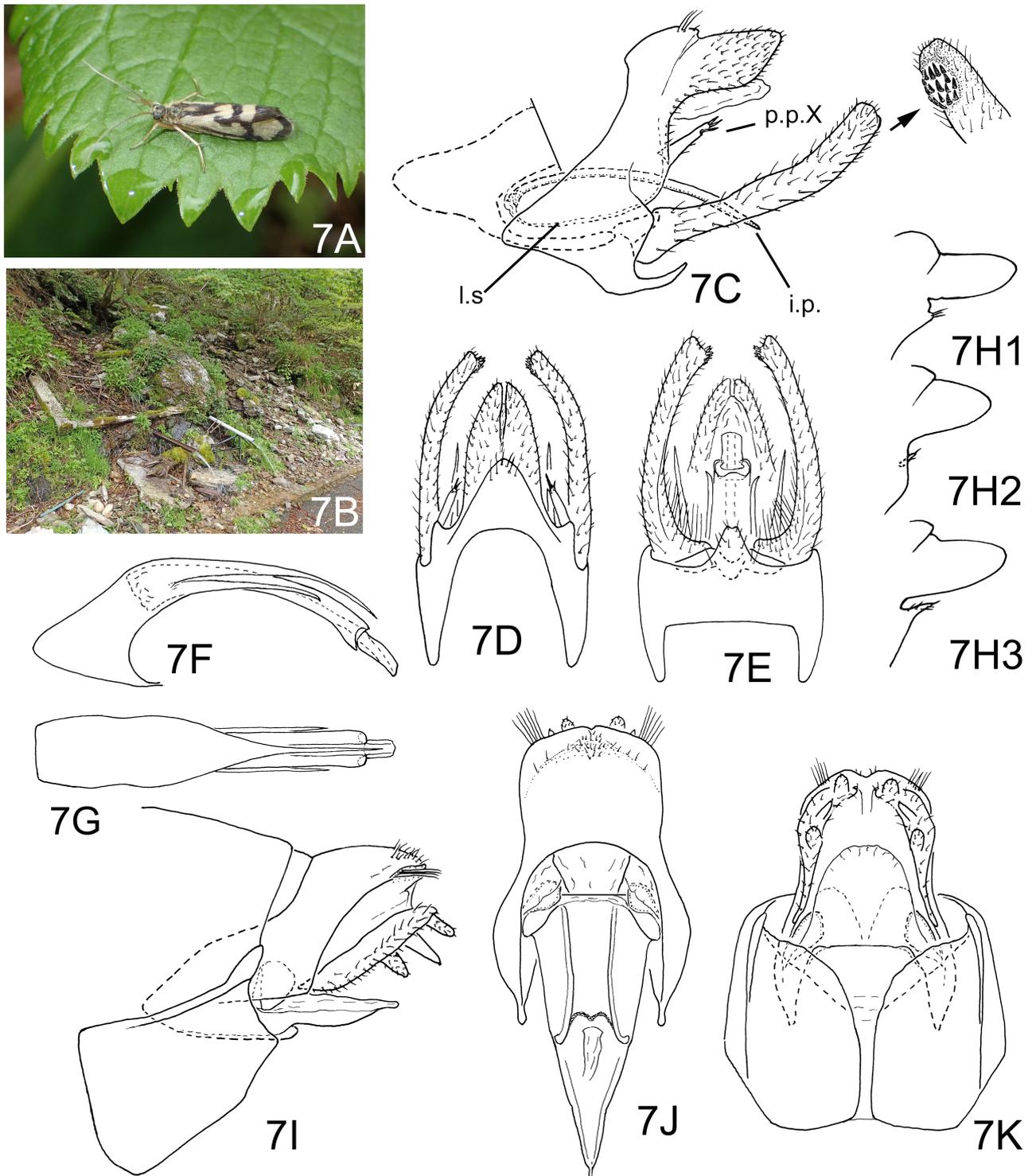


FIGURE 7. Adults of *Homoplectra shikoku* sp. nov. 7A, male, habitus, type locality (Kumakogen-cho, Ehime, photographed by E. Yamamoto). 7B, a spring seep at the type locality where many adults were collected (photographed by E. Yamamoto). 7C–7G, male genitalia, type locality: 7C, left lateral, apicomomesal part of inferior appendage enlarged; 7D, dorsal; 7E, ventral; 7F, phallic apparatus, left lateral; 7G, same, dorsal. 7H1–7H3, posterior process of male segment X, variations (Uchiko-cho, Ehime), left lateral. 7I–7K, female genitalia, type locality: 7I, left lateral, 7J, dorsal; 7K, ventral.

Holotype. Male (in alcohol): Izugataniyama, Nishidani, Kumakogen-cho, Ehime, 33.5628°N, 132.9358°E, alt. 1370 m, 20.v.2020, E. Yamamoto (KPM-NK TN00610).

Paratypes. 15 males, 8 females, same data as holotype (KPM-NK TN00620, KPM-NK TN00630), 2 males (pinned), Nishidani, Kumakogen-cho, Ehime, alt. 1310 m, 25.v.2011, T. Hattori (SPMN-IS-59802, SPMN-IS-59803).

Other specimens examined. JAPAN: SHIKOKU: Tokushima: 6 males, 5 females, Konose-kyo, Kitokitagawa, Naka-cho, 6.v.2009, T. Torii (SPMN); 1 male, Higashiiya-sugeoi, Miyoshi-shi, alt. 1330–1380 m, 8.vi.2011, T. Nozaki (KPM). **Ehime:** 7 males, 4 females, type locality, 11.v–10.vi.2013, E. Yamamoto; 10 males, type locality, 21–31.v.2018, E. Yamamoto; 1 male, Yurano-mori, Kumakogen-cho, 10.v.2007, E. Yamamoto; 4 males, same, 21.v.2007, E. Yamamoto; 1 male, Tsuchigoya, Wakayama, Kumakogen-cho, 20.vii.1996, T. Befu (KPM); 2 males, Wakayama, Kumakogen-cho, 21.v.1999, A. Ohkawa & T. Ito; 1 males, Banjo-dani, Wakayama, Kumakogen-cho, 9.vi.2011, K. Nio (KPM); 2 males, 2 females, Mt. Kasatori, Uchiko-cho, alt. 1500 m, 6–10.vi.2013, E. Yamamoto; 1 male, same, 16–20.vi.2020, E. Yamamoto; 4 males, Oda-cho, Uchiko-cho, 8.v.1992, E. Yamamoto (KPM); 4 males, Odamiyama, Uchiko-cho, 4.v.1986, E. Yamamoto (KPM); 2 males, same locality, 28.iv.1990, E. Yamamoto (KPM); 2 males, same locality, 20.v.1991, E. Yamamoto (KPM); 1 male, same locality, 13.v.2002, E. Yamamoto (KPM); 32 males, 6 females, Namakusa-dani, Odamiyama, Uchiko-cho, 23.v.2020, E. Yamamoto; 12 males, 7 females, Hondani, Odamiyama, Uchiko-cho, 17.v.2020, E. Yamamoto; 13 males, 3 females, Koya-yama, Odamiyama, Uchiko-cho, 21.v.2020, E. Yamamoto; 5 males, 3 females, Honomata, Odamiyama, Uchiko-cho, alt. 925 m, 1–20.v.2018, E. Yamamoto. **Kochi:** 1 male, Nishikuma-rindo, Monobe-cho, Kami-shi, 20.vi.1999, T. Befu (KPM); 3 males, 1 female, same, 12.v.2001, M. Takai; 1 female, same, 5.v.2004, M. Takai; 1 male, Shiraga-toge, Monobe-cho, Kami-shi, 3.vii.2004, T. Takai; 1 male, Befu-kyo, Monobe-cho, Kami-shi, 5.v.2002, M. Takai; 1 female, Tengu-ike, Tsuno-cho, 11.v.2002, M. Takai; 1 male, 1 female, Funato, Tsuno-cho, alt. 910 m, 24.v.2011, T. Hattori (SPMN); 6 males, 2 females, Nano-gawa, Terakawa, Ino-cho, 25.v.1999, A. Ohkawa & T. Ito; 1 male, Mt. Iyofuji, Nakanoka, Ino-cho, alt. 1540 m, 9.vi.2011, T. Nozaki & K. Nio; 1 male, Kuroson, Nishitosa, Shimanto-shi, 30.iv.2005, M. Takai.

Etymology. The specific epithet refers to a major island in Japan, named Shikoku, where this species is widely distributed.

Distribution. Shikoku.

Biology. Many adults of this species, including a mating pair, were found resting on leaves of vegetation along spring seeps or small flows at the type locality in the daytime on 20 May 2020 (Figs 7A, 7B), and were easily collected with an insect net (Yamamoto personal communication on 13 July 2024).

Japanese name. Shikoku-kimadara-shima-tobikera

Homoplectra bicornis sp. nov.

(Fig. 8, 13)

Diagnosis. The male of this species is easily distinguishable from those of other congeneric Japanese species by the pair of posterodorsal horn-like lobes of the segment IX (Fig. 8B). The female is also easily distinguishable from those of known Japanese species by the bottle-like sclerotization of the ventral side of segment X (Fig. 8H).

Description

Adult. General morphology and coloration similar to those of *Homoplectra japonica*, yellow markings on female wings often indistinct. Forewings each 6.0–9.0 mm long in male (n = 10), 7.5–10.0 mm long in female (n = 3), 7.2 mm in male holotype.

Male genitalia (8A–8E). Ventrolateral sides of synsclerotized segment IX with triangular anterior projection in lateral aspect (Fig. 8A); posteroventral lobe triangular and tiny or lacking (Fig. 8C); dorsal part of segment IX rectangular in dorsal aspect (Fig. 8B), with pair of straight, horn-like lobes posterolaterally; broadly fused with segment X laterally (Fig. 8A). Segment X tapering to acute apex in dorsal aspect (Fig. 8B), bilobed posteriorly; pair of posterolateral setose areas protruding posteriorly (Fig. 8A); pair of posterior processes of segment X (p.p.X) long, spine-like, directed posterodorsad, each fused with lateral strip of genital chamber (l.s.) near posteroventral corner of segment X (Fig. 8A). Genital chamber with pair of sclerotized lateral strips curved dorsad near posteroventral corner of segment X (Fig. 8A); pair of inner processes (i.p.) long, spine-like, each arising from near anterior part of

lateral strip, slightly curved ventrad, approximately as long as posterior processes of segment X (Fig. 8A). Inferior appendages each without distal segment, slightly clavate in lateral aspect (Fig. 8A), extending slightly beyond apex of segment X; each weakly convex subapicomeresally, with 5–10 spine-like setae (Figs 8A inset, 8B, 8C). Phallic apparatus arcuate in lateral aspect (Fig. 8D); dorsal process of phallosome long and narrowly triangular in dorsal aspect (Fig. 8E); pair of lateral processes of phallosome 1/5 as long as dorsal process, usually acute apically (Fig. 8D) but rarely blunt; pair of ventral processes longer than dorsal process, each with apical half weakly sinuated in dorsal aspect (Fig. 8E). Aedeagal stem half-pipe-like, moderately curved ventrad; head about 1/7 as long as stem (Figs 8D, 8E).

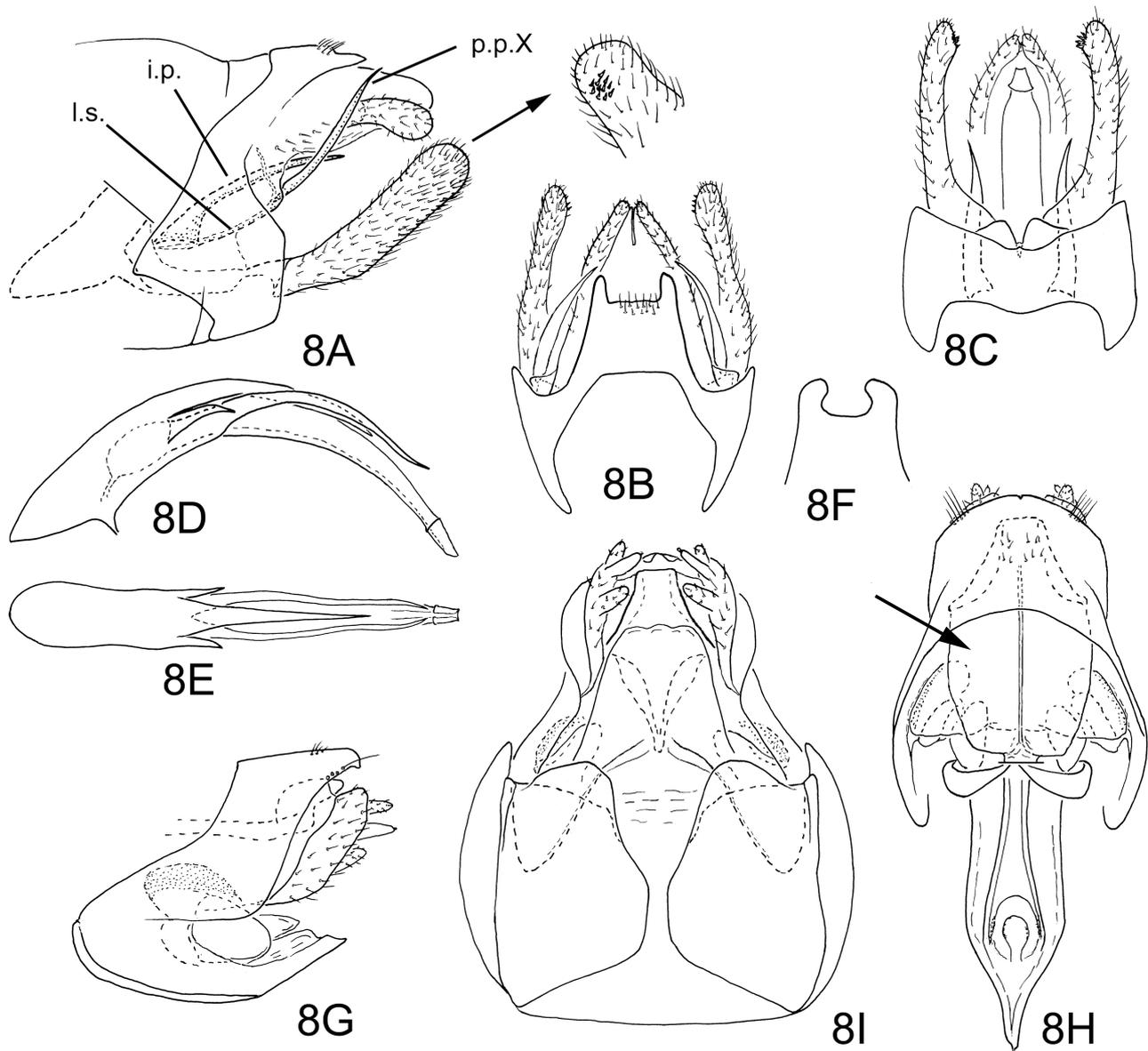


FIGURE 8. Adults of *Homoplectra bicornis* sp. nov. 8A–8E, male genitalia, type locality (Shizuoka-shi, Shizuoka): 8A, left lateral, apicomeresal part of inferior appendage enlarged; 8B, dorsal; 8C, ventral; 8D, phallic apparatus, left lateral; 8E, same, dorsal. 8F, posterodorsal part of male segment IX, variation (Minami-alps-shi, Yamanashi), dorsal. 8G–8I, female genitalia, type locality: 8G, left lateral, 8H, dorsal; 8I, ventral. Arrow in Fig. 8H see text.

Geographic variation of male genitalia (Fig. 8F). In males collected from Yamanashi Prefecture, each horn-like posterolateral lobe of segment IX in dorsal aspect is apically round and directed mesad (Fig. 8F).

Female genitalia (Fig. 8G–8H). Lateral lobes of sternum VIII cleft from base (Fig. 8I). Segment IX obliquely rectangular in lateral aspect (Fig. 8G), subpentagonal posteriorly in dorsal aspect (Fig. 8H), tergum widely sclerotized

ventrally; each mesal lobe sclerotized, bean-shaped in lateral aspect (Fig. 8G), forming large crevice between it and segment IX; with pair of sclerotized ribs on vulvar scale basolaterally in ventral aspect (Fig. 8I), weakly ridged near anteromesal margins. Vulvar scale large, membranous apically (Fig. 8I). Segment X setose, subrectangular, longitudinally short in lateral aspect (Fig. 8G); ventral side sclerotized, with shape of large bottle in dorsal aspect (marked with an arrow in Fig. 8H). Vaginal apparatus slender pentagonal in dorsal aspect (Fig. 8H), with pair of falcate sclerites posterodorsally, with pair of dorsal longitudinal ridges, and with dark arch mark between ridges anterodorsally, mostly surrounding opening of duct of spermatheca (Fig. 8H).

Immature stages. Unknown.

Holotype. Male (pinned): Nyujima, Aoi-ku, Shizuoka-shi, Shizuoka, 35.2270°N, 138.3456°E, alt. 400 m, 5.v.2006, T. Nozaki (KPM-NK 91358).

Paratypes. 1 male (pinned), same data as holotype (KPM-NK 91359); 8 males, 1 female (in alcohol), same locality as holotype, 11.v.1997, T. Hattori (KPM-NK TN00640, KPM-NKTN00650); 6 males, 1 female (pinned), same locality as holotype, 3.v.2002, T. Hattori (SPMN-IS-59804–59810).

Other specimens examined. JAPAN: HONSHU: Yamanashi: 4 males, Heisei-kyo, Takao, Minami-alps-shi, alt. 1200–1400 m, 6.vii.1997, T. Hattori (SPMN); 1 female, Oyana-gawa, Fujikawa-cho, 9.vi.1996, T. Hattori (SPMN). **Shizuoka:** 8 males, 1 female, same locality as holotype, 5.v.1997, T. Hattori (SPMN); 1 male, same locality as holotype, 5.v.1995, T. Hattori (SPMN); 7 males, 1 female, same locality as holotype, 11.v.1997, T. Hattori; 1 male, same locality as holotype, 9.v.2006, T. Torii (TT); 2 males, 1 female, Utogi, alt. ca. 700 m, Aoi-ku, Shizuoka-shi (SPMN); 1 male, Kamikouchi-zawa, alt. 1000 m, Aoi-ku, Shizuoka-shi, 6.v.1990, T. Hattori (SPMN); 1 male, same locality, 20.vi.1990, T. Hattori (SPMN); 1 male, same locality, 9.vi.1991, T. Hattori (SPMN); 7 males, 1 female, Hatanagi, Aoi-ku, Shizuoka-shi, 18.vi.1989, T. Hattori (SPMN); 2 males, 3 females, same locality, 20.vi.1990, T. Hattori (SPMN); 1 male, 2 females, Mitsumine, Yokosawa, Aoi-ku, Shizuoka-shi, 27.v.2004, T. Hattori (SPMN); 1 male, Nigori-gawa, alt. 650 m; Umegashima, Aoi-ku, Shizuoka-shi, T. Hattori (SPMN); 1 male, Nishi-hikage-sawa, Umegashima, Aoi-ku, Shizuoka, 16.vii.1995, T. Hattori (SPMN); 1 male, 2 females, Ushikubi-toge, alt. 1500 m, Umegashima, Aoi-ku, Shizuoka-shi, 25.vii. 1998, T. Hattori (SPMN); 2 females, Abe-toge, Umegashima, Aoi-ku, Shizuoka-shi, 16.vii.1995, T. Hattori (SPMN).

Etymology. The species epithet (Latin adjective, two-horned) refers to the pair of horn-like posterolateral projections of the male segment IX in dorsal aspect.

Distribution. Central Honshu.

Biology. The holotype and a paratype male of this species were flying in the day time around a small waterfall at the type locality.

Japanese name. Tsuno-kimadara-shima-tobikera.

***Homoplectra kimi* sp. nov.**

(Figs 9, 13)

Arctopsyche sp. AB: Kim 1974, pp 70–71, pupa, male and female genitalia.

Diplectrona sp. (af. *japonica*): Morita 1995, p. 96.

Diplectroninae Gen. sp.: Morita 2008, pp 91–93.

Diagnosis. The male of this species is easily distinguishable from those of other congeneric Japanese species by the shape of the phallic apparatus: A pair of long ventral processes of the phallosome are bent sharply in the middle, and each apical sinuated part is easily visible from the ventral or caudal sides (Figs 9C, 9E). The female of this species is distinguishable from those of known Japanese species by the shape of the vaginal apparatus: A pair of dorsal ridges are broad anteriorly in dorsal and lateral aspects (Fig. 9G).

Description

Adult. General appearance similar to that of *H. japonica*, but setae on dorsal warts of head and prothorax mostly brown; face of head, coxae and femora of all legs dark brown in both male and female. Forewings each 7.0–8.8 mm long in male (n = 10), 8.2–10.0 mm long in female (n = 10), 7.5 mm in male holotype.

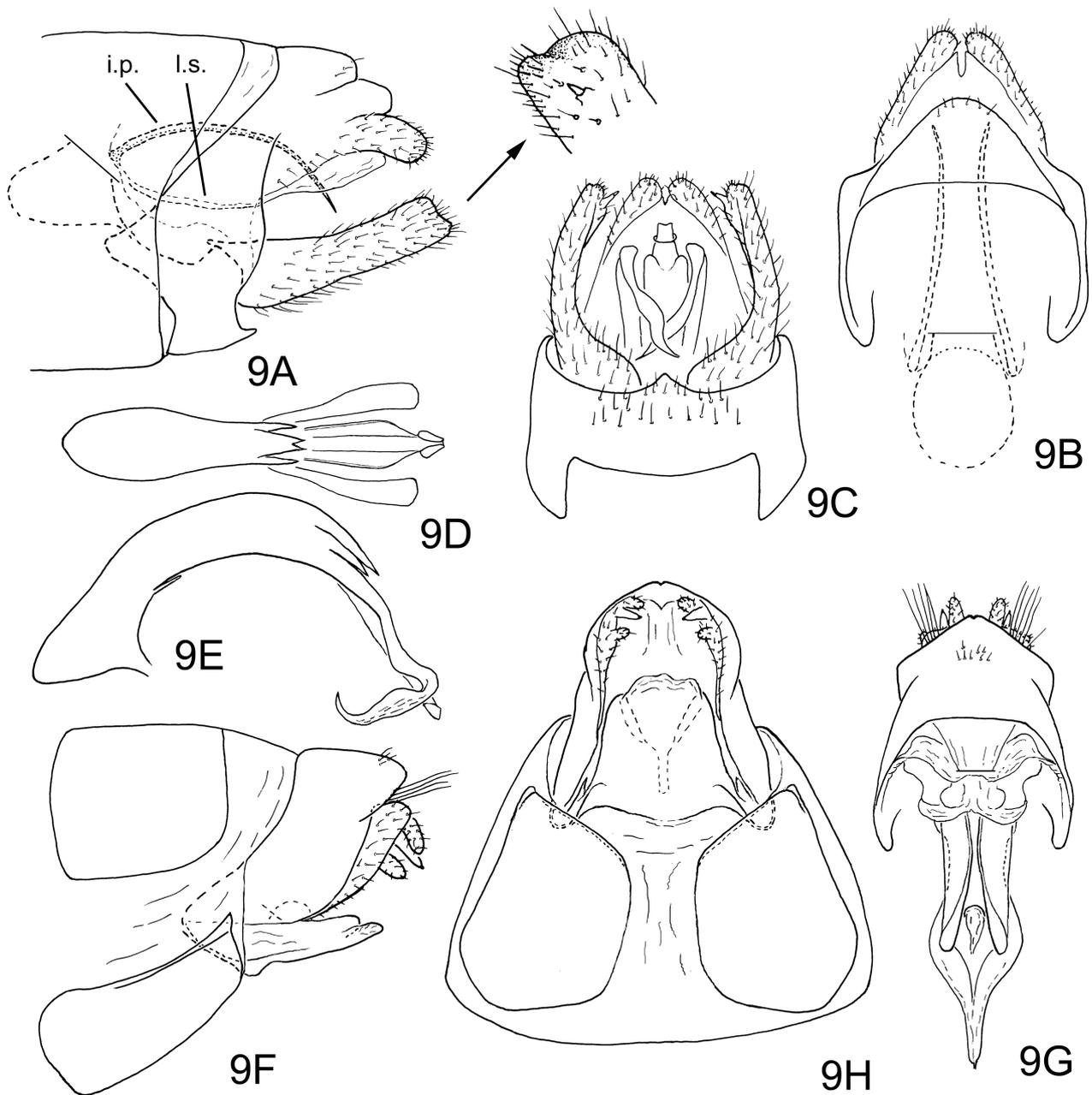


FIGURE 9. Adults of *Homoplectra kimi* sp. nov. 9A–9E, male genitalia, type locality (Minamiise-cho, Mie): 9A, left lateral, apicomeres enlarged; 9B, dorsal, 9C, ventral; 9D, phallic apparatus, left lateral; 9E, same, posterodorsal. 9F–9H, female genitalia, type locality: 9F, left lateral, 9G, dorsal, 9H, ventral.

Male genitalia (Figs 9A–9E). Ventrolateral sides of synsclerotized segment IX triangular anteriorly in lateral aspect (Fig. 9A); posteroventral lobe broadly triangular in ventral aspect (Fig. 9C); dorsal part of segment IX broadly subtriangular to semicircular in dorsal aspect (Fig. 9B), broadly fused with segment X laterally (Fig. 9A). Segment X bilobed posteriorly in dorsal aspect (Fig. 9B), each posterolateral setose area protruding posterad (Figs 9A, 9B), each ventrolateral margin weakly sclerotized, posterior processes lacking (Fig. 9A). Genital chamber with pair of long inner processes, evenly curved downward, each with acute apex (Fig. 9A); pair of lateral strips (l.s.) weakly sclerotized (Fig. 9A). Inferior appendages each without distal segment, long-rectangular in lateral aspect, truncate apically, extending slightly beyond apex of segment X (Fig. 9A); each bearing small process subapicomeresally, with one or two spine-like setae (Figs 9A inset, 9C). Phallosome arcuate, dorsal process short, bifurcated apically (Fig. 9D); pair of lateral processes slightly shorter than dorsal process, each with acute apex (Figs 9D, 9E); pair of ventral

processes long, bent sharply in middle, like head and neck of flamingo in lateral aspect; ventral spine short (Fig. 9E). Aedeagus curved slightly ventrad, stem half-pipe-like, head very short, less than 1/10 as long as stem (Figs 9D, 9E).

Female genitalia (Figs 9F–9H) Lateral lobes of sternum VIII cleft from base, widely separated from each other in ventral aspect (Fig. 9H). Segment IX obliquely rectangular in lateral aspect (Fig. 9F), broadly pentagonal in dorsal aspect (Fig. 9G); pair of mesal lobes small, semimembranous. Vulvar scale large, trapezoidal in ventral aspect (Fig. 9H), membranous apically, weakly ridged basolaterally by sclerotized ribs of segment IX. Vaginal apparatus in dorsal aspect (Fig. 9G) bulb-shaped anteriorly, rectangular posteriorly, with posterodorsal part mostly semi-membranous, complicated, and with pair of dorsal ridges broad anteriorly in dorsal (Fig. 9G) and lateral aspects.

Larva. Unknown.

Pupa. General morphology very similar to that of *H. albomarginata*. Body length 7.0–8.0 mm (n = 3).

Holotype. Male (in alcohol): Iseji, Minamiise-cho, Mie, 34.3861°N, 136.6611°E, alt. 340 m, 28.iv–7.v.2008, H. Morita, Malaise trap (KPM-NK TN00660).

Paratypes. 17 males, 12 females, same data as holotype (KPM-NK TN00670, KPM-NKTN00680).

Other specimens examined. JAPAN: HONSHU: Mie: 8 males, 4 females, same locality as holotype, 7–14.v.2008, H. Morita; 1 male, 3 pupae, same locality, 18.iv.2009, T. Torii (TT); 2 males, Yamato-dani, Odai-cho, 3.v.1994, H. Morita (KT).

Etymology. This species is named in honor of a Korean scientist, the late Mr Jae Won Kim, who described the male and female genitalia of this species for the first time. He was a pioneer in the taxonomic study of Korean caddisflies.

Distribution. Central Honshu.

Biology. Many adults of this species were collected in May using a Malaise trap from a small mountain flow at the type locality (Morita 2008).

Japanese name. Kim-kimadara-shima-tobikera.

Remarks. Kim (1974) described a pupa as “*Arctopsyche* sp. AB” from Nara, central Honshu, Japan, and also provided fine illustrations of male genitalia in the pupal skin. His description and illustrations agree well with those of *H. kimi* described here.

***Homoplectra inazui* sp. nov.**

(Figs 10, 13)

Diplectrona japonica nec Banks 1906: Inazu and Nishida 2011, p. 191 (in part); Inazu 2012, p. 8; Inazu 2013, p. 72.

Misidentifications.

Diagnosis. This species is similar to *H. albomarginata* in having a long scape of each antenna, but both male and female are distinguishable from those of the latter by the character states given in the diagnosis of *H. albomarginata*.

Description

Adult. General morphology and coloration similar to those of *H. albomarginata* including having long scape on each antenna, each scape 3–4 times as long as its pedicel, approximately same length as basal segment of flagellum, with long setae dorsally. Forewings each 9.0–9.8 mm long in male (n = 10), 10.0–12.0 mm long in female (n = 10), 9.3 mm in male holotype.

Male genitalia (Figs 10A–10F). Ventrolateral sides of synsclerotized segment IX triangular anteriorly in lateral aspect (Fig. 10A); posteroventral lobe almost square with median apical concavity and acute apicolateral corners in ventral aspect (Fig. 10C); dorsal part of segment IX trapezoidal in dorsal aspect (Fig. 10B); fused with segment X laterally (Figs 10A). Segment X very wide in dorsal aspect, with pair of fin-like dorsolateral projections, pair of posterolateral setose areas protruding posterad (Figs 10A, 10B); pair of posterior processes lacking. Genital chamber with or without pair of short slender inner processes (Fig. 10A), processes rarely long (Fig. 10F); pair of lateral strips weakly sclerotized (Fig. 10A). Inferior appendages without distal segment, long, finger-like and very slightly

upturned in lateral aspect (Fig. 10A), extending beyond apex of segment X, each with apex round, with many short spine-like setae subapicomeseally (Figs 10A inset, 10C). Phallosome strongly bent posteroventrad, with long dorsal process acute apically (Figs 10D, 10E); pair of ventral processes 2/3 to 3/4 length as dorsal process, acute apically, slightly thicker subapically (Figs 10D, 10E). Aedeagus evenly curved ventrad, but apex curved dorsad (Fig. 10D); head short, less than 1/10 as long as stem; stem half-pipe-like, with broad lateral flanges (Figs 10D, 10E).

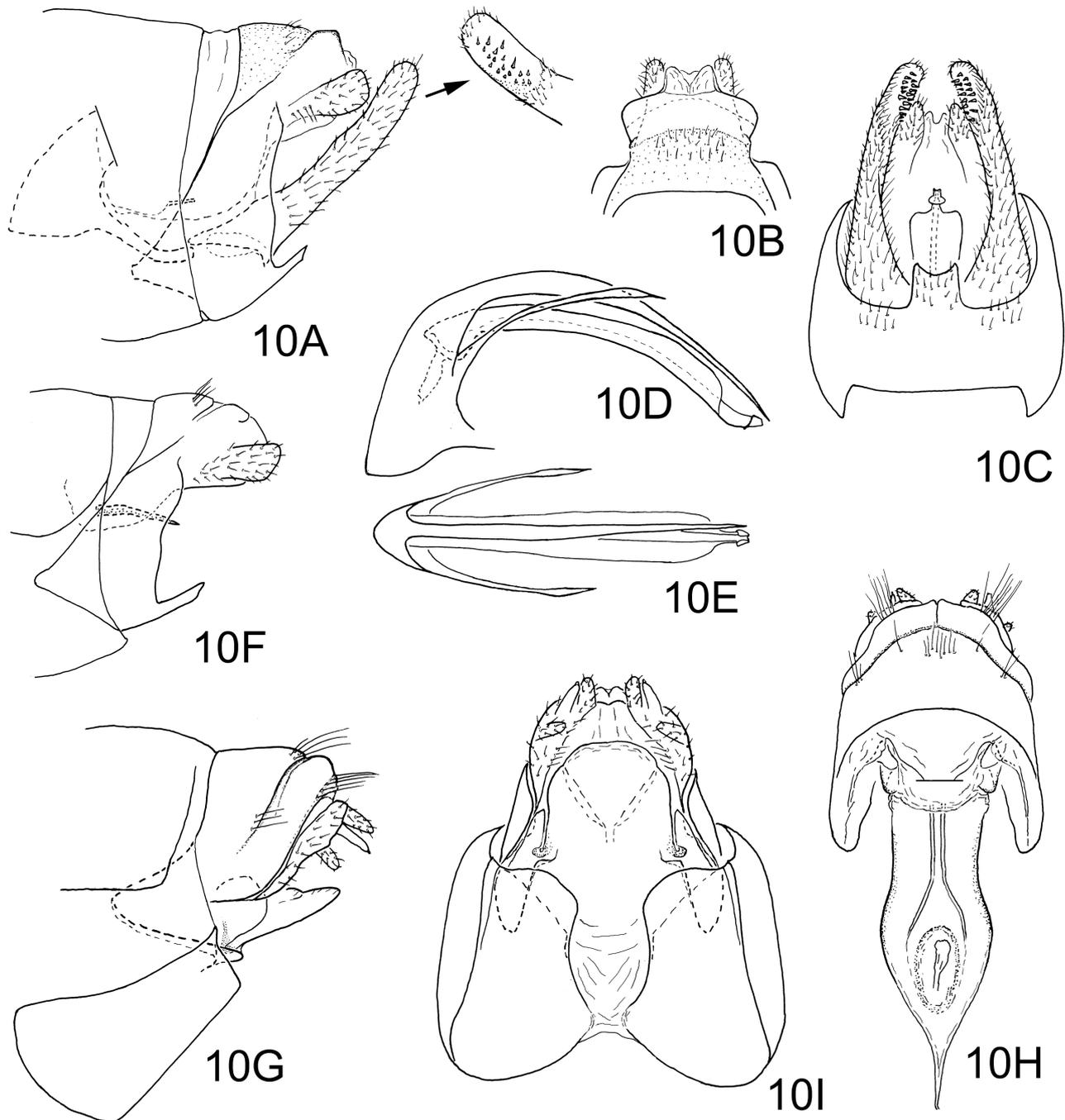
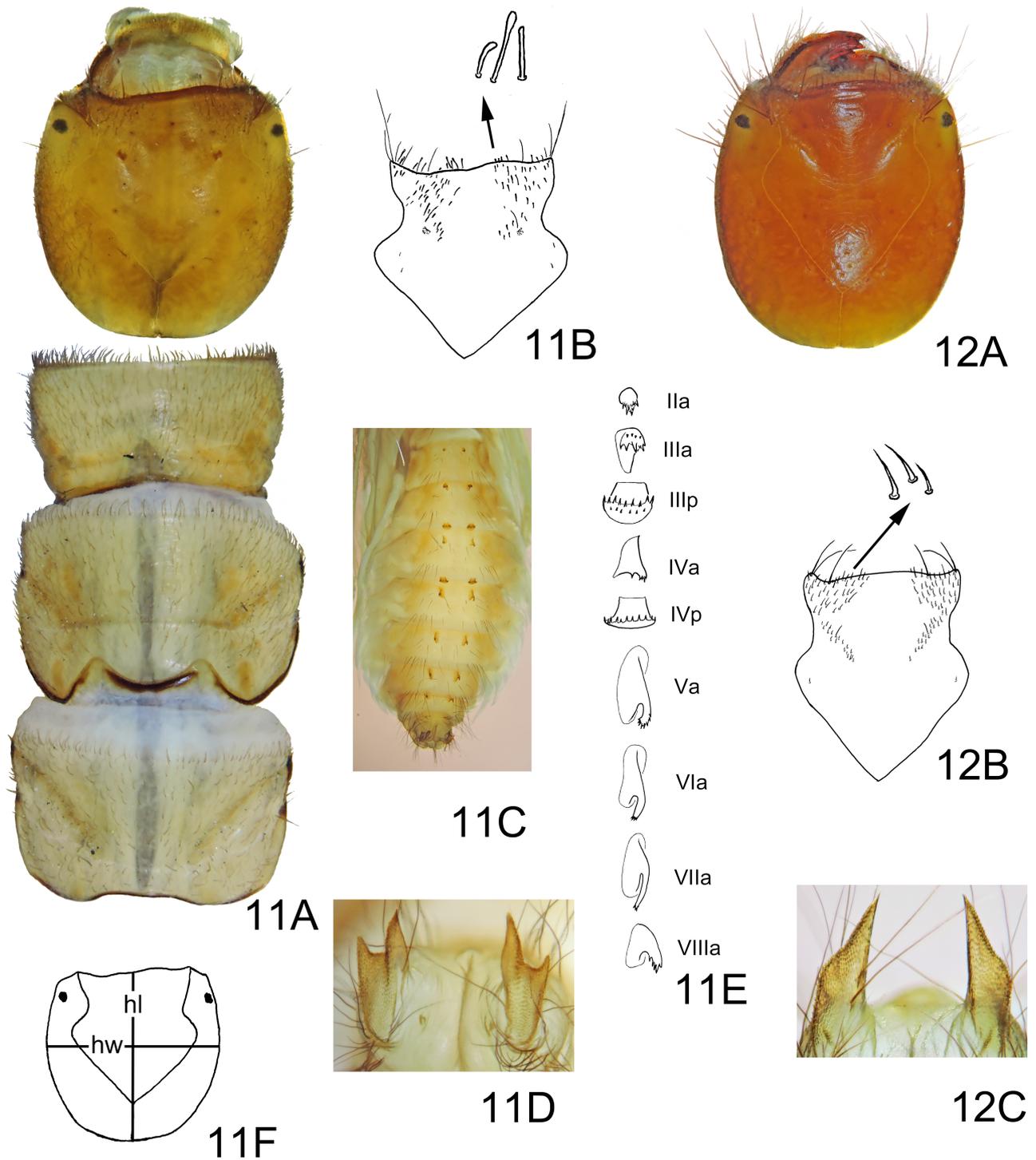


FIGURE 10. Adults of *Homoplectra inazui* sp. nov. 10A–10E, male genitalia, type locality (Yabu-shi, Hyogo): 10A, left lateral, apicomeseal part of inferior appendage enlarged; 10B, dorsal; 10C, ventral; 10D, phallic apparatus, left lateral; 10E, same, dorsal. 10F, male genitalia, variation (Hidaka-cho, Hyogo), lateral. 10G–10I, female genitalia, type locality: 10G, lateral, 10H, dorsal; 10I, ventral.



FIGURES 11–12. Larva and pupa of *Homoplectra* spp. 11A–11E, *Homoplectra japonica* (Banks 1906): 11A, larva, head, pro-, meso-, and metanota, dorsal (Mt. Hiko, Fukuoka); 11B, larva, frontoclypeal apotome, dorsal, secondary setae enlarged (same); 11C, pupa, body, dorsal (same); 11D, pupa, right hook plates, dorsal (same); 11E, pupa, anal processes, ventral (same); 11F, larval head of the dorsal aspect showing measurement points of length and width. **12A–12C, *Homoplectra albomarginata* (Ulmer 1907):** 12A, larva, head, dorsal (Ibigawa-cho, Gifu); 12B, larva, frontoclypeal apotome, dorsal, secondary setae enlarged (same); 12C, pupa, anal processes, ventral (same). Abbreviations: a = anterior, hl = head length, hw = head width, p = posterior, II–VIII = abdominal segments II–VIII.

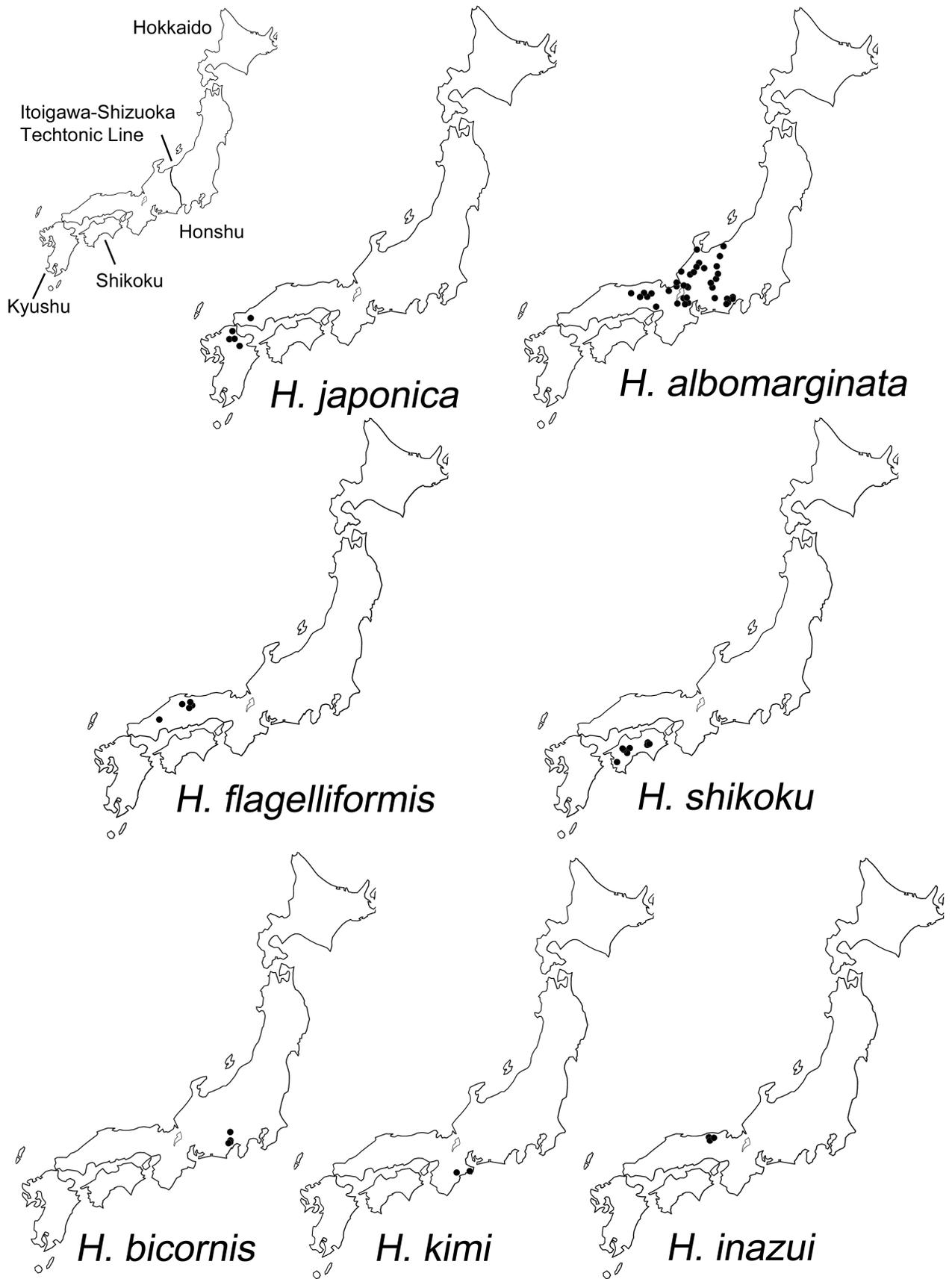


FIGURE 13. Distributions of species of the *Homoplectra japonica* Species Group in Japan.

Female genitalia (Figs 10G–10I). Lateral lobes of segment VIII widely separated from each other in ventral aspect (Fig. 10I), their mesal margins weakly concave. Segment IX quadrate in lateral aspect (Fig. 10G), pentagonal in dorsal aspect (Fig. 10H), with transverse sulcus dorsally on posterior 1/3–1/4; pair of sclerotized ribs forming angular ridges on vulvar scale basolaterally in ventral aspect (Fig. 10I); mesal lobe weakly sclerotized, semicircular in lateral aspect (Fig. 10G). Vulvar scale large, tongue-like, membranous posteriorly; with pair of deep holes basolaterally in ventral aspect. Vaginal apparatus bulb-shaped anteriorly in dorsal aspect (Fig. 10H), rectangular posteriorly; posterodorsal part mostly semi-membranous; longitudinal dorsal ridges divergent anteriorly, opening of duct of spermatheca completely surrounded by dark oval mark in dorsal aspect.

Immature stages. Unknown.

Holotype. Male (in alcohol): Uwano, Yado, Muraoka-ku, Kami-cho, Hyogo, 35.4315°N, 134.5819°E, alt. 600 m, 14.v.2006, K. Inazu (KPM-NK TN00690)

Paratypes. 3 males, 2 females, same locality as holotype, 5.v.2004, K. Inazu (KPM-NK TN00700, KPM-NK TN00710); 3 males, Soryuno-taki, Itashino, Muraoka-ku, Kami-cho, alt. 600m, 28.v.2005, K. Inazu (KPM-NK TN00720); 1 male, Torokawa-daki, Itashino, Muraoka-ku, Kami-cho, 28.v.2005, alt. 900 m, K. Inazu (KPM-NK TN00730).

Other specimens examined. JAPAN: HONSHU: Hyogo: 1 female, Hattanno-taki, Niiya, Ojiro-ku, Kami-cho, alt. 750 m, 4.vi.2006, K. Inazu; 1 male, Myoken-zan, Ishihara, Yoka-cho, Yabu-shi, alt. 700 m, 9.v.2004, K. Inazu (KI); 1 male, Betsugu, Sekinomiya, Yabu-shi, alt. 700 m. 3.v.2007, K. Inazu (KI); 1 male, same locality, 5.v.2010, K. Inazu (KI); 1 female, Hachibuse-kogen, Sekimiya-cho, Yabu-shi, 18.v.2009, K. Inazu; 1 male, 2 females, Takenocho-mihara, Toyooka-shi, alt. 420 m, 11.v.2007, K. Inazu (KI); 1 female, same locality, 1.vi.2007, K. Inazu (KI); 1 male, same locality, 14.v.2013, K. Inazu (KI); 1 female, Mihara-oku, Takeno-cho, Toyooka-shi, 29.v.2009, K. Inazu; 1 male, 1 female, Inab, Hidakacho, Toyooka-shi, alt. 600 m, 29.iv.2003, K. Inazu; 1 male, same locality, 25.iv.2004, K. Inazu (KI); 1 male, Sugawara, Shinonsen-cho, alt. 500 m, 30.v.2004, K. Inazu (KI); 1 male, 3 females, Koke-daki, Sugawara, Shinonsen-cho, alt. 800 m, 8.vi.2003, K. Inazu; 3 males, 1 female, same locality, 30.v.2004, K. Inazu (KI).

Etymology. This species is dedicated to Mr Kazuyuki Inazu, who provided me with many valuable specimens including this species.

Distribution. Central Honshu.

Biology. Type series specimens of this species were collected near small streams or falls in mountainous areas (Inazu 2013).

Japanese name. Inazu-kimadara-shima-tobikera.

Discussion

Homoplectra japonica (as *Diplectrona japonica*) was recorded as a well-known caddisfly in Japan, and figures or photographs of adults bearing beautiful yellow and black markings on their wings have appeared in many illustrated books (e.g., Matsumura 1931; Kuwayama 1932; Esaki *et al.* 1938; Kuwada 1965). However, this study has found that *H. japonica* occurs only in westernmost Honshu and northern Kyushu; whereas *H. albomarginata* and five new species have similar color markings on their wings and are found from central to western Honshu or Shikoku (Fig. 13). Adults of all seven species have the medial cell (MC) closed by a medial crossvein on each hind wing (Fig. 1B), but other known *Homoplectra* species have the hind wing medial cell open (Weaver 1985; Nozaki 2019). The male phallic apparatus of these species is also unique among known species in this genus, having a relatively simple aedeagus lacking spines or processes (e.g., Figs 3D, 3E). Thus, I propose the first species group in this genus, the *H. japonica* Species Group. Unnamed ‘species’ treated collectively as the Diplectroninae Gen. *japonica* Complex (Nozaki *et al.* 2014; Nozaki 2016; Nojima 2017; Yamamoto *et al.* 2021), *Diplectrona japonica* Species Complex (Watanabe 2021), and *Homoplectra japonica* Species Complex (Higuchi 2024) belong to this species group.

Adults of this species group are active during the daytime (e.g., Esaki *et al.* 1938; Kuwada 1965: as *D. japonica*). Watanabe (2021) reported the diurnal mating behavior of *H. arbomarginata* (as a species of the *Diplectrona japonica* Species Complex).

The known distribution area of this species group is Kyushu, Shikoku, and the western to central parts of Honshu (Fig. 13), although other *Homoplectra* species are known widely in the Japanese islands (Ito and Nozaki 2018; Nozaki

2019). The northeast boundary corresponds to the Itoigawa-Shizuoka Tectonic Line, which geologically separates northeastern and southwestern Japan. Thus, the *H. japonica* Species Group could have arisen in southwestern Japan, but further study with molecular data is needed to understand the phylogeny of this species group.

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