

RESEARCH PAPER

Revision of the plant bug genus *Diognetus*, with descriptions of thirteen new species from the Oriental and Eastern Palearctic Regions (Hemiptera: Heteroptera: Miridae)

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Abstract. The mirine plant bug genus *Diognetus* Distant, 1904 (Hemiptera: Heteroptera: Miridae: Mirinae: Mirini) is revised. Eighteen Oriental and Eastern Palearctic species are properly assigned to the genus. *Diplotrichiella* Poppius, 1915, syn. nov. and *Yamatolygus* Yasunaga, 1994, syn. nov. are synonymized with *Diognetus*; accordingly the following two new combinations, one substitute name and one new synonymy are proposed: *Diognetus flavigenis* (Horváth, 1905) comb. nov. and *D. insulanus* (Yasunaga, 1994) comb. nov. (transferred from *Yamatolygus*); *D. yamato* Yasunaga nom. nov. for *Yamatolygus pilosus* Yasunaga, 1994, junior secondary homonym of *D. pilosus* (Poppius, 1914); and *Diplotrichiella rufescens* Poppius, 1914, syn. nov. = *Diognetus intonsus* Distant, 1904 (valid name). Thirteen species are described as new: *Diognetus bagmaticus* sp. nov. (from Nepal), *D. cheimon* sp. nov. (Japan), *D. dhampus* sp. nov. (Nepal), *D. duwalorum* sp. nov. (Nepal), *D. giganteus* sp. nov. (Malaysia), *D. gotohi* sp. nov. (Malaysia), *D. laureus* sp. nov. (Japan), *D. magnificus* sp. nov. (Indonesia), *D. minusculus* sp. nov. (Malaysia), *D. puspae* sp. nov. (Nepal), *D. schuhorum* sp. nov. (Indonesia), *D. styrax* sp. nov. (Taiwan) and *D. vernus* sp. nov. (Japan). The generic characters are reassessed and discussed, on the basis of detailed observation of external structures using scanning electron microscopy as well as male and female genitalia.

Key words. Hemiptera, Heteroptera, Miridae, *Diognetus*, classification, new species, SEM documentation, East Palearctic Region, Oriental Region

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Introduction

The present work represents a part of our continuing effort to unequivocally reclassify the Asian plant bug taxa placed in the inadequately defined genus *Lygus* Hahn, 1833 *sensu lato* (cf. POPPIUS 1914, CARVALHO 1956, SCHWARTZ & FOOTITT 1998), subsequent to SCHWARTZ & KERZHNER (1997), LU & ZHENG (1998), YASUNAGA et al. (2002), SCHWARTZ & CHÉROT (2005), YASUNAGA et al. (2018) and NAMYATOVA et al. (2021). In this paper, we provide a comprehensive revision of the genus *Diognetus* Distant, 1904, which is now recognized to be distributed over the Oriental, Eastern Palearctic and Australian Regions.

Diognetus was established by DISTANT (1904) to accommodate a single species, *D. intonsus* Distant, 1904, based on a female specimen from Sri Lanka. DISTANT (1909) also described *Diophantus* (type species: *D. literatus* Distant, 1909 from Sri Lanka) which was synonymized with *Diognetus* by CARVALHO (1952) in his world catalog of genera of Miridae without stating a rationale. Later, the following genera, now confirmed to be congeneric with *Diognetus*, were proposed: *Diplotrichiella* Poppius, 1915 for *D. rufescens* Poppius, 1914 from India and *Yamatolygus* Yasunaga, 1994 for three Japanese species. Until CHÉROT et al. (2017) provided a detailed generic redescription based on specimens from Papua New Guinea and the Philippines



and synonymized *Gorna* Poppius, 1914 (type species: *G. pilosa* Poppius, 1914, Java) with *Diognetus*, this little known taxon had been ignored for more than a century.

In this paper, we suggest the definitive generic characters for *Diognetus* and argue its systematic position in the plant bug tribe Mirini, posited to be most closely related to a group composed of *Argenis* Distant, 1904 and *Tingnotum* Kirkaldy, 1902. *Diptorichiella* Poppius and *Yamatolygus* Yasunaga are synonymized with *Diognetus*. As a result, at least eighteen members of *Diognetus* are revealed to be adaptively radiated and spread over the Oriental Region north to the Japan archipelago and Korean Peninsula. Thirteen new species are described on the basis of specimens collected from Indonesia, Japan, Korea, Malaysia, Nepal, Philippines and Taiwan. Two known species placed in two synonymized genera are transferred to *Diognetus*, and a new substitute name, *D. yamato* Yasunaga nom. nov., is proposed for *Yamatolygus pilosus* Yasunaga, junior secondary homonym of *D. pilosus* (Poppius). *Diptorichiella rufescens* Poppius is synonymized with *Diognetus intonsus* Distant. Biological information is also provided for nine congeners, including recent observation on three Japanese species reared from immature to adult stages.

Materials and methods

The depositories of material [or images] examined are abbreviated in the text as follows:

AMNH	American Museum of Natural History, New York, USA;
BMNH	Natural History Museum, London, UK;
BPBM	Bernice P. Bishop Museum, Honolulu, Hawaii, USA;
CNC	Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Ontario, Canada;
DOAT	Insect Collection, Entomology & Zoology Group, Plant Protection Research and Development Office, Department of Agriculture, Bangkok, Thailand;
EIHU	Entomological Collection, Hokkaido University, Sapporo, Japan;
HNHM	Hungarian Natural History Museum, Budapest, Hungary;
ISNB	Royal Belgian Institute of Natural Science, Brussels, Belgium;
MZHF	Zoological Museum, University of Helsinki, Helsinki, Finland;
NIAES	Division of Informatics and Inventory, Institute of Agro-Environmental Sciences (NARO), Tsukuba, Japan;
NMNS	National Museum of Natural Science, Taichung, Taiwan;
NMPC	National Museum, Praha, Czech Republic;
NMTU	Natural History Museum, Tribhuvan University, Kathmandu, Nepal;
NSMT	National Science Museum, Tsukuba, Ibaraki, Japan;
SNU	Laboratory of Insect Biosystematics, Department of Agricultural Biotechnology, Seoul National University, Korea;
TYCN	Tomohide Yasunaga Collection, Nagasaki, Japan;
UMUT	University Museum, The University of Tokyo, Japan;
USNM	US National Museum of Natural History, Smithsonian Institution, Washington DC;
WCF	Wesco Co. Collection, Fukuoka, Japan;
ZRC	Zoological Reference Collection, Lee Kong Chian Natural History Museum, National University of Singapore, Singapore.

Matrix code labels are attached to the type specimens and some additional representative specimens, which uniquely identify each specimen, and are referred to as ‘unique specimen identifiers’ (USIs). The USI codes [e.g., AMNH_PBI 0012345] comprise an institution and project code (AMNH_PBI) and a unique number (0012345). These data were digitized on the Arthropod Easy Capture

(formerly the Planetary Biodiversity Inventory) database maintained by the American Museum of Natural History, New York, USA (<http://research.amnh.org/pbi/>) and are also searchable on the ‘Heteroptera Species Pages’ (<http://research.amnh.org/pbi/heteropterasespeciespage/>). Scanning electron micrographs were taken with Hitachi Miniscope® TM3030.

All measurements are given in millimeters in the text; for most of SEM images, scale bars are shown in micrometer (µm). For genitalic SEM images, the following method was used. After observation under dissection microscope, the delicate, fragile organs were dipped and washed in 60% ethanol, placed on filter paper until dry, carefully attached to cards using water soluble wood glue, and finally placed in the TM3030 SEM vacuum-chamber for examination (without vapor deposition of metals).

The synonymic lists for known taxa provide selected references, as comprehensive catalogs are now available (AUKEMA et al. 2013; KERZHNER & JOSIFOV 1999; SCHUH 1995, 2002–2013). Terminology of the genitalia mainly follows YASUNAGA (1994), SCHWARTZ & FOOTITT (1998), YASUNAGA et al. (2002), YASUNAGA & SCHWARTZ (2007) and YASUNAGA et al. (2018). For known species, new distributional records (*) are indicated in the checklist. Some specific terms are used in this paper, to indicate the male genitalic structures (particularly lobes and sclerites on the endosoma). The following abbreviations are used in the text and figures – *Pygophore and parameres* (cf. Fig. 8): HP – hypophysis (solitary or paired apical spine(s) of parameres); LP – left paramere; RP – right paramere; SB – sensory lobe. *Endosoma and adjacent structures*: GP – secondary gonopore; LS – left lateral lobal sclerite; MS – median lobal sclerite; PT – phallosome; RS – right lateral lobal sclerite; SD – seminal duct; SP – spiculum; TP – triangular process (sometimes present on apex of RS). *Female genitalia* (cf. Fig. 9): DLP – dorsal labiate plate; DOS – dorsal structure; IRL – interramal lobe; IRS – interramal sclerite; SCR – sclerotized ring; VLP – ventral labiate plate.

The rearing method followed was principally by MRYAZAKI et al. (2020); a folded tissue paper immersed in about doubling-diluted fermented milk beverage (commercially available) was placed in a Petri dish as diet, together with the host plants (cut into short pieces). Using this method, immature forms were successfully reared and developed into adult stage.

Checklist of species of *Diognetus* Distant, 1904

New records are marked with an asterisk (*).

- D. bagmaticus* Yasunaga, Schwartz & Chérot **sp. nov.** – Nepal (Bagmati Zone, Rasuwa).
- D. cheimon* Yasunaga, Schwartz & Chérot **sp. nov.** – Japan (Honshu, Kyushu, Shikoku), Korea (Jeju Island).
- D. dhampus* Yasunaga, Schwartz & Chérot **sp. nov.** – Nepal (Kasuki).
- D. duvalorum* Yasunaga, Chérot & Schwartz **sp. nov.** – Nepal (Kathmandu).
- D. flavigenis* (Horváth, 1905) **comb. nov.** [= *Lygus flavigenis*] – Japan (Honshu).
- D. giganteus* Yasunaga, Schwartz & Chérot **sp. nov.** – Malaysia (Pahang).
- D. gotohi* Yasunaga, Schwartz & Chérot **sp. nov.** – Malaysia (Pahang).
- D. insulanus* (Yasunaga, 1994) **comb. nov.** [= *Yamatolygus insulanus*] – Japan (Nakadohri, Koshiki, Yakushima and Ryukyu Islands), Taiwan*.

Philippines* (Luzon).

- D. intonsus* Distant, 1904 [= *Diplotrichiella rufescens* Poppius, 1915 **syn. nov.**] – India (Chhattisgarh, Tamil Nadu), Sri Lanka, Thailand* (Chiang Mai).
- D. laureus* Yasunaga, Schwartz & Chérot **sp. nov.** – Japan (Kyushu, Shikoku).
- D. magnificus* Yasunaga, Schwartz & Chérot **sp. nov.** – Indonesia (N. Sumatra).
- D. minusculus* Yasunaga, Schwartz & Chérot **sp. nov.** – Malaysia (Perak), Indonesia (N. Sumatra).
- D. pilosus* (Poppius, 1914) – Indonesia (Java, Sumatra*), Malaysia* (Perak).
- D. puspae* Yasunaga, Schwartz & Chérot **sp. nov.** – Nepal (Kathmandu Valley).
- D. schuhorum* Yasunaga, Schwartz & Chérot **sp. nov.** – Indonesia (N. Sumatra).
- D. styrax* Yasunaga, Schwartz & Chérot **sp. nov.** – Taiwan (Nantou).
- D. vernus* Yasunaga, Schwartz & Chérot **sp. nov.** – Japan (Honshu, Kyushu, Shikoku, Nakadohri and Tsushima Is.), Korea (Jeju Island).
- D. yamato* Yasunaga **nom. nov.** [= *Yamatolygus pilosus* Yasunaga, 1994, junior secondary homonym of *Diognetus pilosus* (Poppius, 1914)] – Japan (Honshu, Kyushu, Shikoku), Korea.

Taxonomy

Genus *Diognetus* Distant, 1904

Diognetus Distant, 1904b: 431–432 (new genus). Type species by original designation: *Diognetus intonsus* Distant, 1904b from Sri Lanka; SCHUH (1995): 760 (catalog); SCHUH (2002–2013) (online catalog); CHÉROT et al. (2017): 93–94 (diagnosis).

Diophantus Distant, 1909: 510 (new genus). Type species by original designation: *Diophantus literatus* Distant, 1909 from Sri Lanka (synonymized by CARVALHO 1952: 87).

Gorna Poppius, 1914b: 130–131 (new genus). Type species by original designation: *Gorna pilosa* Poppius, 1914b from Java, Indonesia (synonymized by CHÉROT et al. 2017: 94).

Diplotrichiella Poppius, 1915a: 65–66 (new genus). Type species by original designation: *Diplotrichiella rufescens* Poppius, 1915a from Tamil Nadu, India. **New junior subjective synonym.**

Diplotrichiella: SCHUH (1995): 761 (catalog), SCHUH (2002–2013) (online catalog).

Yamatolygus Yasunaga, 1994: 119 (new genus, key to Japanese species). Type species by original designation: *Yamatolygus pilosus* Yasunaga, 1994 (= *Diognetus yamato* Yasunaga **nom. nov.**) [junior secondary homonym of *Diognetus pilosus* (Poppius, 1914)] from Honshu, Japan. **New junior subjective synonym.**

Yamatolygus: SCHUH (1995): 972 (catalog); KERZHNER & JOSIFOV (1999): 182 (catalog); YASUNAGA (2001): 280 (diagnosis); SCHUH (2002–2013) (online catalog); OH et al. (2018): 482 (faunal list), 484 (generic key); AUKEMA (2018) (online catalog).

Revised diagnosis. Body ovoid to elongate-oval, rather small to moderate-sized (3.8–6.8 mm in total length, 1.6–3.3 in maximum width), with two or three types of vestiture (brownish semierect setae, silvery or woolly reclining setae and/or fuscous upright setae); as in many other mirines, sexual dimorphism detectable in body shape (usually more elongate in ♂), vertex width (narrower in ♂) and length of antennomeres (sometimes shorter in ♀); basic coloration brown, dark brown, and/or reddish-brown; dorsum weakly shining, uniformly punctate on pronotum, scutellum and hemelytron; head short, vertical, with brown upright setae; eyes contiguous to pronotal collar; vertex clearly carinate basally, sometimes weakly depressed or sulcate mesally; antenna generally slender and almost linear, slightly shorter than body, with segment I more or

less constricted at middle; labium rather thick, variable in length (reaching mesocoxa to exceeding apex of metacoxa); pronotum rather inflated posteriorly, uniformly punctate except on calli, not carinate laterally, usually with both silvery reclining setae and brown semierect setae; pronotal collar grayish, matte, flattened dorsally, as thick as or slightly thicker than first antennal segment; punctures on propleuron sometimes reduced; scutellum weakly or moderately arched, densely pilose, sparsely or uniformly punctate, often transversely rugose; scent efferent system pale, large, about as thick as an eye in lateral view; hemelytron matte or weakly shining, distinctly punctate, with two or three types of vestiture; posterior margin of membrane vein nearly right-angled; femora and tibiae with pale brown, long, upright setae; tibial spines brown; each tarsomere I shorter than II or III; pretarsus with rhombic, developed parempodia and distinct pulvilli; male genital segment small, with pointed apex; sensory lobe of left paramere tumid, strongly produced dorsally; vesica (endosoma) small-sized, with three rod-like sclerites (namely, median lobal sclerite ‘MS’, right lobal-sclerite ‘RS’ and left lobal sclerite ‘LS’, cf. Figs 8D, F–G, J, M) but partly reduced, elongate, spinulate or branched in some species and tiny triangular process (TP) present at apex of RS; female bursa copulatrix with small, ovoid sclerotized rings that are separated from each other; posterior wall with rather narrow, subtriangular interramal lobe and small dorsal structure; and ovipositor (gonapophysis) I rather slender, with rounded or blunt apex. Further diagnostic characters were suggested by CHÉROT et al. (2017), POPPIUS (1915) as *Diplotrichiella* and YASUNAGA (1994) as *Yamatolygus*. The 3rd to final (5th) instar immature forms uniquely have the four transversely arranged dark or reddish spots on the dorsal anal ridge of abdominal tip (e.g., Figs 3F, 5D, 13I). Although this character has been confirmed for four species only, it may be a synapomorphy for the genus. Interestingly, the unique spots were found to remain in the newly emerging adults when the bodies are not fully chitinized (Figs 5H, M).

Biology. *Diognetus* members are basically arboreal, associated with various broadleaf trees (mostly found on the fruits, flower buds and inflorescences). The breeding host plants were confirmed (with associated immature forms) for the following congeners: *Diognetus cheimon* sp. nov. – *Eurya emarginata* (Thunb.) Makino and *E. japonica* Thunb. (Pentaphylacaceae); *D. styrax* sp. nov. – *Styrax formosanus* Matsum. (Styracaceae); *D. laureus* sp. nov. – *Machilus thunbergii* Sieb. et Zucc. (Lauraceae); *D. vernus* sp. nov. – *Castanopsis sieboldii* (Makino) Hatus (Fagaceae), *Eurya emarginata* and *E. japonica*; *D. yamato* – *Symplocos coreana* (H.Lév.) Ohwi and *S. sawafutagi* Nagam. (Symplocaceae). Third to fifth instar immature forms of three Japanese species, *D. cheimon* sp. nov. (Figs 5A–E), *D. laureus* sp. nov. (Figs 14F–I) and *D. vernus* sp. nov. (Figs 5I–K), were reared on (commercially available) fermented milk beverage (cf. Fig. 14G) and successfully developed into adults in laboratory tests (cf. MIYAZAKI et al. 2020).

The majority of congeners are assumed to be thermophi-

lic and have a bivoltine or multivoltine life cycle; species inhabiting deciduous forests in temperate climate zone (e.g., *D. flavigenis*, *D. yamato*) appear to be univoltine. The late instar immatures of two Japanese *Eurya*-feeding species, *D. cheimon* and *D. vernus*, were most frequently found in December, and the adults emerge until late January, possibly due to the host trees yielding fruits, or providing essential diet during the winter season.

Diognetus species are considered to be principally nocturnal, as UV lighting method has frequently yielded a number of specimens at night. In laboratory observations for *D. cheimon* and *D. vernus*, the reared adults became active and often took flight in the cages during midnight. A specimen (misidentified as *D. intonsus*) was collected by fogging *Neonauclea* sp. (Rubiaceae) in Papua New Guinea (CHÉROT et al. 2017). In and around tropical or subtropical forest zones, it is difficult to sample by sweepnetting or beating method and these mirids in all likelihood inhabit canopy.

Distribution. Australia†, India, Indonesia (Java, Sumatra†), Japan, Korea, Malaysia†, Nepal†, Papua New Guinea, Philippines†, Sri Lanka, Taiwan†, Thailand† (YASUNAGA 2001, CHÉROT et al. 2017, OH et al. 2008; † = confirmation by present study). Now known widely from the whole Oriental Region, Indo-Pacific across the Wallacea, and the eastern Palearctic Region; records from Australia and PNG are based on undetermined congeneric specimens (see discussion below).

Discussion. The genus *Diognetus* is characterized by the above diagnostic characters. Nonetheless, Poppius' original descriptions of *Gorna* (in 1914) and *Diplotrichiella* (in 1915) also conform to *Argenis* Distant, 1904 (e.g., CHÉROT 1997) (Figs 24A–B) and *Tingnotum* Kirkaldy, 1902 as well (e.g., CARVALHO 1987, EYLES 2000, YASUNAGA 1999) (Figs 24C–G). In addition, *Tingnotopsis* Poppius, 1915 (in spite of a medial hump-like protuberance on pronotum, cf. Fig. 37D) is also similar in overall appearance to *Diognetus*. These nominal genera share the following characters: Dorsal main vestiture (particularly on pronotum and scutellum) sometimes very long (Figs 24C, F), including at least two types of setae (cf. Fig. 23); vertex carinate basally, weakly or faintly with longitudinal mesal sulcation (cf. Figs 24C, 28D, 30C); eyes, particularly in male, enlarged (possibly for their nocturnal activities, as a number of specimens of *Argenis* and *Tingnotum* were collected by UV lighting at night, e.g. Figs 24A, C), contiguous to pronotal collar; labium reaching or exceeding middle coxa; antennal segment I more or less constricted medially; pronotal calli usually flat; pronotal disc and scutellum with densely distributed, clear punctures; large areolar cell on membrane rounded apically; male genital segment parameres and vesica small-sized, comparing with body size (e.g., Figs 28A, 37I); left paramere with developed, inflated sensory lobe and hooked apex of hypophysis; and sclerotized ring ovoid to elongate-oval, narrow-rimmed (e.g., Figs 25K–L).

The genera mentioned above (and *Tolongia* Poppius, 1915 as well) can be separated from each other by the below key. Incidentally, *Tingnotopsis* is very close to *Tingnotum* and its validity is sometimes questioned (cf. EYLES 2000); the former genus can be separated from the

latter only by presence of the hump-like protuberance on the pronotal disk (Fig. 37D). Further, some members of *Tingnotum* exhibit great similarity to *Argenis* species (e.g., *T. perlatum* Linnavuori, 1961, Fig. 27G). A comprehensive revision on *Argenis*-*Tingnotopsis*-*Tingnotum* complex is required on worldwide basis. As the genera include numerous species known almost throughout the Old World tropics and subtropics, however, a definitive classification for these outgroup taxa is beyond the scope of the present work.

We have recognized two lineages, or groups of species in *Diognetus*. Four congeners, *D. flavigenis*, *D. minusculus*, *D. puspa* and *D. yamato*, possibly constitute a monophyletic group, sharing the following characters assumed as autapomorphies: Basal part of left paramere (sensory lobe) narrowly and triangularly projected; vesical right lobal sclerite well-sclerotized, often forming a spicule; and sclerotized ring relatively thick-rimmed. All other *Diognetus* species generally have the basal protuberance of the left paramere widened and squared or rounded, the vesical right lobal sclerite similar in shape to two other sclerites (LS and MS), and the sclerotized ring thin-rimmed.

Incidentally, there are some additional specimens from W. Sumatra (00419677, CNC), Java (00419720, CNC) and Sulawesi, Indonesia (TYCN), Papua New Guinea (FC n° 3989, ISNB), and Luzon, Philippines (00419676, CNC); most of them are teneral or damaged, and we cannot ascertain their exact identities. It is evident that more undescribed congeners are present in tropical Asia. Therefore, a detailed phylogenetic discussion is not provided as being premature, and our species key, based mainly on the male genitalic structures, is provisional. *Diognetus giganteus* sp. nov. and *D. pilosus* (Poppius), each known only by a single female specimen, are excluded from the key.

The following specimens from Australia (cf. Fig. 7D) and Papua New Guinea obviously belonging to *Diognetus* will be treated in a separate work:

AUSTRALIA: QUEENSLAND: Mellwraith Range, Cap York, rocky shrub, -13.88428, 143.23181, 340 m (1,115 ft), 29 Jun 1932, Darlington, 2 ♂♂ (CNC) (AMNH_PBI 00419632–33); North Queensland, 1.6 km S of Kuranda Turnoff on Hwy 1, -16.84047, 145.61436, 386 m (1,266 ft), 26 Apr 1990, J. Heraty, 1 ♀ (00419637) (CNC). **PAPUA NEW GUINEA: MILNE BAY PROVINCE:** Normanby Island, Mt. Pabinama, No. 2 (Fifth Archbold Expedition to New Guinea), -10.07971, 150.99891, 820 m (2,690 ft), 3–5 May 1956, Fifth Archbold Exped. New Guinea, 1 ♂ (00419628) (CNC); Biniguni, Gwariu River, -9.66670, 149.26670, 150 m (492 ft), 27 Jul–14 Aug 1973, G. M. Tate, 1 ♂ (00419629) (CNC).

Key to related genera discussed

- 1 Pronotal disc mesally with noticeable hump-like protuberance (Fig. 37D). *Tingnotopsis* Poppius, 1915
- Pronotum without distinct protuberance, sometimes roundly inflated. 2
- 2 Clavus without a row of punctures (claval punctures, if any, uniformly distributed, not arranged in recognizable rows along claval vein, cf. Fig. 23).
- *Diognetus* Distant, 1904
- Hemelytron with a row of punctures along claval vein or with two rows of punctures on both sides of claval vein (Fig. 37F). 3

- 3 Body large, elongate, with total length over 7.5 mm; dorsum almost uniformly pale brown, without mottled pattern; lateral margin of pronotum distinctly carinate. *Tolongia* Poppius, 1915
- Body length < 6.7 mm; dorsum usually mottled or spotty; lateral margin of pronotum not carinate. 4
- 4 Vertex with a black longitudinal mesal stripe; antennal segment I tapered towards apex; each humeral angle of pronotum with a shiny fuscous spot; embolium (exocorium) and cuneus semitransparent (Figs 24A–B). ...
..... *Argenis* Distant, 1904
- Vertex pale brown or brown, sometimes with irregularly arranged, dark spots or maculae but lacking black mesal stripe; antennal segment I almost linear; pronotal humeral angle without such dark spot; embolium opaque (Figs 24C, F–G). *Tingnotum* Kirkaldy, 1902

Key to *Diognetus* species (males)

- 1 Sensory lobe of left paramere globally triangular or rounded (Figs 8I, 11B–C, 12G, 18A, 20A, 23I). 2
- Sensory lobe of left paramere obviously squared (Figs 8C, 8K, 12A, D, 15L, 20D, 21D). 7
- 2 Right lobal sclerite of vesica spinulate or toothed (Fig. 8J). 3
- Right lobal sclerite of vesica neither spinulate nor toothed (Fig. 8G). 5
- 3 Right lobal sclerite of vesica fully sclerotized, curved and toothed subapically, pointed apically, spicule-like (Fig. 11D); median lobal sclerite and left lobal-sclerite obviously longer. Japan (Honshu).
..... *D. flavigenis* (Horváth, 1905)
- Shape of right lobal sclerite of vesica different (Figs 12I and 20C). 4
- 4 Right lobal sclerite of vesica partially membranous, with a small triangular process (Fig. 12I). Vesica devoid of horn-like sclerite. Labium long, usually exceeding apex of metacoxa, reaching abdominal sternum III or IV. Principally associated with Lauraceae broadleaf trees. Japan (Shikoku, Kyushu). *D. laureus* sp. nov.
- Right lobal sclerite of vesica sclerotized but not spicule-like, its apex spinulate (Fig. 20C). Vesica with a horn-like sclerite. Labium relatively shorter, reaching but not exceeding apex of metacoxa. Associated with *Trema* sp. Nepal. *D. puspa* sp. nov.
- 5 Vesica devoid of elongate spicule-like sclerite arising basally to secondary gonopore (Fig. 8J). Nepal.
..... *D. dhampus* sp. nov.
- Vesica with an elongate spicule-like sclerite arising basally to secondary gonopore (Figs 18C–D and 21J). 6
- 6 Small species (total length range between 3.5 and 3.8 mm in males). Indonesia (Sumatra), Malaysia (Perak). *D. minusculus* sp. nov.
- Relatively large species (total length about 5 mm in males). Japan (Honshu, Shikoku, Kyushu).
..... *D. yamato* Yasunaga nom. nov.
- 7 Right lobal sclerite of vesica (RS) devoid of recognizable triangular process (TP) (Figs 8D, 8F–G, 20F). 8
- Right lobal sclerite of vesica (RS) with a triangular process (Figs 12F, 15E, N, 21F–G), tiny in some species. 11
- 8 Right lobal sclerite of vesica spinulate or toothed. Apex of left lobal sclerite pointed (Fig. 8M). Nepal. ..
..... *D. duvalorum* sp. nov.
- Right lobal sclerite of vesica neither spinulate nor toothed. 9
- 9 Apex of left lobal sclerite spatulate or rounded. Apex of median lobal sclerite pointed (Fig. 22F); median lobal sclerite shorter than right and left lobal sclerite. Indonesia (Sumatra). *D. schuhorum* sp. nov.
- Apex of left lobal sclerite pointed. 10
- 10 Left lobal sclerite of vesica about as long as right lobal sclerite (Figs 8D). Nepal. *D. bagmaticus* sp. nov.
- Left lobal sclerite of vesica longer than right lobal sclerite (Figs 8G). Japan (Honshu, Shikoku, Kyushu). *D. cheimon* sp. nov.
- 11 Apex of left lobal sclerite of vesica spatulate to rounded. 12
- Apex of left lobal sclerite of vesica pointed. 15
- 12 Left lobal sclerite of vesica longer than right lobal sclerite (Figs 12F, 15I–J). 13
- Left lobal sclerite of vesica almost as long as than right lobal sclerite (Figs 21C, F). 14
- 13 Right lobal sclerite spinulate, median lobal sclerite the shortest (Figs 15I–J). India (Tamil Nadu), Sri Lanka, Thailand. *D. intonsus* Distant, 1904
- Right lobal sclerite smooth, median lobal sclerite slightly longer than the right lobal sclerite (Fig. 12F). Labium about as long as or slightly longer than maximum body width (across hemelytra); currently known only from Japanese Ryukyus, Taiwan and Philippines.
..... *D. insulanus* (Yasunaga, 1994)
- 14 Labium reaching metacoxa, shorter than maximum body width; known from warm temperate zone (SW Honshu, Shikoku, Kyushu, Tsushima of Japan and Korean Jeju Island). *D. vernus* sp. nov.
- Labium reaching apex of mesocoxa. Taiwan (Nantou). *D. styrax* sp. nov.
- 15 Left paramere with a conical process on its body inner margin (Fig. 15L). Indonesia (Sumatra).
..... *D. magnificus* sp. nov.
- Left paramere devoid of conical process on its body inner margin (Fig. 12A). Malaysia (Pahang).
..... *D. gotohi* sp. nov.

Diognetus bagmaticus sp. nov.

(Figs 1G, 2A–C, 7A–C, 8A–D, 9A–B, 10A–D, 25A–P)

Type material. HOLOTYPE: ♂, NEPAL: BAGMATI ZONE: Kathmandu, Tri-pureshwor, 27.693555, 85.316545, UV lighting, 29 Oct 2006, T. Yasunaga (AMNH_PBI 00380744) (NMTU). PARATYPES: NEPAL: Kathmandu, same data as for holotype, 1 ♂ 1 ♀ (TYCN); Kathmandu, Gongabu-Samakhushi, 27.731066, 85.313088, UV lighting, 31 Jun 2005, T. Yasunaga, 1 ♂ (TYCN); Kathmandu District, Nagarjun, 27.7483, 85.2519, 1,700 m (5,577 ft), flowers of *Quercus semecarpifolia*, 16 May 2005, T. Yasunaga, 1 ♂ (AMNH_PBI 00419516) (CNC), 1 ♂ without USIs (TYCN); Kathmandu District, Patibhanjyang, pastures, 27.84678, 85.45931, 1,829 m (6,000 ft), 20 Jun 1967, Can. Nepal Exped., 6 ♂♂ 7 ♀♀ (CNC) (00419583–00419595); Lalitpur District, Godawari [Godavari], 27.59339, 85.39727, 1,829 m (6,000 ft), 14–23 Jul 1967, Can. Nepal Exped., 3 ♂♂ 16 ♀♀ (CNC) (00419596–00419611); Laritpur, Godawari, Taukhel, 27.5999, 85.3555, flowers of *Schima wallichii*, 16 Jun 2006, R. K. Duwal, 4 ♂♂ 1 ♀ (AMNH, TYCN). RASUWA: Langtang Himal National Park, Dhunche, 28.112073, 85.297022, 1,950 m, at FL light of lodge balcony, 8–9 Jun 2006, T. Yasunaga, 1 ♀ (TYCN).

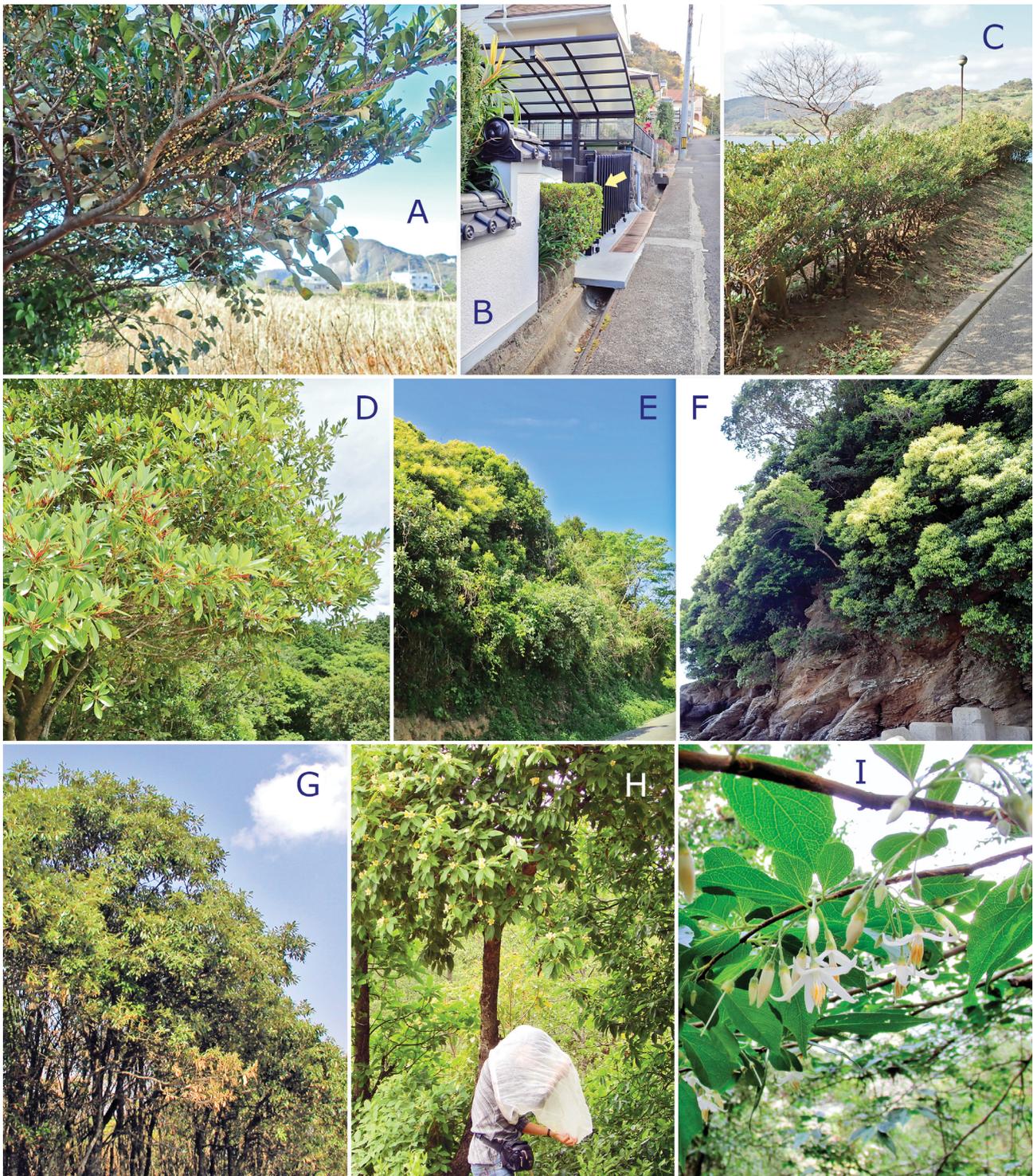


Fig. 1. Habitats and host plants, Japan (A–F), Nepal (G–H) and Taiwan (I) for *Diognetus cheimon* sp. nov. (A–F), *D. laureus* sp. nov. (A–F), *D. vernus* sp. nov. (A–F), *D. bagmaticus* sp. nov. (G), *D. puspae* sp. nov. (H) and *D. styrax* sp. nov. (I). A–C – *Eurya emarginata* at preserved wetland (A), house entrance (B) and seaside park (C) in Nagasaki; D – *Machilus thunbergii* at Satoyama zone in Nagasaki City; E–F – *Castanopsis sieboldii* at coastal zones in Nagasaki City; G – *Quercus semecaprifolia*, inflorescence, at Nagarjun, Kathmandu; H – flowers of *Schima wallichii* at Godawari Valley, Lalitpur; I – *Styrax formosanus*, flowers, in Nantou.

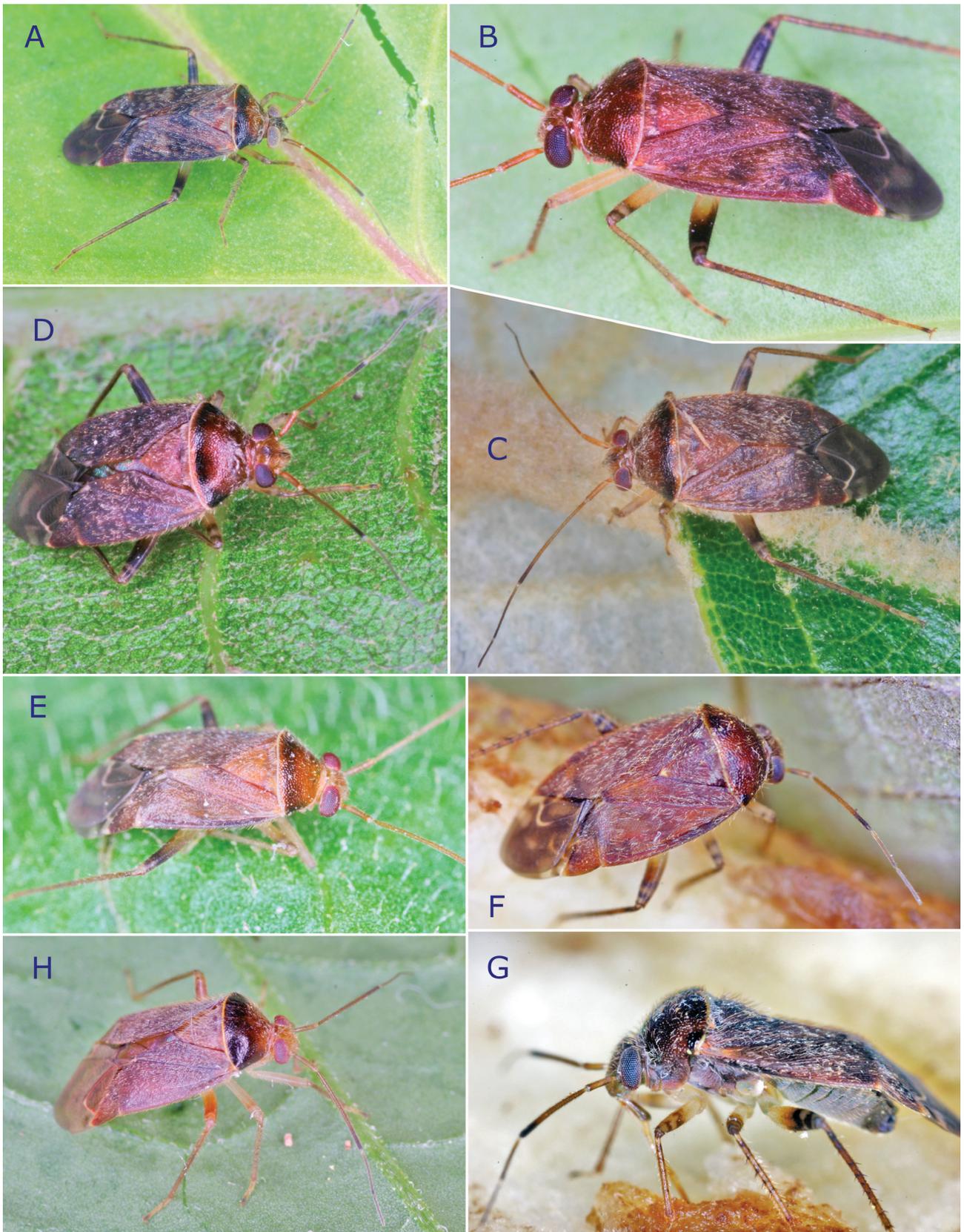


Fig. 2. Habitus images for *Diognetus* species from Nepal. A–C – *D. bagmaticus* sp. nov.; D – a female identical to *D. dhamphus* sp. nov. (from Langtang Himal National Park, Rasuwa, NMTU); E – *D. duvalorum* sp. nov., holotype ♂; F–G, *D. puspa* sp. nov., sucking on banana fruit; H – a female identical to *D. intonsus* Distant, 1904 (from Langtang Himal National Park).

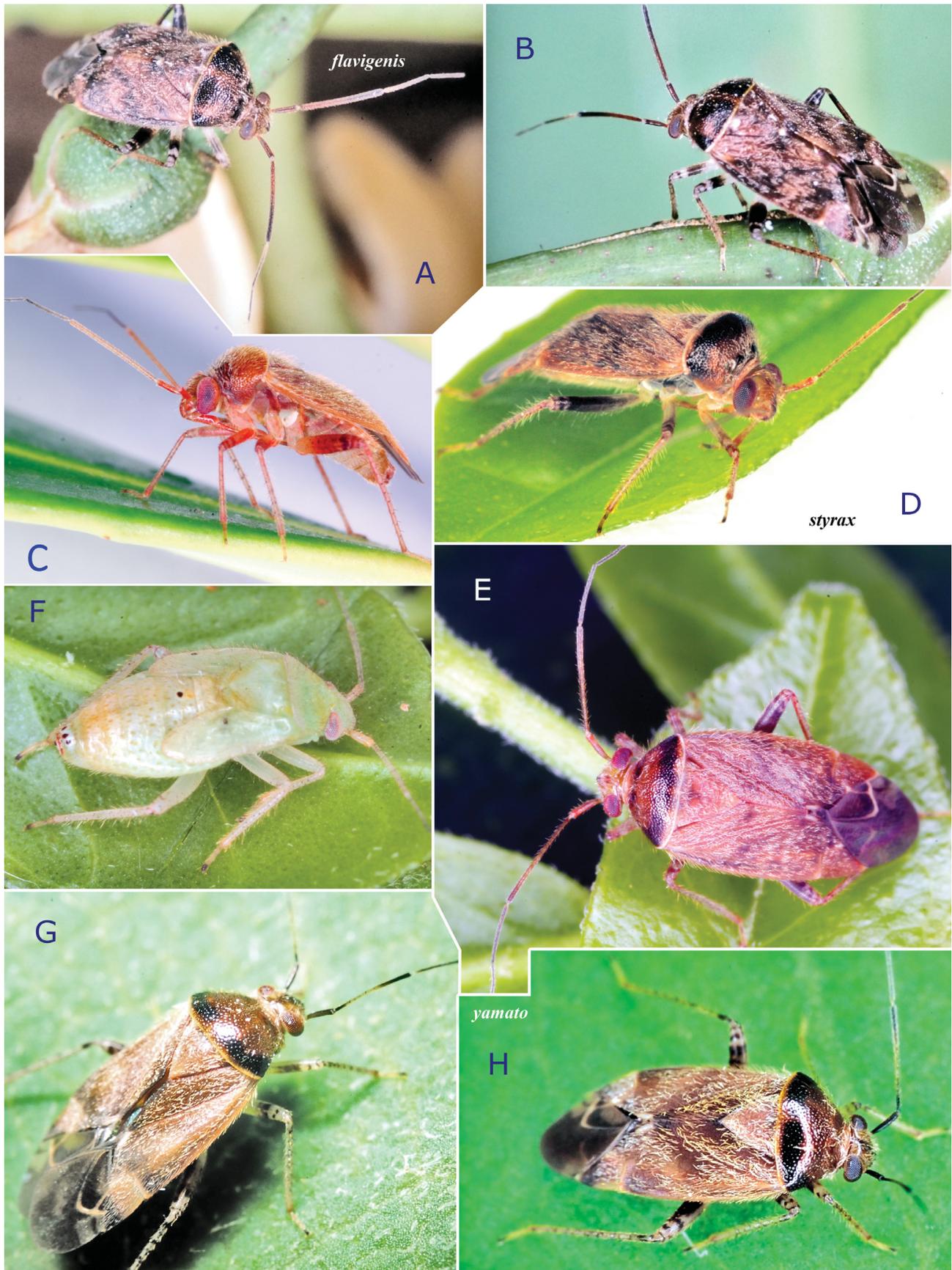


Fig. 3. Habitus images for *Diognetus* species from Japan and Taiwan. A–B – *D. flavigenis* (Horváth, 1905) (from Kumano, Wakayama), C – *D. insulanus* (Yasunaga, 1994) (from Okinawa), D–F – *D. styrax* sp. nov., ♀ (D–E) and 5th instar nymph (Nantou, Taiwan), G–H – *D. yamato* nom. nov. (from Kochi).

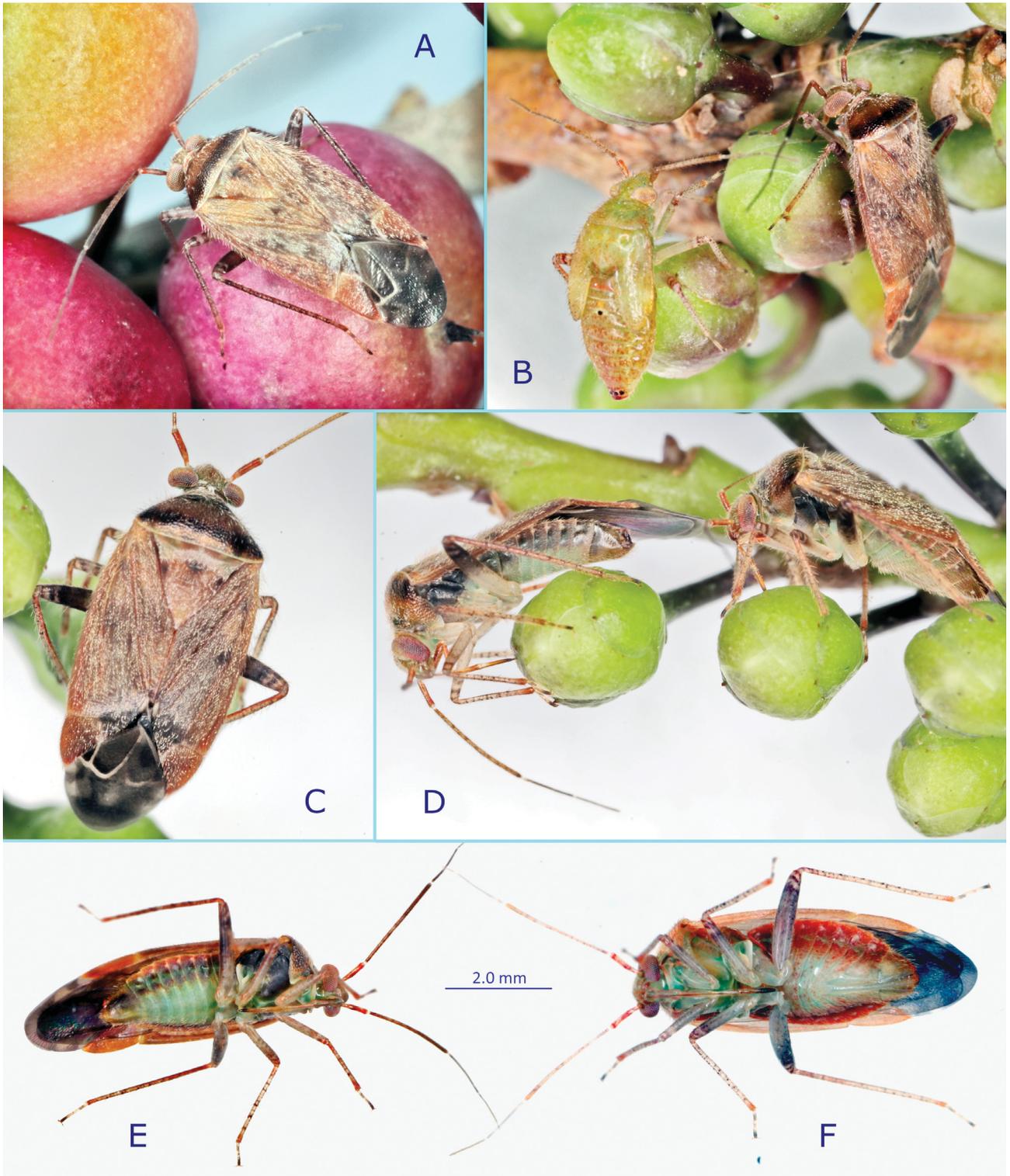


Fig. 4. Habitus images of *Diognetus cheimon* sp. nov. (all from Nagasaki, Japan). A – ♂ sucking on *Eurya emarginata* fruit; B – 5th instar nymph (left) and ♂ on flower buds of *Eurya japonica*; C – ♀; D – ♂ (left) and ♀ sucking on young fruits of *E. japonica*; E–F – ventral habitus images of ♂ (E) and ♀ (F).

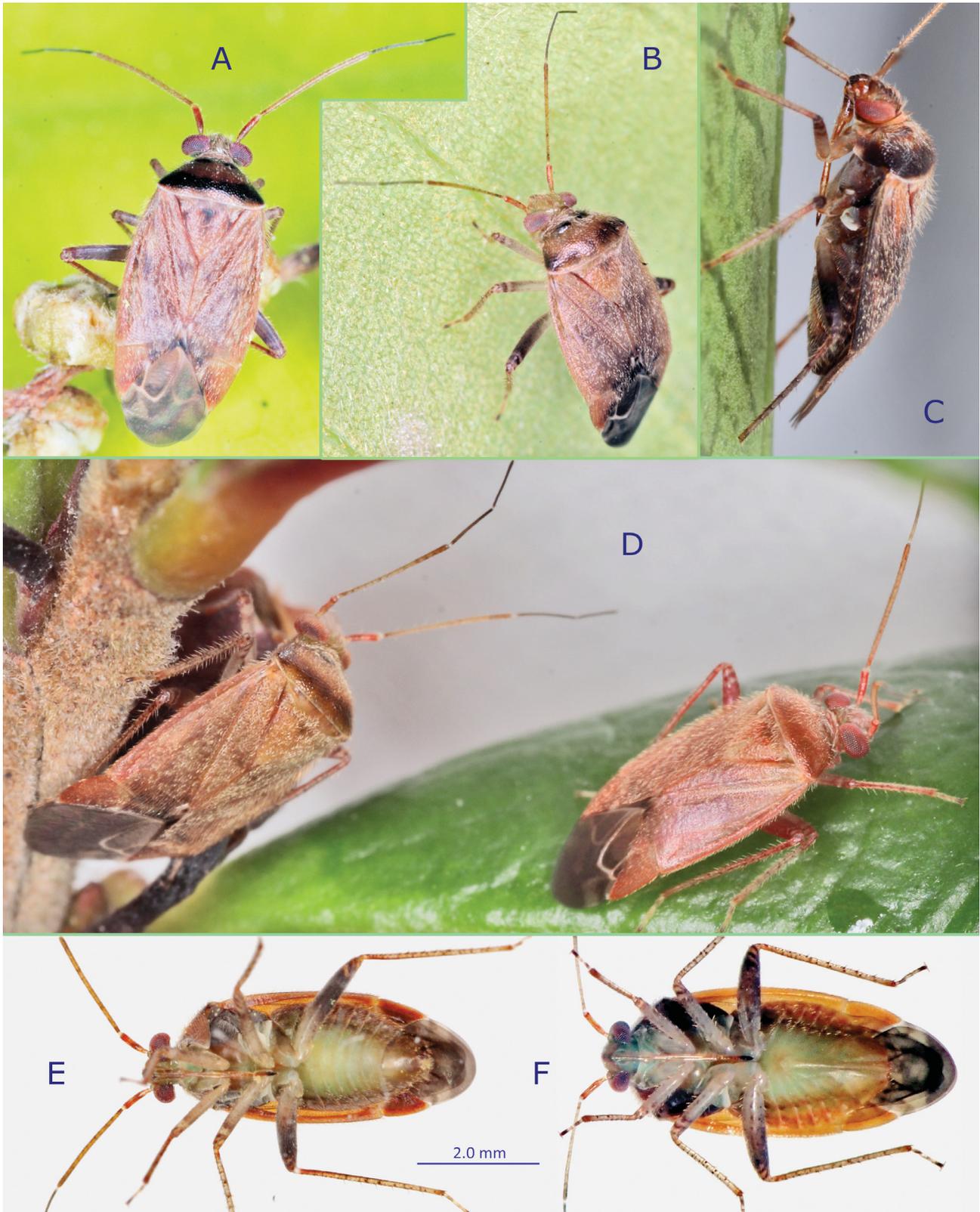


Fig. 6. Habitus images of *Diognetus vernus* sp. nov. (all from Nagasaki, Japan). A – holotype ♂; B – ♀; C – ♀ darkened variant; D – newly emerged ♀ (left) and ♂; E–F – ventral habitus images of ♂ (E) and ♀ (F).

Description. Body elongate ovoid, relatively large in size, 5.1–5.8 mm (Figs 2A–C, 7A). **COLORATION:** Dorsum varying from reddish-brown (Figs 2B, 7A) to chocolate brown (Fig. 2A), usually with mottled pattern (Figs 2A–C). Antennae pale reddish-brown; apex of segment II, segment III (except for pale extreme base) and segment IV dark brown. Labium pale brown, partly tinged with red. Pronotum reddish-brown, with calli and posterior half sometimes darkened (Fig. 2A) and posterior margin narrowly pale; pleura broadly fuscous; scent efferent system creamy yellow. Hemelytron reddish-brown, usually speckled with dark maculae; apices of exocorium (embolium) and cuneus narrowly pale; membrane smoky brown, with yellowish veins. Coxae and legs yellowish brown; mesofemur with two faint dark rings subapically; apical 1/3 of metafemur dark brown, with two pale rings subapically. Ventral surface of abdomen pale brown (somewhat greenish when alive); with more or less darkened lateral margins (Figs 7B–C). **SURFACE AND VESTITURE:** As in generic diagnosis; dorsal surface weakly shining; vestiture on thoracic pleura relatively sparse; hemelytron rather matte. **STRUCTURE:** Vertex narrow, with a basal transverse carina, weakly arched (Figs 25B–C). Antennal segment I about as thick as pronotal collar, longer than segment IV. Labium slightly exceeding apex of mesocoxa but not reaching apex of metacoxa (Fig. 25D). Scutellum rather flat, shallowly and sparsely punctate, with transverse wrinkles. Metathoracic scent efferent system as in Fig. 25E. Metatarsomere I short, about half as long as III; pretarsal structure as in Figs 28H–I; parempodia rather long. **MALE GENITALIA** (Figs 8A–D, 25F, J): Left paramere with squared, developed sensory lobe and rather broad hypophysis that is hooked at apex (Figs 8B, 25F). Vesica with short, branched MS and smooth LS, lacking noticeable TP (Figs 8D, 25J). **FEMALE GENITALIA** (9A–B, 10A–D, 25K–O): Sclerotized ring with thickened anterior rim (Figs 11B, 28L); sclerotized ring with thickened anterior margin (Figs 10A–B); posterior wall (Figs 9A, 10C, 25M–O) with narrow dorsal structure and moderate-sized interramal lobe.

Measurements. See Table 1.

Differential diagnosis. Recognized by its relatively elongate, large body and shape of the male and female genitalic structures described above. Most similar in overall appearance to *D. dhampus* sp. nov., which was also found in Nepal and sympatric in some areas; distinguished by shorter antennal segment IV that is (♀) as long as / (♂) slightly shorter than segment I, sensory lobe of left paramere more strongly produced, somewhat squared; apex (hypophysis) of right paramere flattened; and vesica with shorter, branched MS, lacking TP.

Etymology. Named for the type locality, Bagmati Zone in Nepal; latinized as an adjective.

Biology. Many of available individuals were collected by UV lighting method. Like as *D. cheimon* sp. nov., this species may utilize garden plants or landscaping trees as breeding hosts, since some specimens were collected at downtown area of Kathmandu. Several specimens were yielded by sweeping inflorescence of *Quercus semecarpifolia* Sm. (Fagaceae) (Fig. 1G) and *Schima wallichii* (DC.)

Korth. (Theaceae) (Fig. 1H). Collection records suggest *D. bagmaticus* has a bivoltine life cycle; the adults were found in June and October.

Distribution. Nepal (Bagmati Zone, Rasuwa District).

Diognetus cheimon sp. nov.

(Figs 4, 5A–H, 8E–G, 10E–G, 23, 26, 36J–L)

Type material. HOLOTYPE: ♂, JAPAN: KYUSHU: Nagasaki Pref., Nagasaki City, Kurosaki-Nagata Marsh (biotope), 32.829185, 129.721365, sweeping flowers of *Eurya emarginata*, 13 Dec 2020, T. Yasunaga (AMNH_PBI 00380745) (AMNH). PARATYPES: JAPAN: HONSHU: Chiba Pref., Matsudo City, 21 Century Forest Park, 35.807500, 139.938333, 9 Sep 2012, N. Muro (TYCN). KYUSHU: Nagasaki Pref.: Nagasaki City, Iojima Island (lighthouse-park), 32.714177, 129.761155, sweeping flowers and fruits of *Eurya emarginata*, 27 Dec 2019, T. Yasunaga & K. Tanaka, 3 ♂♂ 2 ♀♀ [1 ♂ – 5th instar immature form reared then emerging on Jan 1, 2020] (TYCN); Nagasaki City, Kabashima Island, 32.564877, 129.780177, sweeping flowers and fruits of *Eurya japonica*, 27 Dec 2019, T. Yasunaga, 2 ♂♂ and 1 ♂ [5th instar immature form reared then emerging on Dec 30, 2019] (TYCN); Nagasaki City, Kurosaki-Nagata Marsh (biotope), 32.829185, 129.721365, sweeping flowers and fruits of *Eurya emarginata*, 15 Dec 2019, T. Yasunaga, 3 ♀♀ and 1 ♂ [5th instar immature form reared then emerging on Dec 17, 2019, dead on Jan 2, 2020] (TYCN); same locality and plant, 13 Dec 2020, T. Yasunaga, 3 ♀♀ (TYCN) and 1 ♀ [5th instar immature form reared then emerging on Dec 15, 2020] (TYCN); Nagasaki City, Sotome, Higashi-Shitsu, 32.835325, 129.702280, sweeping flowers of *Eurya emarginata*, 13 Dec 2020, T. Yasunaga, 1 ♀ (TYCN); Nagasaki City, Konoura-Ohgiyama, Konoura Dam, 32.888, 129.722, UV lighting, 20 Mar 2016, T. Nozaki, 1 ♂ (TYCN), 1 ♀ (WCF); same data, except for date 27 May 2016, 1 ♀ (TYCN); Nagasaki City, Tateyama, Mt. Konpira, sweeping flower buds of *Eurya japonica*, 32.764888, 129.879500, 13 Nov 2021, T. Yasunaga, 1 ♀ (TYCN); same data, except for date 24 Dec 2021, 1 ♂ 2 ♀♀ (TYCN); Nagasaki City, Takenokubo, Nagasaki West High School, 32.765877, 129.859789, inflorescence of *Osmanthus heterophyllus*, 9 Dec 2021, T. Yasunaga, 1 ♂ 2 ♀♀ (TYCN); Nagasaki City, Nameshi 2-24, 32.809253, 129.841743, on *Eurya emarginata*, 6 Dec 2020, T. Yasunaga, 1 ♂ (TYCN); Nagasaki City, Taira (Azekari, Fishery Port), 32.807615, 129.770780, sweeping flowers and fruits of *Eurya emarginata*, 6 Dec 2020, T. Yasunaga, 2 ♂♂ 1 ♀ (TYCN) and 1 ♂ 1 ♀ [5th instar immature form reared then emerging on Dec 8–10, 2020] (TYCN); same locality and plant, 13 Dec 2020, 2 ♀♀ [5th instar immature form reared then emerging on Dec 18, 2020] (TYCN); same locality and plant, 29 Nov 2021, 2 ♂♂ 1 ♀ [4–5th instar immature form reared then emerging on Dec 1–7, 2021] (TYCN); Nagasaki City, Kinkai-Tonehara, 32.900888, 129.795522, sweeping buds of *Eurya japonica*, 21 Jan 2020, T. Yasunaga, 1 ♀ [freshly emerged and dead on May 7, 2020] (TYCN); Nishisonogi-gun, Togitsu-Nagayo, Sakino Nature Park, 32.854271, 129.854646, sweeping buds of *Eurya japonica*, 20 Dec 2020, T. Yasunaga, 1 ♂ 1 ♀ and 1 ♀ [5th instar immature form reared then emerging on Dec 21, 2020] (TYCN); same data, 1 ♂ 1 ♀ [5th instar immature form reared then emerging on Dec 25 (♂) / Dec 28 (♀), 2020 and dead on Apr 28, 2021] (TYCN); Omura City, Kushima, 32.897077, 129.952977, sweeping flowers of *Eurya emarginata*, 15 Jan 2020, T. Yasunaga, 1 ♂ [5th instar immature form reared then emerging on Jan 21, 2020] (TYCN); same locality and plant, 9 Dec 2020, T. Yasunaga, 2 ♀♀ [5th instar immature form reared then emerging on Dec 15–18, 2020] (TYCN); same locality and plant, 23 Dec 2020, T. Yasunaga, 1 ♂ (TYCN); Saikai City, Ohseto Town, Fukushima, Shirikusari Beach, 32.925066, 129.640533 sweeping fruits of *Eurya emarginata*, 2 Jan 2020, T. M. & H. Yasunaga, 1 ♂; Saikai City, Oshima, Mt. Yuridake, 33.040, 129.608, UV lighting, 4 May 2016, T. Nozaki (TYCN). SHIKOKU: Kochi Pref., Tosa-Shimizu City, Cape Ashizuri, 32.73, 133.00, UV lighting, 10 Apr 1999, T. Befu, 1 ♂ 1 ♀ (TYCN); Kochi Pref., Cape Muroto, Muroto Skyline Road [Rt 203], 33.25232, 134.17835, sweeping *Eurya emarginata*, 18 Dec 2019, M. Takai, 15 ♂♂ 24 ♀♀ (AMNH, CNC, NIAES, NMPC, TYCN); same locality, beating *Eurya emarginata*, 9 Dec 2000, T. Befu (TYCN); Kochi Pref., Tosa City, Mt. Yokose-yama, 33.4693, 133.4377, UV lighting, 27 March 2000, T. Befu, 1 ♀ (TYCN); Kochi Pref., Sukumo City, Nakasuji Dam, 32.9282, 132.8137, UV lighting, T. Befu, 1 ♀ (TYCN).

Table 1. Twelve measurements (in mm) for *Diognetus* spp. Abbreviations: FM – femur, HEM – hemelytra, L – length, LB – labium, PRN – pronotum, TB – tibia, VTX – vertex (interocular space), W – width.

		Body		Head	VTX	PRN	HEM	Antennomere L				LB	Metaleg L	
		L	W	W	W	W	W	I	II	III	IV	L	FM	TB
<i>bagmaticus</i> sp. nov. ♂ (N=7)	MAX	5.60	1.21	0.33	1.92	2.16	0.65	2.60	1.15	0.64	2.30	2.04	3.00	
	MIN	5.19	1.15	0.29	1.75	2.02	0.60	2.28	1.02	0.53	2.11	1.79	2.73	
	MEAN	5.42	1.19	0.31	1.82	2.08	0.64	2.42	1.08	0.58	2.22	1.93	2.88	
♀ (N=4)	MAX	5.76	1.23	0.44	2.01	2.59	0.63	2.05	1.03	0.60	2.44	1.95	2.90	
	MIN	5.40	1.13	0.40	1.90	2.28	0.58	1.90	0.95	0.58	2.09	1.79	2.65	
	MEAN	5.60	1.20	0.42	1.97	2.41	0.61	2.00	0.98	0.59	2.33	1.90	2.80	
<i>cheimon</i> sp. nov. ♂ (N=10)	MAX	6.00	1.15	0.29	1.92	2.44	0.60	2.34	1.13	0.79	2.11	1.98	2.92	
	MIN	4.89	1.06	0.27	1.71	2.11	0.48	1.80	0.81	0.60	1.82	1.79	2.50	
	MEAN	5.56	1.11	0.28	1.81	2.29	0.54	2.16	0.98	0.70	2.00	1.88	2.76	
♀ (N=6)	MAX	6.09	1.15	0.42	2.11	2.61	0.58	1.94	0.96	0.77	2.30	1.94	2.69	
	MIN	5.40	1.08	0.36	1.92	2.34	0.52	1.77	0.81	0.60	2.11	1.73	2.50	
	MEAN	5.76	1.12	0.39	2.03	2.51	0.55	1.87	0.92	0.72	2.19	1.86	2.61	
<i>dhampus</i> sp. nov.	Holotype ♂	5.43	1.15	0.31	1.77	2.07	0.60	2.21	1.00	0.61	1.98	1.92	2.69	
	Paratype ♂	5.73	1.15	0.29	1.90	2.30	0.58	2.50	0.96	0.69	2.11	1.86	3.00	
	Paratype ♀	5.70	1.19	0.40	2.25	2.40	0.58	2.21	1.11	—	2.40	1.96	2.78	
<i>duvalorum</i> sp. nov.	Holotype ♂	4.26	1.04	0.33	1.44	1.82	0.56	1.92	0.96	0.60	2.02	1.84	2.30	
<i>flavigenis</i> ♂ (N=6)	MAX	5.10	1.09	0.38	1.98	2.30	0.52	1.57	0.77	0.63	1.86	1.75	2.30	
	MIN	4.50	1.02	0.35	1.84	2.17	0.46	1.44	0.71	0.54	1.82	1.56	2.17	
	MEAN	4.71	1.04	0.37	1.90	2.24	0.49	1.54	0.75	0.58	1.84	1.64	2.24	
♀ (N=4)	MAX	5.20	1.10	0.44	2.09	2.50	0.50	1.55	0.81	0.61	2.07	1.65	2.31	
	MIN	4.53	1.08	0.40	2.00	2.19	0.46	1.43	0.75	0.57	1.92	1.56	2.17	
	MEAN	4.98	1.09	0.42	2.05	2.40	0.48	1.50	0.78	0.59	1.99	1.61	2.26	
<i>giganteus</i> sp. nov.	Holotype ♀	6.71	1.32	0.40	2.48	3.21	1.00	2.67	1.31	1.02	—	2.42	3.59	
<i>gotohi</i> sp. nov.	Holotype ♂	5.10	1.17	0.33	1.86	2.13	0.61	2.30	0.98	—	2.42	1.98	2.88	
<i>laureus</i> sp. nov. ♂ (N=8)	MAX	4.80	1.15	0.31	1.73	2.07	0.56	2.11	0.96	0.79	2.13	1.86	2.69	
	MIN	3.87	1.00	0.27	1.34	1.69	0.44	1.73	0.90	0.67	1.94	1.44	2.15	
	MEAN	4.37	1.08	0.29	1.58	1.94	0.53	1.94	0.93	0.73	2.08	1.66	2.45	
♀ (N=8)	MAX	5.07	1.15	0.40	2.05	2.48	0.58	2.00	0.98	0.77	2.30	1.92	2.69	
	MIN	4.20	1.00	0.38	1.63	1.96	0.50	1.71	0.83	0.69	2.11	1.57	2.28	
	MEAN	4.67	1.08	0.39	1.82	2.25	0.54	1.82	0.92	0.73	2.21	1.73	2.45	
<i>insulanus</i> ♂ (N=6)	MAX	4.74	1.13	0.33	1.71	2.09	0.58	2.17	1.00	0.75	2.13	1.73	2.53	
	MIN	4.50	1.08	0.25	1.65	1.93	0.45	1.68	0.80	0.61	1.75	1.54	2.30	
	MEAN	4.63	1.11	0.29	1.68	2.03	0.52	1.96	0.93	0.68	2.01	1.65	2.42	
♀ (N=6)	MAX	5.16	1.17	0.40	1.96	2.42	0.58	1.92	0.96	0.77	2.30	1.88	2.50	
	MIN	4.68	1.02	0.38	1.73	2.19	0.52	1.71	0.83	0.61	2.13	1.50	2.30	
	MEAN	4.93	1.11	0.39	1.83	2.29	0.55	1.80	0.90	0.71	2.22	1.72	2.41	
<i>intonsus</i> ♀ (N=3)	♂	5.10	1.21	0.28	1.90	2.14	0.58	2.28	0.93	0.75	2.38	1.88	2.70	
	MAX	5.25	1.27	0.42	2.11	2.45	0.61	2.04	1.11	0.65	2.27	1.96	2.61	
	MIN	4.83	1.18	0.40	1.92	2.36	0.54	1.86	0.90	0.56	2.10	1.80	2.57	
MEAN	5.11	1.22	0.41	2.04	2.40	0.58	1.93	1.00	0.61	2.18	1.87	2.59		
<i>magnificus</i> sp. nov.	Holotype ♂	6.35	1.19	0.30	2.03	2.30	0.73	2.80	1.10	—	2.53	2.13	3.40	
	Paratype ♀	6.60	1.21	0.56	2.25	2.65	0.73	2.36	1.48	0.61	2.50	2.11	2.96	
<i>minusculus</i> sp. nov. ♂ (N=3)	MAX	3.81	0.96	0.35	1.52	1.75	0.42	1.56	0.69	0.50	1.73	1.34	1.94	
	MIN	3.51	0.94	0.33	1.42	1.65	0.38	1.50	0.58	0.48	1.59	1.32	1.90	
	MEAN	3.65	0.95	0.34	1.48	1.71	0.40	1.52	0.63	0.49	1.66	1.33	1.92	
♀ (N=4)	MAX	4.20	1.02	0.42	1.71	2.21	0.48	1.56	0.73	0.58	1.86	1.44	2.02	
	MIN	4.05	0.96	0.37	1.57	1.84	0.42	1.44	0.61	0.50	1.73	1.34	1.82	
	MEAN	4.15	0.98	0.40	1.66	1.97	0.45	1.52	0.67	0.54	1.80	1.37	1.91	
<i>pilosus</i>	♀ (Sumatra)	5.33	1.19	0.45	2.13	2.60	0.54	1.86	—	—	2.13	1.95	2.70	
	♀ (Sumatra)	5.10	1.13	0.42	2.23	2.57	0.54	1.79	0.81	0.73	2.02	1.84	2.59	
	♀ (Malaya)	5.40	1.19	0.44	2.13	2.63	0.58	1.90	1.00	0.79	2.07	1.92	2.65	
<i>puspae</i> sp. nov.	Holotype ♂	4.38	1.00	0.33	1.77	2.09	0.40	1.34	0.61	0.56	1.90	1.52	2.02	
	Paratype ♂	4.65	1.02	0.38	1.79	2.11	0.42	1.40	0.71	0.58	1.94	1.57	1.82	
<i>schuhorum</i> sp. nov.	Holotype ♂	5.19	1.11	0.36	1.73	1.94	0.61	2.32	1.04	—	2.11	—	—	
<i>styrax</i> sp. nov.	Holotype ♂	5.55	1.09	0.25	1.73	2.11	0.54	2.13	0.90	—	2.07	1.82	2.84	
	Paratype ♀	5.70	1.24	0.43	2.30	2.69	0.58	2.11	0.96	0.69	2.27	1.94	2.84	
<i>vernus</i> sp. nov. ♂ (N=7)	MAX	4.86	1.14	0.33	1.88	2.30	0.58	2.13	1.06	0.79	2.17	1.79	2.78	
	MIN	4.50	1.06	0.27	1.61	2.05	0.50	1.92	0.90	0.65	1.94	1.59	2.44	
	MEAN	4.73	1.12	0.29	1.73	2.13	0.54	2.04	0.96	0.72	2.04	1.73	2.54	
♀ (N=6)	MAX	5.13	1.17	0.42	2.04	2.59	0.56	2.11	1.04	0.77	2.17	1.86	2.67	
	MIN	4.50	0.96	0.36	1.63	2.11	0.38	1.63	0.86	0.67	1.96	1.69	2.28	
	MEAN	4.78	1.09	0.39	1.81	2.26	0.50	1.83	0.92	0.71	2.09	1.75	2.45	
<i>yamato</i> nom. n. ♂ (N=3)	MAX	5.04	1.13	0.38	1.92	2.25	0.60	1.94	1.06	0.81	2.30	1.82	2.65	
	MIN	4.95	1.08	0.35	1.79	2.17	0.56	1.84	0.90	0.63	2.19	1.69	2.46	
	MEAN	5.00	1.11	0.36	1.87	2.21	0.58	1.90	0.99	0.74	2.25	1.75	2.53	
♀ (N=3)	MAX	6.00	1.19	0.46	2.11	2.57	0.60	1.92	0.96	0.79	2.65	1.98	2.69	
	MIN	4.86	1.13	0.40	1.96	2.27	0.58	1.73	0.90	0.63	2.30	1.73	2.42	
	MEAN	5.42	1.15	0.43	2.05	2.43	0.58	1.80	0.93	0.73	2.50	1.84	2.54	

Additional material examined. JAPAN: KYUSHU: Kumamoto Pref., Amakusa City, Tsuruha-yama Park, 32.15, 130.04, UV lighting, 18 Oct 2015, T. Nozaki, 3 ♂♂ 2 ♀♀ (all teneral specimens, WCF).

Description. Body elongate ovoid, moderate to large in size, 4.8–6.1 mm. COLORATION: Dorsum varying from reddish-brown (Fig. 4B) to chocolate brown (Fig. 4A), usually with mottled pattern (Figs 4A–C). Antennae pale reddish-brown; apex of segment II, segment III (except for pale extreme base) and segment IV dark brown. Labium pale brown, partly tinged with red. Pronotum reddish-brown, with calli and posterior half sometimes darkened (Fig. 4A) and posterior margin narrowly pale; pleura broadly fuscous; scent efferent system creamy yellow. Hemelytron reddish-brown, usually speckled with dark maculae; apices of exocorium (embolium) and cuneus narrowly pale; membrane smoky brown, with yellowish veins. Coxae and legs yellowish brown; mesofemur with two faint dark rings subapically; apical 1/3 of metafemur dark brown, with two pale rings subapically. Ventral surface of abdomen pale brown (somewhat greenish when alive), with more or less darkened lateral margins (Figs 4E–F). SURFACE AND VESTITURE: As in generic diagnosis; dorsal surface weakly shining; scutellum transversely rugose; hemelytron rather matte. STRUCTURE: Vertex with a basal transverse carina weakly arched. Antennal segment I about as thick as pronotal collar, longer than segment IV. Labium slightly exceeding apex of mesocoxa but not reaching apex of metacoxa (Figs 4E–F). Scutellum rather flat, shallowly and sparsely punctate, with apex weakly produced (Fig. 26D). Metathoracic scent efferent system as in Fig. 26C. Metatarsomere I short, about half as long as III; pretarsal structure as in Figs 26F–G; parempodia rather long. MALE GENITALIA (Figs 8E–G 26H–K): Left paramere with squared, developed sensory lobe and rather broad hypophysis that is hooked at apex (Figs 8E, 26J). Vesica with short, branched MS and smooth LS, lacking noticeable TP (Figs 8G, 26K). FEMALE GENITALIA (Figs 10E–G, 26L–P): Sclerotized ring with thickened anterior rim (Figs 10E, 26L); posterior wall (Figs 10F, 26N–P) with narrow dorsal structure and moderate-sized interramal lobe.

Measurements. See Table 1.

Differential diagnosis. Recognized by its relatively elongate, moderate to large body; short labium slightly surpassing apex of mesocoxa; generally long wings; and shape of the male and female genitalic structures described above. Most similar in external appearance to *D. bagmaticus* sp. nov.; distinguished by long antennal segment IV

that is obviously longer than segment I, subapically constricted sensory lobe of left paramere (Figs 8E, 26J), short right paramere (Fig. 26I); vesica with elongate MS; and wider interramal lobe with comb-like scaly microstructures laterally (Fig. 26P).

The final instar nymph is recognized by the following characters (cf. Figs 5A–D, E): Body ovoid, relatively large, 3.6–3.9 mm in length; basic coloration varying from pale greenish yellow (Fig. 5A) to reddish-brown (Figs 5B, E); dorsum sometimes with mottled pattern, with densely distributed, simple, semierect setae and rather sparsely distributed, dark, stiff, upright setae (Figs 36J–K); antenna and legs pale greenish yellow to reddish-brown, partly with small, dark spots; abdomen with reddish spots; scent gland opening on abdominal tergum III with semicircular spot; and anal ridge with 4 dark spots (Fig. 5D).

Measurements. See Table 1.

Etymology. From Greek, *cheimon* (winter), referring to its particular emergence in December and January; most of specimens were collected during this cold season (Table 2). Noun in apposition.

Biology. The present new species was confirmed to be associated with Pentaphylacaceae evergreen broadleaf trees, *Eurya emarginata* (Thunb.) Makino and *E. japonica* Thunb. This winter-emerging mirid was predominantly found in December and January, when the inflorescences and fruits of the host trees were abundant (Figs 1A–C). Within recent years, the mirid has frequently been found in urbanized zones and residential areas of southwestern Japan, as *Eurya emarginata* is now planted everywhere for landscaping (Fig. 1B) and for house hedge (Fig. 1C). The mirid species appears to expand its habitat to artificial environment, utilizing such available host plants. On the other hand, *Eurya japonica* is also common in southern Japan and sometimes used for traditional religious (Shinto) ceremonies.

A univoltine or bivoltine life cycle is assumed for *Diognetus cheimon* sp. nov. (cf. Table 2). The first annual generation appears to emerge in autumn (September–October) and the second generation (late instar immature forms and adult) could hibernate. In Nagasaki area, western Kyushu, the adults emerging in winter (December–January) survived until April or May when reared carefully with the host leaves and fermented milk beverage (Yasunaga, pers. observ.). Like as *Diognetus vernus* sp. nov. (see below), the adults of *D. cheimon* sp. nov. were found to have long life span (107–124 days in ♂ / 121 days in ♀). Several adults were recently found on inflorescence of a (Japanese) holly

Table 2. Annual life cycle of six Japanese *Diognetus* species (A – adult N – nymph * – reared indoors).

Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Season	spring			summer			autumn			winter		
<i>cheimon</i>	A*	A*	A				A	AN	AN	AN	AN	A*
<i>flavigenis</i>				A	A							
<i>insulanus</i>		A	A	A	A	A		A	A			A
<i>laureus</i>				AN	A					AN	AN	
<i>vernus</i>	A*	AN	A	A			A			AN	AN	A*
<i>yamato</i>				A	A	A						

tree, *Osmanthus heterophyllus* (G. Don) P. S. Green (Oleaceae), but no immature forms were confirmed.

Distribution. Japan (Honshu, Shikoku, Kyushu); habitats are restricted to warm temperate climatic zones where the breeding hosts grow.

***Diognetus dhampus* sp. nov.**

(Figs 2D, 7E–F, 8H–J, 27A–E)

Type material. HOLOTYPE: ♂, NEPAL: Kasuki District, Dampas Dara [= Dhampus], 28.306, 83.843, 23–24 Oct 1981, M. Sakai (AMNH_PBI 00380746) (NMTU). PARATYPE: NEPAL: same data as for holotype, 1 ♂ (NSMT).

Additional material examined: NEPAL: Rasuwa District, Dhunche, 28.1120, 85.2973, 1,950 m alt., at FL light of lodge balcony, 8–9 Jun 2006, T. Yasunaga, 1 ♀ (TYCN).

Description. Body elongate ovoid, moderate in size, 5.4–5.8 mm. COLORATION: Dorsum dark reddish-brown, partly speckled with dark brown (Figs 2D, 7E). Antennae pale brown; apex of segment II, apical 1/3 of segment III and entire segment IV dark brown. Labium pale brown, partly tinged with red; apical half of segment IV darkened. Pronotum relatively shining, widely fuscous except for brown anterior 1/3 and yellowish posterior margin; calli area with a pair of dark, ovoid spots; scutellum brown, with yellowish apex; pleura broadly fuscous; scent efferent system creamy yellow. Hemelytron reddish-brown; corium and clavus speckled with dark maculae; membrane smoky brown, with apically yellowish veins. Coxae and legs yellowish brown; metafemur with two dark rings subapically (basal one wider as in Fig. 7F); apical 1/3–1/2 of tarsomeres III darkened. Ventral surface of abdomen pale brown, with darkened lateral margins. SURFACE AND VESTITURE: As in generic diagnosis; scutellum rather matte. STRUCTURE: Eye large; vertex narrow. Antennal segment I slightly shorter than segment IV. Labium reaching metacoxa but not exceeding its apex. Scutellum somewhat swollen. Metathoracic scent efferent system as in Fig. 27C. Metatarsomere I slightly shorter than III; parempodia shorter than claw (Fig. 27D). MALE GENITALIA (Figs 8H–J, 27E): Left paramere with rounded, developed sensory lobe and rather narrow hypophysis (Figs 8I, 27E). Vesica with long RS, apically rounded MS and noticeable TP (Figs 8J). FEMALE GENITALIA: Not examined.

Measurements. See Table 1.

Differential diagnosis. Externally very similar to *D. bagmaticus* sp. nov., from which it can be distinguished by the antennal segment IV longer than segment I and lateral edge of the mesepimeron with the clustered, upright, rather long setae, in addition to the identical male genitalia.

Etymology. Named for the type locality, Dhampus (Kasuki District, central Nepal). Noun in apposition.

Biology. Unknown; available specimens were collected in deciduous broadleaf forest zone (1,500–2,000 m alt.).

Distribution. Nepal (Kasuki and Rasuwa Districts).

***Diognetus duwalorum* sp. nov.**

(Figs 2E, 7G–H, 8K–M, 27F–I)

Type material. HOLOTYPE: ♂, NEPAL: BAGMATI: Kathmandu, Gongabu-Samakhushi, 27.731066, 85.313088, UV lighting, 28 Jun 2005, T. Yasunaga (AMNH_PBI 00380747) (NMTU).

Description. Male (holotype). Body elongate ovoid, small-sized, 4.2–4.3 mm. COLORATION: Dorsum brown, tinged with red (Figs 2E, 7G). Antennae pale brown; extreme apex of segment II, whole segment III and segment IV (except for yellowish base of III) brown. Labium shiny pale reddish-brown; apical part of segment IV darker. Pronotum relatively shining, with posterior 1/3 darkened except for yellowish posterior margin; collar yellowish brown; scutellum uniformly pale brown; pleura reddish-brown (Fig. 7H); scent efferent system creamy yellow. Hemelytron almost uniformly reddish-brown; base of cuneus narrowly semitransparent; membrane pale grayish brown brown, with pale, semitransparent areolar cells and apical irregular maculae. Coxae and legs pale brown, partly tinged with red; metafemur with two brown rings subapically (basal one wider as in Fig. 2E); apical 1/3 of metatarsomere III darkened. Ventral surface of abdomen pale brown, with reddish lateral margins and pygophore. SURFACE AND VESTITURE: As in generic diagnosis; dorsal vestiture relatively short; scutellum rather matte, weakly punctate. STRUCTURE: Eye moderate in size; vertex about as wide as an eye in dorsal view. Antennal segment I shorter than segment IV. Labium long, exceeding apex of metacoxa and reaching abdominal sternum VIII (Fig. 27F), longer than antennal segment II. Scutellum weakly swollen. Metathoracic scent efferent system as in Fig. 27G. Metatarsomere I as long as II, slightly shorter than III (Fig. 27I); parempodia shorter than claw (Fig. 27D). MALE GENITALIA (Figs 8K–M, 27H): Left paramere with slightly rounded sensory lobe and rather broad hypophysis (Figs 8K, 27H). Vesica with long RS and short MS; LS spinulate mesially, lacking TP (Fig. 8M).

Female. Unknown.

Measurements. See Table 1.

Differential diagnosis. Recognized by its small size; almost uniformly brownish general coloration without mottled pattern; and long labium reaching abdominal sternum VIII.

Etymology. Named for Dr. Ram Keshari Duwal and her family, who kindly supported research activity of the first author in Nepal (2005–2007).

Biology. Unknown; an available male specimen was collected by UV lighting at residential zone in Kathmandu.

Distribution. Nepal (Kathmandu).

***Diognetus flavigenis* (Horváth, 1905) comb. nov.**

(Figs 3A–B, 7L–M, 11, 28)

Lygus flavigenis Horváth, 1905: 419 (original description).

Lygus flavigenis: LINNAUORI (1965): 269 (diagnosis).

Pinalitus flavigenis: KERZHNER (1988): 70 (new combination); MIYAMOTO & YASUNAGA (1989): 161 (faunal list).

Yamatolygus flavigenis: YASUNAGA (1994): 123 (new combination, redescription); SCHUH (1995): 972 (catalog); KERZHNER & JOSIFOV (1999): 182 (catalog); YASUNAGA (2001): 268 (diagnosis), fig. 316 [color image wrongly showing *D. vernus* sp. nov.]; SCHUH (2002–2013) (online catalog); AUKEMA (2018) (online catalog).

Type material examined. SYNTYPES (?): 1 ♂ 1 ♀ (EIHU; without USIs), JAPAN: HONSHU: Gifu Pref., 13 Jul (no further data provided). We could not access the type series preserved in HHNM, but a couple of specimens from Gifu, Japan, deposited in Hokkaido University Entomological Collection, Sapporo, Japan are considered as syntypes (cf. YASUNAGA 1994).

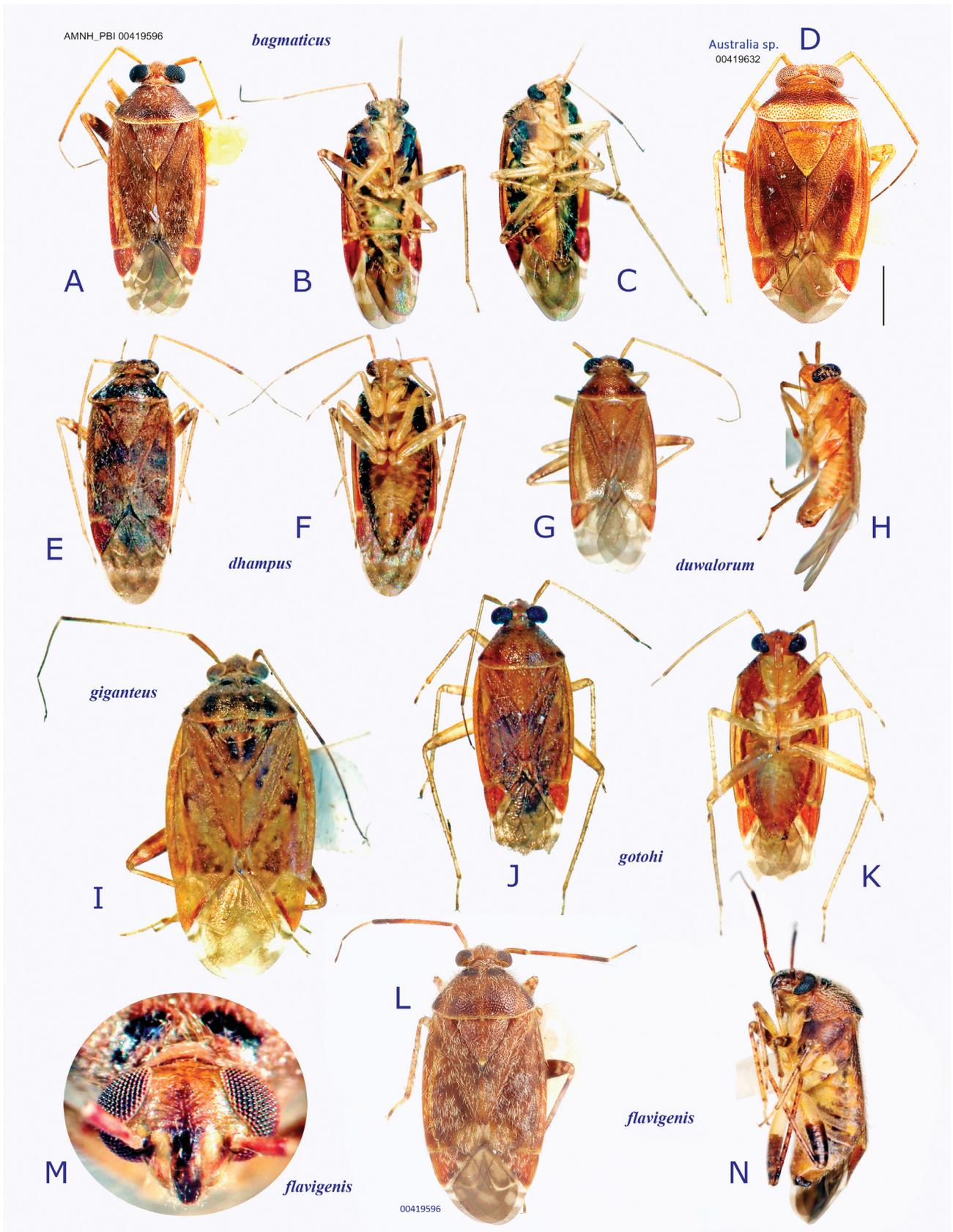


Fig. 7. Habitus images of *Diognetus* spp. A–C – *D. bagmaticus* sp. nov., ♂ (A–B) and ♀ (C); D – undetermined ♂ specimen from Queensland, Australia; E–F – *D. dhampus* sp. nov., ♂; G–H – *D. duwalorum* sp. nov., holotype ♂; I – *D. giganteus* sp. nov., holotype ♀; J–K – *D. gotohi* sp. nov., holotype ♂; L–N – *D. flavigenis* (Horváth, 1905), ♂ (M – head in frontal view). Scale bar 2 mm.

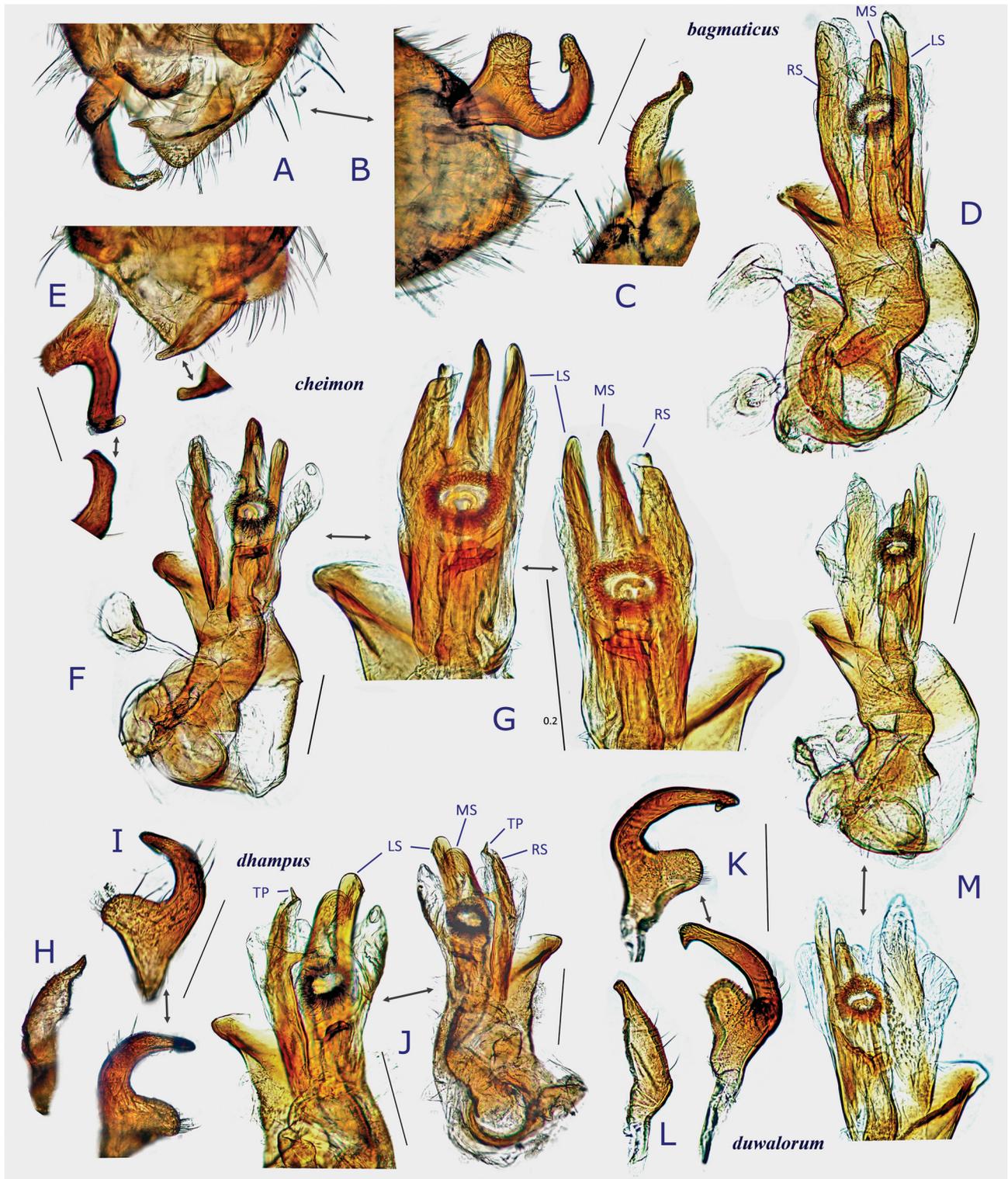


Fig. 8. Male genitalia of *Diognetus bagmaticus* sp. nov. (A–D), *D. cheimon* sp. nov. (E–G), *D. dhampus* sp. nov. (H–J) and *D. duwalorum* sp. nov. (K–M). A–B, E – apex of pygophore with parameres; C, H, L – right paramere; I, K – left paramere; D, F–G, J, M – vesica (endosoma). Scale bars 0.2 mm.

Additional material examined. JAPAN: HONSHU: Wakayama Pref., Kumano area, Hatanashi Mts., Mt. Ando, 1,100 m alt., 33.8977 135.6200, UV lighting, 7 Jun 2000, S. Gotoh, 1 ♂ 1 ♀ (AMNH_PBI 00419456–57) (CNC), 10 ♂♂ 8 ♀♀ without USIs (TYCN); Wakayama Pref., Tanabe City (previous Ohtoh Village), Mengawa, Sampo Shinto Shrine, Kumano River, 33.689689, 135.595353, sweeping flowers of *Cleyera japonica* Thunb., 15 Jun 1998, T. Yasunaga & S. Gotoh, 3 ♂♂ 3 ♀♀ (TYCN).

Redescription. See YASUNAGA (1994). **Measurements.** See Table 1.

Differential diagnosis. Recognized by the following characters: body generally chocolate brown, ovoid, rather tumid; dorsum speckled with paler maculae or spots (Figs 3A–B); head with yellowish brown jugum contrasting to dark clypeus (tylus) (Fig. 7M); labium short, reaching but not exceeding apex of mesocoxa (Fig. 28A); apex of scutellum creamy yellow; dark reddish-brown metafemur with creamy yellow basal half; parempodia rather broad and long (Figs 28G–H); left paramere with sensory lobe triangularly inflated (Fig. 11B) and thick hypophysis (Fig. 28I); vesical RS with an apical pointed process that is notched basally (Fig. 11D); sclerotized ring thick-rimmed (Figs 11G, 28O); dorsal structure of posterior wall rounded, wide, toothed (Figs 28K–L); and interramal lobe with uniformly distributed, comb-like scaly microstructures (Fig. 28N).

Biology. Occurrence of *Diognetus flavigenis* is, thus far as known, restricted to central and western Honshu (Tokai and Kinki areas). One of the breeding hosts appears to be *Cleyera japonica* Thunb. (Pentaphylacaceae); several fresh adults were found on the flower buds and inflorescence. A univoltine life cycle is assumed for this mirid. The adults were found in June and July and the eggs presumably hibernate.

Distribution. Japan (central and western Honshu).

Comments. This Japanese-indigenous species was described by HORVÁTH (1905), based on at least three syntypes, a couple of male specimens from Gifu, central Honshu and a female from Sapporo, Hokkaido (AUKEMA 2018). LINNAVUORI (1965) redescribed the female syntype (with label data as Japan, Sapporo, Matsumura) which however does not match the acceptable concept of *Diognetus flavigenis* and most probably fits *Salignus duplicatus* (Reuter, 1906), judging from the redescription. This willow-inhabiting mirid is commonly found throughout Hokkaido (TODO & YASUNAGA 1995, YASUNAGA 2001), whereas *D. flavigenis* is now assumed to inhabit restricted areas in central and western Honshu including Gifu. Therefore, the type-series of '*flavigenis*' (partim in HNHM) could include two species, and further verification and lectotype designation are required.

As mentioned above, we could access 1 ♂ 1 ♀ specimens from Gifu, deposited in Hokkaido University, Sapporo (namely, Matsumura Collection, the oldest insect collection in Japan). These are presumed to be a series of material that were collected along with the syntype male (from Gifu, HNHM) or can be included in the type-series, although HORVÁTH (1905) did not state in the original description how many specimens were designated as type-series.

Diognetus giganteus sp. nov.

(Figs 7I, 27J–K)

Type material. HOLOTYPE: ♀, MALAYSIA: PAHANG: Cameron Highlands, 4,488, 101.367, at UV light, 28 Jul 1986, S. Gotoh (ZRC) (AMNH_PBI 00380748).

Description. Female (holotype). Body ovoid, largest among known congeners with total length 6.7 mm, maximum width 3.2 mm. COLORATION: Dorsum pale brown, partly tinged with red (Fig. 7I). Head reddish-brown. Antennae pale brown; segment I pale reddish-brown; apical 1/5 of segment II, whole segment III and segment IV (except for yellow extreme base of III) dark brown. Labium shiny pale reddish-brown (segments III–IV not observed as heavily glued). Pronotum irregularly speckled with dark maculae; mesoscutum and scutellum reddish-brown, with irregular symmetrical dark maculae and yellow apex; lateral margin of pronotum and dorsal half of propleuron shiny dark brown; mesepimeron and episternum infuscate; scent efferent system creamy yellow. Hemelytron pale reddish-brown, speckled with irregular dark maculae; cuneus pale brown, with sanguineous suffusion along inner margin; membrane pale grayish brown, semitransparent, with lighter veins. Coxae and legs reddish-brown; metafemur with two brown rings subapically (basal one wider); tarsi pale brown. Ventral surface of abdomen pale brown, with reddish or brownish lateral and posterior margins. SURFACE AND VESTITURE: As in generic diagnosis; dorsal vestiture relatively short; scutellum and hemelytron rather matte, weakly and sparsely punctate (Fig. 27K). STRUCTURE: Eye relatively large; vertex a little narrower than an eye in dorsal view. Antennal segment II slightly longer than pronotal width. Scutellum inflated, transversely rugose. Scent efferent system relatively large, with thick peritreme (Fig. 27J). FEMALE GENITALIA: Not examined, as a single available specimen is excessively glued.

Male. Unknown.

Measurements. See Table 1.

Differential diagnosis. Easily recognized by its largest size among known congeners; ovoid and tumid body; and relatively inflated pronotal disk and scutellum. These diagnostic characters enable to be distinguished from any other known species of *Diognetus*.

Etymology. Latin adjective *giganteus* (large, giant), referring to its largest size among the congeners.

Biology. Unknown.

Distribution. Malaysia (Pahang).

Diognetus gotohi sp. nov.

(Figs 7J–K, 12A–C, 27L–O)

Type material. HOLOTYPE: ♂, MALAYSIA: PAHANG: Fraser's Hill [= Bukit Fraser], 3,715, 101.735, at light, 6 Jan 1997, S. Gotoh (ZRC) (AMNH_PBI 00380749).

Description. Male (holotype). Body elongate ovoid, moderate in size, 5.1 mm. COLORATION: General coloration reddish-brown (Figs 7J–K). Antennae pale brown; apical 1/6 of segment II, whole segment III and segment IV (except for yellow base of III) brown. Labium

shiny pale reddish-brown; apex of segment IV infusate. Pronotum relatively shining, slightly darkened at humeri, with yellowish-brown posterior margin; collar yellowish brown; scutellum uniformly pale reddish-brown; pleura reddish-brown (Fig. 7K); scent efferent system creamy yellow. Hemelytron almost uniformly pale reddish-brown; cuneus rather bright red; membrane pale grayish brown, with a pair of pale, semitransparent marks posterior to cuneus. Coxae and legs pale brown, partly tinged with red; each femur without apical darker rings; apical half of each metatarsomere III brown. Ventral surface of abdomen pale reddish-brown, slightly paler mesally. SURFACE AND VESTITURE: As in generic diagnosis; scutellum rather matte, weakly punctate; hemelytron almost impunctate. STRUCTURE: Eye relatively large; vertex narrower than eye in dorsal view. Antennal segment II more than twice as long as segment III. Labium reaching but not exceeding apex of metacoxa, longer than antennal segment II. Scutellum almost flat. Metathoracic scent efferent system as in Fig. 27M, rather rounded. Metatarsomere I obviously shorter than II or III (Fig. 30N); parempodia relatively broad, about as long as claw (Fig. 27N). MALE GENITALIA (Figs 12A–C, 27O): Left paramere with developed basal protuberance of sensory lobe (Figs 12A, 27O); hypophysis of

right paramere short, blunt-tipped (Fig. 12B); vesica with TP at apex of LS; RS thick, curved apically; phallosome with narrow apical keel (Fig. 12C).

Female. Unknown.

Measurements. See Table 1.

Differential diagnosis. Based on similar shape of the male genitalia, the present new species is most closely related to *D. duwalorum* sp. nov., from which *D. gotohi* sp. nov. can be distinguished by the following characters: Body larger; basic coloration pale reddish-brown (Fig. 7J); antennal segment II longer, more than twice as long as segment III; labium not surpassing apex of metacoxa; pronotal disk not significantly darkened; ostiolar peritreme rather rounded (Fig. 27M); mesofemur shorter than basal width of pronotum; metatarsomere I shorter than II or III (Fig. 27N); basal protuberance of left paramere wider (Figs 12A, 27O); hypophysis of right paramere shorter, blunt-tipped (Fig. 12B); vesica with TP at apex of LS; and vesical RS thick, curved apically (Fig. 12C).

Etymology. Named for the late Mr. Shin Gotoh who collected the holotype.

Biology. Unknown.

Distribution. Malaysia (Pahang).

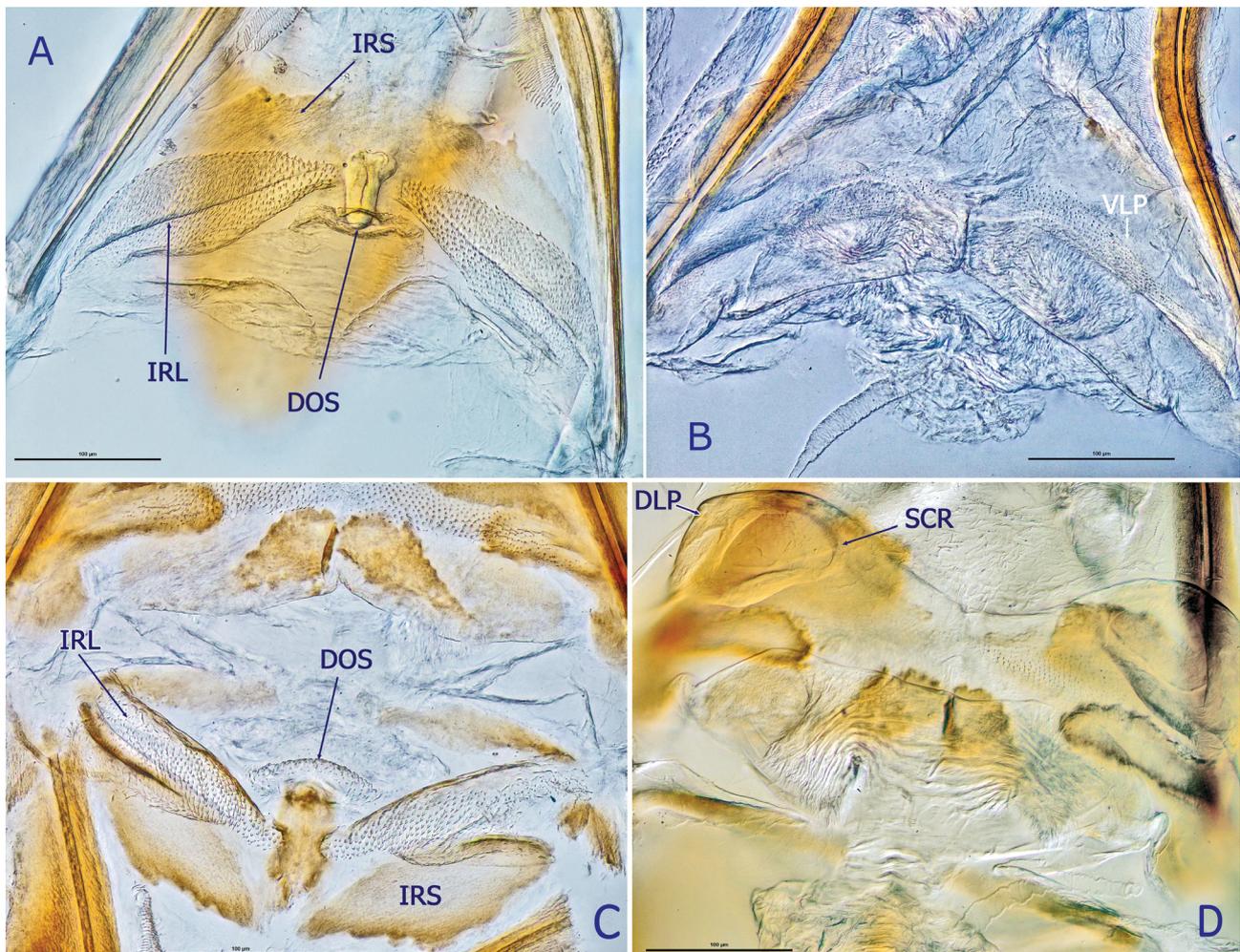


Fig. 9. Female genitalia of *Diognetus bagmaticus* sp. nov. (A–B) and *D. intonsus* Distant, 1904 (C–D). A, C – posterior wall; B, D – genital chamber. Scale bars 0.1 mm.

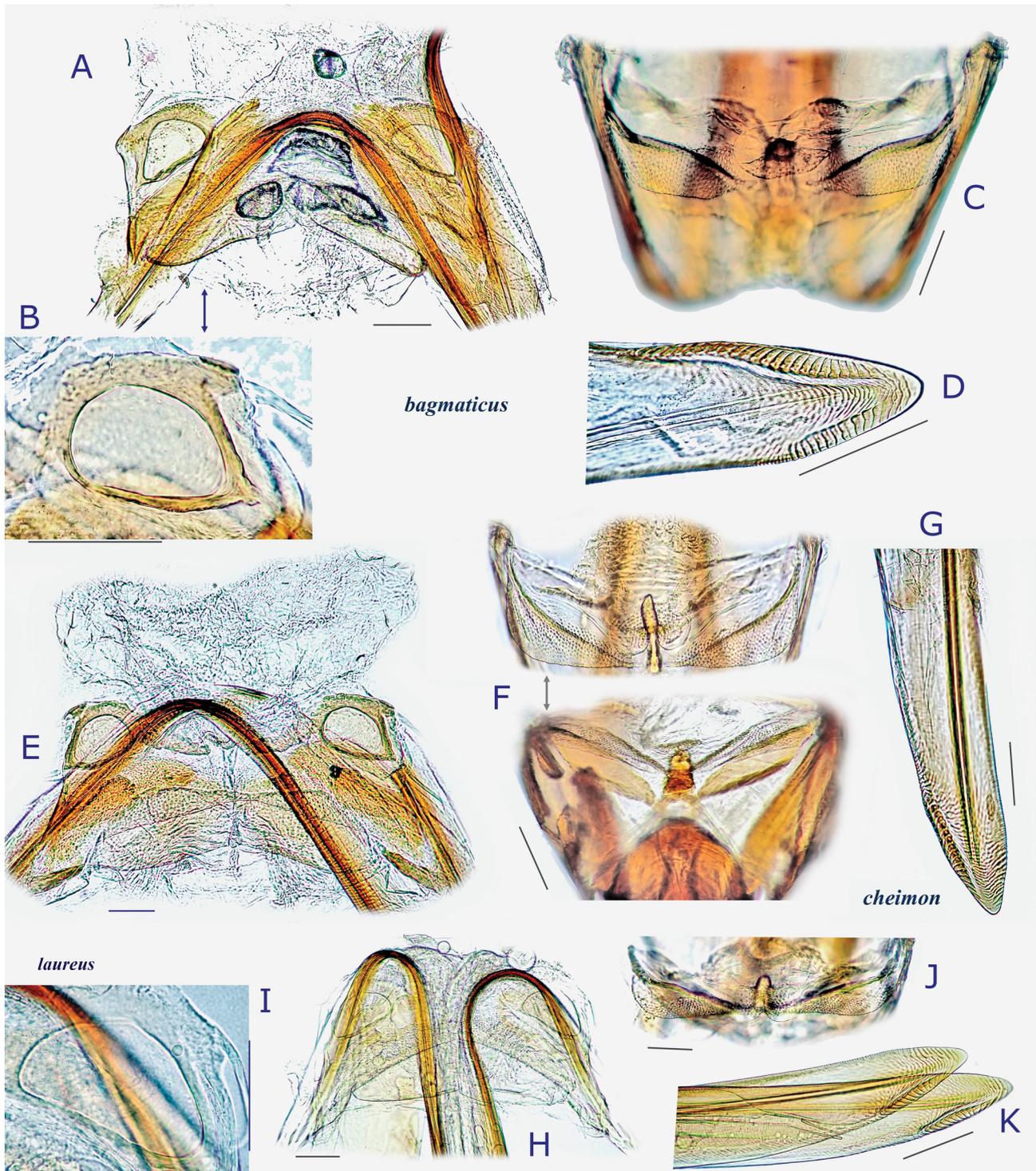


Fig. 10. Female genitalia of *Diognetus bagmaticus* sp. nov. (A–D), *D. cheimon* sp. nov. (E–G) and *D. laureus* sp. nov. (H–K). A, E – genital chamber; B, I – sclerotized ring; C, F, J – posterior wall; D, G, K – ovipositor (gonapophysis I). Scale bars 0.1 mm.

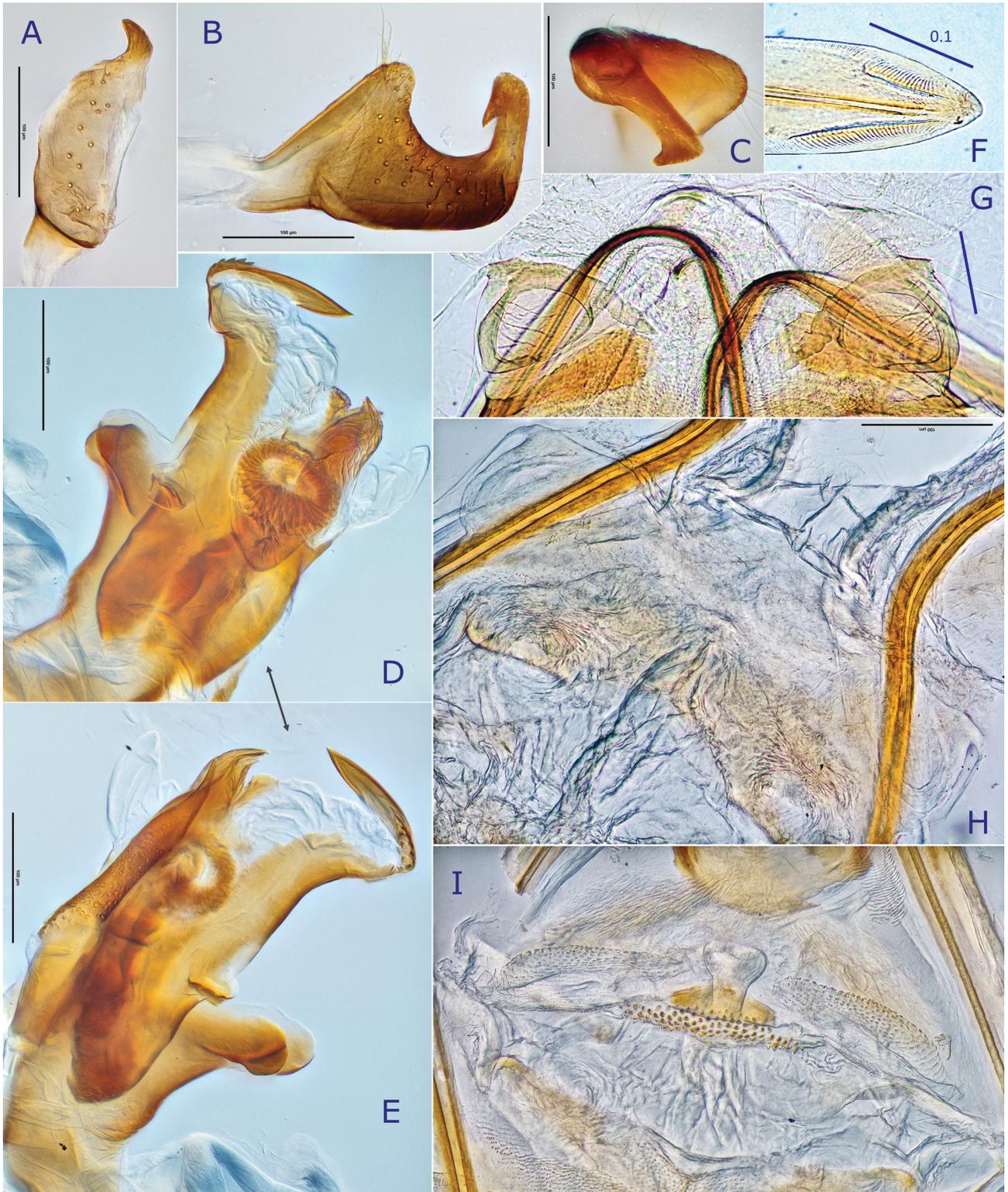


Fig. 11. Male (A–E) and female (F–I) genitalia of *Diognetus flavigenis* (Horváth, 1905). A – right paramere; B–C – left paramere; D–E – vesica (endosoma); F – ovipositor (gonapophysis I); G–H – genital chamber; I – posterior wall. Scale bars 0.1 mm.

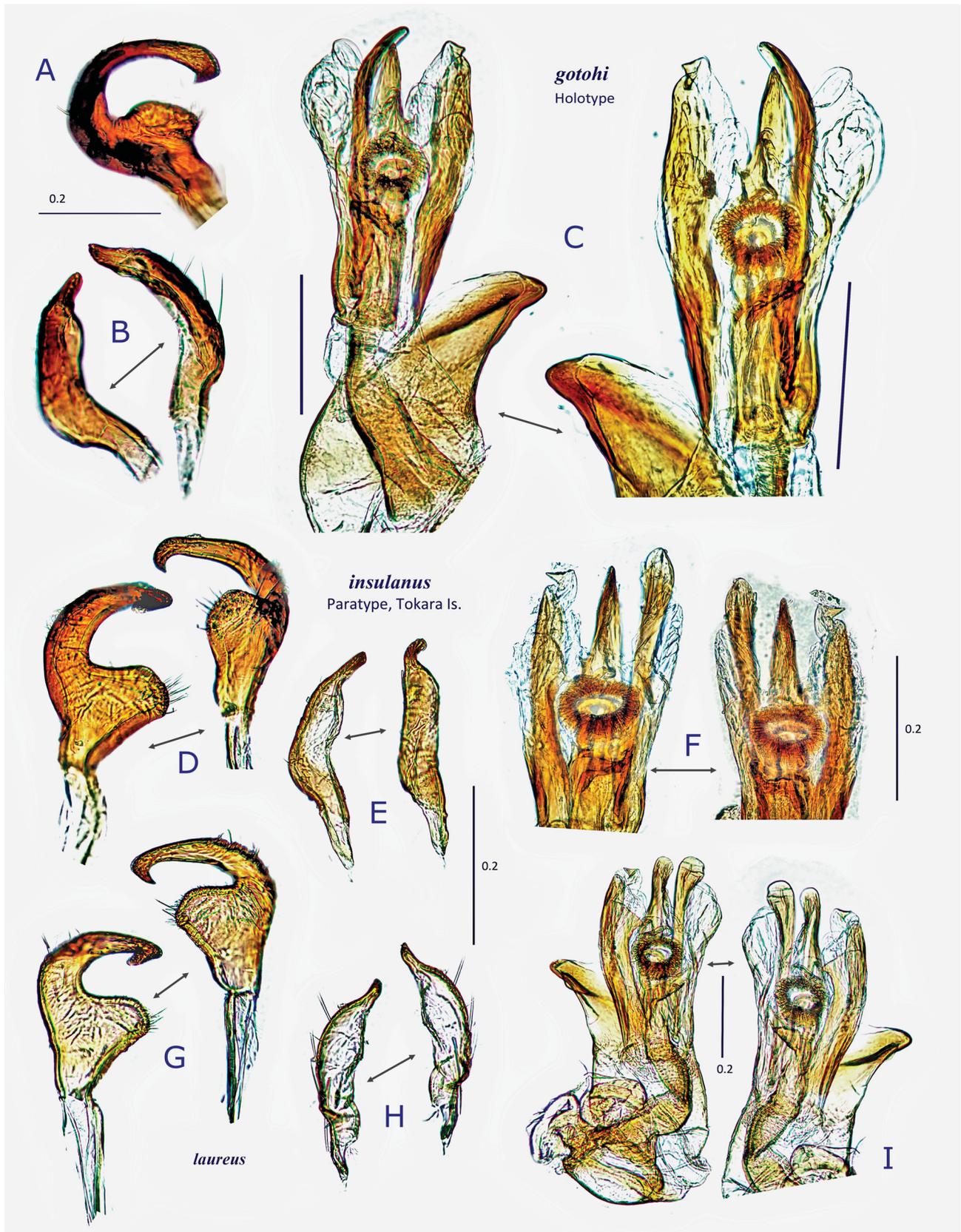


Fig. 12. Male genitalia of *Diognetus gotohi* sp. nov. (A–C), *D. insulanus* (Yasunaga, 1994) (D–F) and *D. laureus* sp. nov. (G–I). A, D, G – left paramere; B, E, H – right paramere; C, F, I – vesica (endosoma). Scale bars 0.2 mm.

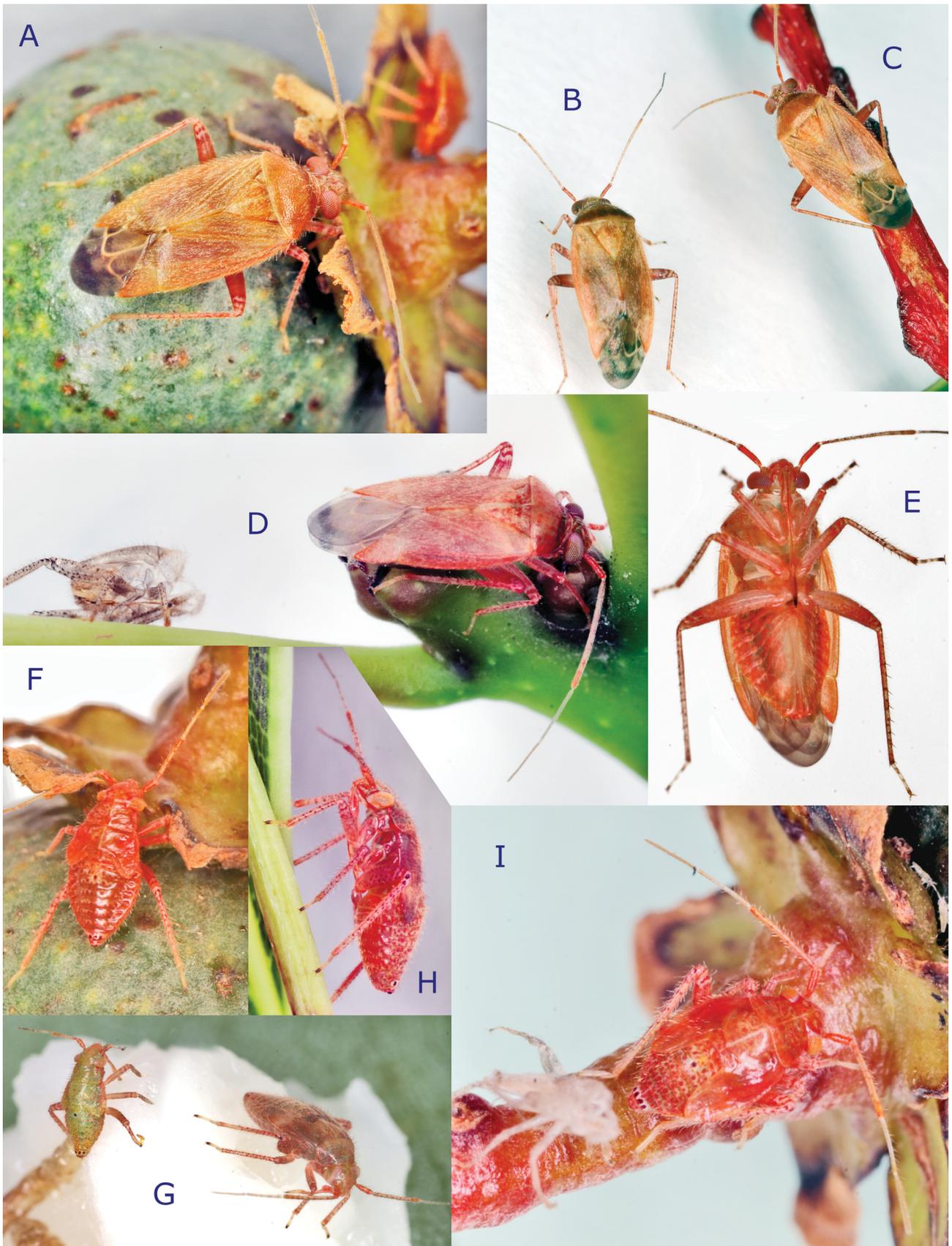


Fig 13. Habitus images of adults (A–E) and immature forms (F–I) for *Diognetus laureus* sp. nov. A, C – male on *Machilus thunbergii* (C– holotype); B, E – female; D – male and exuvia (left); F – 4th instar nymph; G – 3rd (left) and 5th instar nymphs; H–I – 5th instar nymph.

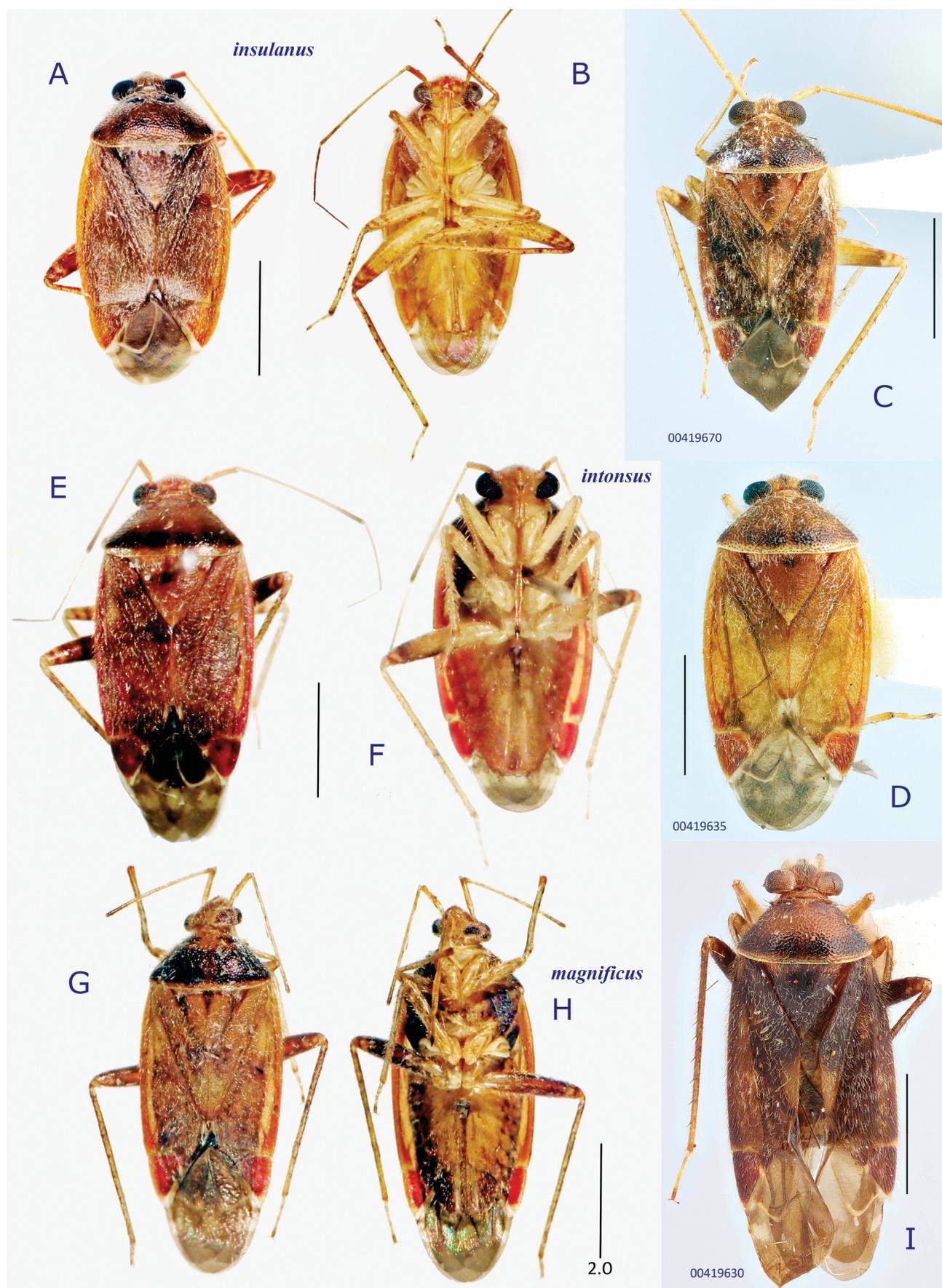


Fig. 14. Habitus images of *Diognetus* spp. A–C–D. *insulanus* (Yasunaga, 1994), ♀, dorsal (A) and ventral (B) views; C–F–D. *intonsus* Distant, 1904, ♂ (C) and ♀ (D) from India, ♀ (E–F) from Thailand. G–I – *D. magnificus* sp. nov., ♀ (G–H) and holotype ♂ (I).

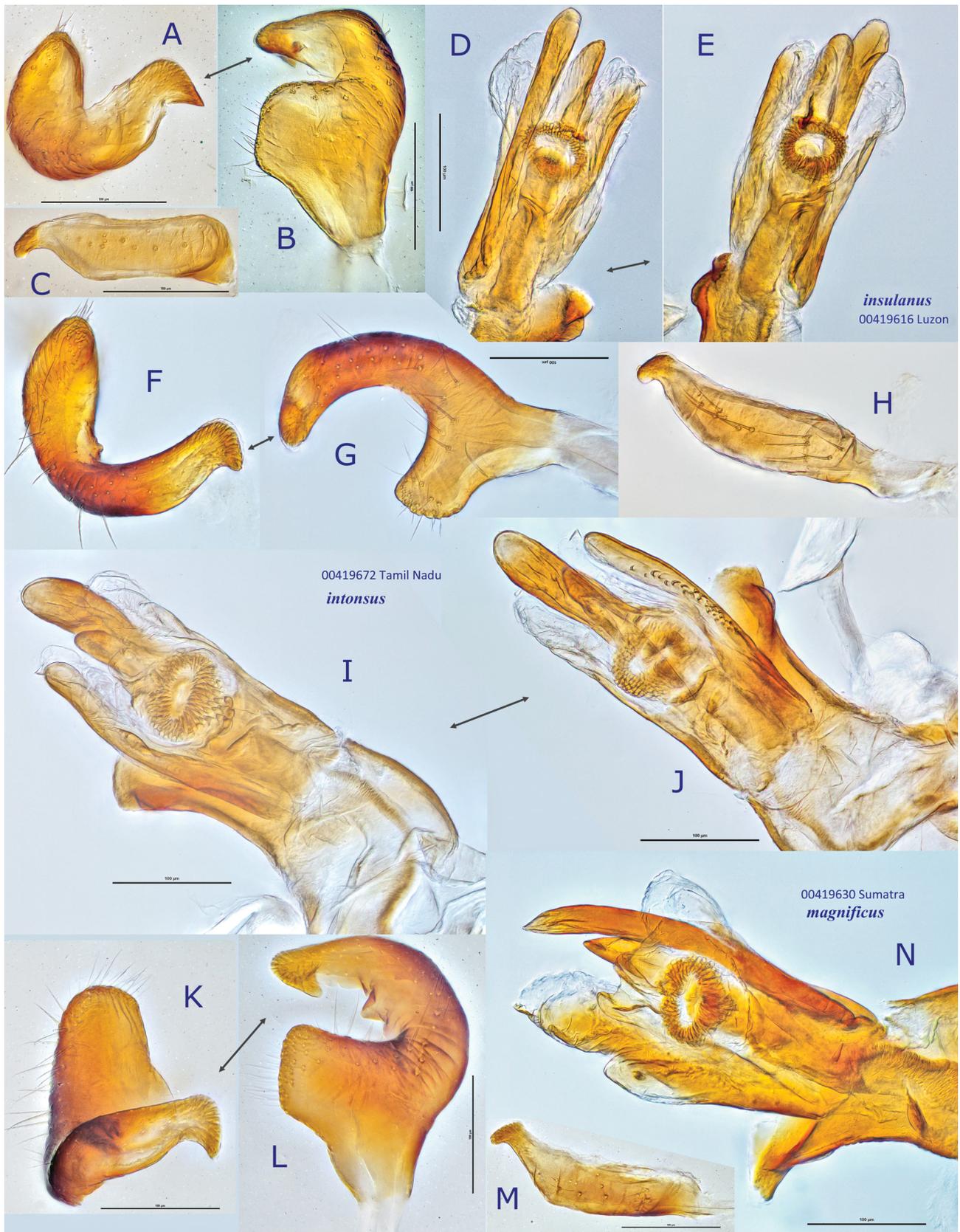


Fig. 15. Male genitalia of *Diognetus insulanus* (Yasunaga, 1994) (A–E), *D. intonsus* Distant, 1904 (F–J) and *D. magnificus* sp. nov. (K–N). A–B, F–G, K–L – left paramere; C, H, M – right paramere; D–E, I–J, N – vesica (endosoma). Scale bars 0.1 mm.

***Diognetus insulanus* (Yasunaga, 1994) comb. nov.**

(Figs 3C, 12D–F, 14A–B, 15A–E, 23, 29)

Yamatolygus insulanus Yasunaga, 1994: 121 (original description).*Yamatolygus insulanus*: YASUNAGA (2001): 268, fig. 317 (diagnosis); KERZHNER & JOSIFOV (1999): 182 (catalog); SCHUH (2002–2013) (online catalog); NOZAKI et al. (2015): 17 (faunal list); AUKEMA (2018) (online catalog).*Yamatolygus insulans* (incorrect subsequent spelling): SCHUH (1995): 972 (catalog).*Yamatolygus insulanus* (misidentification referring to *Diognetus vernus* sp. nov.): NOZAKI et al. (2016): 81 (faunal list); OH et al. (2018): 482 (faunal list); KIM et al. (2019): 72 (diagnosis).

Type material examined. HOLOTYPE: ♂, JAPAN: RYUKYUS: Amami-Oshima Island, Kagoshima Pref., Yamato Village, Materia Waterfall, 28.316860, 129.351380, UV light trap, 12 May 1987, T. Yasunaga (TYCN) AMNH_PBI00380750. PARATYPES: JAPAN: RYUKYUS: Tokara Islands, Takara Island, 29.14, 129.21, 16–17 May 1991, T. Ueno, 2 ♂♂ 2 ♀♀ (TYCN); Amami-Oshima Island, Chinaze, 28.351, 129.437, UV light trap, 13 May 1987, T. Yasunaga (TYCN); Okinawa Island, Nago City, Ohura, 26.555, 128.045, UV lighting, 5 Jun 1990, M. Hayashi et al., 1 ♂ 1 ♀ (TYCN); Okinawa Island, Nago City, Haneji, 26.61 128.02, 24 Apr 1993, S. Azuma, 1 ♂ 2 ♀♀ (TYCN); Okinawa Island, Kunigami Village, Yona, 26.763503, 128.216387, on flower of *Schima wallichii*, 21 May 1993, T. Yasunaga, 1 ♀ (TYCN); same locality, UV light trap, 20–25 May 1993, T. Yasunaga, 2 ♂♂ 2 ♀♀ (TYCN); same locality, 24 May 1993, Y. Nakatani, 1 ♀ (NIAES).

Additional material examined. JAPAN: KYUSHU: Kagoshima Pref., Simo-Koshiki Island, Aose, 31.6755, 129.7210, UV lighting, 25 Aug 2014, T. Nozaki, 1 ♀ (WCF); Yakushima Island, Issou, 30.45 130.48, 10 Oct 1992, Y. Sawada, 1 ♂ (TYCN). Nagasaki Pref., Goto Islands, Nakadohri Island, Shin-Kamigoto Town, Tsuzuki-Hamano'ura, 32.9608, 129.0277, UV lighting, 5–6 Jun 2022, T. Yasunaga, 1 ♂ (TYCN). RYUKYUS: Okinawa Island, Kunigami Village, Okuni Trail, 26.74, 128.22, inflorescence of *Meliosma oldhamii*, T. Yasunaga, 1 ♀ (TYCN); same locality, UV lighting, 25 Jun 1999, T. Yasunaga, 4 ♂♂ 3 ♀♀ (TYCN); Okinawa Island, Kunigami Village, Yona, 15–18 May 1998, Y. Nakatani, 2 ♂♂ 2 ♀♀ (NIAES); same locality, 5 Feb 1998, K. Takahashi, 1 ♀ (TYCN). PHILIPPINES: LUZON: Ifugao, Liwo, 8 km East Mayoyao, 16.90000, 121.20000, 1000 m (3,281 ft), 06 Jun 1967–08 Jun 1967, H. M. Torrevillas, 2 ♂♂ (AMNH_PBI 00419615–00419616), 2 ♀♀ (00419620–00419621) (BPBM). TAIWAN: NANTOU HSIEN: Ren'ai Town, Huei-Sun For. Rec. Area, 5 km NE of Meiyuan, 24.06670, 120.98330, 733 m (2,405 ft), 10–11 Jul 1992, T. J. Henry & A. G. Wheeler, Jr., 1 ♀ (00419675) (USNM); same data, 1 ♂ (TYCN); Huiseun Forest Area, along Guandao-xi, 24.0865, 121.0265, Mercury UV lighting, 14–15 Mar 2017, T. Yasunaga et al. (NMNS).

Redescription. For description see YASUNAGA (1994). **Measurements.** See Table 1.

Differential diagnosis. Recognized by its ovoid body, with 4.5–5.2 mm total length; castaneous to reddish-brown general coloration (Figs 3C, 14A–B); densely distributed sericeous setae along with rather sparsely distributed simple setae on dorsum (Fig. 23); relatively long labium that is as long as or slightly exceeding apex of metacoxa (Figs 3C, 14B, 29A, C); less rugose, uniformly and finely punctate scutellum (Figs 23, 29B); short metafemur that is shorter than basal width of pronotum in male; relatively wide basal protuberance of left paramere (Figs 12D, 15B); distinct TS and elongate LS of vesica (Figs 12F, 15D, 29J); rather thick-rimmed sclerotized ring (Figs 16A, 29N); and rather narrow interramal lobe and dorsal structure (Figs 16B, 29L). See also differential diagnosis section under *D. laureus* sp. nov.

Biology. *Diognetus insulanus* is a thermophilic mirid, occurring only in subtropical and tropical climate zones. Its breeding host is yet to be determined, but ever-green

broadleaf trees appear to be the candidates, such as inflorescences of *Meliosma oldhamii* Miq. (Sabiaceae) and *Schima wallichii* (DC.) Korth. (Theaceae) from which the adult specimens (including some teneral individuals) were found. Collection records suggest at least two generations per year (Table 2). Like as other congeners, the adults were frequently attracted to UV light at night.

Distribution. Japan (Koshiki, Yakushima, Amami-Oshima and Okinawa Islands) (YASUNAGA 1994, 2001, NOZAKI et al. 2015), Philippines* (Luzon), Taiwan* (Nantou District); this thermophilic species appears to be restricted to subtropical and tropical climatic zones.

***Diognetus intonsus* Distant, 1904**

(Figs 2G, 9C–D, 14C–F, 15F–J, 16D–E, 30A–I)

Diognetus intonsus Distant, 1904b: 432 (as new species).*Diognetus intonsus*: SCHUH (1995): 760 (catalog), SCHUH (2002–2013) (online catalog); CHÉROT et al. (2017): 93–94 (diagnosis, DV, MG, FG); SAHA et al. (2020): 279 (faunal list).*Diophantus literatus* Distant, 1909: 510–511 (as new species).*Diophantus literatus*: SCHUH (1995): 760 (catalog), SCHUH (2002–2013) (online catalog); CHÉROT et al. (2017): 94 (synonymy).*Diplotrichiella rufescens* Poppius, 1915a: 66 (as new species). **New junior subjective synonym.***Diplotrichiella rufescens*: SCHUH (1995): 761 (catalog), SCHUH (2002–2013) (online catalog).

Type material examined. *Diognetus intonsus*: LECTOTYPE: ♀ (BMNH), SRI LANKA: Ceylon, Maskelyia, Green (no further data, BMNH).

Diognetus literatus: LECTOTYPE: ♀ (BMNH), SRI LANKA: Ceylon, Ohiya, Green (no further data, damaged specimen, BMNH).

Diplotrichiella rufescens: HOLOTYPE: ♀ (MZHF), INDIA: TAMIL NADU: Trichinopoly, 1898, Coll. Nouhalier (vertically compressed and partly damaged condition).

Additional material examined. INDIA: TAMIL NADU: Madras, Anamalai Hills, Cinchona, 10.28228, 76.97999, 1,067 m (3,500 ft), Apr 1959, P. S. Nathan, 1 ♀ (AMNH_PBI 00419635) (CNC); same locality, May 1965; P. S. Nathan, 3 ♂♂ 2 ♀♀ (00419670–00419674) (CNC). THAILAND: CHIANG MAI: Doi Pui, 18.826460, 98.892088, UV lighting, 23–24 Oct 1981, S. Sakurai, 3 ♀♀ (DOAT, TYCN).

Redescription. Body oval, moderate in size, 4.8–5.3 mm. COLORATION: Dorsum castaneous, usually tinged with red (Figs 14C–D), usually with mottled pattern (Fig. 14C). Antennae yellowish brown; apical 1/6–1/5 of segment II, segment III (except for pale extreme base) and segment IV brown. Labium pale brown, partly tinged with red. Pronotum reddish-brown, relatively shining, with posterior 1/3–1/2 darkened and posterior margin pale; anterior mesal part of scutellum sometimes narrowly infusate; pleura fuscous; scent efferent system creamy yellow. Hemelytron castaneous to reddish-brown, without mottled pattern; border between apex of corium and cuneal base narrowly pale; membrane pale smoky brown, with irregular pale, semitransparent maculae and pale veins. Coxae and legs yellowish brown; apical 1/3–1/2 of metafemur darkened, with two (subapical and apical) pale rings (Fig. 14F). Ventral surface of abdomen pale brown, with more or less reddish lateral margins. SURFACE AND VESTITURE: As in generic diagnosis; dorsum with densely distributed, silvery, reclining setae; base of mesepisternum with long, erect setae (Fig. 30B); hemelytron rather matte. STRUCTURE: Vertex relatively wide (Fig. 30C). Labium reaching apex of metacoxa (Fig. 13F). Scutellum weakly swollen, shallowly and sparsely punctate, less rugose.

Metathoracic scent efferent system as in Fig 30B. Metatarsomere II as long as III (Fig. 30E); pretarsal structure as in Fig. 30F; parempodia slightly shorter than claw. MALE GENITALIA (Figs 15F–J): Left paramere generally broad, with small, median process and flattened apex (Fig. 15F). Vesica with short, narrowed MS, medially spinulate LS and tiny TP (Figs 15I–J). FEMALE GENITALIA (Figs 9C–D, 16D–E, 30G–I): Sclerotized ring with thickened anterior rim, posterolateral angle somewhat angulate (Fig. 16D); posterior wall (Figs 30H–I) with wide, rounded interramal lobe; dorsal structure lacking spinulate processes (Fig. 30I).

Measurements. See Table 1.

Differential diagnosis. Recognized and distinguished from other congeners by the following combination of characters: body moderate-sized, ovoid; dorsum with relatively dense, reclining, silvery setae; scutellum less rugose, with sparsely distributed, fine punctures; left paramere generally stout, with a small median process on sensory lobe; posterior wall with rather wide interramal lobe; and dorsal structure lacking spinulate processes.

Biology. Unknown; most of available specimens were collected by UV lighting method at forest zones in the Oriental Region.

Distribution. India (Tamil Nadu), Sri Lanka, Thailand (Chiang Mai); record from Papua New Guinea by CHÉROT et al. (2017) most probably represents an undescribed species.

Diognetus laureus sp. nov.

(Figs 1D, 10H–K, 12G–I, 13, 23, 30J–O, 31)

Yamatolygus sp. 1: MIYAZAKI et al. (2020): 66, table 1 (life span, Japanese name).

Type material. HOLOTYPE: ♂, JAPAN: KYUSHU: Nagasaki Pref., Nagasaki City, Yotsue-machi, Agri-Hills Park, 32.809700, 129.797000, sweeping fruits of *Machilus thunbergii* Siebold et Zucc. (Lauraceae), 25 Jun 2019, T. Yasunaga (AMNH) (AMNH_PBI 00380751). PARATYPES: JAPAN: KYUSHU: Fukuoka Pref., Yame City, Mt. Shakadake, 33.20, 130.84, UV lighting, 6 Jul 2019, 1 ♀, T. Nozaki (WCF); Nagasaki Pref., Nagasaki City, Tateyama, Mt. Konpira, sweeping flower buds of *Eurya japonica*, 32.764888, 129.879500, 24 Dec 2021, T. Yasunaga, 1 ♀ (TYCN); Nagasaki City, Nomozaki, Kabashima Island, 32.556555, 129.777977, sweeping fruits of *Machilus thunbergii*, 1 Jun 2019, T. Yasunaga, 1 ♂ [4th instar immature form reared then emerging on Jun 5, 2019, and mounted on Jun 16] (TYCN); same data, except for date, 6 Jun 2021, T. Yasunaga, 1 ♂ 3 ♀♀ (TYCN); same data, from 32.556161, 129.778000, inflorescence of *Cinnamomum japonicum* Sieb., 6 Jun 2021, T. Yasunaga, 1 ♀ [5th instar immature form reared then emerging on same day and dead on Jun 12] (TYCN); Nagasaki Pref., same data as for holotype, 2 ♂♂ 2 ♀♀ (TYCN); Nagasaki City, Iojima Island (lighthouse-park), 32.714177, 129.761155, sweeping flowers and fruits of *Eurya emarginata*, 27 Dec 2019, T. Yasunaga & K. Tanaka, 1 ♀ [5th instar immature form reared then emerging on Jan 1, 2020] (TYCN); Nagasaki City, Tateyama; Mt. Konpira, 32.765247, 129.877073, sweeping flowers and fruits of *Machilus thunbergii*, 19 Jun 2021, T. Yasunaga, 6 ♂♂ (CNC, TYCN); same data, except for detailed collecting site, 32.7640, 129.8787, 1 ♀ (TYCN); Nagasaki Pref., Omura City, Kushima, Ryujin Island (Shrine), 32.895166, 129.952900, on flower of evergreen broadleaf, 4 Jul 2022, T. Yasunaga, 1 ♂ (TYCN). SHIKOKU: Kochi Pref., Otoyo Town, Osugi, 33.76, 133.66, on *Ternstroemia gymnanthera* (Wight & Arn.) Bedd. (Pentaphylacaceae), 14 Jul 2004, M. Takai, 1 ♀ (TYCN); Tosa-Shimizu City, Cape Ashizuri, 32.73, 133.00, 22 May 1999, T. Befu, 1 ♂ (TYCN).

Additional material examined (general specimens): JAPAN: KYUSHU: Kumamoto Pref., Amakusa City, Uonuki Town, 32.256, 129.999, UV lighting, 12 Jun 2015, T. Nozaki, 1 ♀ (WCF); Nagasaki Pref., Nagasaki City, Kabashima Island, from 32.556161, 129.778000, inflorescence of *Cinnamomum japonicum* Sieb., 6 Jun 2021, T. Yasunaga, 1 ♀ [5th instar immature form reared then emerging on Jun 9 and dead on Jun

12] (TYCN); same locality and plant as for holotype, 6 Jun 2021, T. Yasunaga, 2 ♂♂ [5th instar immature form reared then emerging on Jun 10–11 and dead on Jun 15, Jun 20] (TYCN).

Description. Body elongate ovoid, relatively small, 4.2–5.1 mm in total length. COLORATION: Body including ventral surface generally pale reddish-brown (Figs 13A–C, E) (fresh specimens often bright red, cf. Fig. 13D); dorsum without mottled pattern. Antennae pale reddish-brown; segment I red or reddish-brown; apex of segment II uniformly pale, partly tinged with red; segment III (except for pale extreme base) and segment IV brown. Labium pale reddish-brown; apex of segment IV infusate (Fig. 13E). Pronotum usually brown posteriorly, with yellowish posterior margin; calli often with a pair of dark, small spots; pleura broadly reddish-brown; scent efferent system creamy yellow. Hemelytron almost uniformly pale reddish-brown, without dark maculae; membrane pale smoky brown, with pale veins and several semitransparent spots (Figs 13A–B). Coxae and legs reddish-brown; mesofemur with two faint pale rings subapically (Fig. 13E); tarsi brown; apical part of each tarsomere III brown. Ventral surface of abdomen reddish-brown, with paler median part. SURFACE AND VESTITURE: As in generic diagnosis; dorsal surface weakly shining, with densely distributed, brown, simple, semierect setae and silvery, reclining setae (Figs 23, 30N); scutellum transversely rugose, sparsely and finely punctate; hemelytron rather matte; punctures on corium partly very sparse or missing. STRUCTURE: Vertex with a basal transverse carina, weakly arched. Antennal segment II obviously shorter than labium. Labium long, exceeding apex of metacoxa and reaching abdominal sterna IV–VI (Fig. 30J), in ♂ longer than maximum width across hemelytron. Scutellum rather flat. Metathoracic scent efferent system as in Fig. 30L. Metatarsomere II slightly longer than III; pretarsal structure as in Fig. 31B; parempodia rather long and broad. MALE GENITALIA (Figs 12G–I, 31C): Pygophore generally small in size (Fig. 31C). Left paramere with relatively narrow protuberance of sensory lobe and somewhat tapered hypophysis that is hooked at apex (Fig. 12G); right paramere slender (Fig. 12H). Vesica small-sized, with MS and LS that are similar in shape and size; RS minutely and sparsely spinulate, with small TP (Fig. 12I). FEMALE GENITALIA (Figs 10H–K, 31D–I): Sclerotized ring thin-rimmed (Figs 10H–I, 31G–H); posterior wall (Figs 10J, 31E–F) with rather small dorsal structure; interramal lobe with rounded lateral margin (Fig. 31E); spines on dorsal structure smaller than interramal lobe (Fig. 31F).

Measurements. See Table 1.

Differential diagnosis. Recognized by its generally pale reddish-brown, relatively small-sized, elongate oval body; long labium that is surpassing apex of metacoxa and longer than maximum width in ♂; generally small male genitalia; and thin-rimmed sclerotized ring. Most closely related to *D. insulanus*, from which *D. laureus* sp. nov. can be distinguished by the generally smaller size, pale reddish-brown basic coloration, longer labium, narrower apical part of the protuberance of the left paramere, thinner-rimmed sclerotized ring, rather rounded lateral margin of the interramal lobe, and shorter spines on the dorsal structure.

The immature forms (3rd to 5th instars) are recognized by the following features: Body generally bright red, rounded or ovoid (sometimes partly tinged with olive as in Fig. 13G); antenna long, longer than body in 4th–5th (Figs 13F, I); and dark spot (scent gland opening) on abdominal tergum III reddish, small. By these characters, the late immature forms of *D. laureus* sp. nov. can be distinguished from those of *D. cheimon* sp. nov. and *D. vernus* sp. nov. (cf. Fig. 5).

Etymology. Named for the plant association of this new species with Lauraceae hosts; an adjective.

Biology. This new species is associated with Lauraceae evergreen broadleaf trees (flowers and fruits), *Machilus thunbergii* Siebold & Zucc. (Fig. 1D) and *Cinnamomum japonicum* Sieb., on which the immature forms were found in June. The reddish general coloration both in the adults and nymphs appears to be cryptic, harmonious with the red peduncles (cf. Figs 13C, I). On the other hand, winter-emerging population (possibly 2nd annual generation, cf.

Table 2) was discovered from the flowers or fruits of *Eurya emarginata* (and 1 ♀ from *E. japonica*) and often co-occurred with *Diognetus cheimon* sp. nov. and *D. vernus* sp. nov. These three mirids are closely related to each other and may be derived from a common ancestor that was associated with *Eurya* evergreen trees, although the spring–summer generation of each species utilizes different hosts.

Distribution. Japan (Shikoku, Kyushu).

***Diognetus magnificus* sp. nov.**

(Figs 14G–I, 15K–N, 16F–H, 32A–F)

Type material. HOLOTYPE: ♂, INDONESIA: SUMATRA: North Sumatra, Dolokmaranggir [Dolok Merangir], 3.14100, 99.12600; no date provided, E.W. Diehl (AMNH_PBI 00419630) (CNC). PARATYPE: INDONESIA: SUMATRA: N. Sumatra, Karo, Aek Popo, NW of Lake Toba, N2.92 E98.50, 1,700 m, light trap, 1 May 1989, K. Maruyama, 1 ♀ (TYCN).

Description. Body elongate, large-sized, more than 6.3 mm; 2nd largest species among known congeners. COLORATION: Body generally castaneous (Fig. 14G–I);

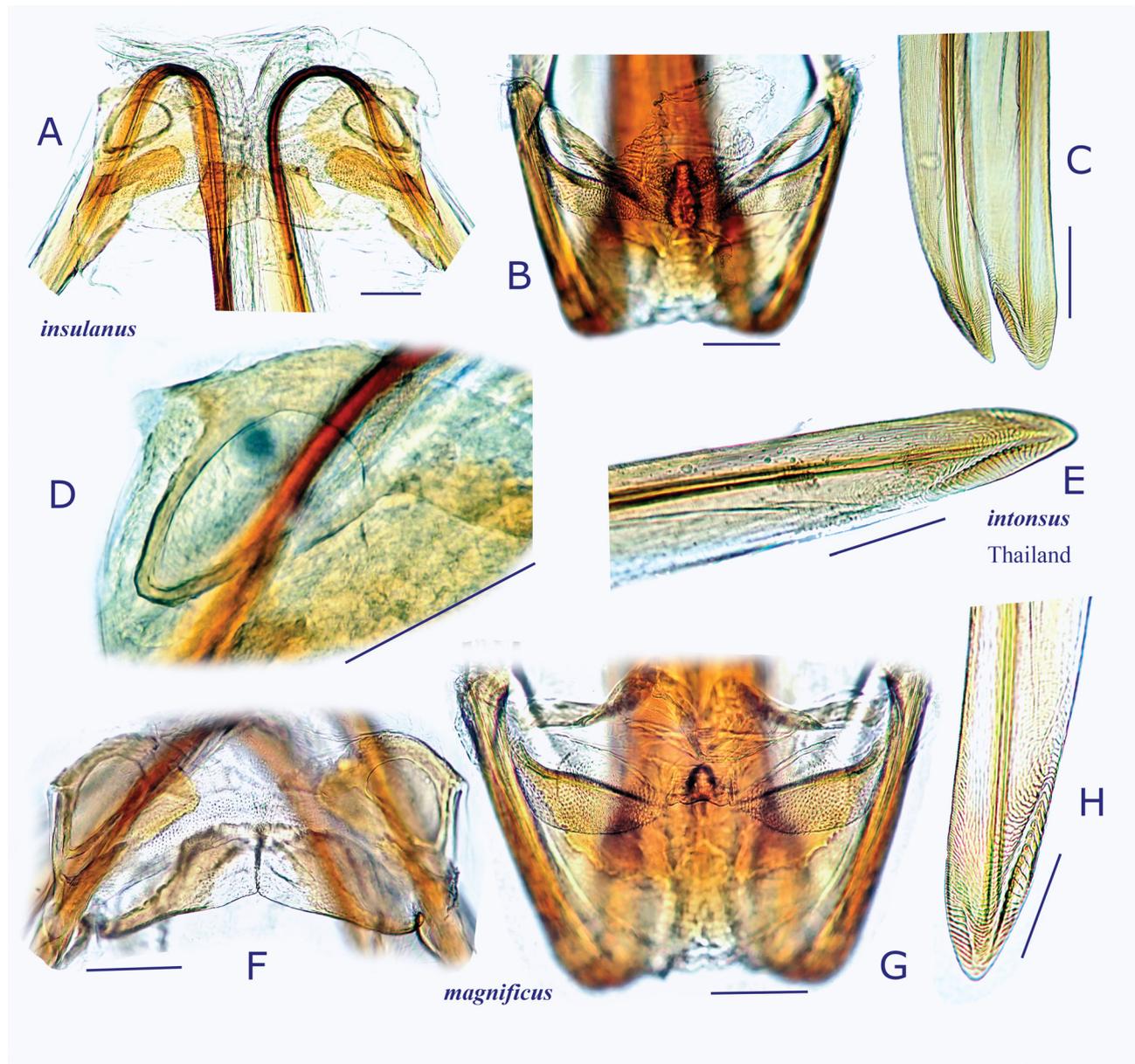


Fig. 16. Female genitalia of *Diognetus insulanus* (Yasunaga, 1994) (A–C), *D. intonsus* Distant, 1904 (D–E) and *D. magnificus* sp. nov. (F–H). A, F – genital chamber; D – sclerotized ring; B, G – posterior wall; C, E, H – ovipositor (gonapophysis I). Scale bars 0.1 mm.

dorsum partly darkened. Head somewhat lighter; frons weakly darkened. Antennae pale brown; segment I partly suffused with red; segments III and IV brown. Labium pale reddish-brown; apex of segment IV infuscate (Fig. 14H). Pronotum widely darkened posteriorly, with yellowish posterior margin; calli with a pair of dark, ovoid spots; mesoscutum pale brown; scutellum uniformly darkened in ♂ (Fig. 14I) or pale brown with dark mesal and lateral stripes in ♀ (Fig. 14G); pleura widely fuscous; scent efferent system creamy yellow. Hemelytron castaneous, with dark irregular spots in ♀; cuneus tinged with red, with yellowish extreme apex; membrane pale smoky brown, with distally pale veins and two semitransparent spots posterior to apex of cuneus. Coxae and legs pale brown; meso- and metafemora darkened except for pale bases; apical half of each tarsomere III brown. Ventral surface of abdomen dark brown, with paler median part in ♀. SURFACE AND VESTITURE: As in generic diagnosis; dorsal surface weakly shining, with rather sparsely distributed,

silvery, reclining setae; scutellum less rugose, sparsely and finely punctate; hemelytron rather matte. STRUCTURE: Antennal segment I obviously longer than segment IV. Labium longer than basal width of pronotum, reaching but not exceeding apex of mesocoxa. Scutellum weakly arched. Metathoracic scent efferent system as in Fig. 32B. Metatarsomere II almost equal in length to III (Fig. 32C). MALE GENITALIA (Figs 15K–N): Left paramere with a conical process at middle and developed, squared protuberance of sensory lobe (Fig. 15K). Vesica with short MS and well-sclerotized, spicule-like LS; RS with weak TP (Fig. 15N). FEMALE GENITALIA (Figs 16F–H, 32A–F): Sclerotized ring thickened anteriorly (Figs 16F, 32D); posterior wall (Figs 16G, 32E) with narrow dorsal structure; interramal lobe relatively wide with rounded lateral margin; micro-spines on interramal lobe with 2–4 sharp branches (Fig. 32F).

Measurements. See Table 1.

Differential diagnosis. Recognized by its large size; long

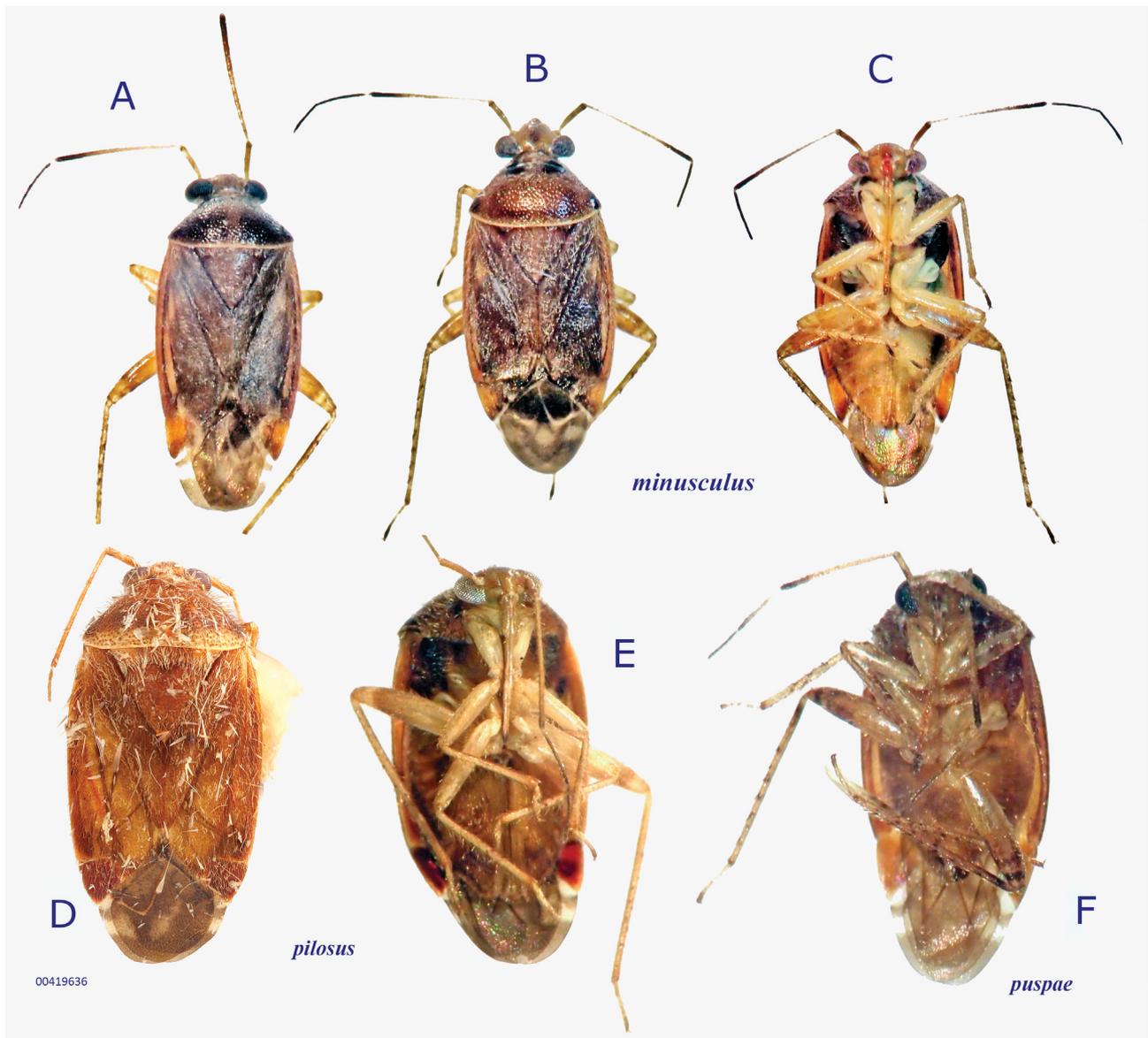


Fig. 17. Habitus images of *Diognetus* spp. A–C – *D. minusculus* sp. nov., ♂ (A) and ♀ (B–C); D–E – *D. pilosus*, ♂ (D) and ♀ (E); F – *D. puspae* sp. nov., ♂. Scale bar 2 mm.

antennal segment I that is longer than IV; short labium not exceeding apex of mesocoxa; and male and female genital structures as described above. Externally most similar to *D. dhampus* sp. nov. from Nepal, from which *D. magnificus* sp. nov. can be distinguished by the larger size, antennal segment I longer than IV, and darkened metafemur.

Etymology. Latin adjective *magnificus* (= magnificent), referring to the large-sized body of this new species.

Biology. Unknown.

Distribution. Indonesia (N. Sumatra).

***Diognetus minusculus* sp. nov.**

(Figs 17A–C, 18, 33)

Type material. HOLOTYPE: ♂, MALAYSIA: PERAK: Taiping, Bukit Larut (Maxwell Hill), 4.8625, 100.8000, 1100 m, mercury light trap, 21 Aug 1990, T. Yasunaga (ZRC) (AMNH_PBI 00380752). PARATYPES: MALAYSIA: Same data as for holotype, 2 ♂♂ 3 ♀♀ (DOAT, TYCN); same data, except for date 29 Dec 1989, 1 ♀ (TYCN).

Additional material examined: INDONESIA: NORTH SUMATRA: Brastagi, North of Toba Lake, 3.18°N, 98.50°E, 1,400 m, at FL light, 5–9 Dec 1989, T. Yasunaga, 1 ♀ (TYCN).

Description. Body ovoid, small, 3.5–4.2 mm in total length; smallest species among known congeners. CO-

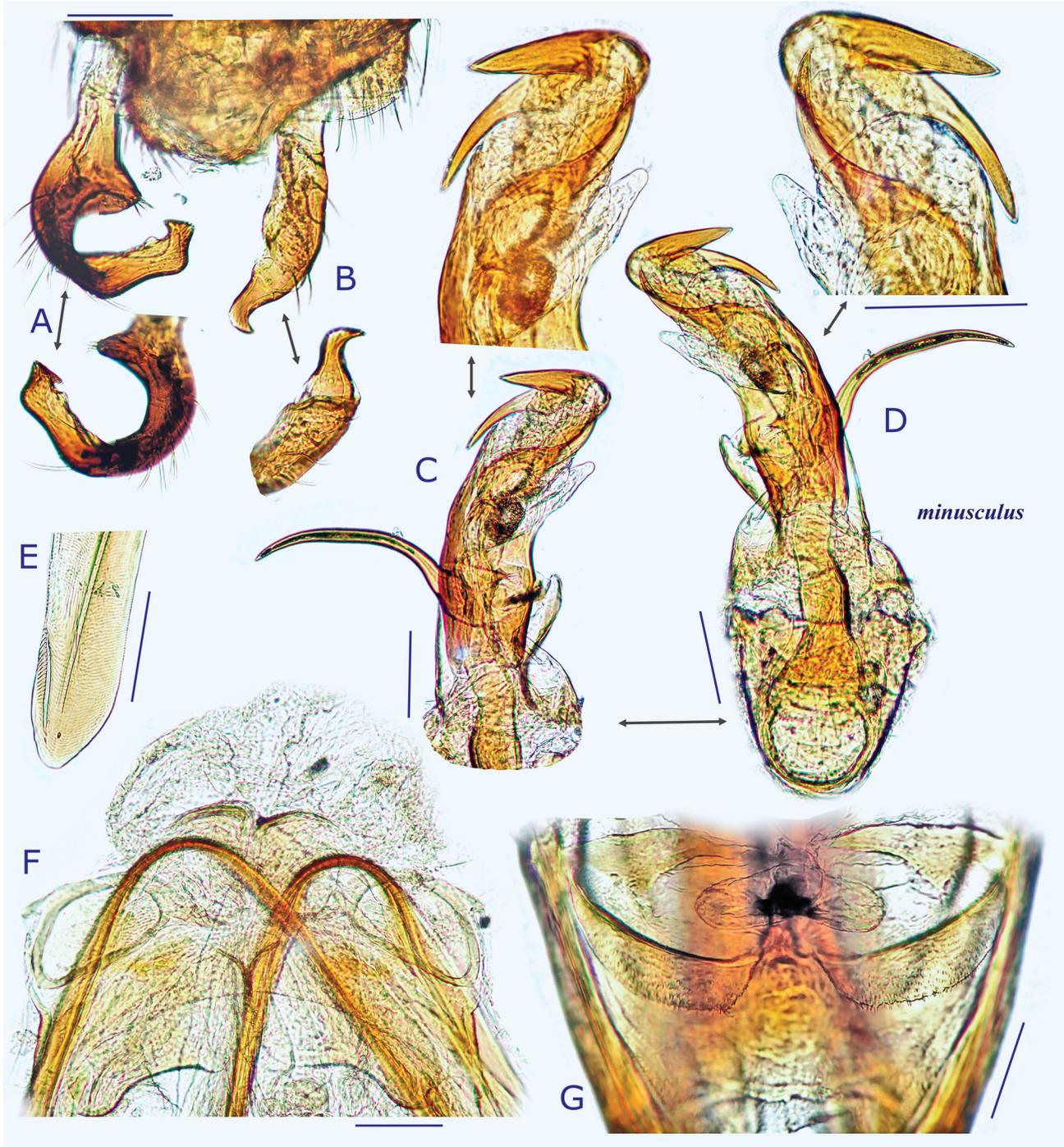


Fig. 18. Male (A–D) and female (E–G) genitalia of *Diognetus minusculus* sp. nov. A – left paramere and apex of pygophore; B – right paramere; C–D – vesica (endosoma); E – ovipositor (gonapophysis I); F – genital chamber; G – posterior wall. Scale bars 0.1 mm.

DESCRIPTION: Body generally brown to dark brown (Figs 17A–B); dorsum partly speckled with darker maculae. Head pale brown; vertex and frons somewhat darkened medially; clypeus sometimes suffused with red. Antennae pale brown; segment I partly darkened; apical 1/4–1/3 of segment II, and whole segment III (except for yellowish extreme base) and segment IV dark brown. Labium shiny pale reddish-brown; apex of segment IV narrowly dark brown (Fig. 17C). Pronotum relatively shining, brown, more or less darkened posterolaterally, with creamy yellow posterior margin; calli with a pair of dark, shiny spots;

mesoscutum and scutellum grayish brown; pleura, except for brown propleuron, shiny black; scent efferent system creamy yellow, weakly tinged with red in some specimens. Hemelytron irregularly mottled with dark maculae; cuneus reddish-brown, with paler basal 2/3; membrane smoky brown, with pale veins and several semitransparent spots. Coxae and legs whitish brown; apical half of metafemur brown, with two faint pale rings subapically; apices of tibiae and tarsomeres III darkened. Ventral surface of abdomen almost uniformly pale brown. **SURFACE AND VESTITURE:** As in generic diagnosis; scutellum finely

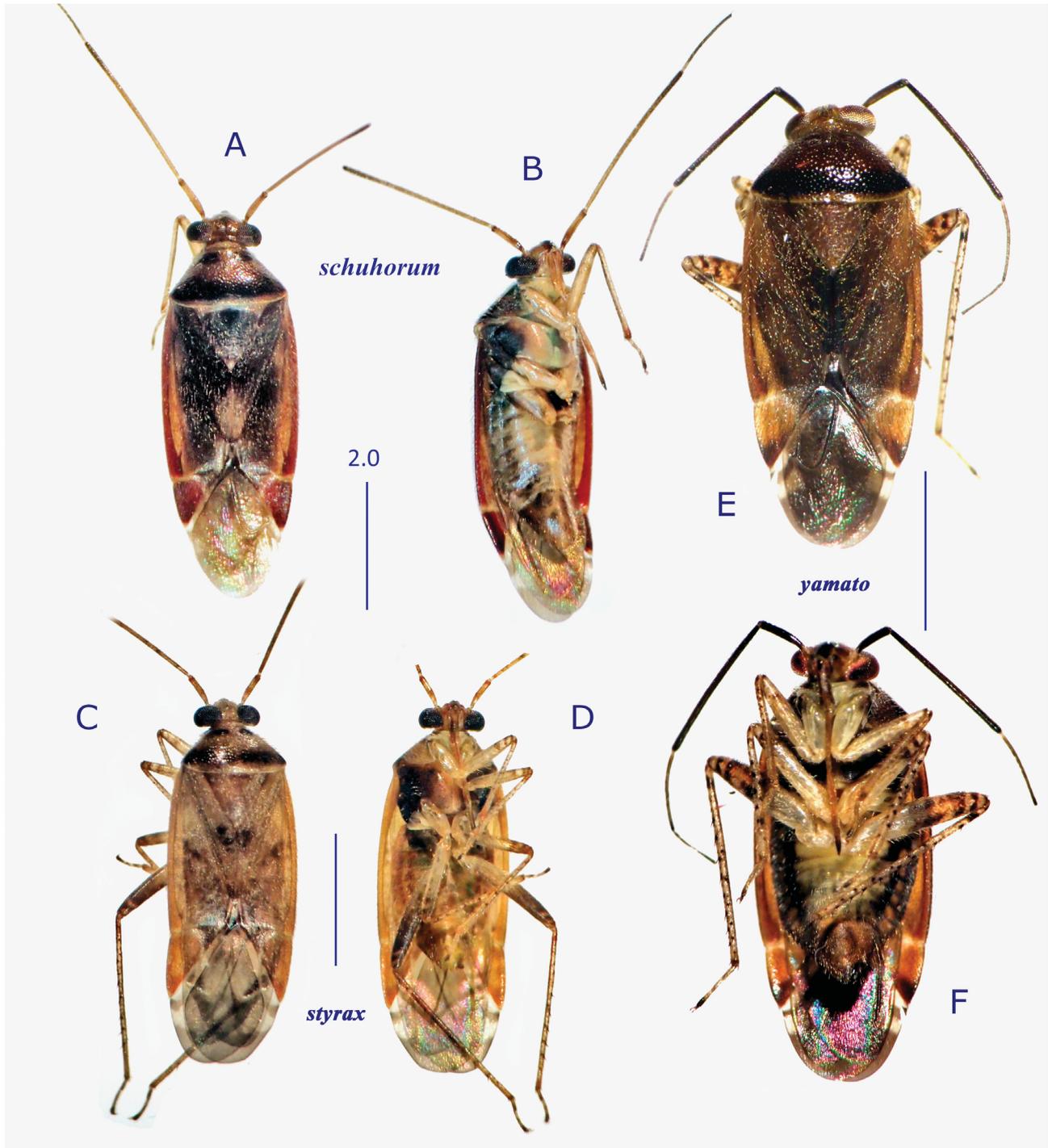


Fig. 19. Habitus images of *Diognetus* spp. A–B – *D. schuhorum* sp. nov., holotype ♂, dorsal (A) and ventral (B) views; C–D – *D. styrax* sp. nov., holotype ♂; E–F – *D. yamato* nom. nov., ♂. Scale bars 2 mm.

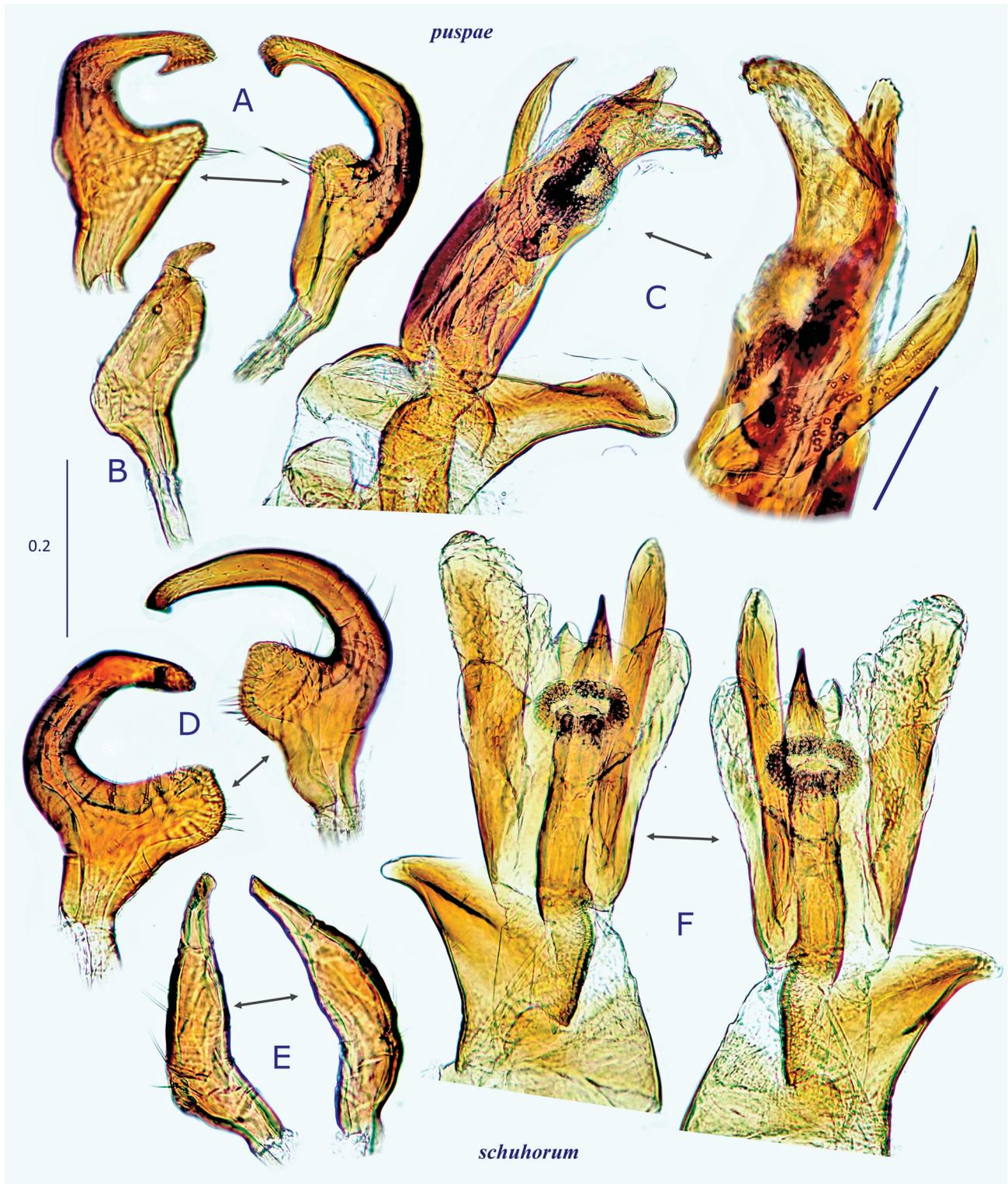


Fig. 20. Male genitalia of *Diognetus puspae* sp. nov. (A–C) and *D. schuhorum* sp. nov. (D–F). A, E – left paramere; B, E – right paramere; C, F – vesica (endosoma). Scale bars 0.2 mm.

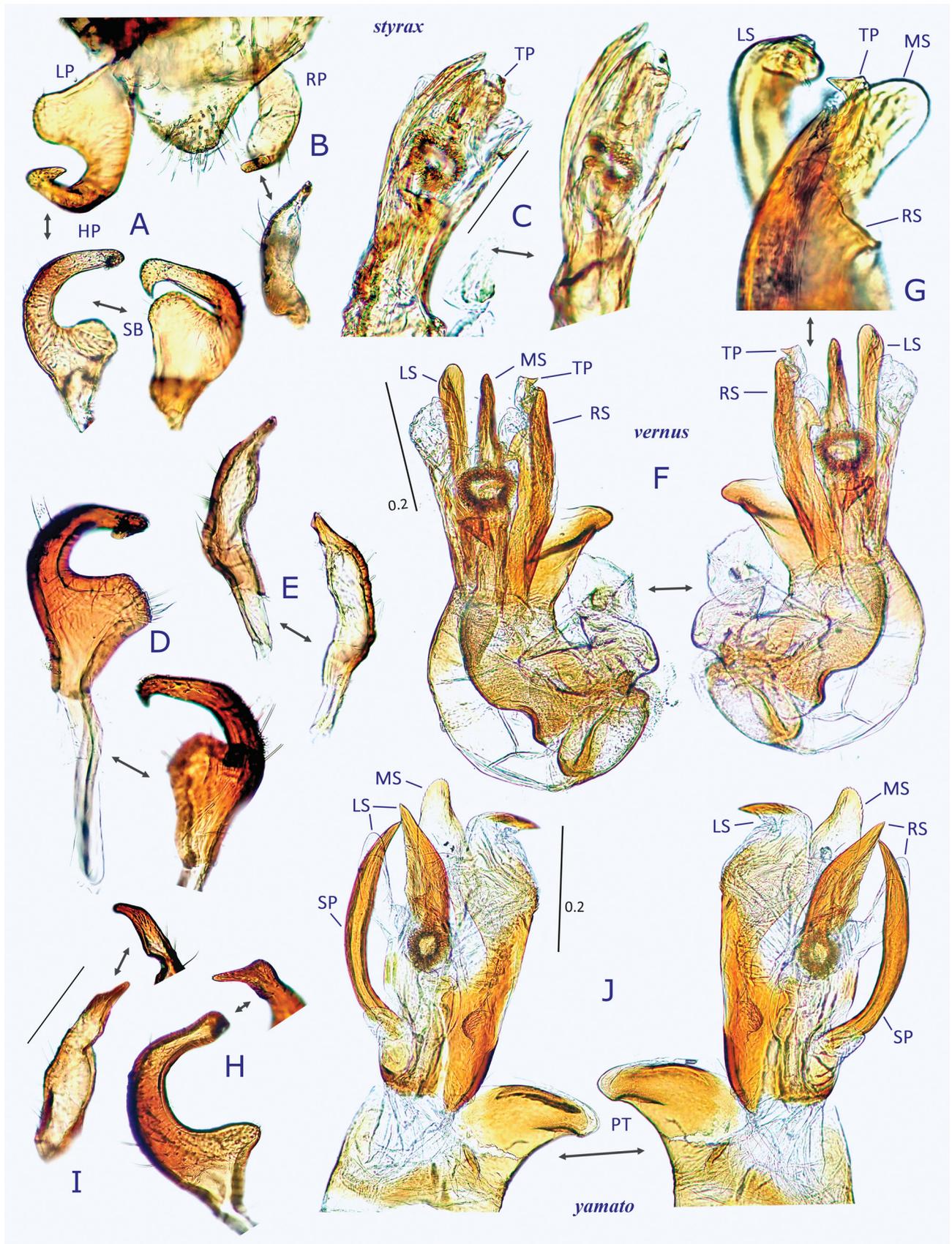


Fig. 21. Male genitalia of *Diognetus styrax* sp. nov. (A–C), *D. vernus* sp. nov. (D–G) and *D. yamato* nom. nov. (H–J). A, D, H – left paramere; B, E, I – right paramere; C, F–G, J – vesica (endosoma). Scale bars 0.2 mm.

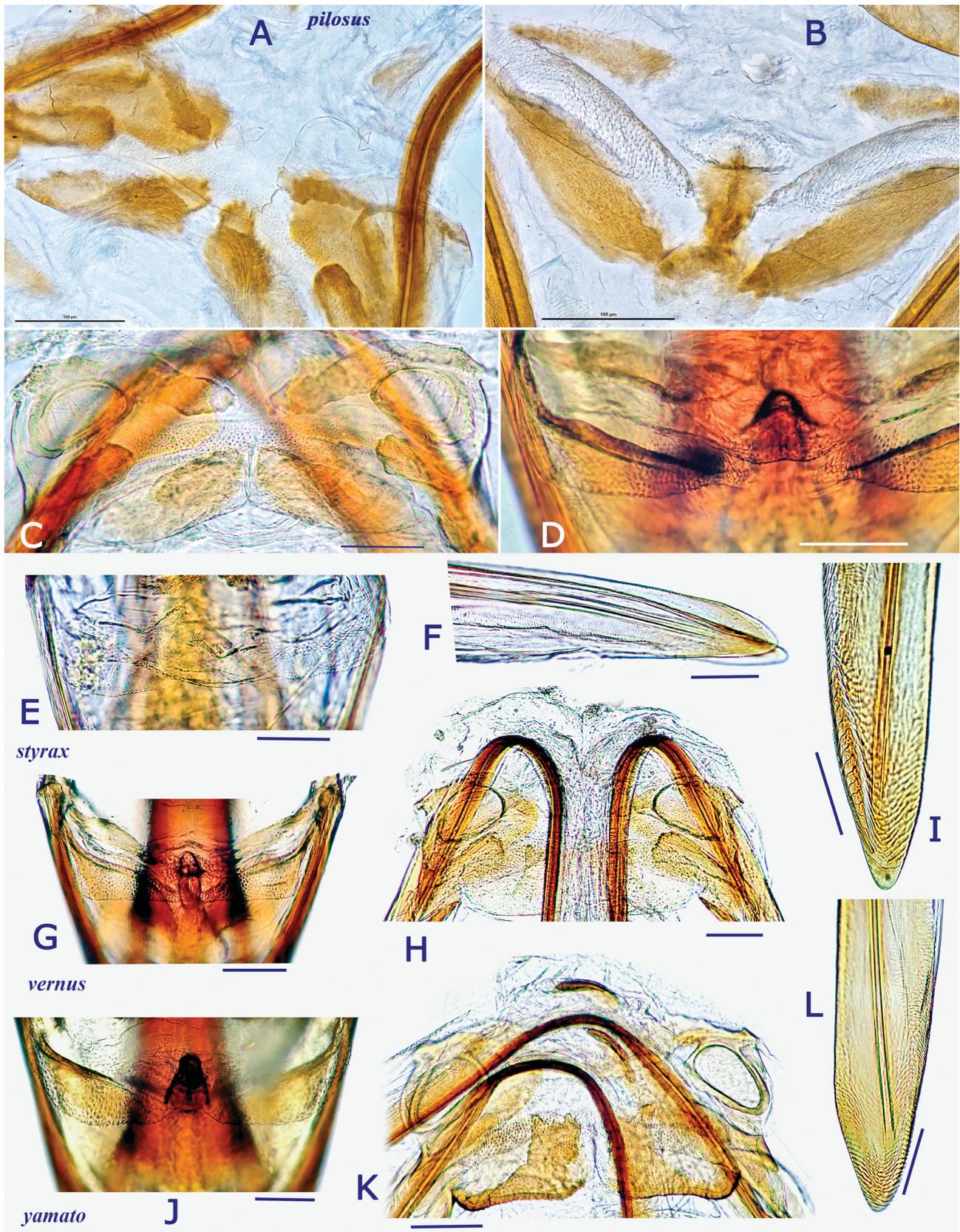


Fig. 22. Female genitalia of *Diognetus pilosus* (Poppius, 1914) (A–B – 00419636 from Sumatra, C–D – from Malaysia), *D. styrax* sp. nov. (E–F), *D. vernus* sp. nov. (G–I) and *D. yamato* nom. nov. (J–L). A, C, H, K – genital chamber. B, D, E, G, J – posterior wall; F, I, L – ovipositor (gonapophysis I); Scale bars 0.1 mm.

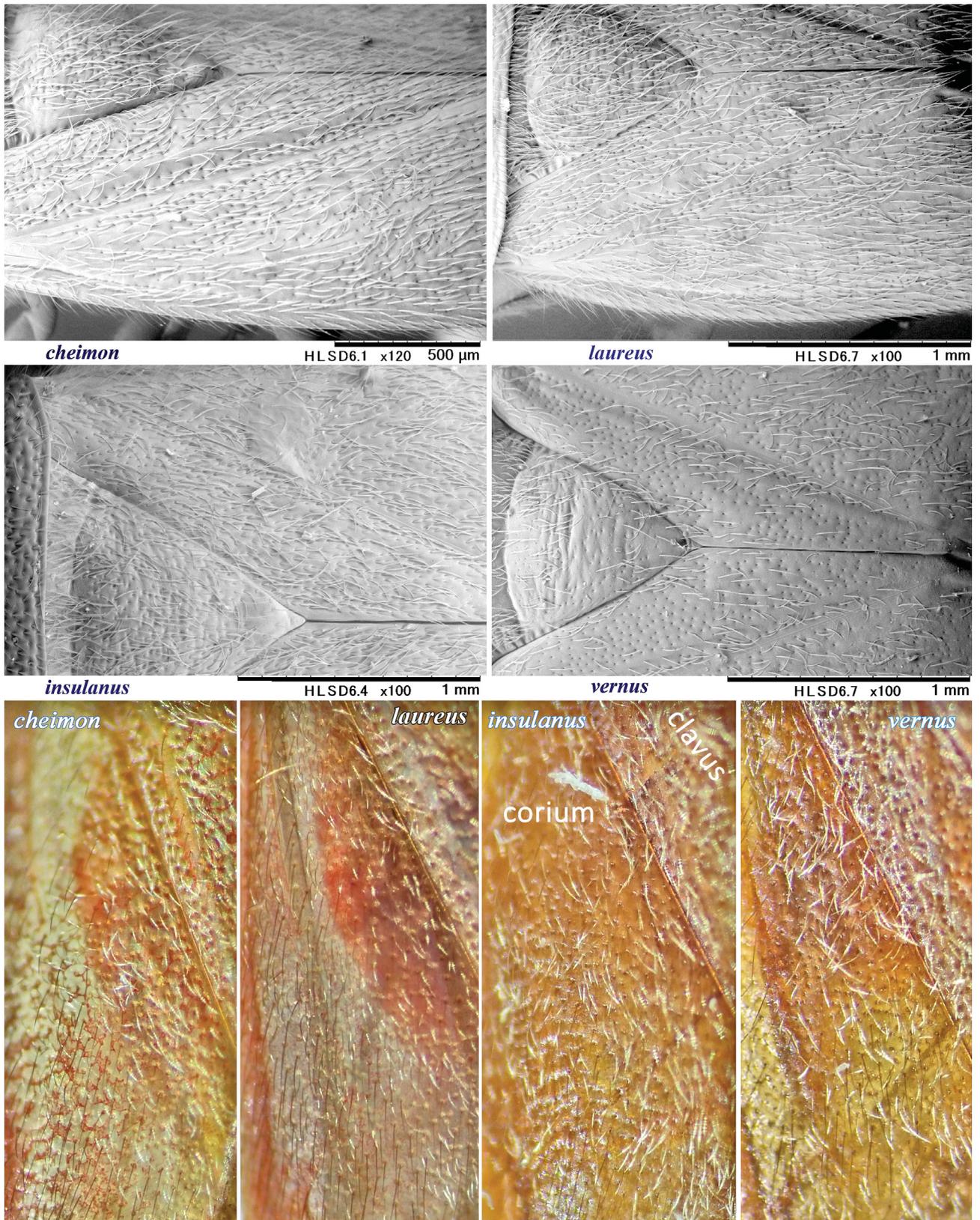


Fig. 23. Dorsal vestiture pattern for 4 Japanese *Diognetus* species: *D. cheimon* sp. nov., *D. insulanus* (Yasunaga, 1994), *D. laureus* sp. nov. and *D. vernus* sp. nov.

and uniformly punctate, less rugose (Fig. 33A); hemelytron matte; punctures on corium partly sparse and shallow. STRUCTURE: Vertex wider than an eye in dorsal view, with narrow basal transverse carina (Fig. 33D). Antennal segment II obviously shorter than labium. Labium long, reaching apex of mesocoxa but not exceeding apical metacoxa (Figs 17C, 33C). Pronotum and propleuron uniformly punctate (Figs 33B–C); scutellum rather flat (Figs 33B, E); metathoracic scent efferent system as in Fig. 33F. Pretarsal structure as in Fig. 33I; parempodia rather long and broad. MALE GENITALIA (Figs 18A–D, 33G, J–K): Left paramere modified in shape, with triangular protuberance of sensory lobe and somewhat flattened hypophysis that is hooked at apex (Figs 19A, 36J); right paramere relatively elongate (Figs 18B, 33J). Vesica (Figs 18C–D) heavily sclerotized, with a distinct spicule (Fig. 33K); RS with two apical pointed processes; secondary gonopore small. FEMALE GENITALIA (Figs 18F–G, 33L–O): Sclerotized ring comparatively large (Figs 18F, 33L); posterior wall (Figs 18G, 33M–O) with moderately developed dorsal structure that is covered with scaly microstructures (Fig. 33N); interramal lobe wide, semi-circular (Fig. 33M), not spinulate but densely furnished with scaly microstructures (Fig. 33O).

Measurements. See Table 1.

Differential diagnosis. Recognized by its tiny size; short antennal segment II with darkened apical 1/4–1/3; generally whitish brown femora; and unique shape of male and female genitalia as described above. At first sight similar to *D. duvalorum* sp. nov. (Nepal), from which this new species can be distinguished by the darker dorsum, dark apical part of antennal segment II, and shorter labium.

Etymology. From Latin, *minusculus* (very small), referring to its smallest size among known congeners; adjective.

Biology. Unknown; all available individuals were collected at UV (mercury) lights, facing to a tropical rain forest.

Distribution. Malaysia (Perak), Indonesia (North Sumatra).

Comments. Based on the shape of the male genitalia, this new species is most closely related to *D. flavigenis* (Japan) and *D. puspa* sp. nov. (Nepal), although the external appearance of each species is distinctive (e.g., body size, color pattern of femora). The distribution pattern of the three related species may imply faunal relationships between the Himalayas and eastern (and SE) Asia.

Diognetus pilosus (Poppius, 1914)

(Figs 17D–E, 22A–D, 32G–P)

Gorna pilosa Poppius, 1914: 131–132 (new species).

Gorna pilosa: CARVALHO (1959): 96 (catalog); SCHUH (1995): 760 (catalog); SCHUH (2002–2013) (online catalog).

Diognetus pilosus: CHÉROT et al. (2017): 48 (new combination, diagnosis).

Type material examined. HOLOTYPE: ♀, INDONESIA: JAVA: «Mus. Zool. Hels. Loan n° HE 96-31» / «Mus. Zool. H:fors. Spec. typ. n° 9977 *Gorna pilosa* POPP.» / «*Gorna pilosa* n. gen. et sp. B. Poppius Det.» / «Tijnj(i)ruan, W. Java., 1400 m., Malabar geb(irge) [1700m]» (FC n° 935) (ZMHF) [dorsal habitus image shown by CHÉROT et al. (2017): 87, fig. 10].

Additional material examined. INDONESIA: SUMATERA UTARA (North Sumatra): Brastagi, NW end of Lake Toba; 2.88851, 98.49254, 1,600 m (5,249 ft), no date provided, E.W. Diehl, 1 ♀ (AMNH_PBI 00419636)

(CNC); Brastagi, North of Toba Lake, 3.18°N, 98.50°E, 1,400 m, at FL light, 4 Dec 1989, T. Yasunaga, 1 ♀ (TYCN). MALAYSIA: PERAK: Taiping, Bukit Larut (Maxwell Hill), 4.8624, 100.7999, 1100 m, UV lighting, 7 Jan 1990, T. Yasunaga, 1 ♀ (TYCN).

Redescription. **Female.** Body oval, tumid, moderate in size, 5.1–5.4 mm. COLORATION: Dorsum almost uniformly castaneous (Fig. 17D), without mottled pattern. Antennae yellowish brown; apical part of segment II slightly darkened; segment III (except for pale extreme base) and segment IV brown. Labium shiny pale brown; apex of segment IV infusate. Pronotum brown, weakly shining, with posterior 1/5 pale; anterior mesal part of scutellum sometimes narrowly infusate; pleura fuscous; scent efferent system creamy yellow. Forewing membrane smoky brown, with irregular pale, semitransparent maculae and pale veins. Coxae and legs whitish brown; apical half of metafemur darkened, with two (subapical and apical) pale rings in Malaysian specimen. Ventral surface of abdomen pale brown, with more or less darkened lateral margins. SURFACE AND VESTITURE: As in generic diagnosis; punctures on scutellum and hemelytron fine and sparsely distributed (Fig. 32H); dorsum with densely distributed, silvery, reclining setae; base of mesepisternum with long, erect setae (Fig. 32G); hemelytron rather matte. STRUCTURE: Vertex relatively wide. Labium reaching apex of metacoxa (Fig. 17E). Pronotum tumid, with slanting disk (Fig. 32G); scutellum nearly flat. Metathoracic scent efferent system as in Fig. 32I. Metatarsomere III longer than I or II (Fig. 32J); parempodia as long as claw. FEMALE GENITALIA (Figs 22A–D, 32K–P): Sclerotized ring ovoid (Figs 32K, N), with thickened posterolateral rim (Figs 22A, C); dorsal labiate plate with sclerotized anterior margin; posterior wall (Figs 32L–M, O–P) with rounded dorsal structure and narrow, laterally rounded interramal lobe (Figs 32L, O); dorsal structure and inner part of interramal lobe with spinulate processes (Fig. 32P).

Male. Unknown.

Measurements. See Table 1; holotype ♀ (by F. Chérot): total length ca. 5.46; maximum width 2.60; medial length of pronotum 1.19; posterior width of pronotum 2.21; vertex width 0.41; eye width 0.40; length of antennal segments I: 0.67, II: 2.24, III–IV missing; medial length of scutellum 1.06; basal width of scutellum 1.02; length of cuneus 1.10; width of cuneus 0.82.

Differential diagnosis. Recognized by its ovoid, stout body; dark castaneous general coloration; slanting pronotum; almost uniformly creamy brown femora; and spinulate dorsal structure and inner part of interramal lobe on posterior wall.

Biology. Unknown.

Distribution. Indonesia (Java, Sumatra*), Malaysia* (Perak).

Comments. *Gorna pilosa* was described by POPPIUS (1914) on the female holotype from Malabar Gebirge [= Mts.], Java, Indonesia. This species had been little known until CHÉROT et al. (2017) redefined the taxon and correctly placed under *Diognetus*. Our recent examination revealed that the species also occurs in Peninsular Malaysia and Sumatra and is now posited to be a Sundaland element.

However, any definitive relative of *D. pilosus* is yet to be recognized, as no male specimen is currently available.

***Diognetus puspae* sp. nov.**

(Figs 2E–F, 17F, 20A–C, 34A–F)

Type material. HOLOTYPE: ♂, NEPAL: BAGMATI: Laritpur, Godawari, Taukhel-Kodetar, 27.5999, 85.3555, fruits of *Trema* sp., 16 Jun 2006, T. Yasunaga (NMTU) (AMNH_PBI 00380753). PARATYPE: NEPAL: Same data as for holotype, 1 ♂ (TYCN).

Description. Male. Body elongate ovoid, relatively small in size, 4.3–4.7 mm in total length. COLORATION: General coloration castaneous to dark brown (Figs 2E–F); dorsum somewhat tinged with red. Antennae pale brown; apical 1/6–1/5 of segment II, whole segment III and segment IV (except for pale base of III) dark brown. Labium pale brown; almost entire segment I and apex of segment IV darkened (Fig. 2E). Pronotum relatively shining, with discontinuous posterior dark band and yellowish brown posterior margin (Fig. 2F); calli area somewhat darkened; scutellum with creamy yellow apex; pleura dark brown (Fig. 17F); metathoracic scent efferent system creamy yellow. Hemelytron partly with darker maculae; cuneus tinged with red; membrane smoky brown, with yellowish veins and a pair of pale, semitransparent marks posterior to cuneus. Coxae and legs pale brown; each femur with two apical dark rings (Fig. 2F); apical half of each tarsomere III darkened. Ventral surface of abdomen brown. SURFACE AND VESTITURE: As in generic diagnosis; scutellum and hemelytron sparsely and finely punctate. STRUCTURE: Eye relatively small; vertex as wide as an eye in dorsal view. Antennal segment II shortest among known congeners, about as long as mesotibia, shorter than metafemur, slightly incrassate towards apex. Labium reaching but not exceeding apex of metacoxa, much longer than antennal segment II. Scutellum slightly arched. Metathoracic scent efferent system as in Fig. 34B. Tarsi long and slender; metatarsomere I less than half as long as II or III (Fig. 34C). MALE GENITALIA (Figs 20A–C, 34D–F): Left paramere with triangular basal protuberance of sensory lobe (Figs 20A, 34D); hypophysis of right paramere oblique (Figs 20B, 34F); vesica (Figs 20C, 34F) with distinct horn-like spicule that is punctate at basal half; MS notched apically; RS well-sclerotized, with spinulate apex.

Female. Unknown.

Measurements. See Table 1.

Differential diagnosis. Recognized by its short antennal segment II that is about as long as mesotibia; yellow apex of scutellum; triangular protuberance of left paramere; and distinct vesical spicule that is punctate basally. Judging from similar male genitalia, this new species is most closely related to *D. flavigenis*, from which *D. puspae* sp. nov. can be distinguished readily by the shorter antennal segment II, longer labium and different color pattern of the femora, in addition to their disjunct distributions.

Etymology. Named for Ex-Assoc. Prof. Pusp Keshari Shrestha (NMTU) who greatly supported works of the author in Nepal (2005–2007).

Biology. Two male adults were collected from fruits of *Trema* sp. However, the breeding host is yet to be confirmed.

Distribution. Nepal (Kathmandu Valley).

Comments. See comments under *D. minusculus* sp. nov.

***Diognetus schuhorum* sp. nov.**

(Figs 19A–B, 20D–F, 34G–I)

Type material. HOLOTYPE: ♂, INDONESIA: NORTH SUMATRA: Brastagi, North of Toba Lake, 3.18°N, 98.50°E, 1,400 m, at FL light, 5–9 Dec 1989, T. Yasunaga (ZRC) (AMNH_PBI 00380754).

Description. Male (holotype). Body elongate, moderate in size, 5.2 mm in total length. COLORATION: General coloration chocolate brown (Figs 19A–B). Head castaneous; median part of frons and clypeus darkened. Antennae pale brown; segment I with obscure stripe ventrally and dark narrow ring at apex; apical 1/5 of segment II and entire segment III (except for yellow base) dark brown; segment IV missing. Labium shiny pale brown; segment I slightly tinged with red; apical half of segment IV infuscate. Pronotum relatively shining, darkened at posterior half, with yellowish brown posterior margin; calli with a pair of dark, ovoid maculae; collar yellowish brown; mesoscutum creamy yellow; apex of scutellum pale; pleura dark brown; ventral margin of propleuron and ventral half of mesepisternum shiny yellowish brown; scent efferent system creamy yellow. Hemelytron chocolate brown; apical part of clavus yellowish; cuneus tinged with red; membrane pale grayish brown. Coxae and legs pale brown (only right proleg remaining as in Fig. 19B); extreme apex of protibia and apical half of protarsomere III darkened. Ventral surface of abdomen dark brown, with pale brown median part. SURFACE AND VESTITURE: As in generic diagnosis; scutellum and hemelytron rather matte; setae on mesepimeron and episternum sparsely distributed (Fig. 34G). STRUCTURE: Eyes relatively large; vertex slightly narrower than eye in dorsal view. Antennal segment II even longer than labium. Labium reaching but not exceeding apex of mesocoxa; apex of segment IV with rather wide fields of sensilla (Fig. 34H). Scutellum somewhat arched. Metathoracic scent efferent system as in Fig. 34G. MALE GENITALIA (Figs 20D–F, 34I): Left paramere with developed basal protuberance of sensory lobe and elongate hypophysis (Figs 20D, 34I); hypophysis and apical sensory lobe of right paramere slender, tapered towards apex (Fig. 20E); vesica with short, pointed MS and long LS, lacking TP (Fig. 20F); phallosome with narrow apical keel.

Female. Unknown.

Measurements. See Table 1.

Differential diagnosis. Recognized readily by its elongate body form; long antennal segment II; creamy yellow mesoscutum; yellowish apical part of clavus; and distinctive shape of male genitalia. Most similar in external appearance to *D. magnificus* sp. nov.; easily distinguished by smaller size, longer antennal segment II, and pale mesoscutum and apical part of clavus.

Etymology. Named in honor of Dr. Randall T. Schuh (AMNH) and his beloved family.

Biology. Unknown; a single male specimen was collected at a FL light.

Distribution. Indonesia (North Sumatra).

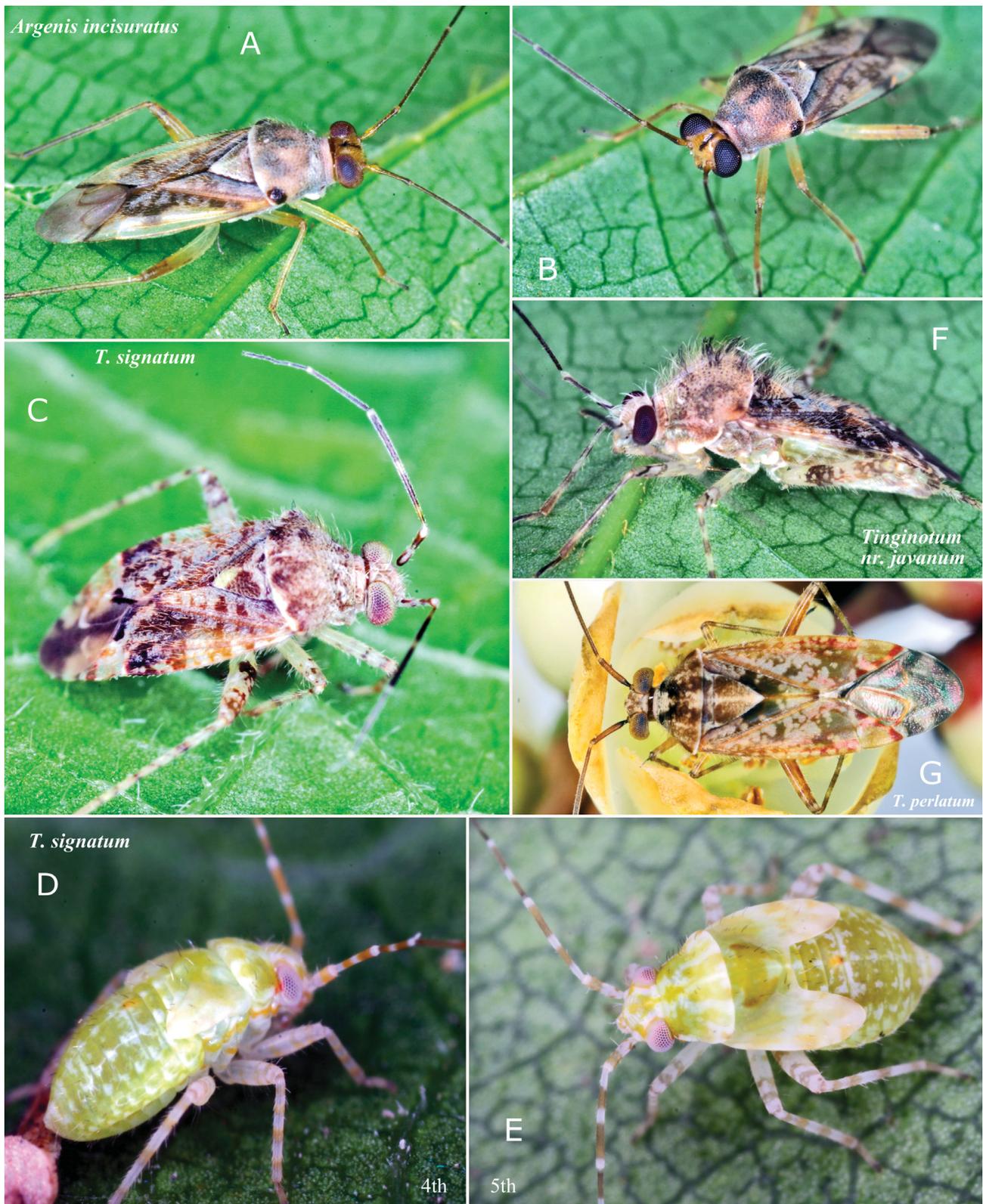


Fig. 24. Habitus images of most plausible outgroup taxa for *Diognetus*. A–B – *Argenis incisuratus* (Walker, 1873) (from Nakhon Ratchasima, Thailand); C – *Tinginotum signatum* (Distant, 1904) (Rayong, Thailand); D – same, 4th instar nymph; E – final (5th) instar nymph; F – a species similar to *T. javanum* (Kirkaldy, 1902) (Nakhon Ratchasima, Thailand); G – *T. perlatum* Linnavuori, 1961 (Nagasaki, Japan).

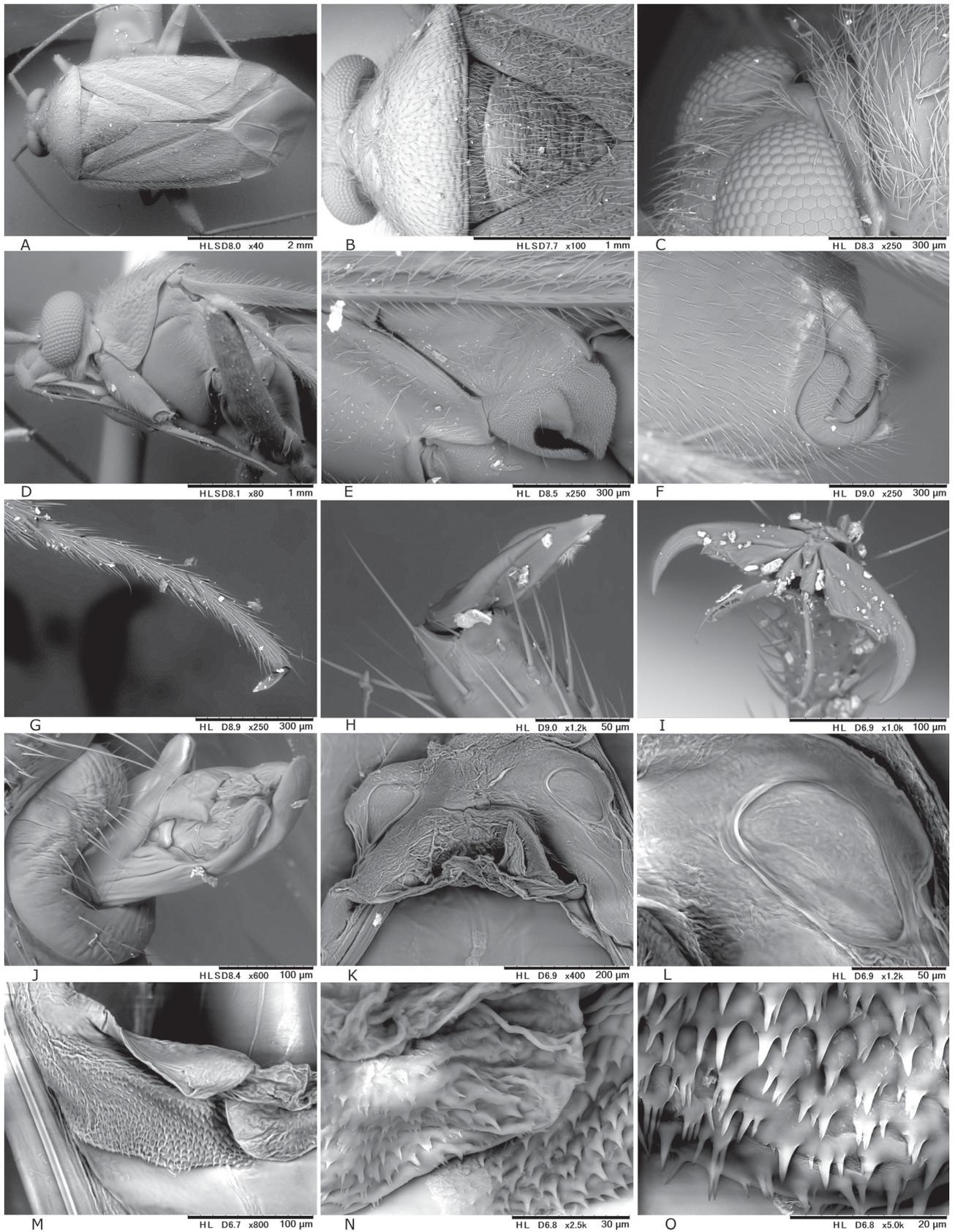


Fig. 25. Scanning electron micrographs for *Diognetus bagmaticus* sp. nov. from Nepal, ♂ (A–J) and ♀ (K–O). A–B – dorsal habitus; C – head and anterior pronotum, left lateral view; D – anterior body, left lateral view; E – pleura and scent efferent system, left lateral view; F – pygophore, left lateral view; G – metatarsus; H–I – pretarsal structure of metaleg; J – apex of pygophore with exposed vesica and left paramere; K – genital chamber, dorsal view; L – sclerotized ring; M – posterior wall; N – dorsal structure; O – interramal lobe.

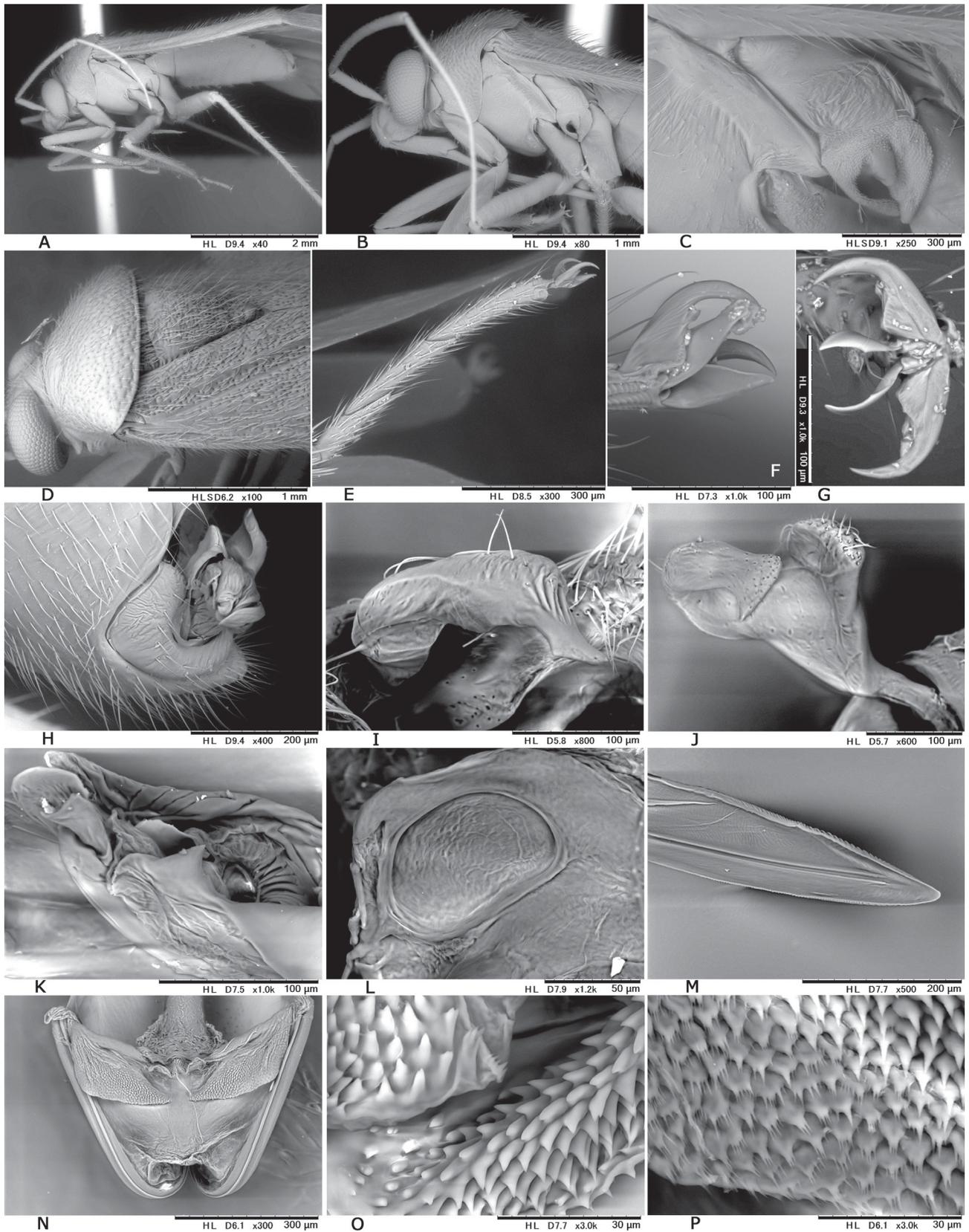


Fig. 26. Scanning electron micrographs for *Diognetus cheimon* sp. nov. from Nagasaki, Japan, ♂ (A–K) and ♀ (L–P). A–B – left lateral habitus; C – pleura and scent efferent system, left lateral view; D – head and pronotum, left lateral view; D – anterior body, left lateral view; E – metatarsus; F–G – pretarsal structure of metaleg; H – apex of pygophore with exposed vesica and left paramere; I – right paramere; J – left paramere; K – vesica (endosoma); L – sclerotized ring; M – apex of ovipositor (gonapophysis I); N – posterior wall; O – dorsal structure; P – interramal lobe.

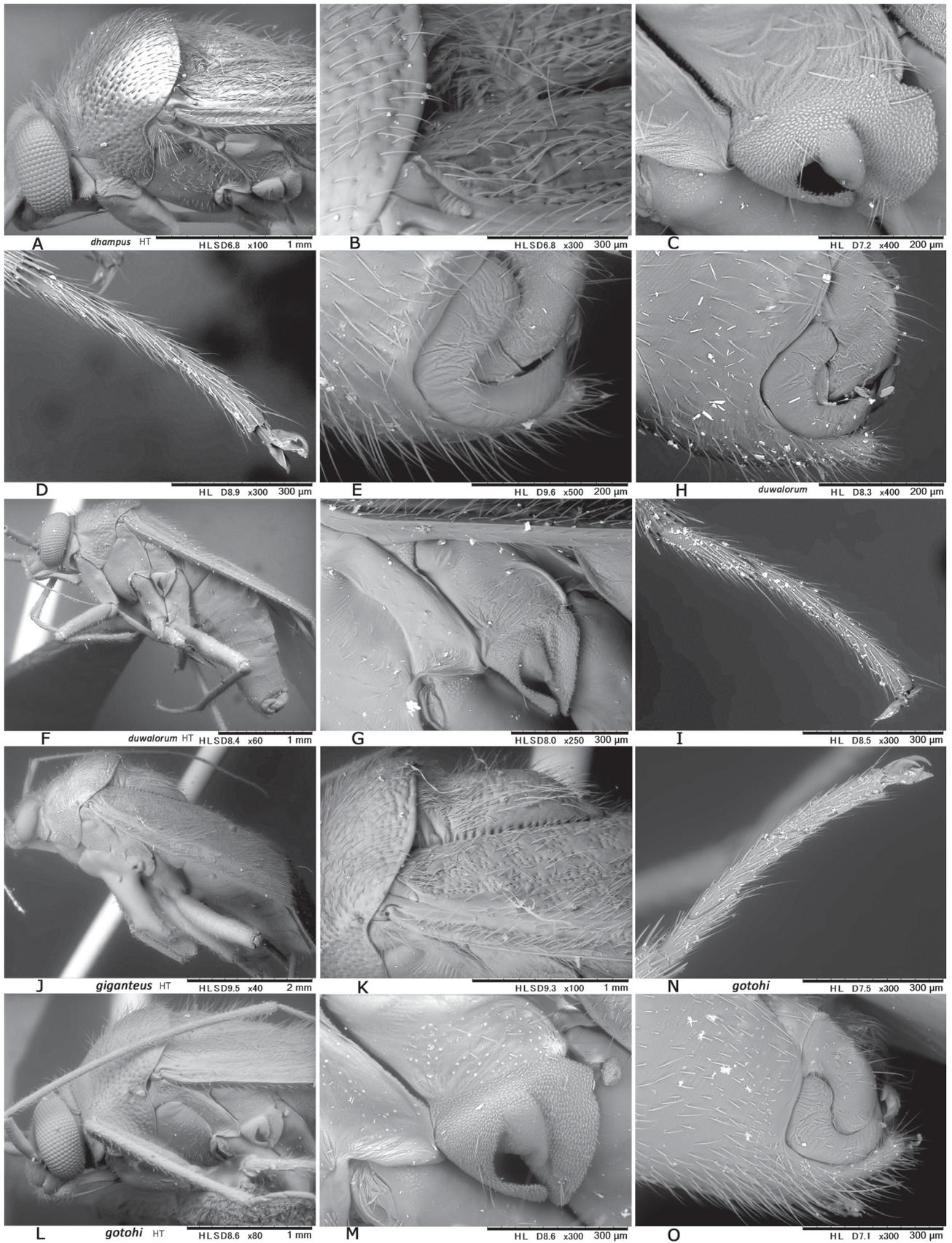


Fig. 27. Scanning electron micrographs for *Diognetus dhampus* sp. nov., ♂ (A–E), *D. duwalorum* sp. nov., holotype ♂ (F–I), *D. giganteus* sp. nov., holotype ♀ (J–K) and *D. gotohi* sp. nov., holotype ♂ (L–O). A, L – anterior body, left lateral view; F, J – left lateral habitus; B, D – scutellum and adjacent structures; C, G, M – pleura and scent efferent system, left lateral view; D, I, N – metatarsus; E, H, O – pygophore.

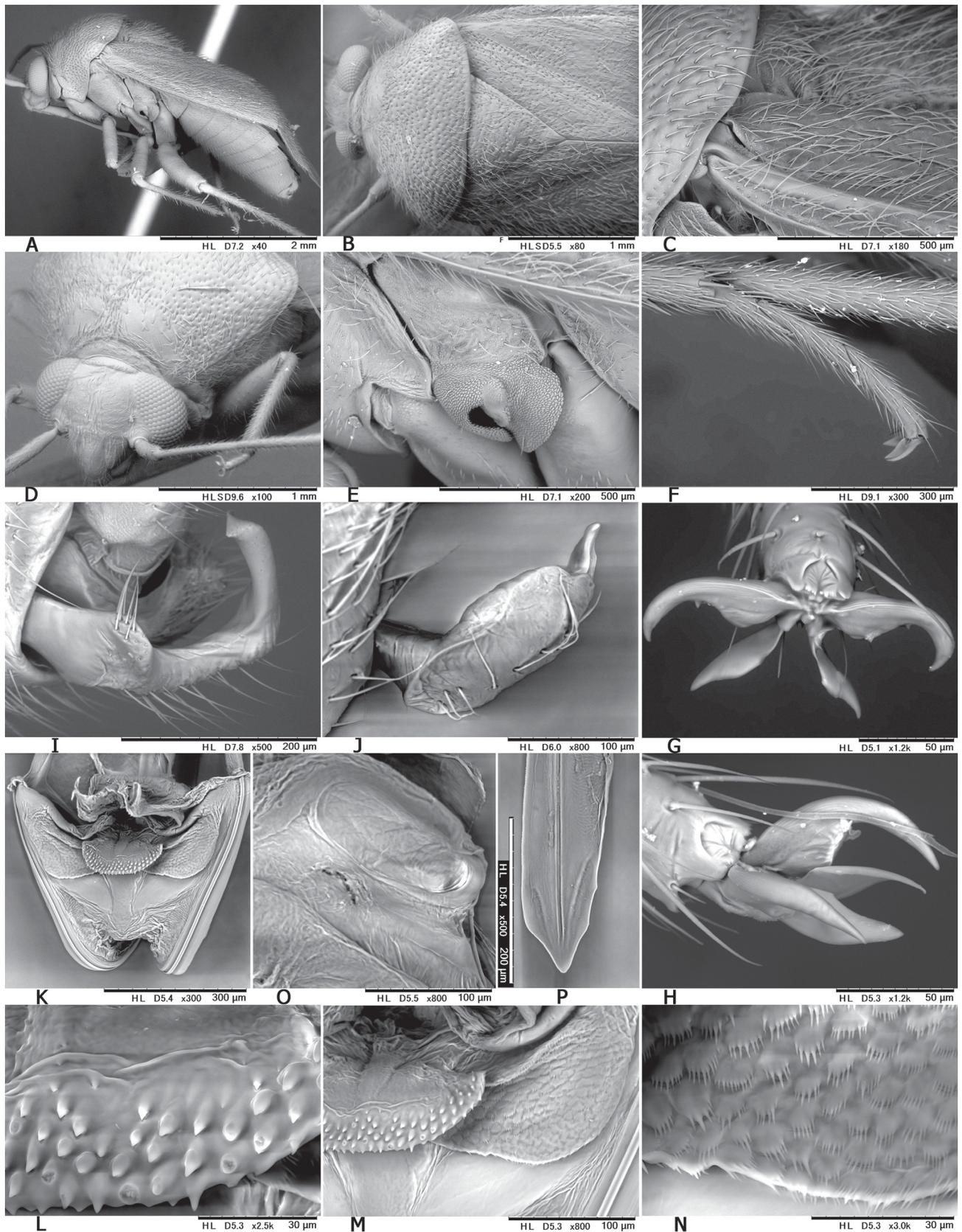


Fig. 28. Scanning electron micrographs for *Diognetus flavigenis* (Horváth, 1905) from Honshu, Japan, ♂ (A, C–H) and ♀ (B, K–P). A – left lateral habitus; B – dorsal habitus; C – scutellum and adjacent structures; D – head and pronotum, anterior view; E – pleura and scent efferent system, left lateral view; F – metatarsus; G–H – pretarsal structure of male; I – left paramere; J – right paramere; K – posterior wall; L – dorsal structure; M – dorsal structure and interramal lobe; N – interramal lobe; O – sclerotized ring; P – apex of ovipositor (gonapophysis I).

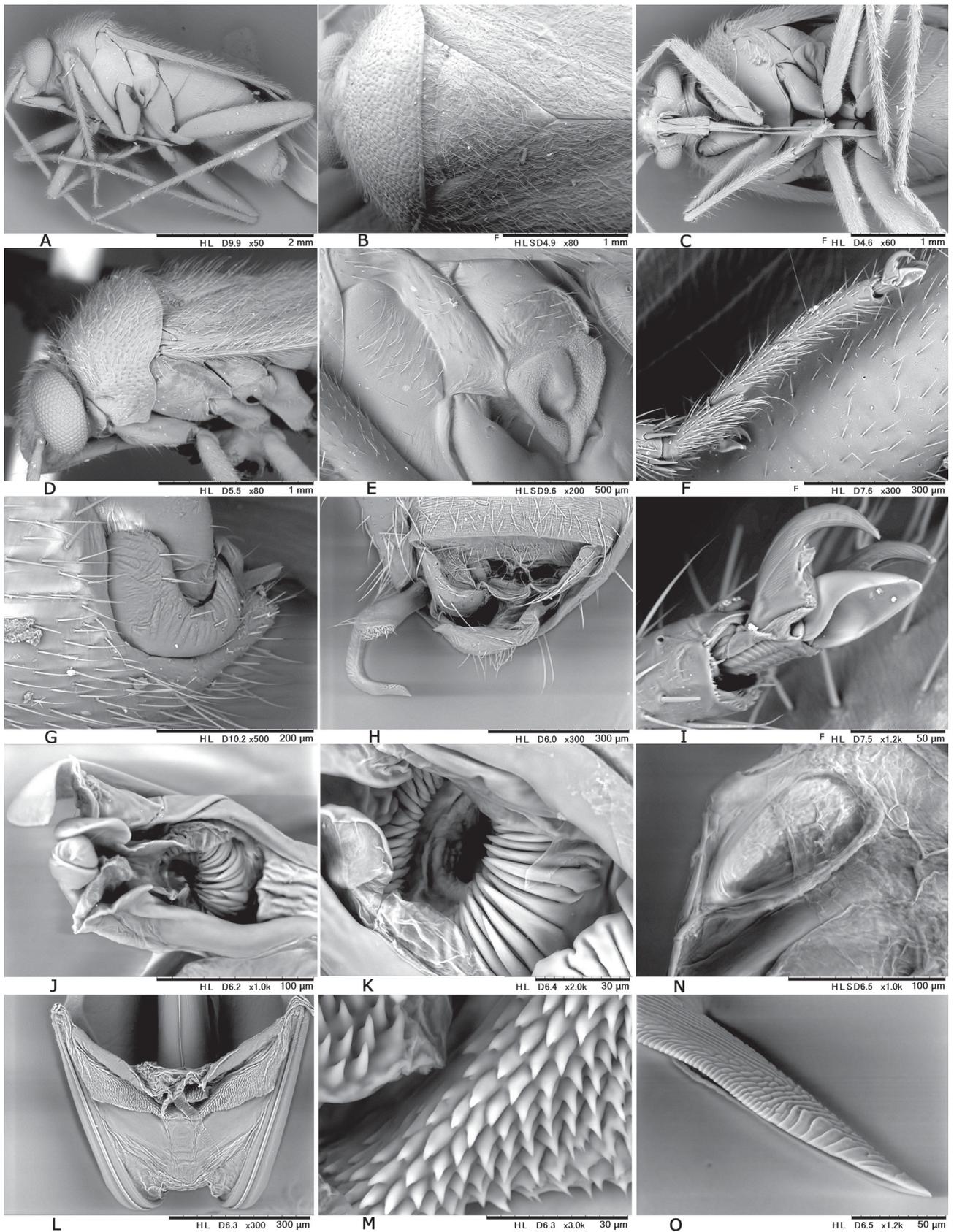


Fig. 29. Scanning electron micrographs for *Diognetus insulanus* (Yasunaga, 1994) from Okinawa, Japan, ♂ (A, D–E, G–H) and ♀ (B–C, F, I, L–O). A – left lateral habitus; B – dorsal habitus; C – ventral habitus; D – anterior body, left lateral view; E – pleura and scent efferent system, left lateral view; F – metatarsus; G–H – apex of pygophore with parameres, left lateral view (G) and dorsal view (H); I – pretarsal structure of metaleg; J–K – vesica (endosoma); L – posterior wall; M – dorsal structure and interramal lobe; N – sclerotized ring; O – apex of ovipositor (gonapophysis I).

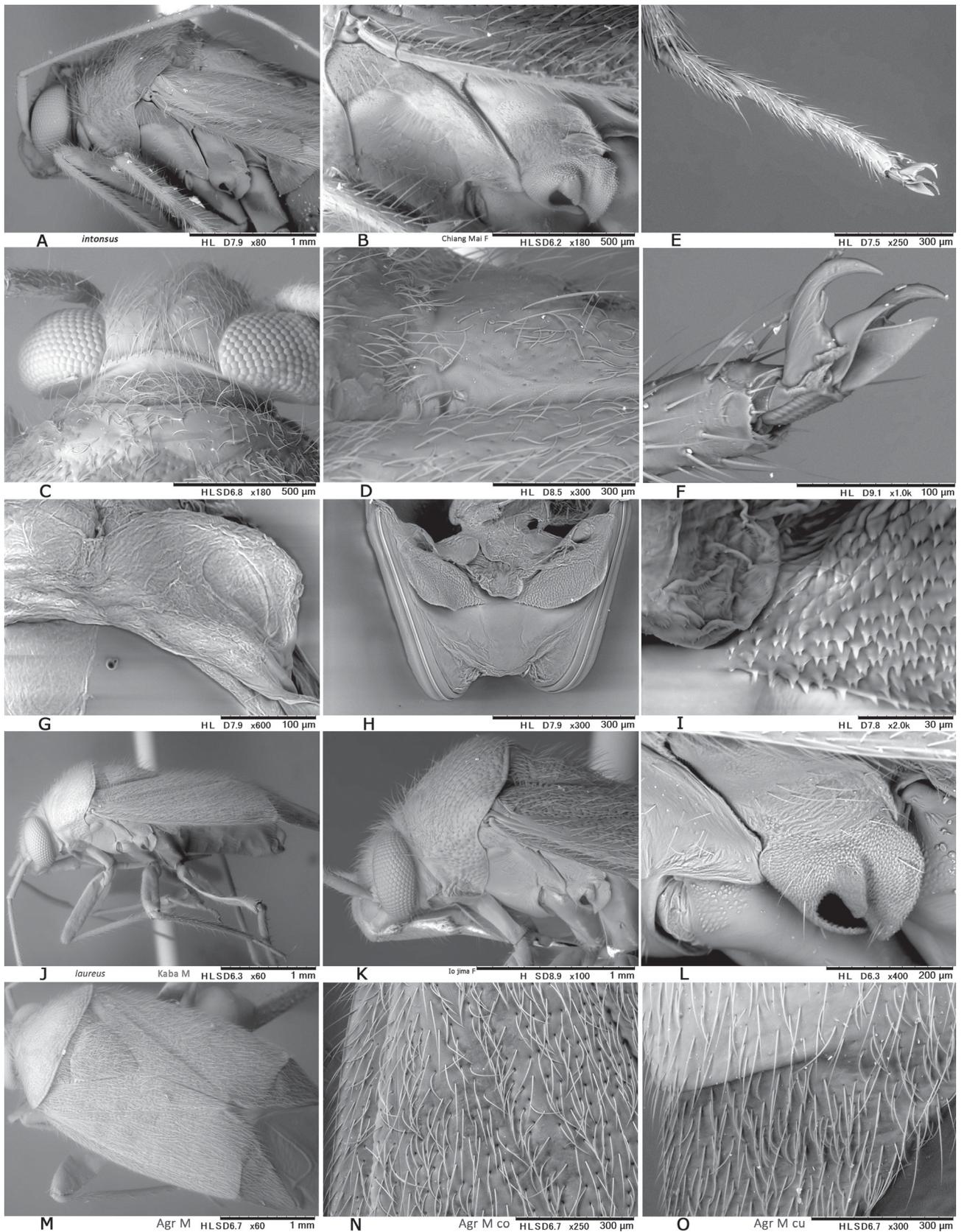


Fig. 30. Scanning electron micrographs for *Diognetus intonsus* Distant, 1904, ♀ from Chiang Mai, Thailand (A–I) and *D. laureus* sp. nov., ♂ from Nagasaki, Japan (J–O). A, K – anterior body, left lateral view; J – left lateral habitus; B, L – scutellum and adjacent structures, left lateral view; C – head and anterior pronotum, dorsal view; D – scutellum and adjacent structures; E–F – metatarsus; G – sclerotized ring; H – posterior wall; I – dorsal structure and interramal lobe; M – dorsal habitus; N – corium; O – posterior corium and anterior cuneus.

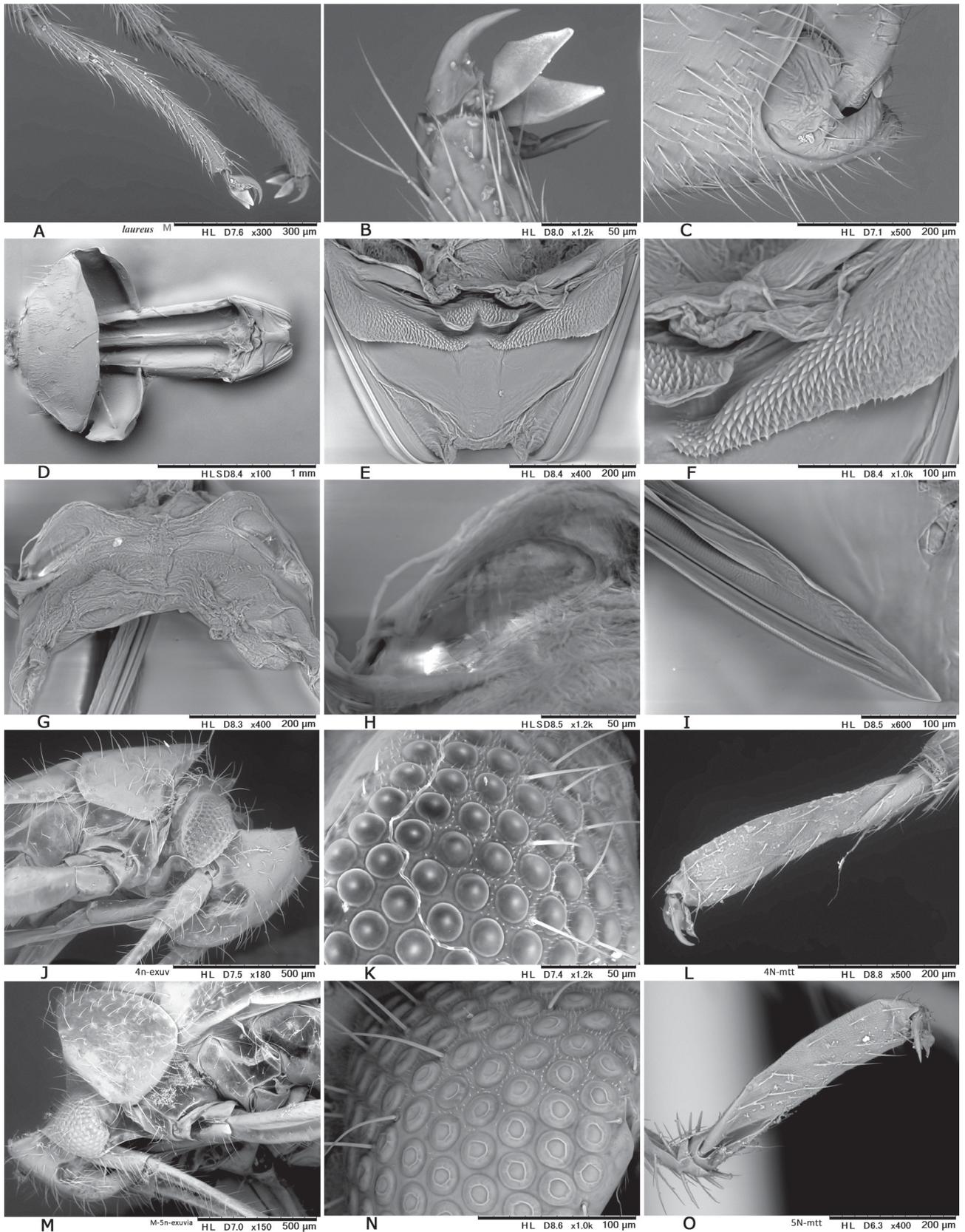


Fig. 31. Scanning electron micrographs for *Diognetus laureus* sp. nov. from Nagasaki, Japan, ♂ (A–C), ♀ (G–I), 4th instar nymph's exuvia (J–L) and 5th instar's exuvia, ♂ (M–O). A – metatarsi; B – pretarsal structure of metaleg; C – apex of pygophore with parameres, left lateral view; D–E – posterior wall; F – dorsal structure and interramal lobe; G – genital chamber, dorsal view; H – sclerotized ring; I – apex of ovipositor (gonapophysis I); J, M – anterior body, right (J) and left (M) lateral view; K, N – compound eye; L, O – metatarsus.

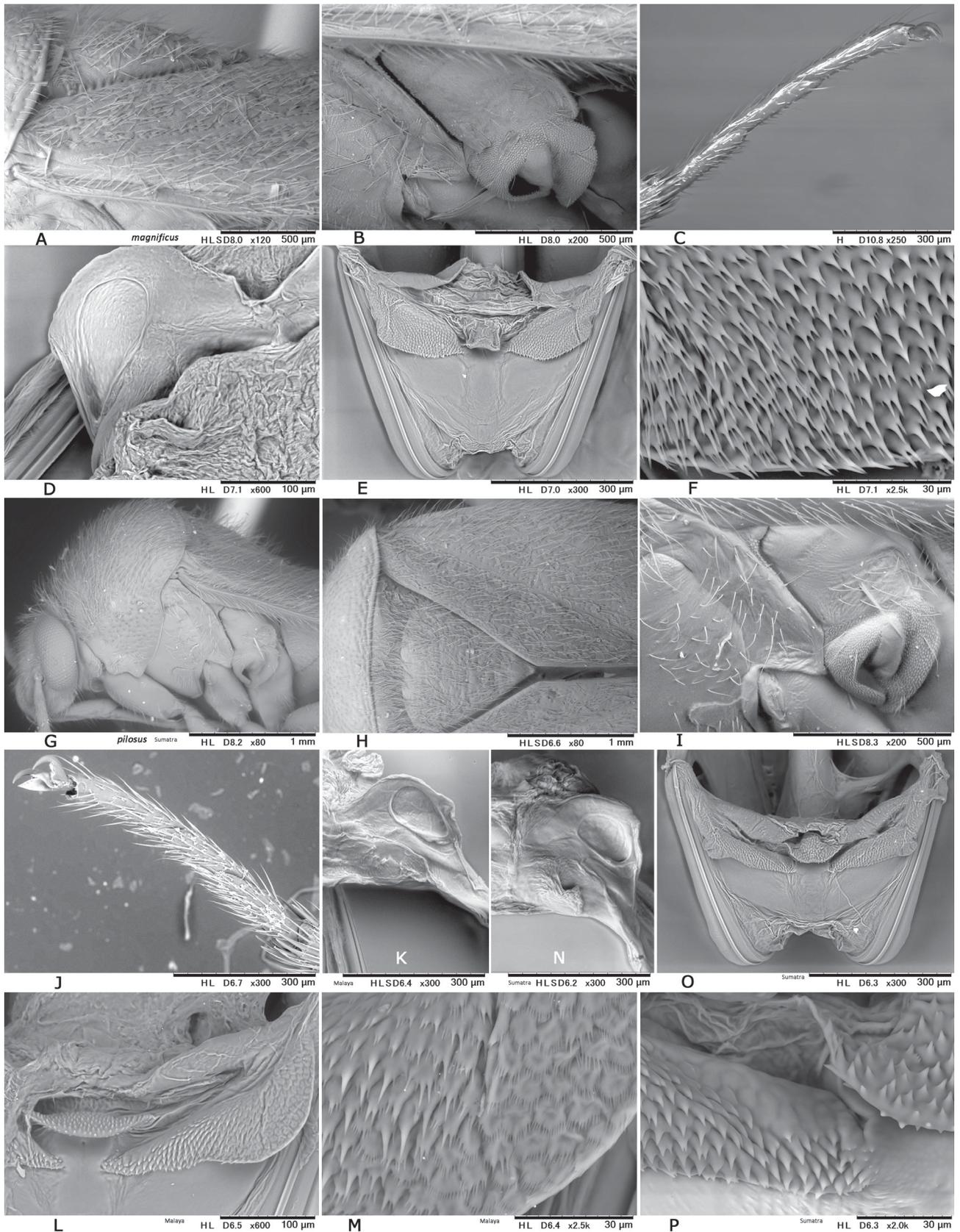


Fig. 32. Scanning electron micrographs for *Diognetus magnificus* sp. nov., ♀ from N. Sumatra, Indonesia (A–F) and *D. pilosus* (Poppius, 1914), ♀ from W. Malaysia (K–M) and Sumatra (G–J, N–P). A – scutellum and adjacent structures, left lateral view; B, I – pleura and scent efferent system, left lateral view; C, J – metatarsus; D, K, N – sclerotized ring; E, O – posterior wall; F, M – interramal lobe; L, P – dorsal structure and interramal lobe.

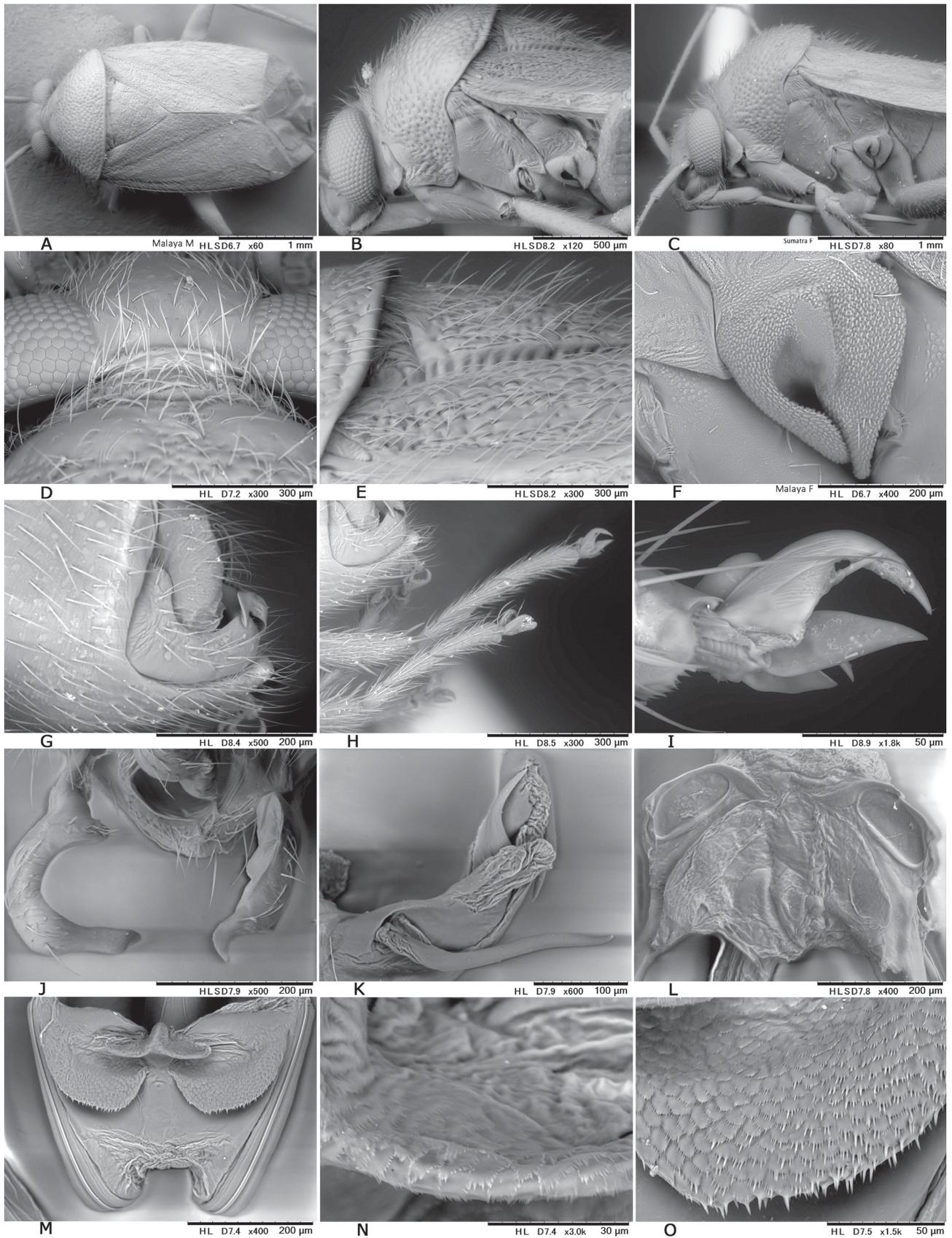


Fig. 33. Scanning electron micrographs for *Diognetus minusculus* sp. nov. from Malaysia (except for Sumatra, ♀ on C), ♂ (A–B, D–E, G–K) and ♀ (C–F, L–O). A – dorsal habitus; B–C – left lateral habitus; D – head and anterior pronotum, dorsal view; E – scutellum and adjacent structures, left lateral view; F – pleura and scent efferent system, left lateral view; G – apex of pygophore with parameres, dorsal view; H – mesotarsus (lower) and metatarsus; I – pretarsal structure of metaleg; J – apex of pygophore with parameres, dorsal view; K – vesica; L – genital chamber, dorsal view; M – posterior wall; N – dorsal structure; O – interramal lobe.

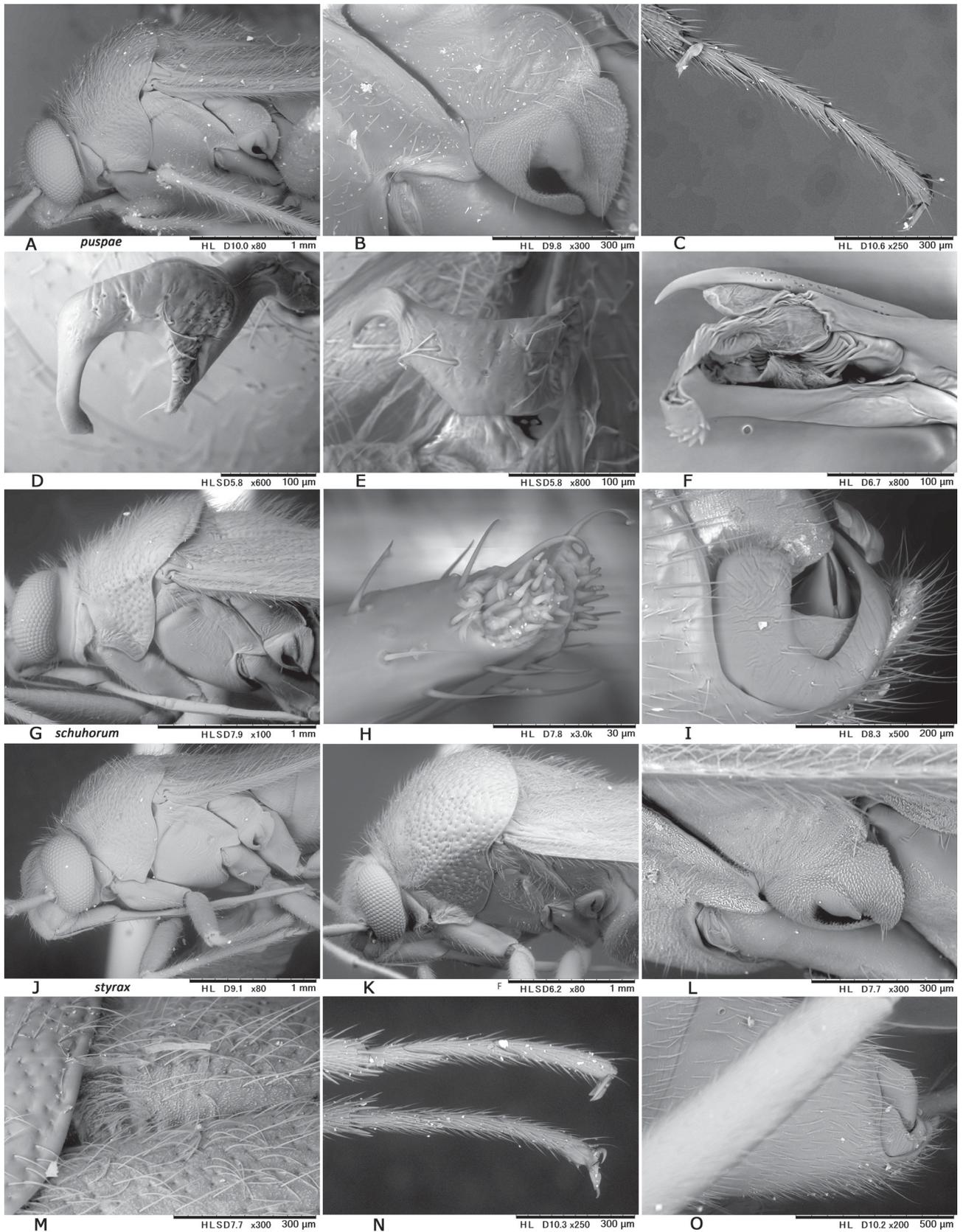


Fig. 34. Scanning electron micrographs for *Diognetus puspae* sp. nov., ♂ (A–F), *D. schuhorum* sp. nov., holotype ♂ (G–I), and *D. styrax* sp. nov., holotype ♂ (J, L, M–O) and ♀ (K). A, G, J, K – anterior body, left lateral view; B, L – pleura and scent efferent system, left lateral view; C, N – metatarsus; D – left paramere; E – right paramere; F – vesica (endosoma); H – apex of labium; I – apex of pygophore with parameres, left lateral view; M – scutellum and adjacent structures, left lateral view; N – metatarsus; O – pygophore, left lateral view.

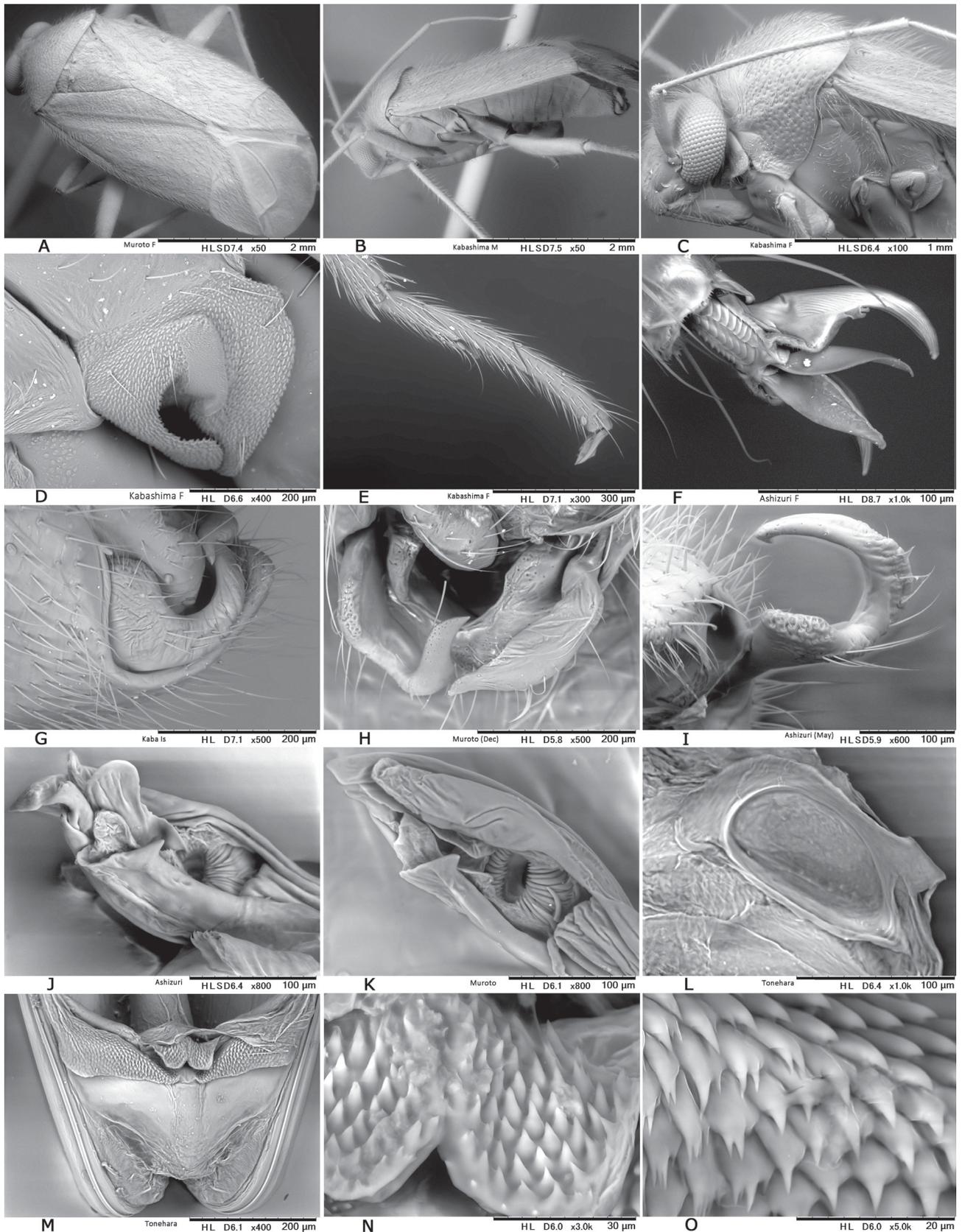


Fig. 35. Scanning electron micrographs for *Diognetus vernus* sp. nov. from southwestern Japan, ♂ (B, G–K) and ♀ (A, C–F, L–O). A – dorsal habitus; B – left lateral habitus; C – anterior body, left lateral view; D – pleura and scent efferent system, left lateral view; E – metatarsus; F – pretarsal structure of metaleg; G–H – apex of pygophore with parameres, left lateral view (G) and dorsal view (H); I – left paramere; J–K – vesica (endosoma); L – sclerotized ring; M – posterior wall; N – dorsal structure; O – interramal lobe.

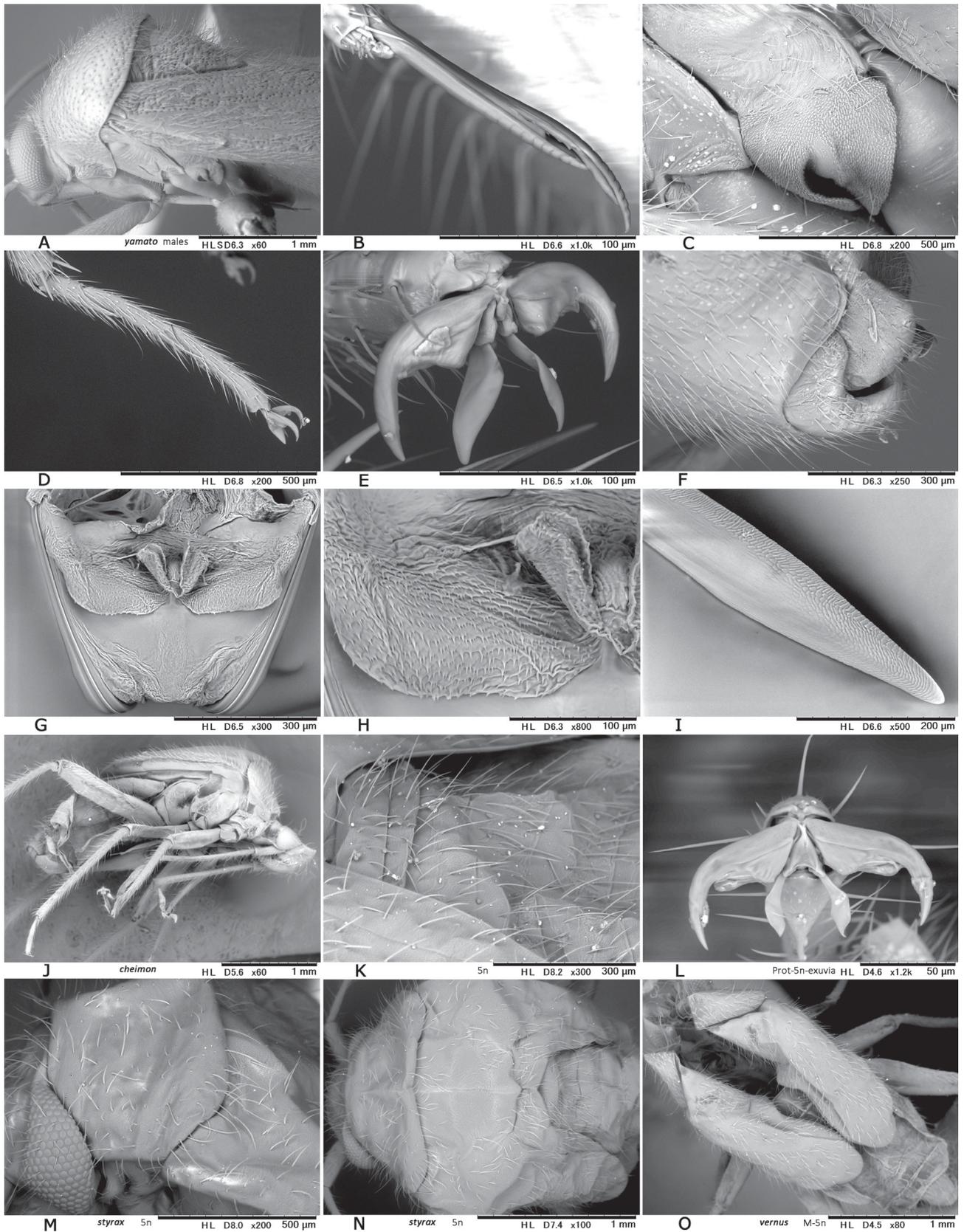


Fig. 36. Scanning electron micrographs for *Diognetus yamato* Yasunaga nom. nov. from Shikoku, Japan (A–I), ♂ (A–F) and ♀ (G–I), and immature forms of *D. cheimon* sp. nov. from Nagasaki, Japan (J–L), *D. styrax* sp. nov. from Nantou, Taiwan (M–N) and *D. vernus* sp. nov. from Nagasaki (O). A – anterior body, left lateral view; B – apex of labium with mandibular and maxillary stylets; C – pleura and scent efferent system, left lateral view; D – metatarsus; E, L – pretarsal structure of metaleg; F – apex of pygophore with parameres, left lateral view; G – posterior wall; H – dorsal structure and interramal lobe; I – apex of ovipositor (gonapophysis I); J – 5th instar exuvia, right lateral view; K – 5th instar thorax and abdomen, dorsal view; M – 5th instar nymph, anterior body; N – same, dorsal habitus; O – 5th instar exuvia, dorsal view.

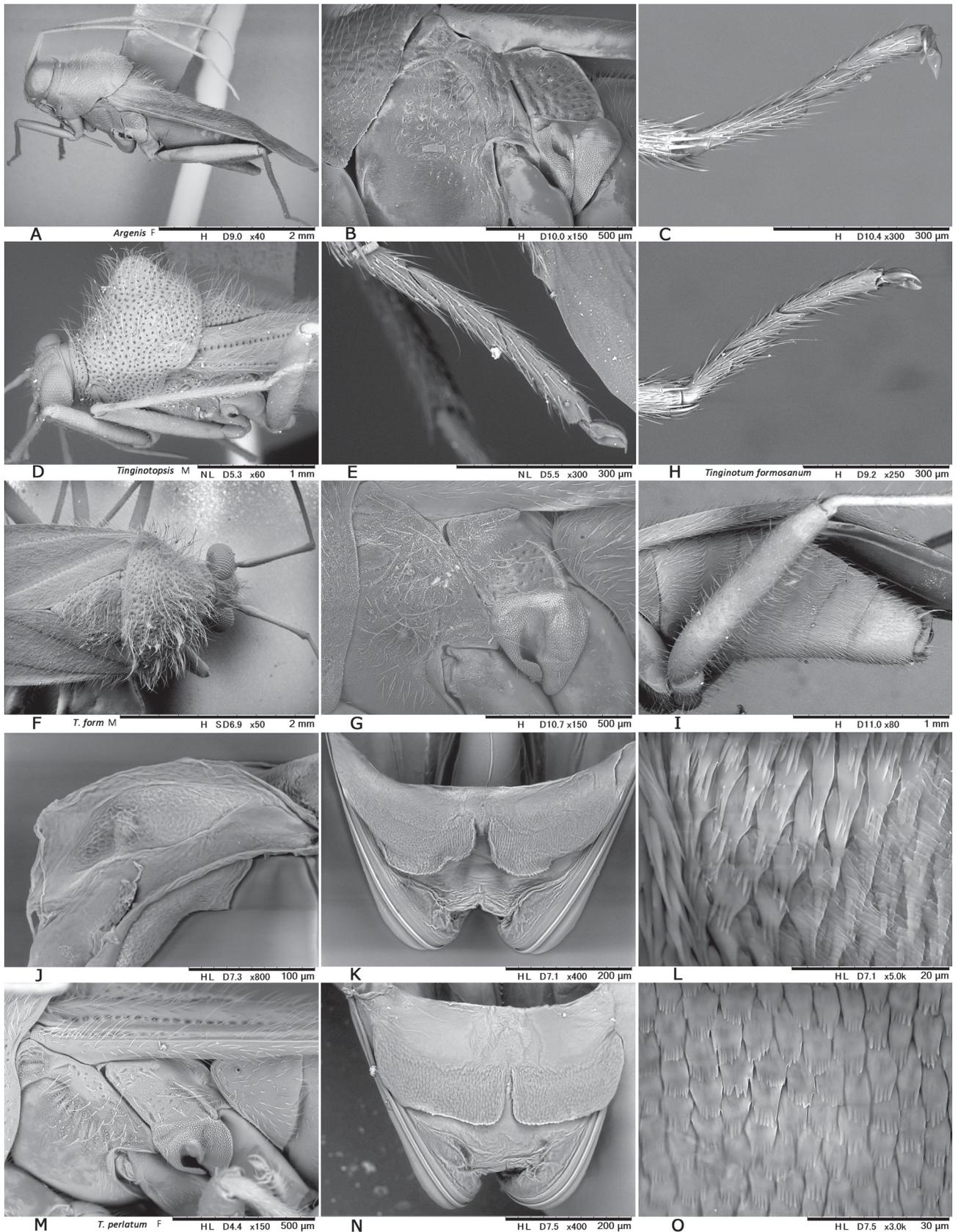


Fig. 37. Scanning electron micrographs for assumed outgroup taxa for *Diognetus*. A–C – *Argenis incisuratus* (Walker, 1873) (from Nakhon Ratchasima, Thailand); D–E – *Tinginotopsis* sp. (Java, Indonesia); F–L – *Tinginotum formosanum* Poppius, 1915 (Ryukyus, Japan); M–O – *T. perlatum* Linnavuori, 1961 (Nagasaki, Japan). A – left lateral habitus; B, G, M – pleura and scent efferent system, left lateral view; C, H – metatarsus; D – anterior body, left lateral view; F – anterior body, dorsal view; I – posterior body, left lateral view; J – sclerotized ring; K, M – posterior wall; L, O – interramal lobe.

***Diognetus styrax* sp. nov.**

(Figs 3D–F, 19C–D, 21A–C, 22E–F, 34J–O, 36M–N)

Type material. HOLOTYPE: ♂, TAIWAN: NANTOU HSIEN: Huiseung Forest Area, along Guandao-xi, 24.0865, 121.0265, sweeping inflorescence of *Styrax suberifolia*, 14 Mar 2017, T. Yasunaga (AMNH_PBI 00380755). PARATYPE: TAIWAN: Same data as for holotype, 1 ♀ (TYCN).

Additional material examined. Same data, 5th instar nymph (TYCN).

Description. Body oval (♀, Fig. 3E) or elongate ovoid, subparallel-sided (♂, Figs 19C–D), moderate in size, 5.5–5.7 mm. COLORATION: Basic coloration reddish-brown, with mottled pattern (Figs 3E, 19C). Head shiny, pale brown; clypeus darkened. Antennae pale reddish-brown; apex of segment II, segment III (except for pale extreme base) and segment IV dark brown. Labium pale brown, partly tinged with red; apical half of segment IV darkened. Pronotum reddish-brown, with posterior half darkened and posterior margin pale brown; mesal part of mesoscutum and anteromedial scutellum narrowly infuscate; pleura broadly fuscous; propleuron brown; scent efferent system creamy yellow. Hemelytron reddish-brown, speckled with dark maculae; cuneus slightly tinged with red; membrane smoky brown, with pale veins and some transparent maculae. Coxae and legs yellowish brown; pro- and mesofemora each with two obscure rings subapically; apical half of metafemur dark brown, with two pale rings subapically. Ventral surface of abdomen pale brown, mottled with darker maculae (Fig. 19D). SURFACE AND VESTITURE: As in generic diagnosis; dorsal surface weakly shining; punctures on pronotum and propleuron uniformly distributed; mesoscutum and scutellum pruinose (Fig. 34M); scutellum shallowly and transversely rugose; hemelytron weakly shining, minutely pruinose. STRUCTURE: Eyes large; vertex narrow. Antennal segment II about as long as labium. Labium slightly exceeding apex of mesocoxa but not reaching apex of metacoxa. Scutellum flat (Fig. 34K). Metathoracic scent efferent system as in Fig. 34L. Metatarsomere III about twice as long as I, slightly longer than II. MALE GENITALIA (Figs 21A–C, 34O): Left paramere with round-edged protuberance on sensory lobe and relatively broad hypophysis that is hooked at apex (Fig. 21A). Vesica with long LS and weak TP (Fig. 21C). FEMALE GENITALIA (Figs 22E–F): Some structures were not confirmed, due to teneral specimen. Posterior wall (Fig. 22E) with rather widened dorsal structure and moderate-sized interramal lobe.

Measurements. See Table 1.

Differential diagnosis. Based on the similarity in external appearance and genitalic structures, the present new species is considered as a closest relative of *D. cheimon* sp. nov. (Japan) or *D. dhampus* sp. nov. (Nepal), from which *D. styrax* sp. nov. can be distinguished by the following combination of characters: Vertex narrower in ♂; antennal segment II about as long as labium; protuberance on sensory lobe of left paramere rather rounded, less produced; surfaces of scutellum and hemelytron pruinose, more sparsely punctate; shorter vesical MS; and interramal lobe wider, more rounded. The final instar nymph (Fig. 3F) is at first sight similar to two Japanese congeners, *D. cheimon*

sp. nov. and *D. vernus* sp. nov. (cf. Fig. 5); distinguished from them by generally lemon-yellow coloration, a pair of dark small spots on anterior wingpads, sparser vestiture on dorsum (cf. Fig. 36K vs. 36N), faint dark spots on each tibia and orange-pink spots scattered on abdominal sterna.

Etymology. Named for the generic name of the breeding host, *Styrax formosanus*; noun in apposition.

Biology. A pair of adults (Figs 3D–E) and a final instar nymph (Fig. 3F) were found to co-occur on the inflorescence of *Styrax formosanus* Matsum. (Styracaceae) (Fig. 1I) in central montane area of Taiwan.

Distribution. Taiwan (Nantou).

***Diognetus vernus* sp. nov.**

(Figs 1E–F, 5I–M, 6, 21D–G, 22G–I, 23, 35, 36O)

Yamatolygus flavigenis (misidentification): YASUNAGA (2001): pl. 80, fig. 316 [a female adult figured as *flavigenis* corresponding to this new species].

Yamatolygus insulanus (misidentification): NOZAKI et al. (2016): 81 (faunal list); OH et al. (2018): 482 (faunal list); KIM et al. (2019): 72 (diagnosis).

Yamatolygus sp. 2: MIYAZAKI et al. (2020): 66, table 1 (life span, Japanese name).

Type material. HOLOTYPE: ♂, JAPAN: KYUSHU: Nagasaki Pref., Nagasaki City, Kabashima Island, 32.558909, 129.784485, sweeping inflorescence of *Castanopsis sieboldii*, 12 May 2019, T. Yasunaga (AMNH) (AMNH_PBI 00380756). PARATYPES: JAPAN: HONSHU: Wakayama Pref., Kushimoto Town, Satokawa, 33.547, 135.654, sweeping flowers of *Styrax japonica*, 2 Jun 1997, T. Yasunaga, 2 ♀♀; Wakayama Pref., Kozagawa Town, Yasaka, 33.53, 135.81, 13 Sep 1999, H. Matsushita, 1 ♂ (TYCN); Kozagawa Town, Komorigawa, 33.65, 135.78, 5 Jul 1994, S. Gotoh, 1 ♀ (TYCN). KYUSHU: Fukuoka Pref., Yame City, Mt. Shakadake, 33.20, 130.84, UV lighting, 23 Jun 2019, T. Nozaki, 1 ♂ (WCF); Kumamoto Pref., Amakusa City, Ushibuka Town, Mt. Tomi, 32.205105, 130.022851, 23 Jul 2015, T. Nozaki, 1 ♀ (TYCN); Amakusa City, Uonuki Town, 32.256, 129.999, UV lighting, 12 Sep 2015, T. Nozaki, 1 ♂ (TYCN); Amakusa City, Futa'ura Town, 32.27, 130.00, UV lighting, 18 Oct 2015, T. Nozaki, 1 ♀ (WCF); Amakusa City, Tsuruha-yama Park, 32.15, 130.04, UV lighting, 18 Oct 2015, T. Nozaki, 2 ♂♂ 1 ♀ (WCF) and 8 May 2015, T. Nozaki, 2 ♀♀ (WCF); Nagasaki Pref., same data as for holotype, 1 ♀ (TYCN); Nagasaki Pref., same locality (lighthouse), 32.551875, 129.777530, 27 Dec 2019, T. Yasunaga, 1 ♀ (TYCN); Nagasaki Pref., same locality and date (orange garden), 32.564850, 129.780180, sweeping buds of *Eurya japonica*, T. Yasunaga, 1 ♂ [5th instar immature form reared then emerging on 29 Dec 2019] (TYCN); Nagasaki City, Kinkai-Odo, 32.935593, 129.815751, sweeping inflorescence of *Castanopsis sieboldii*, 8 May 2019, T. Yasunaga, 1 ♂ [reared and dead on Jun 30] (TYCN); same data, except for date, 4 May 2019, 1 ♀ (TYCN); Nagasaki City, Kinkai-Tonehara, 32.902671, 129.787376, sweeping inflorescence of *Castanopsis sieboldii*, 4 May 2019, T. Yasunaga, 1 ♀ [5th instar immature form reared then emerging on May 6 and dead on Jul 2] (TYCN); Nagasaki City, Tateyama, Mt. Konpira, sweeping flower buds of *Eurya japonica*, 32.764888, 129.879500, 13 Nov 2021, T. Yasunaga, 2 ♀♀ (TYCN); Nagasaki City, Aikawa-machi, Agri-Hills Park, 32.809700, 129.797000, sweeping flowers of *Ligustrum japonicum*, 20 May 2020, T. Yasunaga 1 ♀ [reared then dead on Jul 16] (TYCN); Nagasaki City, Taira (Azekari, Fishery Port), 32.807615, 129.770780, sweeping flowers and fruits of *Eurya emarginata*, 15 Dec 2019, T. Yasunaga, 1 ♀ (TYCN) [5th instar immature form reared then emerging on Dec 17, 2019 and dead on 22 Jun 2020] (TYCN); same locality and plant, 24 Dec 2019, T. Yasunaga, 1 ♂ [5th instar immature form reared then emerging on 29 Dec 2019 and dead on 26 Apr 2020] (TYCN); Nagasaki Pref., Goto Islands, Nakadohri Island, Shin-Kamigoto Town, Tsuzuki-Hamano'ura, 32.9608, 129.0277, UV lighting, 5–6 Jun 2022, T. Yasunaga, 2 ♂♂ (TYCN); Tsushima Island, Mizushima Town, Kechi, Tsushima Green Park, 34.2773, 129.3277, flowers of *Lithocarpus edulis*, 20 May 2020, H. Asanabe, 1 ♂ 1 ♀ (UMUT); Omura City, Kushima,

32.897077, 129.952977, sweeping fruits of *Eurya emarginata*, 15 Jan 2020, T. Yasunaga, 1 ♂ [5th instar immature form reared then emerging on 22 Jan 2020 and dead on 23 Apr 2020] (TYCN). **SHIKOKU:** Kochi Pref., Tosa-Shimizu City, Cape Ashizuri, 32.73, 133.00, UV lighting, 22 May 1999, M. Takai, 1 ♂ 1 ♀ (TYCN); Kochi Pref., Cape Muroto, Muroto Skyline Road [Rt 203], 33.25232, 134.17835, sweeping *Eurya emarginata*, 18 Dec 2019, M. Takai, 2 ♂♂ 3 ♀♀ (CNC, TYCN); Kochi Pref., Takaoka-gun, Tsuno Town, Tengu-ike, UV lighting, 33.47, 133.00, 21 Jul 2000, M. Takai, 1 ♀ (TYCN). **KOREA: JEJU ISLAND:** Jeju City, Eongtto Fall, 33.268440, 126.50000, sweeping *Castanopsis* inflorescence, 12 May 2008, T. Yasunaga, S.H. Jung & R.K. Duwal (SNUK).

Description. Body ovoid, slightly elongate in ♂ (Figs 6A, E), relatively small to moderate in size, 4.5–5.2 mm in total length. **COLORATION:** Body generally castaneous brown (winter-emerging specimens sometimes darkened, cf. Fig. 6C). Head somewhat lighter; clypeus usually darkened. Antennae pale brown; segment I sometimes tinged with red; apex of segment II not significantly darkened; segments III and IV dark brown. Labium pale reddish-brown; apical 1/3–1/2 of segment IV infuscate. Pronotum more or less darkened posteriorly, always with yellowish posterior margin (cf. Figs 6A–C); calli often with a pair of dark, small spots; pleura broadly chestnut or dark brown; scent efferent system creamy yellow. Hemelytron castaneous, partly mottled with dark maculae; membrane smoky brown, with pale veins and several irregular, semitransparent maculae. Coxae and legs pale brown (creamy brown in fresh specimens); mesofemur with two faint pale rings subapically; apical part of metafemur usually more or less darkened, with two pale apical rings; tarsi brown; apical half of each tarsomere III dark brown. Ventral surface of abdomen castaneous to dark brown, with paler median part. **SURFACE AND VESTITURE:** As in generic diagnosis; scutellum transversely rugose, sparsely and finely punctate (Fig. 23); hemelytron with uniformly distributed, fine punctures (Figs 23, 35A). **STRUCTURE:** Antennal segment II as long as or slightly shorter than labium. Labium reaching but not surpassing apex of metacoxa. Scutellum rather flat. Metathoracic scent efferent system as in Fig. 35D. Metatarsomere II as long as III (Fig. 38E); pretarsal structure as in Fig. 35F; parempodia slightly shorter than claw. **MALE GENITALIA** (Figs 21D–G, 35G–K): Left paramere with relatively wide protuberance of sensory lobe and rather stout hypophysis that is hooked at apex (Figs 21D, 35H–I); right paramere with rather small hypophysis (Figs 21E, 35H). Vesica with MS slightly shorter than LS; LS spatulate apically; RS with distinct TP and developed median hook, lacking field of minute spines (Figs 21G, 35J–K); apical keel of phallosome narrow (Fig. 21F). **FEMALE GENITALIA** (Figs 22G–I, 35L–O): Sclerotized ring ovoid, rather thin-rimmed (Figs 22H, 35L); posterior wall with distinctly spinose, rather small dorsal structure (Figs 35M–N); interramal lobe with widened, somewhat angulate lateral margin (Figs 22G, 35M); more than inner 2/3 of interramal lobe with thick spines (Fig. 35N).

Measurements. See Table 1.

Differential diagnosis. Distinguished from two closely related and sympatric congeners, *D. laureus* sp. nov. and *D. insulanus*, by the above key (based mainly on the male genital structures) or by the following key:

- 1 Basic coloration reddish-brown; labium long, usually exceeding apex of metacoxa, reaching abdominal sternum III or IV; principally associated with Lauraceae broadleaf trees. ***D. laureus* sp. nov.**
- Body generally castaneous, not strongly tinged with red; labium reaching but not exceeding apex of metacoxa. 2
- 2 Labium about as long as or slightly longer than maximum width (across hemelytra); currently known from Japanese southwestern islands (Koshiki, Tokara, Amami-Oshima and Okinawa Islands), Taiwan and Philippines (Luzon). ***D. insulanus*** (Yasunaga, 1994)
- Labium shorter than maximum width; known from warm temperate zone (SW Honshu, Shikoku, Kyushu, Tsushima of Japan and Korean Jeju Island). ***D. vernus* sp. nov.**

The final instar nymph of *D. vernus* sp. nov. is very similar in general appearance and dorsal vestiture pattern (cf. Figs 36J, O) to that of *D. cheimon* sp. nov. (cf. Fig. 5); the former can be distinguished from the latter by usually smaller size, tibial dark spots smaller and faint, a pair of clear dark large spots at base (knee) of metatibia (Fig. 5C vs. 5K), and smaller dark spot on abdominal scent gland opening (Fig. 5J).

Etymology. Latin adjective *vernus* (= spring), referring to its frequent occurrence on spring inflorescences.

Biology. MIYAZAKI et al. (2020) reported that a pair of newly emerging adults (in spring) survived for 54 days (♂) / 60 days (♀), reared with a fermented milk beverage. Additional tests (Yasunaga, pers. observ.) also confirmed that some adults (winter-emerging population) had longer life span – 187 days (♀, Dec 17, 2019 – Jun 22, 2020); 118 days (♂, Dec 29, 2019 – Apr 26, 2020); and 91 days (♂, Jan 22, 2020 – Apr 23, 2020). Therefore, two generations may coexist in mid and late spring.

The winter population of *D. vernus* was predominantly found from the flowers and fruits of *Eurya* spp. (Figs 5J–K), whereas the spring to early summer population seems to utilize inflorescences of a variety of broadleaf trees, such as *Castanopsis sieboldii* (Makino) Hatus., *Lithocarpus edulis* (Makino) Nakai (Fagaceae), *Ligustrum japonicum* Thunb. (Oleaceae), and *Styrax japonica* Siebold & Zucc. (Styracaceae) (YASUNAGA 2001). See also biology section under *D. laureus* sp. nov. From December to January, any of three Japanese congeners (including immature forms), *D. cheimon*, *D. laureus* and *D. vernus*, may co-occur on inflorescences or fruits of *Eurya* broadleaf trees.

Distribution. Japan (SW Honshu, Shikoku, Kyushu, Tsushima Island), Korea (Jeju Island).

***Diognetus yamato* Yasunaga nom. nov.**

(Figs 3G–H, 19E–F, 21H–J, 22J–L, 36A–I)

Yamatolygus pilosus Yasunaga, 1994: 119 (original description) [= junior secondary homonym of *Diognetus pilosus* (Poppius, 1914)].

Yamatolygus pilosus: SCHUH (1995): 972 (catalog); KERZHNER & JOSIFOV (1999): 182 (catalog); YASUNAGA (2001): 268 (diagnosis), fig. 318 [wrongly figured as *D. flavigenis*]; SCHUH (2002–2013) (online catalog); AUKEMA (2018) (online catalog); OH et al. (2018): 482 (faunal list).

Type material examined. *Yamatolygus pilosus*: HOLOTYPE: ♂, JAPAN: HONSHU: Aomori Pref., Mutsu City, Mt. Osoreyama, 41.30, 141.08, 2 Aug 1953, H. Hasegawa (NIAES, without USIs, image available on http://www.naro.affrc.go.jp/archive/niaes/inventory/insect/dbhemiptera/y_pilosus.html). PARATYPES: JAPAN: KYUSHU: Oita Pref., Takeda City, Mts. Kuju, Daisen-rindo (trail), 33.11, 131.26, on flower of *Hydrangea paniculata*, 1 Aug 1988, Y. Abe, 1 ♂ (AMNH_PBI 00380757), 1 ♀ (TYCN); Kumamoto Pref., Izumi Village [= current Yatsushiro City, Izumi Town], Mt. Shiratori, 32.4800, 131.0044, 27–28 Jun 1987, R. Noda, 1 ♂ (AMNH_PBI), 1 ♀ (TYCN). SHIKOKU: Kochi Pref., Honkagawa Village [= current Ino Town], 33.750, 133.200, T. Befu, 1 ♂ (AMNH_PBI) (TYCN).

Additional material examined. JAPAN: HONSHU: Nagano Pref., Azumino City, Jonen–Mitsumata, 36.30, 137.75, 6 Jul 1988, M. & S. Gotoh, 1 ♀ (TYCN); Niigata Pref., Tsunan Town, Mt. Yamabushi, 37.0241, 138.5858, UV lighting, 11 Aug 2002, S. Sakurai, 1 ♂ (TYCN); Niigata Pref., Myoko City, Hikosa Waterfall, 36.8863, 138.0566, 1 Aug 1994, K. Sueyoshi, 1 ♂ 1 ♀ (TYCN); Okayama Pref., Shinjo City, Mt. Kenashi, 35.2344, 133.5144, 14 Jul 1994, T. Nozaki, 1 ♀ (WCF); Wakayama Pref., Kumano area, Hatenashi Mts., Mt. Ando, 1,100 m alt., 33.8977 135.6200, UV lighting, 7 Jul 1994, S. Gotoh, 1 ♀ (TYCN). KYUSHU: Fukuoka Pref., Yame City, Mt. Shakadake, 33.20, 130.84, UV lighting, 23 Jun 2019, T. Nozaki, 1 ♂ (WCF). SHIKOKU: Kochi Pref., Agawa-gun, Teragawa, Shirasa, 33.7691777 133.183555, flowers of *Symplocos coreana* (H.Lév.) Ohwi, 2–3 Aug 2002, T. Yasunaga, 3 ♂♂ 3 ♀♀ (TYCN).

Redescription. For description see YASUNAGA (1994, as *Yamatolygus pilosus*). **Measurements.** See Table 1.

Differential diagnosis. Readily distinguished from other congeners by the following unique characters: moderate to large size (5.0–6.0 mm); castaneous to dark reddish-brown general coloration (Figs 3G–H, 19E–F); dark antennal segments I and II (median part of segment II sometimes pale as in Figs 3G–H); long labium exceeding apex of metacoxa (Fig. 19F); rather inflated scutellum (Fig. 36A); and pale brown cuneus with fuscous apical 1/3–1/2. The male and female genitalic structures are also unique to *D. yamato* (Figs 21H–J, 22J–L, 36F–I): Left paramere with triangular protuberance on sensory lobe (Fig. 21H); right paramere constricted subapically (Fig. 21I); heavily sclerotized vesica with developed spiculum (Fig. 21J); widened interramal lobe and dorsal structure that are entirely covered with comb-like scar microstructures and lacking distinct spines (Figs 36G–H); and thick-rimmed sclerotized ring (Fig. 22K).

Etymology. From an ancient name of Japan, Yamato, also referring to the synonymized generic name *Yamatolygus* Yasunaga; latinized as a noun in apposition.

Biology. As suggested by YASUNAGA (1994), this species is associated with deciduous Symplocaceae host plants, *Symplocos coreana* (H.Lév.) Ohwi and *S. sawafutagi* Nagam from which its immature forms were confirmed. The eggs appear to hibernate, and the adults are found on the host flowers and fruits between late June and early August. Some teneral adults were also collected from inflorescence of *Hydrangea paniculata* Sieb. & Zucc. (Hydrangeaceae).

Distribution. Japan (Honshu, Shikoku, Kyushu), Korea; this species has the northernmost distribution among known congeners and is restricted to montane deciduous broadleaf forests in Shikoku and Kyushu.

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