

RESEARCH PAPER

Review of the genus *Cladiscus* (Coleoptera: Cleridae) from Japan and Taiwan, with descriptions of two new species

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Abstract. The Japanese and Taiwanese species of the genus *Cladiscus* Chevrolat, 1843 are reviewed. Two new species are described: *C. hachijoensis* sp. nov. from Japan (Hachijōjima Is.) and *C. liaoi* sp. nov. from Taiwan. *Cladiscus pallidicornis* Corporaal & van der Wiel, 1949 is recorded for the first time from Japan and *C. weyersi* Kraatz, 1899 from Taiwan. *Cladiscus sanguinicollis* (Spinola, 1844) is removed from the Taiwanese fauna, as its records are based on misidentification. The Japanese and Taiwanese members, plus *C. thalassinus* Murakami, 2017 from Borneo, Malaysia, are divided into two species groups based on the features of male and female genitalia.

Key words. Coleoptera, Cleridae, Tillinae, *Cladiscus*, key to species, new species, Japan, Taiwan

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Introduction

The genus *Cladiscus* Chevrolat, 1843, of the subfamily Tillinae Leach, 1815 (Coleoptera, Cleridae), resembles genera *Diplophorus* Heller, 1922, *Gracilotillus* Pic, 1933, *Egenocladiscus* Corporaal & van der Wiel, 1949, *Orthocladiscus* Corporaal & van der Wiel, 1949, and *Paracladiscus* Miyatake, 1965 in general appearance, i.e., pectinate, bipectinate, flabellate, or serrate antennae, and elongate body (CORPORAAL & VAN DER WIEL 1949, MIYATAKE 1965). *Cladiscus* is comprised of thirty five species from the Palearctic and Oriental Regions, and five species from Africa and Madagascar (CORPORAAL 1950; PIC 1954, 1955; MURAKAMI 2017).

Four species are presently known from Japan and Taiwan: *C. obeliscus* Lewis, 1892, *C. sauteri* Schenkling, 1912, *C. terminalis* Schenkling, 1912, and *C. pallidicornis* Corporaal & van der Wiel, 1949. The author's discovery of new species and range extensions of some species indicated by newly collected material prompted further investigation of *Cladiscus*, the findings of which resulted in the present paper.

In this review, I report the results of a comprehensive morphological examination of the available *Cladiscus* ma-

terial. Two new species are described, species-groups are delimited, and the taxonomic significance of female genitalia is discussed. A key to species and a distributional map for Japanese and Taiwanese members are also provided.

Material and methods

The methods of examination of genitalia and associated morphology follow MURAKAMI (2016, 2017). Genitalia illustrations were made using Adobe Illustrator CS4 based on photographs taken with a HiROX KH-1300 digital microscope and 2D measurement software SHX-13M v2.9.0. Measurements were taken using a micrometer eyepiece with a scale. The arithmetic mean is given in parentheses after the range of measurements and ratios.

Data for the type specimens are cited verbatim (with original spelling retained) and are provided inside single quotation marks (‘’). The single vertical bar (|) separates rows within each label. The specimens examined in this study are deposited in the following collections:

EUMJ	Ehime University Museum, Matsuyama, Japan;
HUMJ	Hokkaido University Museum, Sapporo, Japan;
JCCT	Jiafong Chen and Jiamu Chen collection, Tainan, Taiwan;
KSCJ	Kaoru Sakai collection, Tokyo, Japan;



KUMJ	Kyushu University Museum, Fukuoka, Japan;
MMCJ	Masafumi Matsumura collection, Okinawa, Japan;
MTCJ	Minoru Tanaka collection, Osaka, Japan;
SDEI	Senckenberg Deutsches Entomologisches Institut, München, Germany;
SSCT	Sinyan Shih collection, Changhua, Taiwan.

The following abbreviations are used for measurements:

BL	length of body (PL+EL);
EL	length of elytra measured from basal margin to the apex of suture;
EW	maximum width of elytra;
EyD	distance between eyes in dorsal view;
EyW	width of a single eye in dorsal view;
PL	maximum length of pronotum (along mid-line);
PWA	pronotal width at anterior margin;
PWB	pronotal width at posterior margin.
PWM	minimum width of pronotum.

The abbreviations for male and female genital structures are as follows:

ACL	anterior coxital lobe;
BC	bursa copulatrix;
CM	connecting membrane between tegmen and phallus;
CPr	coxital processes;
MO	median orifice;
Ov	ovipositor;
PCL	posterior coxital lobe;
Ph	phallus;
Sc	sclerite at base of median oviduct;
Sp	spermatheca;
Tg	tegmen;
Vg	vagina.

Taxonomy

Cladiscus Chevrolat, 1843

Cladiscus Chevrolat, 1843: 33 [original description]. CORPORAAL & VAN DER WIEL (1949): 190 [key to species].

Type species. *Cladiscus strangulatus* Chevrolat, 1843.

Diagnosis. The genus is similar to *Orthocladiscus* Corporaal & van der Wiel, 1949, but it is distinguished by the following characters: male antennae serrate, pectinate, or flabellate (*Orthocladiscus*: male antennae bipectinate or bifurcate) (GERSTMEIER 2006).

Redescription (for Japanese and Taiwanese species). Body length 5.2–13.4 mm; head including eyes wider than pronotum, with finely and evenly setigerous punctures; terminal palpomeres of maxillary palpi digitiform; terminal palpomeres of labial palpi triangular, their length equal to 1/2 of width of apical margin of terminal palpomeres; postgular processes short. Pronotum long campaniform, constricted in basal 1/3, evenly covered with pubescence; notosternal suture (= pronototergosternal suture sensu OPITZ (2010)) complete. Elytra elongate, subparallel, with large and deep punctation; rows of punctures not reaching apex; mesoventrite without anterior process. Legs elongate; claws bidentate with basal denticles shorter than apical denticles; protibiae covered densely with pubescence on inner surface; tarsal sole formula 4–4–4; tibial spur formula 0–0–0 (most species) or 2–2–2 (*C. sauteri*).

Female. Metaventrite with or without pair of tuft-like trichobothria; ovipositor with well sclerotized coxite,

which is divided into PCL and ACL; trifurcated CPr attached at apex of PCL; coxite covered with pubescence on membrane of base of CPr; median oviduct with or without sclerite at base.

Cladiscus obeliscus Lewis, 1892

(Figs 1, 14, 15, 27, 34, 40–51, 119–120, 126)

[Japanese name: Hoso-kakkoumushi]

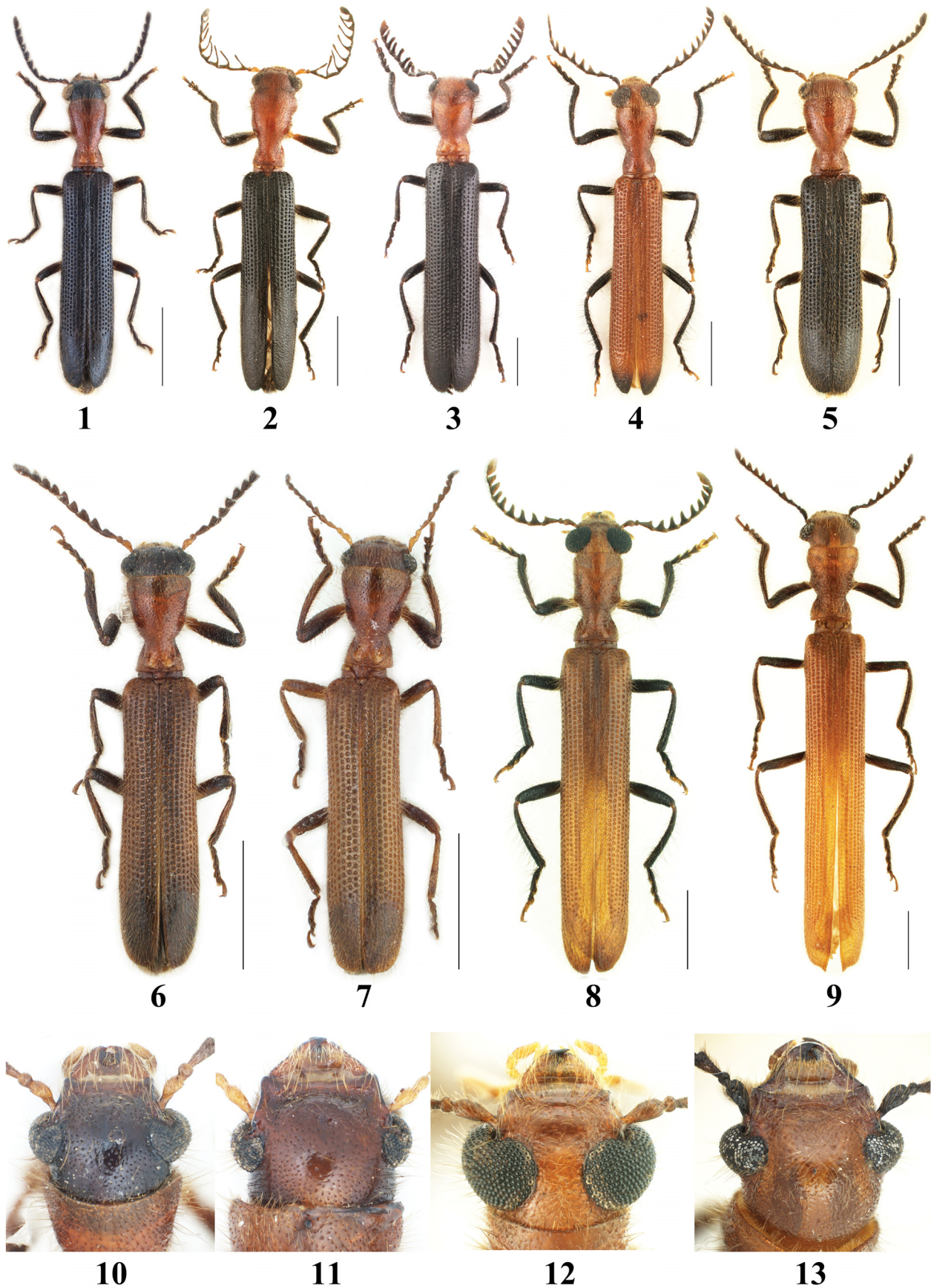
Cladiscus obeliscus Lewis, 1892: 185 [original description]. LOHDE (1900): 16 [listed]; GORHAM (1903): 332 [noted, faunistics]; SCHENKLING (1906): 247 [noted]; SCHENKLING (1910): 9 [listed]; CORPORAAL & VAN DER WIEL (1949): 197 [key to species]; CORPORAAL (1950): 22 [listed]; NAKANE (1963): 182 [noted, incl. pl. 91, figs 22a, b]; MIYATAKE (1985): 152 [noted, incl. pl. 24, fig. 20].

Cymatodera strangulata Kiesenwetter, 1879 (nec Chevrolat, 1843): 314 [original description]. LEWIS (1895): 122 [synonymized].

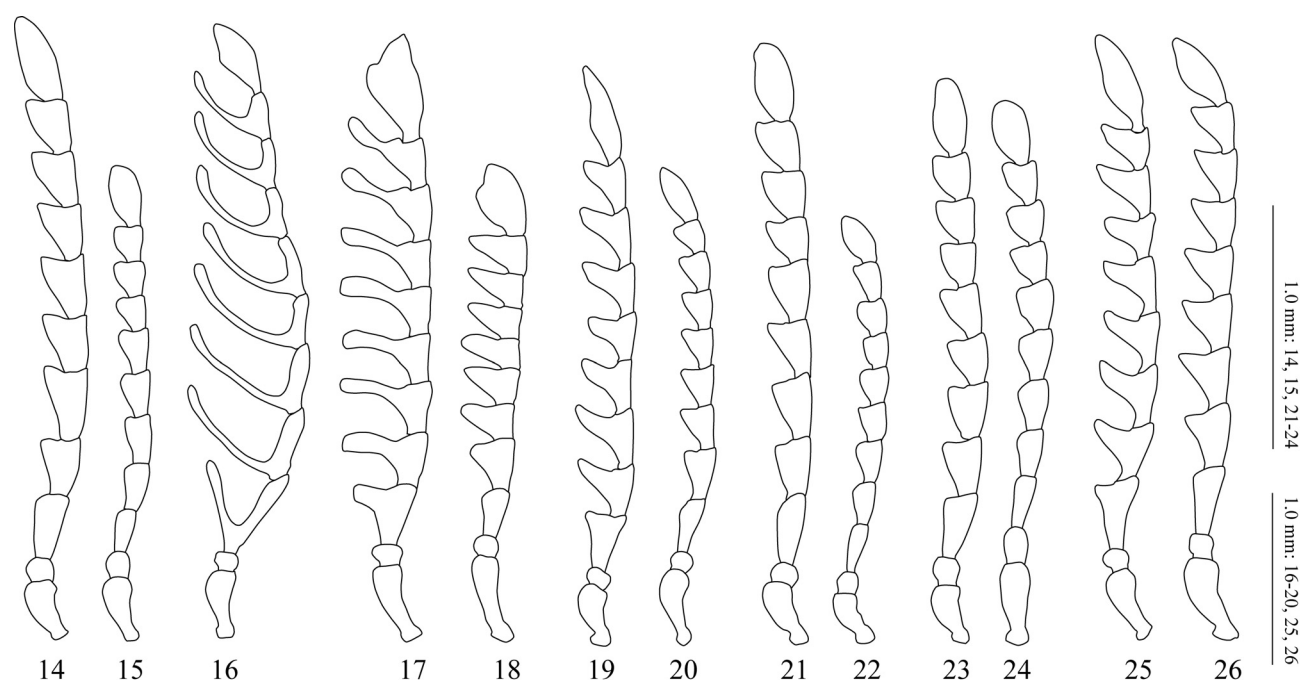
Type locality. Japan, Honshu and Kyushu (after LEWIS 1892).

Specimens examined. **TAIWAN:** NANTOU COUNTY: Nanshanshi, Renai Township, 29.vii.1968, 1 ♀, K. Yamamoto leg. (EUMJ). **TAITUNG COUNTY:** Jinping Forest Road, Chihshang Township, 19.vi.2011, 1 ♂, J. Yamasako leg. (EUMJ). **PINGTUNG COUNTY:** Mt. Dahanshan, alt. ca. 1,500 m, Chunrih Township, 2.vi.2013, 1 ♂, H. Murakami leg. (EUMJ). **JAPAN:** **HOKKAIDŌ PREFECTURE:** Fonyu, Rubeshibe, Kitami-shi, 9.viii.1918, 1 ♀, M. Suzuki leg. (KUMJ). **FUKUI PREFECTURE:** Kurokawa-rindō, alt. ca. 500 m, Tsuruga-shi, 25.viii.2003, 1 ♂, M. Hasegawa leg. (EUMJ). **KANAGAWA PREFECTURE:** Ōwakudani, Hakone-machi, 4.vii.1984, 1 ex., H. Yoshitomi leg. (EUMJ). **NAGANO PREFECTURE:** Tobira Spa, 30.vii.1973, 1 ♀, S. Hisamatsu leg. (EUMJ). **MIE PREFECTURE:** Misugi-mura, 16.vii.1955, 1 ex., M. Satō leg. (EUMJ). **KYŌTO PREFECTURE:** Kifuse, 6.viii.1980, 1 ♂, K. Morimoto leg. (KUMJ). **HYŌGO PREFECTURE:** Mt. Hyounosen, Yabu-shi, light trap, 1.viii.2015, 1 ex., Y. Hisasue leg. (EUMJ). **TOTTORI PREFECTURE:** Mt. Daisen, 27–28.vii.1976, 1 ex. Y. Notsu leg. (EUMJ). **TOKUSHIMA PREFECTURE:** Minaminoma, Kamiyama-chō, 20.vii.1952, 1 ♂, S. Miyamoto leg. (KUMJ); Fukuwara, Kamikatsu-chō, 7.viii.1953, 1 ♂, M. Hirai leg. (HUMJ); Mt. Mimune, Higashi-Iya, 2–3.viii.1969, 1 ♂, S. Kinoshita leg. (EUMJ). **EHIME PREFECTURE:** Mt. Shiratsue, Tōon-shi, 25.vii.1972, 1 ♂, S. Kinoshita leg. (EUMJ); Mt. Saragamine, Tōon-shi, 2.viii.1980, 3 ♂♂, Y. Seiyama leg. (EUMJ); Akanma, Uwa-chō, 23.vii.1994, 1 ♂, M. Sakai leg. (EUMJ); Onigajō, Uwajima-shi, 8.viii.1994, 1 ex., H. Tanabe leg. (EUMJ); Yokono, Nishidani, Kumakōgen-chō, 15.vii.1994, 2 ♀♀, M. Sakai leg. (EUMJ), 15–16.vii.1994, 1 ♀, Lizhen Li leg. (EUMJ); Komi, Nishidani, Kumakōgen-chō, 1 ♀, M. Mino leg. (EUMJ), 1 ♂, K. Okada leg., 2 ♂♂, N. Ohbayashi leg. (EUMJ); Odamiyama, Uchiko-chō, 1 ♂, 23.vii.1967, Y. Hori leg. (EUMJ), 2 exs, 3 ♂♂ 2 ♀♀, E. Yamamoto leg. (EUMJ), 20.viii.1994, 1 ♀, 28.vii.1994, 1 ♂ 1 ♀ (EUMJ), 30.vii.1994, 1 ♂, M. Kawanabe leg. (EUMJ), 7.vii.1996, 1 ♀, H. Ono leg. (EUMJ), 9.vi.1996, 1 ♂ 1 ♀, M. Shiraishi leg. (EUMJ), 12.viii.1996, 2 ♂♂ 1 ♀, S. Yano leg. (EUMJ); Oino-machi, Matsuyama-shi, 1 ♂, 5.viii.2000, J. Ogawa leg. (EUMJ); Kōmo-misaki, Nishiumi-machi, 30.vi.2004, 1 ♂, J. Ogawa leg. (EUMJ), 18.vii.2005, 1 ♀ (EUMJ); Wakimizu, Tōon-shi, 26.vii.2006, 1 ♀, K. Takasuka leg. (EUMJ); Mt. Takanawa, Matsuyama-shi, alt. ca. 970 m, 5.viii.2012, M. Hasegawa leg. (EUMJ). **KŌCHI PREFECTURE:** Yusu-hara-chō, 15–16.vii.1994, 3 ♂♂ 2 ♀♀, M. Kawano leg. (EUMJ); Ashizuri-misaki, Tosashimizu-shi, 16.vi.2013, 1 ex., R. Okano leg. (EUMJ); Nuno, Tosashimizu-shi, 12.vii.1987, 1 ♂, M. Sakai leg. (EUMJ). **FUKUOKA PREFECTURE:** Mt. Inugatake, Buzen-shi, 14.vii.1938, 1 ♂, Hori, Kawahara & Yasumatsu leg. (KUMJ); Yamaharu, Ōnohara, Ukiha-shi, 17.iv.1956, 1 ♀, N. Gyōtoku leg. (HUMJ). **ŌITA PREFECTURE:** Mt. Sobosan, 25.vii.1978, 1 ♂, H. Miyama leg. (EUMJ). **KAGOSHIMA PREFECTURE:** Kirishima-shi, 25.vii.1971, 1 ♂, T. Nakane leg. (HUMJ), 26.vii.1971, 3 ♂♂, 28.vii.1971, 1 ♂ (HUMJ). **Ōsumi Islands:** Tange-ga-shima, Nogi, Nishinoomote, 10.vii.1974, 2 ♂♂, S. Hisamatsu leg. (EUMJ). **Tokara Islands:** Nakano-shima, vi.1953, 1 ♂, S. Miyamoto leg. (HUMJ), 25.vi.1962, 1 ♀, H. Yokoyama leg. (EUMJ).

Differential diagnosis. This species is similar to *C. pallidicornis* Corporaal & van der Wiel, 1949, but it is distinguished by the following characters: head black; elytra



Figs 1–13. Habitus and head of *Cladiscus* spp. (1–5, 6, 8, 10, 12, male; 7, 9, 11, 13, female). 1 – *Cladiscus obeliscus* Lewis, 1892; 2 – *C. weyersi* Kraatz, 1899; 3 – *C. sauteri* Schenkling, 1912; 4 – *C. terminalis* Schenkling, 1912; 5 – *C. pallidicornis* Corporaal & van der Wiel, 1949; 6, 7, 10, 11 – *C. hachijoensis* sp. nov. (6, 10, holotype; 7, 11, paratype); 8, 9, 12, 13 – *C. liaoi* sp. nov. (8, 12, holotype; 9, 13, paratype). Scale bars: 2.0 mm.



Figs 14–26. Antennae (14, 16, 17, 19, 21, 23, 25 – male; 15, 18, 20, 22, 24, 26 – female). 14, 15 – *Cladiscus obeliscus* Lewis, 1892; 16 – *C. weyersi* Kraatz, 1899; 17, 18 – *C. sauteri* Schenkling, 1912; 19, 20 – *C. terminalis* Schenkling, 1912; 21, 22 – *C. pallidicornis* Corporaal & van der Wiel, 1949; 23, 24 – *C. hachijoensis* sp. nov.; 25, 26 – *C. liaoi* sp. nov.

wholly black; EL/PL 4.36–5.15 (4.87) in male, 4.02–4.45 (4.28) in female; apical margin of male pygidium (Fig. 41) round; apical margin of female ventrite VI (Fig. 45) almost straight; phallus and tegmen (Figs 46–48) symmetrical; base of MO with a flattened sclerite plate (Fig. 120).

Supplementary description. Male (Fig. 1). Head, antennomeres III to XI, elytra and legs brownish black; antennomeres I and II, pronotum brownish red; pronotum sometimes largely brownish black.

Antennae (Fig. 14) weakly serrate; antennomere I claviform; II compact; III cylindrical; IV to X weakly serrate, longer than wide; antennomere XI slightly longer than X.

Pronotum smooth at apex; postcoxal projections (Fig. 34) long; prosternal process not extending contact point of postcoxal projections. Elytra with rows of deep, large, asetigerous punctures in basal 4/5; apical margins gently finely indented. Mesoventrite with sparse setigerous punctures except for central portion. Metaventral anterior process short. Metendosternite (Fig. 40) without furcal laminae; process extending anteriorly, bifurcated at apex; furcal arms extending straight.

Protibiae (Fig. 27) widening from basal 1/3 to apex; meso- and metatibiae almost straight. Tibial spur formula 0–0–0.

Apical margin of abdominal ventrite V broadly and slightly emarginated. Pygidium (Fig. 41) rounded posteriorly, with long struts. Apical margin of ventrite VI (Fig. 42) almost straight. Spicular fork (Fig. 43) with intraspicular plate, which is 1/3 of spicular fork.

CM (Figs 46–48) without spines, 1/2 as long as tegmen. Tegmen 1/2 as long as phallus, flattened, apically widening.

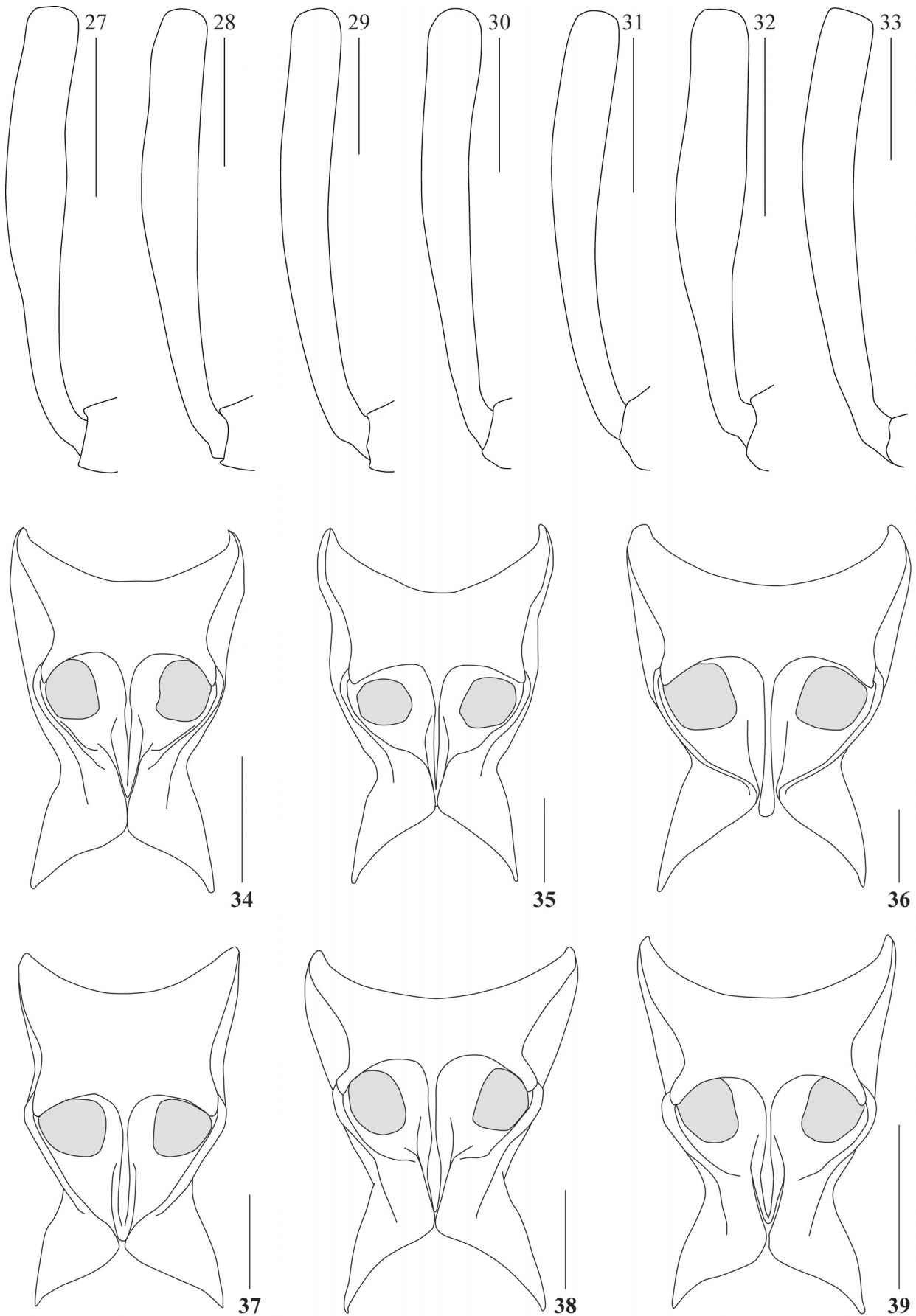
Phallus flattened, pointed at apex.

Female. Similar to male, but EyD/EyW 3.18–4.63 (3.57); antennae (Fig. 15) relatively shorter; apical margin of abdominal ventrite V truncated broadly and deeply in middle.

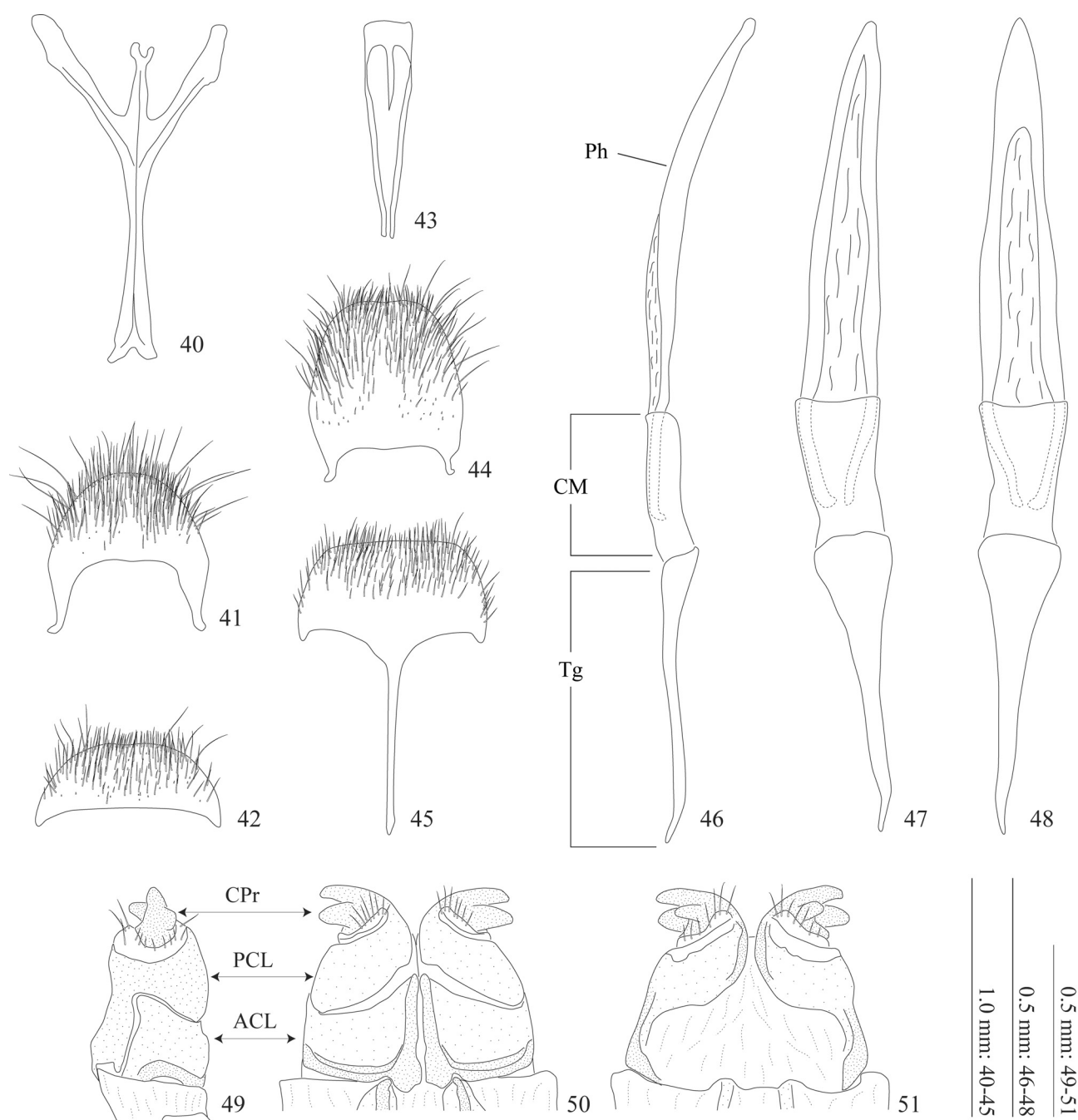
Apical margin of pygidium (Fig. 44) almost straight; struts short. Apical margin of ventrite VI (Fig. 45) almost straight; apodeme 2/3 as long as ventrite VI.

Spermatheca (Fig. 119) sclerotized; Sc (Fig. 120) flattened. CPr (Figs 49–51) distally trifurcate; central and ventrolateral processes large, equal in size; dorsolateral process relatively short.

Measurements and ratios. Male (n = 6): BL: 5.41–6.12 (5.89) mm; PL: 1.32–1.50 (1.45) mm; PWA: 0.82–1.00 (0.91) mm; PWM: 0.44–0.50 (0.47) mm; PWB: 0.64–0.74 (0.71) mm; EL: 4.09–4.64 (4.44) mm; EW: 1.00–1.18 (1.13) mm; EyD: 0.54–0.68 (0.60) mm; EyW: 0.22–0.26 (0.25) mm; EL/PL: 4.36–5.15 (4.87); EW/PWA: 1.16–1.29 (1.24); EW/PWM: 2.27–2.68 (2.43); EW/PWB: 1.56–1.69 (1.60); PWA/PWB: 1.22–1.35 (1.29); PWA/PWM: 1.80–2.17 (1.96); PWB/PWM: 1.40–1.61 (1.52); EyD/EyW: 2.15–2.83 (2.44). **Female** (n = 6): BL: 5.12–6.79 (5.86) mm; PL: 1.30–1.54 (1.47) mm; PWA: 0.86–1.22 (1.03) mm; PWM: 0.42–0.56 (0.48) mm; PWB: 0.62–0.84 (0.72) mm; EL: 3.83–5.27 (4.39) mm; EW: 0.98–1.28 (1.09) mm; EyD: 0.60–0.82 (0.69) mm; EyW: 0.16–0.24 (0.20) mm; EL/PL: 4.02–4.45 (4.28); EW/PWA: 1.00–1.14 (1.07); EW/PWM: 2.00–2.52 (2.28); EW/PWB: 1.41–1.58 (1.53); PWA/PWB: 1.39–1.46 (1.43); PWA/PWM: 1.92–2.35 (2.14); PWB/PWM: 1.32–1.61 (1.49); EyD/EyW: 3.18–4.63 (3.57).



Figs 27–39. Male protibiae (27–33) and prothorax in ventral view (34–39). 27, 34 – *Cladiscus obeliscus* Lewis, 1892; 28, 35 – *C. weyersi* Kraatz, 1899; 29, 36 – *C. sauteri* Schenkling, 1912; 30, 37 – *C. terminalis* Schenkling, 1912; 31, 38 – *C. pallidicornis* Corporaal & van der Wiel, 1949; 32, 39 – *C. hachijoensis* sp. nov.; 33 – *C. liaoi* sp. nov. Scale bars: 0.5 mm.



Figs 40–51. Metendosternite, terminal parts and genitalia of *Cladiscus obeliscus* Lewis, 1892 (40–43, 46–48, male; 44, 45, 49–51, female). 40 – metendosternite; 41, 44 – pygidium; 42, 45 – ventrite VI; 43 – spicular fork; 46–48 – male genitalia in lateral (46), ventral (47), and dorsal (48) views; 49–51 – apices of ovipositor in lateral (49), ventral (50), and dorsal (51) views.

Distribution (Fig. 126). Japan: Hokkaidô, Honshû, Shikoku, Kyushu, Nakano-shima, Tanega-shima (new record); Taiwan (new record); India (GORHAM 1903).

Remarks. This species was recorded from the southeastern islands of Japan, Amami-Oshima and Ishigaki-jima (NAKAMURA 1986), Iriomote-jima (TSUCHIDA & SAKAI 2015), Yonaguni-jima (ICHIKAWA 2008). Considering the similarity between this species and *C. pallidicornis*, all previous records need to be reviewed in the future and are not considered for the distribution data in this paper.

Cladiscus weyersi Kraatz, 1899

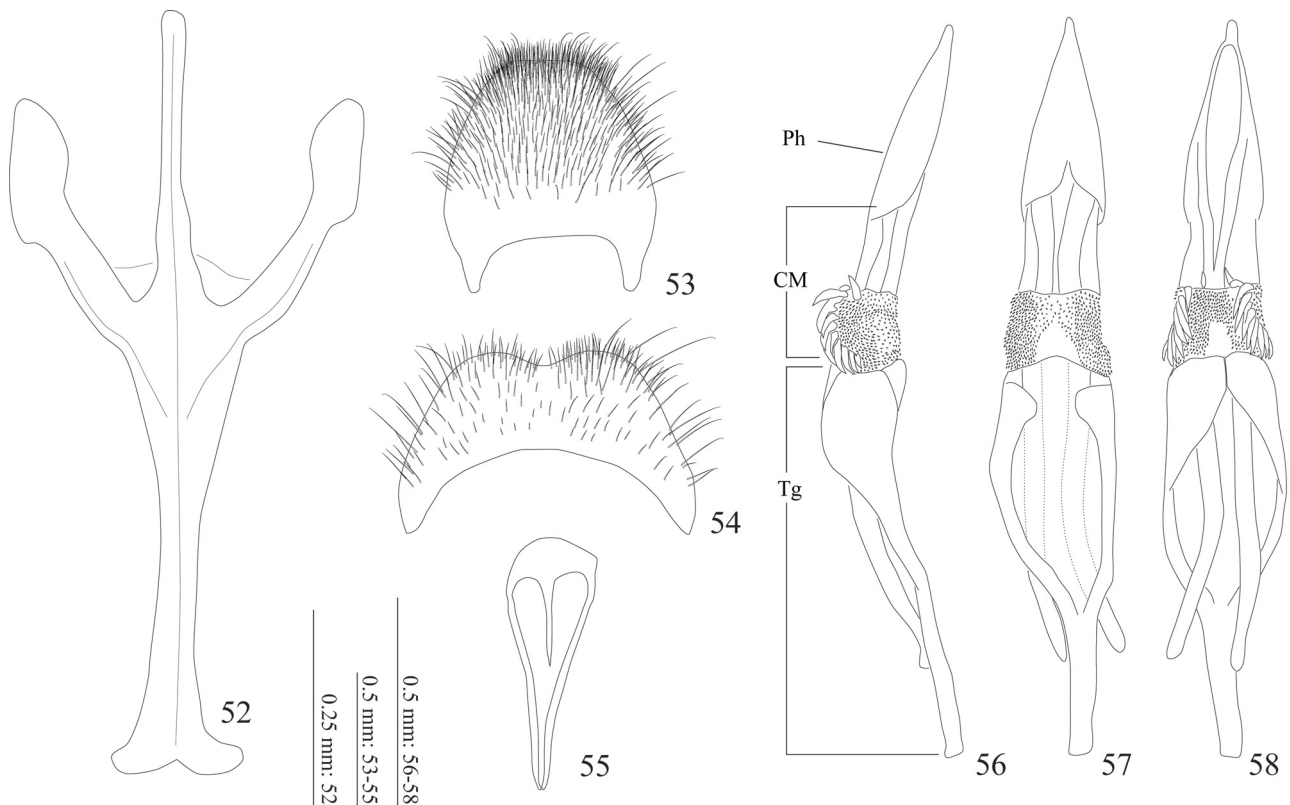
(Figs 2, 16, 28, 35, 52–58, 126)

Cladiscus weyersi Kraatz, 1899: 213 [original description]. LOHDE (1900): 17 [listed]; SCHENKLING (1910): 10 [listed]; CORPORAAL & VAN DER WIEL (1949): 196 [key to species]; CORPORAAL (1950): 24 [listed].

Type locality. Indonesia, Sumatra (after KRAATZ 1899).

Specimens examined. TAIWAN: PINGTUNG COUNTY: Shouka, Shihtzu Township, 11.v.2014, 2 ♂♂, Jiafong Chen leg. (JCCT).

Differential diagnosis. This species is similar to *C. mindanensis* Chapin, 1924 from the Philippines, but it is



Figs 52–58. Metendosternite, terminal parts and genitalia in male of *Cladiscus weyersi* Kraatz, 1899. 52 – metendosternite; 53 – pygidium; 54 – ventrite VI; 55 – spicular fork; 56–58 – male genitalia in lateral (56), ventral (57), and dorsal (58) views.

distinguished by the following characters (CORPORAAL & VAN DER WIEL 1949): scutellum red; head and pronotum finely and sparsely punctured.

Supplementary description. Male (Fig. 2). Head, pronotum, and antennomeres I and II brownish red; antennomeres III to XI, elytra, and legs brownish black.

Antennae (Fig. 16) longer than total length of head and pronotum combined; antennomere I swollen and bent; II compact; III to X pectinate, with branches arising at base of antennomeres; XI fusiform.

Pronotum smooth at apex; postcoxal projections (Fig. 35) long; prosternal process not extending contact point of postcoxal projections. Elytra with rows of large, deep, asetigerous punctures in basal half; apical margins finely indented. Mesoventrite with sparse setigerous punctures except for central portion. Metaventrte with evenly arranged fine setigerous punctures except for central portion; metaventral anterior process elongate, as wide as mesoventral posterior process. Metendosternite (Fig. 52) without furcal laminae; process extending anteriorly, tapered; furcal arms almost straight, extending anterolaterally.

Protibiae (Fig. 28) gently widening from basal 1/3 to apex, weakly curved; meso- and metatibiae almost straight. Tibial spur formula 0–0–0.

Apical margin of abdominal ventrite V broadly and weakly emarginate. Apical margin of pygidium (Fig. 53) straight; struts short. Apical margin of ventrite VI (Fig. 54) slightly emarginate. Spicular fork (Fig. 55) with intraspicular plate, which is 1/2 as long as spicular fork.

CM (Figs 56–58) covered with large spines and fine spines, 1/4 as long as tegmen. Tegmen shorter than phallus; phallobasic apodeme fused with phallobasic struts. Phallus widest at 1/3, thence tapered apically.

Female. Unknown.

Measurements and ratios. Male ($n = 2$): BL: 8.08–8.82 mm; PL: 2.08–2.28 mm; PWA: 1.40 mm; PWM: 0.73–0.75 mm; PWB: 0.93–0.98 mm; EL: 6.00–6.55 mm; EW: 1.50–1.63 mm; EyD: 0.75–0.78 mm; EyW: 0.38–0.40 mm; EL/PL: 2.88–2.89; EW/PWA: 1.07–1.16; EW/PWM: 2.07–2.17; EW/PWB: 1.62–1.67; PWA/PWB: 1.44–1.51; PWA/PWM: 1.87–1.93; PWB/PWM: 1.28–1.30; EyD/EyW: 1.94–2.00.

Distribution (Fig. 126). Taiwan (new record); India (CORPORAAL & VAN DER WIEL 1949); Indonesia: Sumatra (KRAATZ 1899), Java (CORPORAAL & VAN DER WIEL 1949).

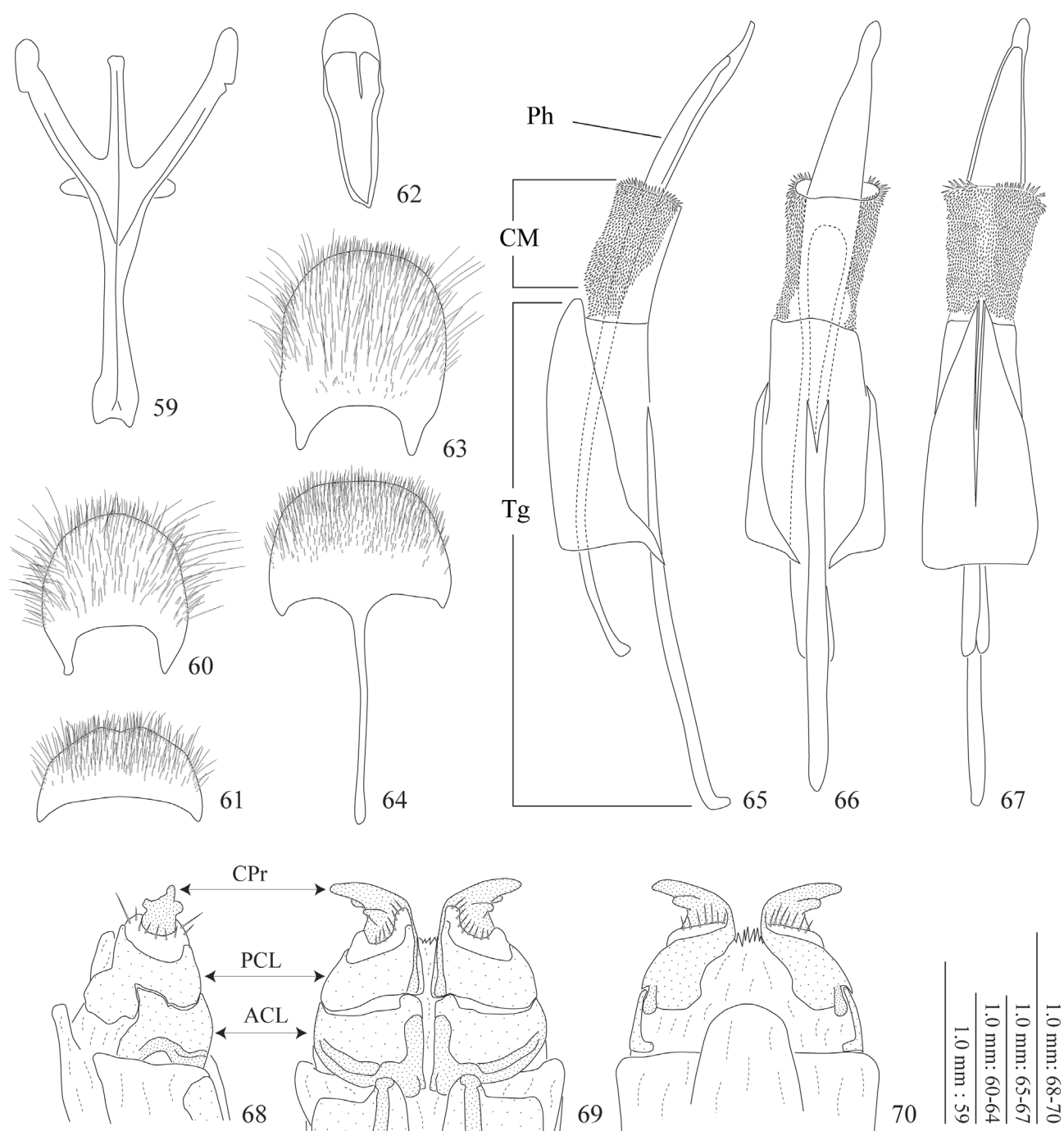
Cladiscus sauteri Schenkling, 1912

(Figs 3, 17, 18, 29, 36, 59–70, 126)

Cladiscus sauteri Schenkling, 1912: 322 [original description]. CORPORAAL & VAN DER WIEL (1949): 196 [key to species]; CORPORAAL (1950): 23 [listed].

Type locality. Taiwan, Kosempo (= Jiaxian District, Kaohsiung County) and Banshoryo (= Chishan District, Kaohsiung County).

Type material. SYNTYPES: 1 ♀, 'Kosempo | Formosa | H. Sauter VI. 11', 'Schenkling | det.', 'Syntypus', 'Cladiscus | sauteri Schklg | Type', 'DEI Coleoptera | # 200092' (SDEI); 1 ♀, 'Banshoryo Distr | Sokutsu (Formosa) | H Sauter VI. 1912', 'Schenkling det.', 'Syntypus', 'DEI Coleoptera | # 200093' (SDEI). I have examined these specimens based on the photos available in Integrated Insect Types Database of Taiwanese species at



Figs 59–70. Metendosternite, terminal parts and genitalia of *Cladiscus sauteri* Schenkling, 1912 (59–61, 65–67, male; 62, 63, 68–70, female). 59 – metendosternite; 60, 63 – pygidium; 61, 64 – ventrite VI; 62 – spicular fork; 65–67 – male genitalia in lateral (65), ventral (66), and dorsal (67) views; 68–70 – apices of ovipositor in lateral (68), ventral (69), and dorsal (70) views.

<http://twinsecttype.nmns.edu.tw/species/orig/?id=3378F3D7ADCCDA-51CA21CFDB96EB737B>.

Additional specimens examined. **TAIWAN:** **YILAN COUNTY:** Ying tzu ling, Toucheng Township, 21.vi.2016, 1 ♂, Yulung Lin leg. (SSCT). **TAOYUAN COUNTY:** Mt. Lalashan, Fusing Township, 3.vii.1983, 1 ♂, H. Takizawa leg. (KSCJ). **TAIPEI COUNTY:** Wulai, New Taipei City, 12.vi.1968, 1 ♂, M. Tomokuni leg. (EUMJ). **NANTOU COUNTY:** Jihyuehtan, Puli Township, 27.v.1981, 1 ♀, Y. Tagawa leg. (EUMJ); Nanshan, Renai Township, 6.vi.1985, 1 ♂, T. Shirozu leg. (EUMJ), 17.v.1969, 2 ♂♂, S. Hisamatsu leg. (EUMJ); Mt. Kuantaoshan, Puli Township, 5.v.1983, 1 ♂, K. Kusama leg. (KSCJ), 2.vi.1995, 1 ♂, unknown collector (KSCJ), same locality, 18.iv.2015, 1 ♂, Sinyan Shih leg. (SSCT), 3.v.2015, 1 ♂ (SSCT); Nanfeng, Taoyuan Township, 19.–21.v.2006, 1 ♂, M. Ito leg.

(KSCJ). **MIAOLI COUNTY:** Mt. Shihtoushan, 4. vi. 1976, 1 ♂, H. Makihara leg. (KUMJ). **TAINAN COUNTY:** Meiling, Nanxi District, 28.v.2017, 1 ♂, Uitsiann Ong leg. (SSCT). **KAOHSIUNG COUNTY:** Too Nah, Maolin Township, 2.vii.1986, 1 ♀, K. Baba leg. (EUMJ); Liukuei, Renai Township, 29.iv.–8.v.1982, 1 ♀, H. Takizawa leg. (KSCJ).

Differential diagnosis. This species is easily distinguished from other members by the following characters: antennae stout and flabellate in male (Fig. 17), widely serrate (Fig. 18) in female.

Redescription. Male (Fig. 3). Head and pronotum red; antennae, elytra and legs brownish.

Antennae (Fig. 17) longer than total length of head and pronotum combined; antennomere I swollen and bent; II compact; III to X flabellate; XI fusiform.

Pronotum with transverse impressions at apex; postcoxal projections (Fig. 36) short; prosternal process long, completely separating postcoxal projections. Elytra with rows of deep, large, asetigerous punctures in basal 5/6; apical margins not indented. Mesoventrite with dense setigerous punctures except for central apical portion. Meta-ventral anterior process shorter and wider than mesoventral posterior process. Metendosternite (Fig. 59) without furcal laminae; process extending anteriorly, tapered; furcal arms extending anterolaterally, sinuous at apex.

Protibiae (Fig. 29) gently widening from basal 1/3 to apex., weakly curved. Tibial spur formula 2–2–2.

Apical margin of abdominal ventrite V broadly emarginated. Pygidium (Fig. 60) rounded posteriorly, with short struts. Apical margin of ventrite VI (Fig. 61) emarginated. Spicular fork (Fig. 62) with intraspicular plate, which is 1/3 of spicular fork.

CM (Figs 65–67) with fine spines, 1/3 as long as tegmen. Tegmen shorter than phallus; phallobase dorsally incised; phallobasic struts not reaching phallobasic apodeme, which is 3/4 as long as tegmen and divaricated at apex. Phallus flattened, widest at apical 1/3, rounded at apex.

Female. Similar to male, but EyD/EyW 2.53–3.31 (3.06); antennae (Fig. 18) widely serrate; central portion of metaventrite with pair of bundles of elongate setae-like trichobothria; protibiae slenderer; apical margin of abdominal ventrite V truncated broadly and deeply in middle.

Apical margin of pygidium (Fig. 63) almost straight; struts short. Ventrite VI (Fig. 64) rounded posteriorly, with apodeme 2/3 as long as ventrite VI.

Spermatheca membranous; Sc lacking. CPr (Figs 68–70) distally trifurcate; central process large; dorsolateral and ventrolateral processes relatively short.

Measurements and ratios. Male (n = 9): BL: 8.84–11.65 (10.29) mm; PL: 1.75–2.38 (2.10) mm; PWA: 1.28–1.85 (1.63) mm; PWM: 0.80–1.18 (0.92) mm; PWB: 1.10–1.45 (1.25) mm; EL: 7.09–9.27 (8.19) mm; EW: 1.73–2.30 (1.96) mm; EyD: 0.75–1.13 (0.97) mm; EyW: 0.43–0.70 (0.50) mm; EL/PL: 3.59–4.47 (3.90); EW/PWA: 1.10–1.37 (1.21); EW/PWM: 1.91–2.39 (2.15); EW/PWB: 1.49–1.70 (1.57); PWA/PWB: 1.16–1.40 (1.31); PWA/PWM: 1.57–2.00 (1.79); PWB/PWM: 1.23–1.52 (1.37); EyD/EyW: 1.61–2.28 (1.96). **Female** (n = 4): BL: 10.43–12.09 (11.15) mm; PL: 2.05–2.45 (2.22) mm; PWA: 1.83–2.08 (1.92) mm; PWM: 0.95–1.08 (1.02) mm; PWB: 1.33–1.48 (1.40) mm; EL: 8.18–9.64 (8.93) mm; EW: 1.98–2.20 (2.09) mm; EyD: 1.08–1.33 (1.22) mm; EyW: 0.38–0.43 (0.40) mm; EL/PL: 3.64–4.41 (4.04); EW/PWA: 1.05–1.16 (1.09); EW/PWM: 1.98–2.11 (2.05); EW/PWB: 1.46–1.52 (1.49); PWA/PWB: 1.31–1.42 (1.37); PWA/PWM: 1.81–1.97 (1.88); PWB/PWM: 1.35–1.39 (1.37); EyD/EyW: 2.53–3.31 (3.06).

Distribution (Fig. 126). Taiwan.

Remarks. This species was unintentionally characterized based on females in the original description (SCHENKLING 1912) and a key to the species (CORPORAAL & VAN DER WIEL 1949).

SCHENKLING (1912) mentioned that this species was similar to *C. obeliscus* and *C. weyersi* in black head and the punctures of elytra disappearing before apex. In contrast to other Taiwanese and Japanese species, and some species from south-east Asia of *Cladiscus*, *C. sauteri* has 2–2–2 tibial spur formula. Although tibial spur formula is often genus-specific in Cleridae, I assign *C. sauteri* into *Cladiscus* because of the characters of the apex of the female ovipositor which are shared with other Japanese and Taiwanese *Cladiscus* species.

Cladiscus terminalis Schenklng, 1912

(Figs 4, 19, 20, 30, 37, 71–82, 126)

Cladiscus terminalis Schenklng, 1912: 322 [original description]. CORPORAAL & VAN DER WIEL (1949): 195 [key to species]; CORPORAAL (1950): 23 [listed].

Type locality. Taiwan, Taihorinsho (= Talin, Chiayi County).

Type material. HOLOTYPE: 1 ♂, 'Taihorinsho | Formosa | H Sauter', '7. X', 'Holotypus', '♂', 'DEI Coleoptera | # 200094' (SDEI). I examined the holotype based on the photos available in Integrated Insect Types Database of Taiwanese species at <http://twinssectype.nmns.edu.tw/species/orig/?id=9CE4F73E4A51DA32414C50E82EFFDFAF>

Additional specimens examined. TAIWAN: TAIPEI COUNTY: Mt. Yangmingshan, 24.viii.1966, 1 ♂, H. Kamiya leg. (EUMJ). **PINGTUNG COUNTY:** Chiupeng, Manchou Township, 16.x.2016, 1 ♂, K. Takahashi leg. (KSCJ); Mt. Dahanshan, Chunri Township, 13.vi.2015, 1 ♂, Sinyan Shih leg. (SSCT). **NANTOU COUNTY:** Musha, Renai Township, alt. 1,700 m, 24–28.viii.2016, 1 ♀, M. Tanaka leg. (MTCJ).

Differential diagnosis. This species is similar to *C. liaoi* sp. nov., but distinguished by the following characters: EyD/EyW 0.68 in male, 1.53 in female; PWA/PWB 1.12–1.24; female antennae (Fig. 20) relatively shorter than male (Fig. 19); apex of elytra round, partly black.

Supplementary description. Male (Fig. 4). Head, pronotum, elytra except for apex yellowish brown; antennae, elytra at apex., and legs brownish black.

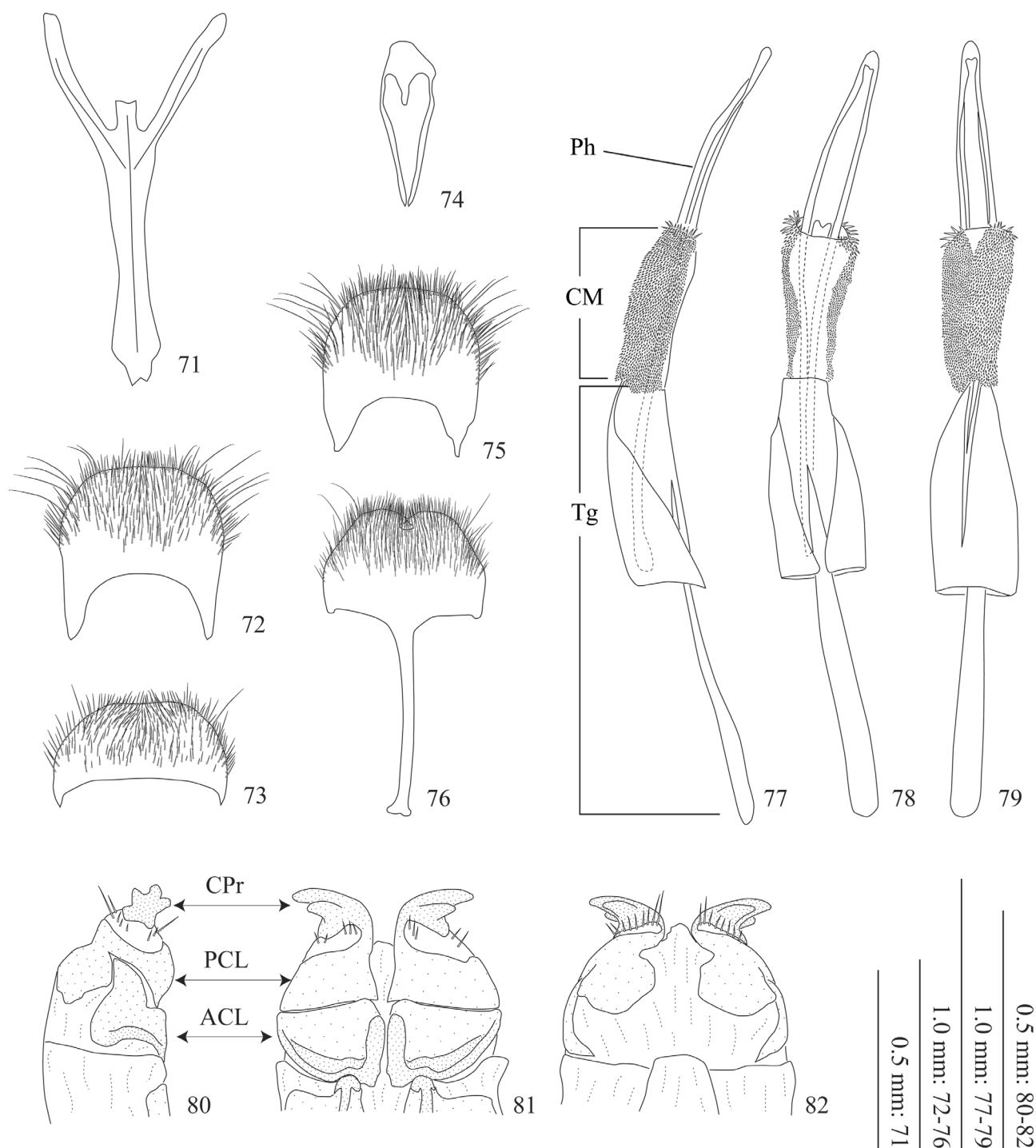
Antennae (Fig. 19) longer than total length of head and pronotum combined, antennomeres III to X acutely serrate; XI fusiform, twice as long as X.

Pronotum smooth at apex; tubercles developed in middle; postcoxal projections (Fig. 37) short; prosternal process not extending contact point of postcoxal projections. Elytra with rows of deep, large, asetigerous punctures before apex; apical margins not indented. Mesoventrite evenly covered with setigerous punctures. Meta-ventral anterior process shorter and wider than mesoventral posterior process. Metendosternite (Fig. 71) without furcal laminae; process extending slightly anteriorly; furcal arms almost straight, extending anterolaterally.

Protibiae (Fig. 30) gently widening to apex., weakly curved. Tibial spur formula 0–0–0.

Apical margin of abdominal ventrite V broadly and slightly emarginated. Apical margin of pygidium (Fig. 72) almost straight; struts short. Apical margin of ventrite VI (Fig. 73) almost straight. Spicular fork (Fig. 74) with short intraspicular plate, which is 1/4 of spicular fork.

CM (Figs 77–79) with fine spines, about 1/2 as long as tegmen. Tegmen shorter than phallus; phallobase incised dorsally; phallobasic struts reaching phallobasic apodeme,



Figs 71–82. Metendosternite, terminal parts and genitalia of *Cladiscus terminalis* Schenkling, 1912 (71–74, 77–79, male; 75, 76, 80–82, female). 71 – metendosternite; 72, 75 – pygidium; 73, 76 – ventrite VI; 74 – spicular fork; 77–79 – male genitalia in lateral (77), ventral (78), and dorsal (79) views; 80–82 – apices of ovipositor in lateral (80), ventral (81), and dorsal (82) views.

which is $\frac{3}{4}$ as long as tegmen. Phallus flattened, divaricated in apical $\frac{1}{3}$, rounded at apex.

Female. Similar to male, but EyD/EyW 1.53; antennae (Fig. 20) weakly serrate; central portion of metaventrite with pair of bundles of elongate setae-like trichobothria; apical margin of ventrite V truncated broadly and deeply in middle.

Apical margin of pygidium (Fig. 75) almost straight; struts short. Apical margin of ventrite VI (Fig. 76) incised

in middle; apodeme $\frac{2}{3}$ as long as total length.

Spermatheca weakly sclerotized; Sc lacking. CPr (Figs 80–82) distally trifurcate; central process large; dorsolateral and ventrolateral processes relatively short.

Measurements and ratios. **Male** ($n = 2$): BL: 8.67–9.06 mm; PL: 1.88–2.13 mm; PWA: 1.18–1.30 mm; PWM: 0.70–0.75 mm; PWB: 1.05 mm; EL: 6.55–7.18 mm; EW: 1.50–1.68 mm; EyD: 0.38–0.43 mm; EyW: 0.55–0.63 mm; EL/PL: 3.08–3.83; EW/PWA: 1.15–1.43; EW/PWM:

2.00–2.39; EW/PWB: 1.43–1.60; PWA/PWB: 1.12–1.24; PWA/PWM: 1.68–1.73; PWB/PWM: 1.40–1.50; EyD/EyW: 0.68. **Female** (n = 1): BL: 9.46 mm; PL: 2.10 mm; PWA: 1.23 mm; PWM: 0.70 mm; PWB: 1.00 mm; EL: 7.36 mm; EW: 1.48 mm; EyD: 0.65 mm; EyW: 0.43 mm; EL/PL: 3.51; EW/PWA: 1.20; EW/PWM: 2.11; EW/PWB: 1.48; PWA/PWB: 1.23; PWA/PWM: 1.75; PWB/PWM: 1.43; EyD/EyW: 1.53.

Distribution (Fig. 126). Taiwan.

Cladiscus pallidicornis

Corporaal & van der Wiel, 1949

(Figs 5, 21, 22, 31, 38, 83–94, 121, 123–125, 126)

[Japanese name: Taiwan-hoso-kakkoumushi]

Cladiscus pallidicornis Corporaal & van der Wiel, 1949: 192 [original description, incl. pl. 1, fig. 15]. CORPORAAL (1950): 23 [listed].

Cladiscus sanguinicollis (Spinola, 1844) (misidentification): SCHENK-LING, (1912): 322 [faunistics]; MIWA (1931): 112 [listed].

Type locality. Taiwan, Shinchiku (= Hsinchu County) (after CORPORAAL & VAN DER WIEL 1949).

Specimens examined. **TAIWAN:** TAoyuan County: Syue wu nao, Fuxing Township, 10.vi.2016, 1 ♂, Yulung Lin leg. (SSCT). **TAIPEI County:** Wulai, New Taipei City, 17.v.1965, 1 ♀, Y. Miyatake leg. (EUMJ). **TAINAN County:** Kantoushan, Dongshan District, 14.v.2014, 1 ♂, Jiafong Chen leg. (SSCT); Nanxi District, 7.v.2017, 1 ♂, Jiamu Chen leg. (SSCT). **NANTOU County:** Aowanda, Renai Township, 5.vi.2108, 3 ♀♀, Sinyan Shih leg. (SSCT); Nanshanshi, Renai Township, 4.vi.1981, 1 ♂, Y. Tagawa leg. (EUMJ); Tsuifeng–Sungkan, alt. ca. 2,044–2,306 m, 3.vi.1981, 1 ♂, K. Sasagawa leg. (EUMJ). **KAohsiung County:** “Banshoryo-Distr/ Soukutsu (Formosa)/ H. Sauter VI. 1912”, “Schenkling/ det.”, 1 ♂ (SDEI, Fig. 123); “Banshoryo-Distr/ Sokutsu VI 1912” (handwriting), “Schenkling/ det.”, “Cladiscus/ sanguinicollis/ Spin.” (handwriting), 1 ♂ (SDEI, Fig. 124); “Kosempo/ Formosa/ H. Sauter. V. 1912”, “Schenkling/ det.”, 1 ♀ (SDEI, Fig. 125); Mt. Baiyunshan, Jiaxian District, 16.vi.1977, 1 ♂, K. Ushijima leg. (EUMJ); Liukuei, Renai Township, 27.v.1970, 1 ♀, Y. Kiyoyama leg. (EUMJ); Mt. Tai Yuan Shan, Liukuei, Renai Township, 1.vi.1986, 1 ♀, 1 ex., K. Baba leg. (EUMJ); Tao Nah, Maolin Township, 30. v. 1986, 2 ♂♂ 2 ♀♀, K. Baba leg. (EUMJ). **TAITUNG County:** Jinping Forest Road, Chihshang Township, 19.vi.2011, 1 ♂, J. Yamasako leg. (EUMJ). **PINGTUNG County:** Kenting Park, Hengchun Township, 26.v.1969, 1 ♂ 1 ♀, S. Hisamatsu leg. (EUMJ), 16.vi.1971, 2 ♂♂, Y. Miyatake leg. (EUMJ); Mt. Dahanshan, alt. ca. 1,230 m, Chunrih Township, 2–14.vi.2013, 1 ♂, Fit Trap, K. Sonaka leg. (EUMJ); Mt. Kaoshihoshan, Mudan Township, 10.vi.2013, 1 ♂, H. Murakami leg. (EUMJ), 15.vi.2013, 1 ♀, K. Sonaka leg. (EUMJ). **JAPAN: KAGOSHIMA PREFECTURE: Ōsumi Islands:** Yakushima, Yakusugi-land, 14.vii.1979, 1 ♀, M. Kotani leg. (EUMJ). **Amami Islands:** Amami-Ōshima, Yamato-son, 25.vi.2008, 1 ♂, M. Matsumura leg. (MMCJ). **OKINAWA PREFECTURE: Yaeyama Islands:** Iriomote-jima, Komi, 1.v.1984, 2 ♂♂, S. Yamaya leg. (HUMJ); Ishigaki-jima, Mt. Maese, 9.v.2008, 1 ♂, Chando Han leg. (EUMJ), 12.v.2008, 1 ♂ (EUMJ); Ishigaki-jima, Yababu, 29.v.2012, 1 ♂, M. Matsumura leg. (MMCJ); Iriomote-jima, Otomi, 28.iv.1969, 1 ♂, H. Makihara leg. (KUMJ); Iriomote-jima, Urauchi, 31.v.2011, 1 ♂, M. Matsumura leg. (MMCJ); Taketomi-jima, 17.iv, 1 ♂, unknown collector and year (EUMJ); Yonaguni-jima, Iranda, 18.v.2017, 1 ♂, M. Matsumura leg. (MMCJ); Yonaguni-jima, Sonai, 6–8.vii.1970, 1 ♂, H. Makihara leg. (KUMJ); Yonaguni-jima, Inbi-dake, 11.vi.2017, 1 ♂, N. & T. Ohbayashi leg. (EUMJ); Yonaguni jima, Nosoko, 12.vi.2017, 1 ♀, N. & T. Ohbayashi leg. (EUMJ).

Differential diagnosis. This species is similar to *C. obeliscus*, but it is distinguished by the following characters: head red; base of elytra reddish; EL/PL 2.72–3.14 (2.94) in male, 2.76–2.94 (2.84) in female; apical margin of male pygidium (Fig. 84) pointed posteriorly in the middle; apical margin of female ventrite VI (Fig. 88) widely emarginated;

phallus and tegmen (Figs 89–91) not symmetrical; base of MO with a sagittate sclerite (Fig. 121).

Supplementary description. **Male** (Fig. 5). Head, pronotum and base of elytra red; antennomeres I and II yellow; antennomeres III to VIII, elytra except for base, and legs brownish black.

Antennae (Fig. 21) weakly serrate; antennomere I claviform; II compact; III cylindrical; IV to X weakly serrate, longer than wide; antennomere XI slightly longer than X.

Pronotum smooth at apex; postcoxal projections (Fig. 38) long; prosternal process not extending contact point of postcoxal projections. Elytra with rows of deep, large, asetigerous punctures in basal 3/4; apical margins finely and gently indented. Mesoventrite densely with setigerous punctures except for central apical portion. Metaventral anterior process short. Metendosternite (Fig. 83) without furcal laminae; process extending anteriorly, tapered; furcal arms almost straight, extending anterolaterally.

Protibiae (Fig. 31) gently widening to apex., weakly curved. Tibial spur formula 0–0–0.

Apical margin of abdominal ventrite V emarginated broadly and slightly. Apical margin of pygidium (Fig. 84) shortly projected posteriorly in middle; struts short. Apical margin of ventrite VI (Fig. 85) almost straight. Spicular fork (Fig. 86) with intraspicular plate, which is 1/3 as long as spicular fork.

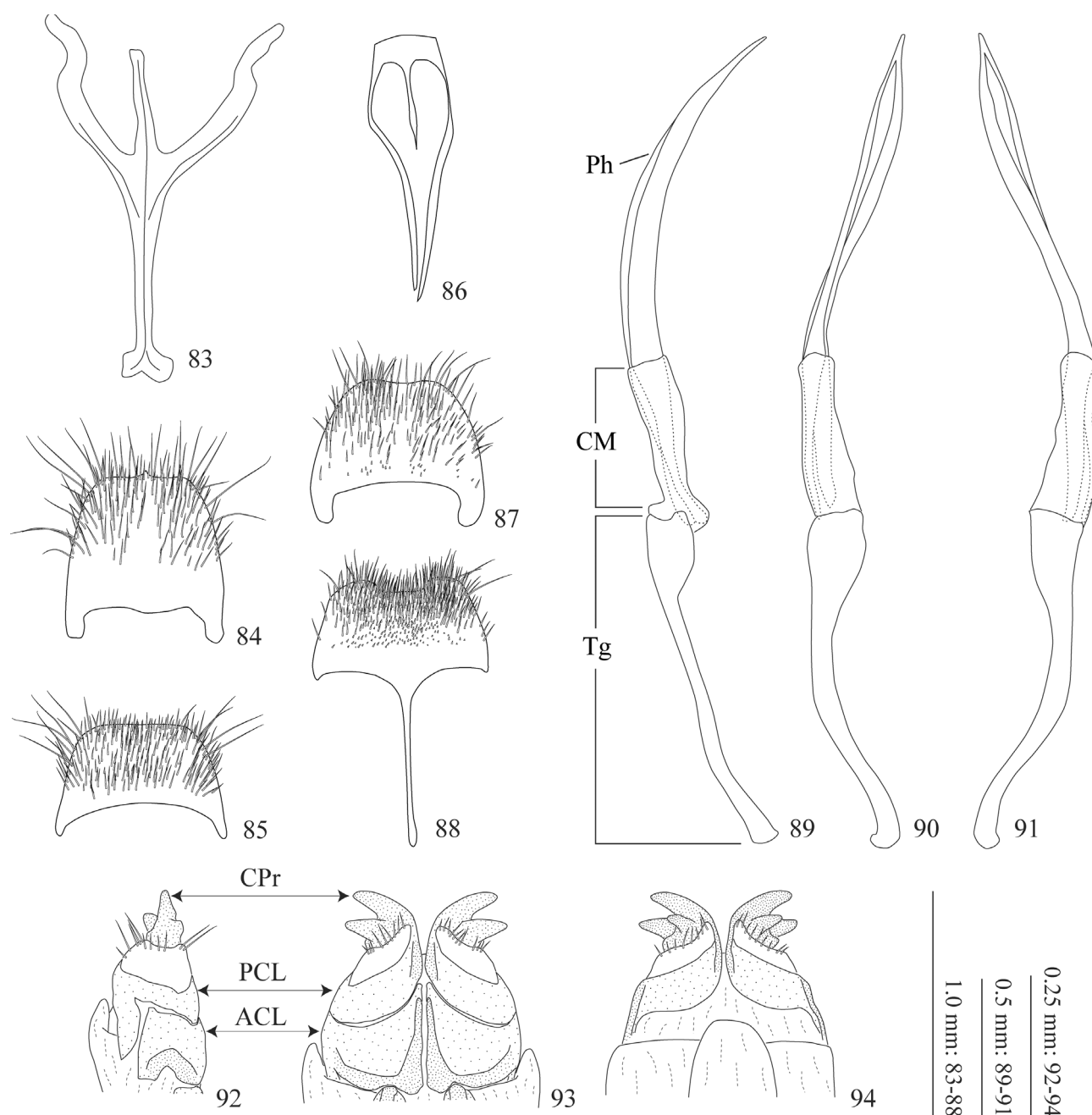
CM (Figs 89–91) without fine spines, 1/2 as long as tegmen. Tegmen sinuate in basal 2/3, widest at apex. Phallus curved in lateral views, sinuate in dorsal and ventral views, pointed at apex.

Female. Similar to male, EyD/EyW 3.62–4.50 (3.92); antennae (Fig. 22) relatively shorter; apical margin of abdominal ventrite V truncated broadly and deeply in middle.

Apical margin of pygidium (Fig. 87) slightly emarginated; struts short. Apical margin of ventrite VI (Fig. 88) broadly emarginated; apodeme 2/3 as long as ventrite VI.

Spermatheca weakly sclerotized; Sc (Fig. 121) sagittate. CPr (Figs 92–94) distally trifurcate; central and ventrolateral processes large, equal in size; dorsolateral process relatively short.

Measurements and ratios. **Male** (n = 6): BL: 6.29–6.83 (6.54) mm; PL: 1.56–1.74 (1.66) mm; PWA: 1.14–1.34 (1.20) mm; PWM: 0.56–0.62 (0.59) mm; PWB: 0.82–0.90 (0.86) mm; EL: 4.73–5.09 (4.88) mm; EW: 1.26–1.44 (1.34) mm; EyD: 0.68–0.76 (0.72) mm; EyW: 0.26–0.34 (0.30) mm; EL/PL: 2.72–3.14 (2.94); EW/PWA: 1.07–1.16 (1.12); EW/PWM: 2.16–2.36 (2.27); EW/PWB: 1.52–1.60 (1.56); PWA/PWB: 1.36–1.49 (1.40); PWA/PWM: 1.94–2.16 (2.03); PWB/PWM: 1.42–1.50 (1.45); EyD/EyW: 2.06–2.92 (2.47). **Female** (n = 5): BL: 6.39–7.26 (6.91) mm; PL: 1.66–1.90 (1.80) mm; PWA: 1.20–1.36 (1.31) mm; PWM: 0.60–0.66 (0.64) mm; PWB: 0.80–0.94 (0.88) mm; EL: 4.73–5.36 (5.11) mm; EW: 1.28–1.46 (1.38) mm; EyD: 0.90–0.94 (0.92) mm; EyW: 0.20–0.26 (0.24) mm; EL/PL: 2.76–2.94 (2.84); EW/PWA: 1.02–1.09 (1.05); EW/PWM: 1.94–2.29 (2.15); EW/PWB: 1.55–1.60 (1.57); PWA/PWB: 1.43–1.55 (1.50); PWA/PWM: 1.82–2.19 (2.05); PWB/PWM: 1.21–1.45 (1.37); EyD/EyW: 3.62–4.50 (3.92).



Figs 83–94. Metendosternite, terminal parts and genitalia of *Cladiscus pallidicornis* Corporaal & van der Wiel, 1949 (83–86, 89–91, male; 87, 88, 92–94, female). 83 – metendosternite; 84, 87 – pygidium; 85, 88 – ventrite VI; 86 – spicular fork; 89–91 – male genitalia in lateral (89), ventral (90), and dorsal (91) views; 92–94 – apices of ovipositor in lateral (92), ventral (93), and dorsal (94) views.

Distribution (Fig. 126). Japan (new record): Yaku-shima, Amami-Ōshima, Ishigaki-jima, Iriomote-jima, Taketomi-jima, Yonaguni-jima; Taiwan (CORPORAAL & VAN DER WIEL 1949).

Remarks. SCHENKLING (1912) recorded *C. sanguinicollis* (Spinola, 1844) from Taiwan, based on four specimens from ‘Kosempo’ and ‘Banshoryo’, and the species was subsequently listed by MIWA (1931) without additional records. After close examination, three specimens (Figs 123–125) were found in SDEI, and they all belong *C. pallidicornis*. *Cladiscus sanguinicollis* is hence excluded from Taiwanese fauna.

Cladiscus hachijoensis sp. nov.

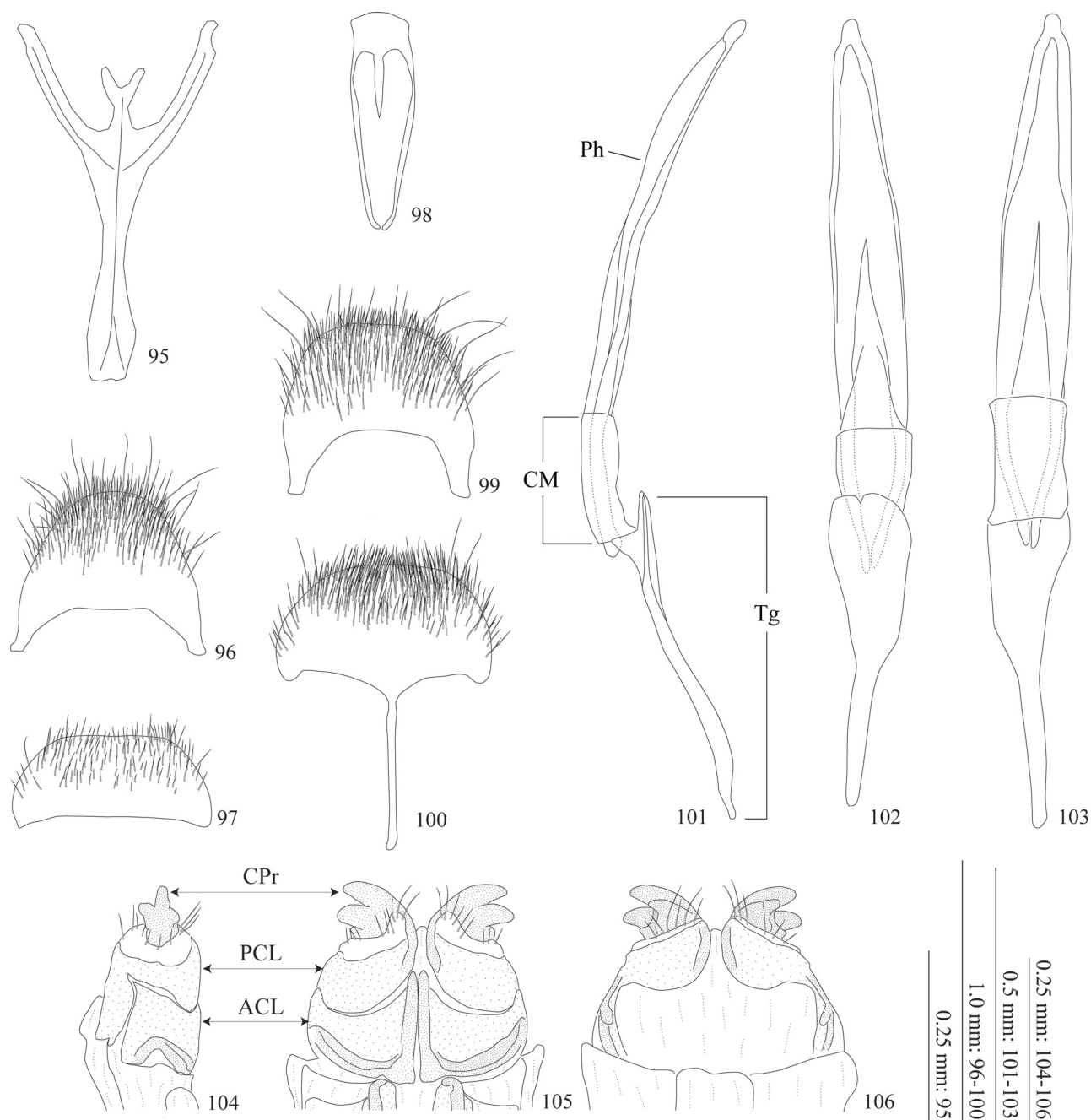
(Figs 6, 7, 10, 11, 23, 24, 32, 39, 95–106, 122, 123)

[Japanese name: Hachijo-hoso-kakkoumushi]

Cladiscus obeliscus (misidentification): UEDA et. al. (1994).

Cladiscus sp.: KAWABATAKE (2009): 29 [faunistics, fig. 2].

Type series. HOLOTYPE: 1 ♂, ‘Sueyoshi/ Hachijōjima Is. | Tōkyō Met. | 7–Jul–1981 | Y. Kusakabe leg.’ (EUMJ). PARATYPES: 1 ♀, ‘Sueyoshi/ Hachijōjima Is. | Tōkyō Met. | 7–Jul–1981 | Y. Kusakabe leg.’ (KSCJ); 1 ♀, ‘[SUEYOSHI] | Is. Hachijōjima | Tōkyō Met. | 8. VII. 1983. | T. WAKEJIMA leg.’ (KSCJ); 1 ♀, ‘TŌKYŌ: JAPAN | NoboryōPass | Hachijō Island | 23–25. VII. 2001 | Jirō Ogawa leg.’ (EUMJ); 1 ♂, ‘(HACHIJŌ ISLAND) | Neighbourhood of | Hachijō-onsen Hotel | Kashitate, 4. VII. | 1991, S. Hisamatsu’ (EUMJ); 1 ♂, ‘Mitsune-Noboriyu toge, | 5. VI.



Figs 95–106. Metendosternite, terminal parts and genitalia of *Cladiscus hachijoensis* sp. nov. (95–98, 101–103, male; 99, 100, 104–106, female). 95 – metendosternite; 96, 99 – pygidium; 97, 100 – ventrite VI; 98 – spicular fork; 101–103 – male genitalia in lateral (101), ventral (102), and dorsal (103) views; 104–106 – apices of ovipositor in lateral (104), ventral (105), and dorsal (106) views.

1964, Y. Hirashima & M. Shiga leg.' (KUMJ); 1 ♂, 'HACHIJO | 5.VI.71 | T. Nakane' (HUMJ).

Description. Male (Figs 6, 10). Head brownish black, sometimes brownish red; pronotum and elytra brownish red; antennae and legs brownish black.

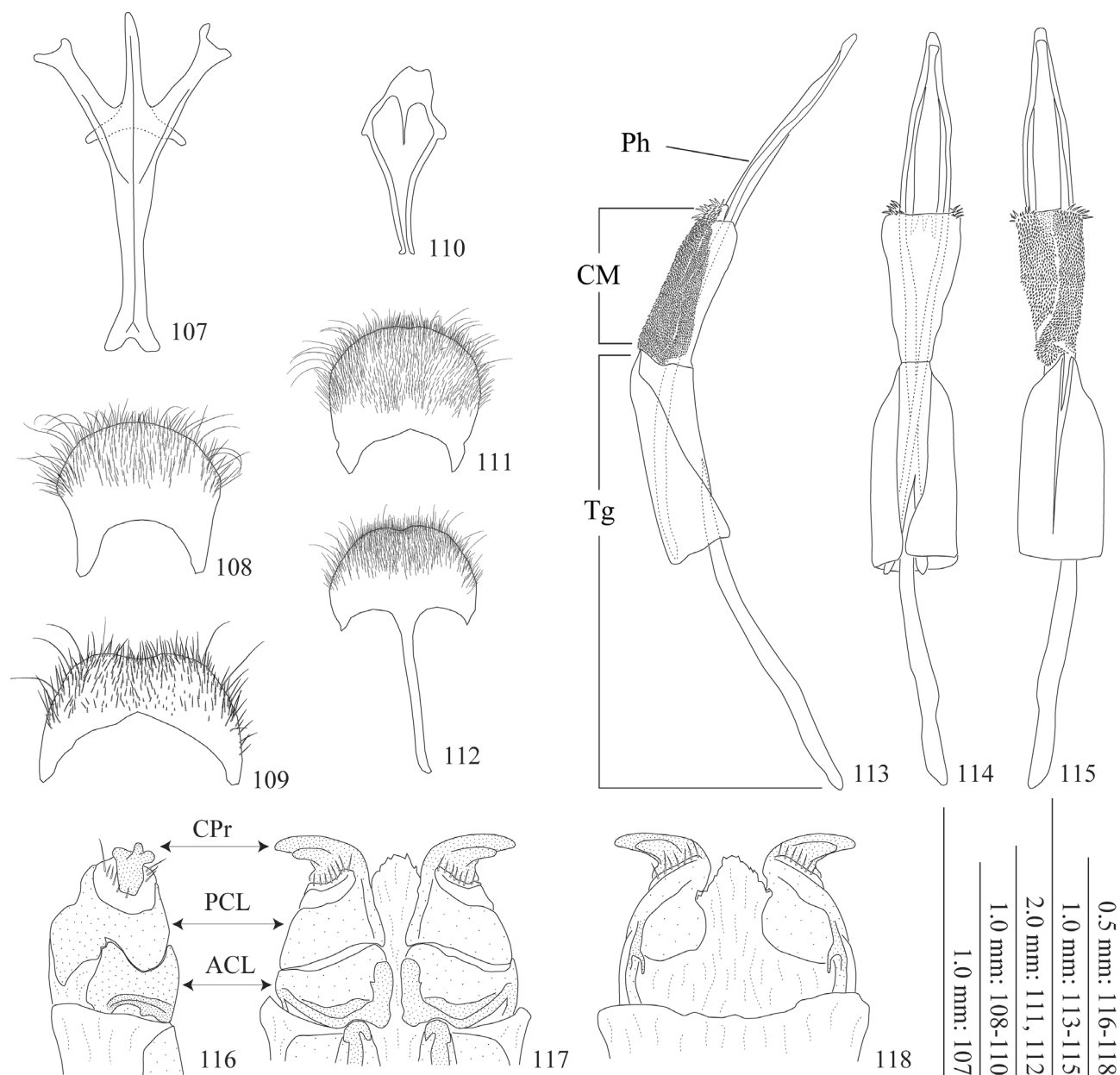
Antennae (Fig. 23) weakly serrate, longer than total length of head and pronotum combined; antennomere XI slightly longer than X.

Pronotum smooth at apex; postcoxal projections (Fig. 39) long; prosternal process not extending contact point of postcoxal projections. Elytra with rows of deep, large, asetigerous punctures in basal 3/4; apical margins not indented.

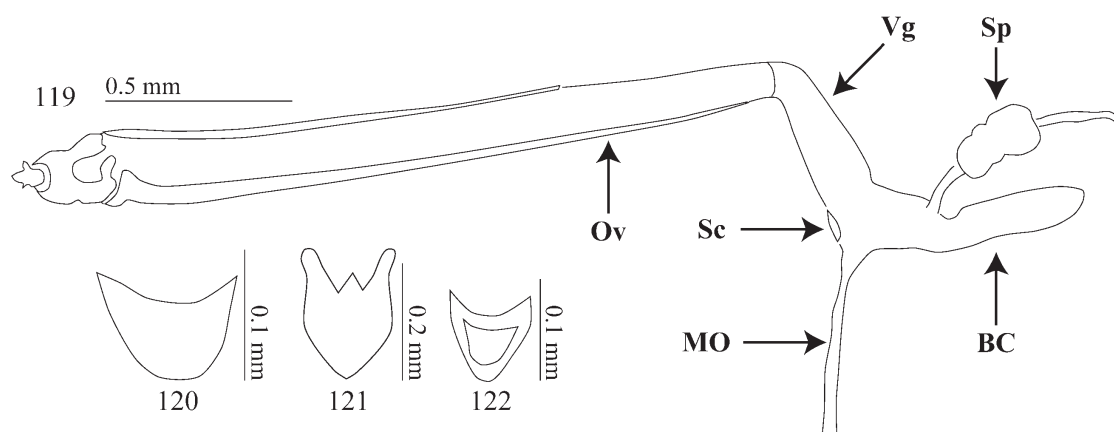
Mesoventrite with sparse setigerous punctures except for central portion. Metaventral anterior process short. Metendosternite (Fig. 95) without furcal laminae; process short, extending anteriorly, bifurcated at apex; furcal arms almost straight, extending anterolaterally.

Protibiae (Fig. 32) widening from basal half to apex. Tibial spur formula 0–0–0.

Apical margin of abdominal ventrite V emarginated broadly and slightly. Pygidium (Fig. 96) rounded posteriorly; pygidial struts extended distally. Apical margin of ventrite VI (Fig. 97) almost straight. Spicular fork (Fig. 98) with intraspicular plate, which is 1/2 of spicular fork.



Figs 107–118. Metendosternite, terminal parts and genitalia of *Cladiscus liaoi* sp. nov. (107–110, 113–115, male; 111, 112, 116–118, female). 107 – metendosternite; 108, 111 – pygidium; 109, 112 – ventrite VI; 110 – spicular fork; 113–115 – male genitalia in lateral (113), ventral (114), and dorsal (115) views; 116–118 – apices of ovipositor in lateral (116), ventral (117), and dorsal (118) views.



Figs 119–122. Female reproductive organs (119) and sclerites (120–122). 119, 120 – *Cladiscus obeliscus* Lewis, 1892; 121 – *C. pallidicornis* Corporaal & van der Wiel, 1949; 122 – *C. hachijoensis* sp. nov.

CM (Fig. 101–103) without fine spines, 1/3 as long as tegmen. Tegmen flattened, widest at apex. Phallus flattened, divaricated in apical 1/2, rounded at apex.

Female. Similar to male (Fig. 7), but EyD/EyW 2.82–3.23; antennae (Fig. 24) almost as long as total length of head and pronotum combined; apical margin of abdominal ventrite V emarginated broadly and deeply.

Apical margin of pygidium (Fig. 99) almost straight; pygidial struts extended anteriorly. Apical margin of ventrite VI (Fig. 100) almost straight; apodeme about half of ventrite VI.

Spermatheca weakly sclerotized; Sc (Fig. 122) annular. CPR (Figs 104–106) distally trifurcate; central and ventrolateral processes large, equal in size; dorsolateral process relatively short.

Measurements and ratios. Male ($n = 2$): BL: 5.19–5.91 mm; PL: 1.46–1.64 mm; PWA: 1.02–1.08 mm; PWM: 0.52–0.54 mm; PWB: 0.76–0.82 mm; EL: 3.55–4.45 mm; EW: 1.20–1.34 mm; EyD: 0.60–0.82 mm; EyW: 0.20–0.28 mm; EL/PL: 2.16–3.05; EW/PWA: 1.18–1.24; EW/PWM: 2.31–2.48; EW/PWB: 1.58–1.63; PWA/PWB: 1.32–1.34; PWA/PWM: 1.96–2.00; PWB/PWM: 1.46–1.52; EyD/EyW: 2.14–4.10. **Female** ($n = 2$): BL: 5.82–6.84 mm; PL: 1.46–1.84 mm; PWA: 1.02–1.30 mm; PWM: 0.44–0.60 mm; PWB: 0.72–0.86 mm; EL: 4.36–5.00 mm; EW: 1.12 mm; EyD: 0.62–0.84 mm; EyW: 0.22–0.26 mm; EL/PL: 2.72–2.99; EW/PWA: 0.86–1.10; EW/PWM: 1.87–2.55; EW/PWB: 1.30–1.56; PWA/PWB: 1.42–1.51; PWA/PWM: 2.17–2.32; PWB/PWM: 1.43–1.64; EyD/EyW: 2.82–3.23.

Differential diagnosis. This species is similar to *Cladiscus fulvescens* (Chevrolat, 1874), but distinguished by blackish antennae and legs.

Etymology. The specific name is derived from the type locality, Hachijo-jima, Tokyo Prefecture, Japan; adjective.

Distribution (Fig. 126). Japan: Tokyo: Izu Islands: Hachijo-jima.

Remarks. This species was recorded from Hachijo-jima as *Cladiscus obeliscus* (UEDA et. al. 1994) because of misidentification. Subsequently, it was listed as *Cladiscus* sp. (KAWABATAKE 2009). In this study, this species is newly described.

Cladiscus liaoi sp. nov.

(Figs 8, 9, 12, 13, 25, 26, 33, 107–118, 123)

Type material. HOLOTYPE: 1 ♂, '[Taiwan] Dahanshan (Mt.). | Alt. ca. 1,200 m, Chunrih | Township, Pingtung County | 屏東縣春日鄉大漢山 | 28. V. 2015, W. C. Liao leg.' (EUMJ). PARATYPE: 1 ♀, 'FORMOSA | TAIWAN | 1968.....1971', unknown collector. (EUMJ).

Description. Male (Figs 8, 12). Head, pronotum, elytra yellowish brown; antennae and legs brownish black.

Antennae (Fig. 25) longer than total length of head and pronotum combined, antennomeres III to X acutely serrate; XI fusiform, twice as long as X.

Pronotum smooth at apex; postcoxal projections short; prosternal process long, completely separating postcoxal projections. Elytra with rows of deep, large, asetigerous punctures in basal 5/6; apical margins not indented. Mesoventrite with evenly and densely arranged setigerous punctures. Metaventral anterior process tapered and as

wide as mesoventral posterior process. Metendosternite (Fig. 107) with short furcal laminae; process extending anteriorly, tapered; furcal arms almost straight, extending anterolaterally.

Protibiae (Fig. 33) gently widening from base to apex., weakly curved. Tibial spur formula 0–0–0.

Apical margin of abdominal ventrite V emarginated broadly. Apical margin of pygidium (Fig. 108) rounded posteriorly; struts short. Apical margin of ventrite VI (Fig. 109) weakly emarginated. Spicular fork (Fig. 110) with intraspicular plate, which is 1/3 of spicular fork.

CM (Figs 113–115) bearing fine spines. Tegmen shorter than phallus; phallobase incised dorsally; phallobasic struts reaching phallobasic apodeme, which is 3/4 as long as tegmen. Phallus flattened, divaricated in apical 1/3, rounded at apex.

Female. Similar to male (Fig. 9), but EyD/EyW 2.30; antennae (Fig. 26) weakly serrate; elytra pointed posteriorly at apex; central portion of metaventrite with pair of bundles of elongate setae-like trichobothria; apical margin of abdominal ventrite V truncated broadly and deeply in middle.

Pygidium (Fig. 111) rounded posteriorly, with struts short. Ventrite VI (Fig. 112) rounded posteriorly, with apodeme 2/3 as long as ventrite VI.

Spermatheca membranous; Sc lacking. CPR (Figs 116–118) distally trifurcate; central process large; dorso-lateral and ventrolateral processes relatively short.

Measurements and ratios. Male ($n = 1$): BL: 10.18 mm; PL: 2.18 mm; PWA: 1.28 mm; PWM: 0.48 mm; PWB: 1.03 mm; EL: 8.00 mm; EW: 1.83 mm; EyD: 0.35 mm; EyW: 0.63 mm; EL/PL: 3.68; EW/PWA: 1.43; EW/PWM: 3.84; EW/PWB: 1.78; PWA/PWB: 1.24; PWA/PWM: 2.68; PWB/PWM: 2.16; EyD/EyW: 0.56. **Female** ($n = 1$): BL: 13.4 mm; PL: 2.18 mm; PWA: 1.28 mm; PWM: 0.98 mm; PWB: 1.43 mm; EL: 10.9 mm; EW: 2.20 mm; EyD: 1.15 mm; EyW: 0.50 mm; EL/PL: 4.36; EW/PWA: 1.21; EW/PWM: 2.26; EW/PWB: 1.54; PWA/PWB: 1.28; PWA/PWM: 1.87; PWB/PWM: 1.46; EyD/EyW: 2.30.

Differential diagnosis. This new species is similar to *C. terminalis*, but it is distinguishable by the following characters: EyD/EyW 0.56 in male, 2.30 in female; PWA/PWB 1.24–1.28; female antennae (Fig. 26) as long as male (Fig. 25); whole elytra yellowish brown, in female pointed at apex.

Etymology. The species name is dedicated to Mr. Wen-Chuan Liao, the collector of the holotype; noun in genitive case standing in apposition.

Distribution (Fig. 126). Taiwan.

Key to the species of *Cladiscus* from Japan and Taiwan

- 1 Elytra largely yellowish red (Figs 4, 6–9). 2
- Elytra largely black or brownish black (Figs 1–3, 5). 4
- 2 Eyes small (EyD/EyW 2.14–4.10 in male, 2.82–3.23 in female); elytra relatively wide (EL/EW 2.65–3.71 in male, 3.90–4.46 in female). ... *C. hachijoensis* sp. nov.



Figs 123–125. Habitus and labels of Taiwanese specimens of *Cladiscus pallidicornis* Corporaal & van der Wiel, 1949 deposited in SDEI, previously identified as *Cladiscus sanguinicollis* (Spinola, 1844) by SCHENKLING (1912).

- Eyes large in male, small in female (EyD/EyW 0.56–0.68 in male, 2.18–2.20 in female); elytra relatively long (EL/EW 4.29–4.38 in male, 4.96–4.99 in female). 3
- 3 Elytra mostly yellowish-red, black at apex (Fig. 4). *C. terminalis* Schenkling, 1912
- Elytra entirely yellowish-red (Figs 8, 9). *C. liaoi* sp. nov.
- 4 Elytral punctures not extending to apical half (Fig. 2). *C. weyersi* Kraatz, 1899
- Elytral punctures extending to apical half (Figs 1, 3, 5). 5
- 5 Male antennae flabellate (Fig. 17); female antennae serrate, antennomeres IV to X widely triangular (Fig. 18). *C. sauteri* Schenkling, 1912
- Male and female antennae weakly serrate. 6
- 6 Head black; elytra entirely blackish (Fig. 1); EL/PL 4.36–5.15 (4.87) in male, 4.02–4.45 (4.28) in female; tegmen and phallus symmetrical (Figs 46–48); base of MO with a flattened sclerite plate (Fig. 120). *C. obeliscus* Lewis, 1892
- Head brownish red; elytra reddish near base (Fig. 5); EL/PL 2.72–3.14 (2.94) in male, 2.76–2.94 (2.84) in female; tegmen and phallus not symmetrical (Figs 89–91); base of MO with a sagittate sclerite (Fig. 121). *C. pallidicornis* Corporaal & van der Wiel, 1949

Discussion

The Japanese and Taiwanese *Cladiscus* species can be arranged into two groups based on the features of the genitalia of both sexes:

The *C. sauteri* group (*C. weyersi*, *C. sauteri*, *C. terminalis*, and *C. liaoi* sp. nov.): male genitalia with spinose membrane between tegmen and phallus; apices of gonocoxite with one large process and two small processes; median oviduct without basal sclerite. *Cladiscus thalassinus* Murakami, 2017 from Malaysia is also included into this group.

The *C. obeliscus* group (*C. obeliscus*, *C. hachijoensis* sp. nov., and *C. pallidicornis*): male genitalia with simple membrane between tegmen and phallus; apices of gonocoxite with two large processes and one small process; median oviduct with basal sclerite.

The anterior and posterior lobe of gonocoxite in *Cladiscus* are chitinous, though those are membranous at least in the family Cleridae and Thanerocleridae. On the apex of gonocoxite, trifurcated chitinous processes are positioned instead of cylindrical membranous gonostylus. The shape of sclerites on the spermatophore (Figs 120–122) is species-specific, and the structure is similar to the “bursal plate”, “bursal sclerite” and “vaginal plate”, observed in

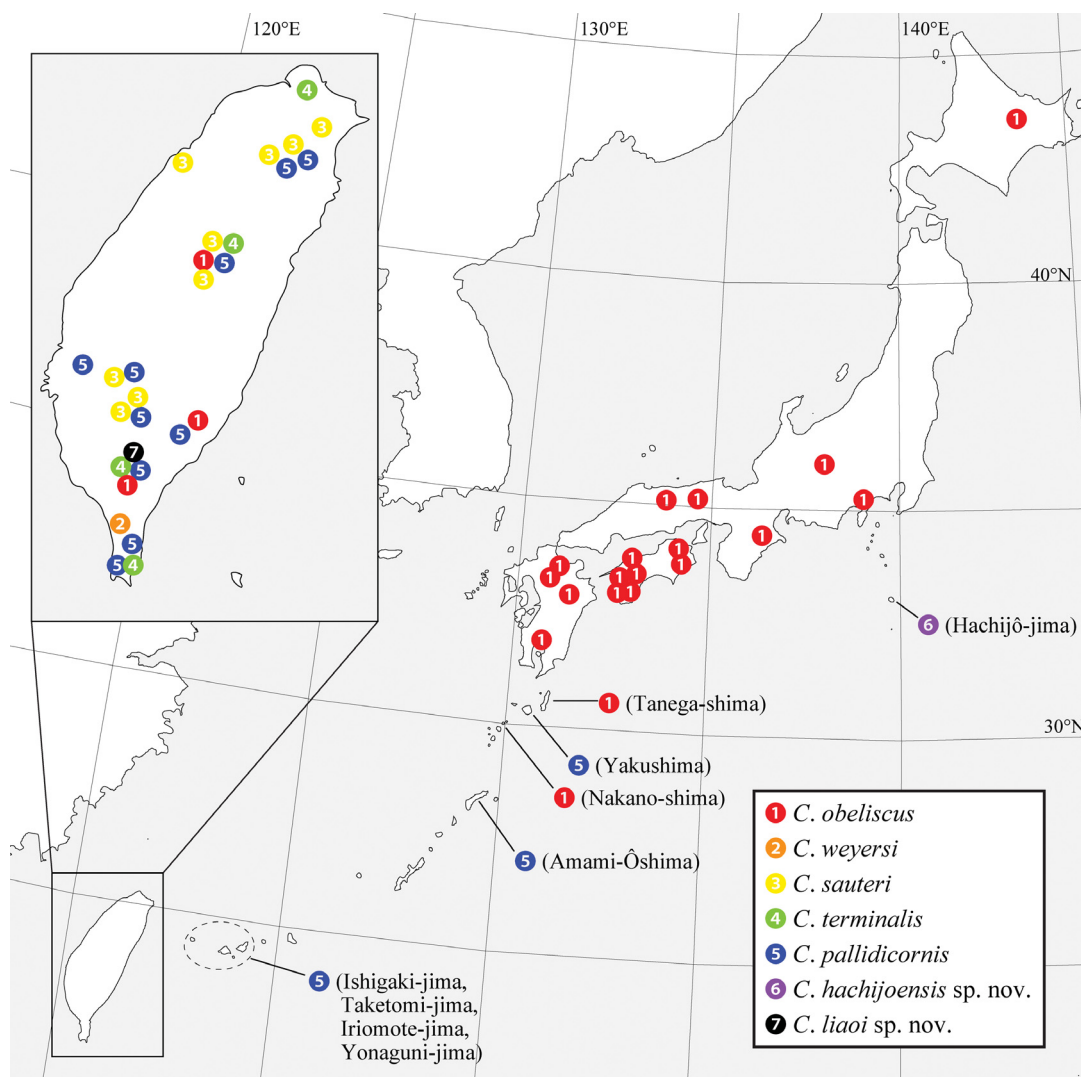


Fig 126. Distribution map of the species of *Cladiscus* from Japan and Taiwan.

the following clerid genera: *Tillus* Olivier, 1790, *Denops* Fischer, 1829, *Cymatodera* Gray, 1832, *Lecontella* Wolcott & Chapin, 1918, *Monophylla* Spinola, 1844, *Onychotillus* Chapin, 1945, *Pallenis* Laporte de Castelnau, 1836 of the subfamily Tillinae, and *Ambonides* Opitz, 2016, *Chariessa* Perty, 1832, *Dermestoides* Schaeffer, 1771, *Fallopylus* Opitz, 2012, *Isocymatodera* Hintz, 1902, *Neopylus* Solervicens, 1989, *Parapylus* Blackburn, 1891, *Pelonium* Spinola, 1844, *Pseudopylus* Opitz, 2012, *Phymatophaea* Pascoe, 1876, *Platynoptera* Chevrolat, 1834, *Pyticara* Spinola, 1844, of Korynetinae (KOLIBÁČ 1989, 1997; MURAKAMI & GERSTMEIER 2020; OPITZ 2003, 2009, 2012, 2014a, b, 2015a, b, 2017a, b, 2018); plus in the subgenus *Isoclerus* Lewis, 1892 of the family Thanerocleridae Chapin, 1924 (MURAKAMI 2019).

A high degree of morphological diversity of the apical structures of ovipositor in *Cladiscus* was mentioned without detail descriptions and figures by OPITZ (2010: 115). The differences were exemplified by this study. The presence or absence of spermatophoral sclerotization is potentially significant at the intra-generic or supra-generic level in the families Cleridae and Thanerocleridae. This,

and whether such sclerites function as a compression organ to expedite the relocation of the sperm, locked in the spermatophore, into the spermathecal chambers (OPITZ 2003), requires further investigation. Likewise, further study of the components of female genitalia may yield phylogenetically significant characters.

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