Species Diversity **27**: 53–60

DOI: 10.12782/specdiv.27.53

Taxonomic Reassessment of *Cybaeus communis* and *Cybaeus maculosus* (Araneae: Cybaeidae) from Central Honshu, Japan

Yusuke Sugawara[1,2], Yoh Ihara[1], and Takafumi Nakano[1]

[1] *Department of Zoology, Graduate School of Science, Kyoto University, Sakyo-ku, Kyoto 606-8502, Japan*
E-mail: sugawara@zoo.zool.kyoto-u.ac.jp
[2] *Corresponding author*

(Received 4 October 2021; Accepted 8 December 2021)

http://zoobank.org/6D31CFF1-0F27-4AA7-B164-E37E38A6A9BB

The taxonomic status of the two Japanese species of the spider genus *Cybaeus* L. Koch, 1868, viz., *C. communis* Yaginuma, 1972 and *C. maculosus* Yaginuma, 1972, is revisited on the basis of male and female specimens, which were collected from each type locality and the adjacent areas, along with the holotypes of both species. Mitochondrial cytochrome *c* oxidase subunit I and nuclear internal transcribed spacer 1 sequence data confirmed that *C. communis* and *C. maculosus* are conspecific, and *C. maculosus* is synonymized with *C. communis*. The obtained molecular phylogenies corroborate the monophyly of *C. communis*, *C. kirigaminensis* Komatsu, 1963, *C. shinkaii* (Komatsu, 1970), and *C. daimonji* Matsuda, Ihara, and Nakano, 2020.

Key Words: Arachnida, Cave, RTA clade, epigean, new synonym, First Reviser, Mt. Fuji.

Introduction

Spiders of the genus *Cybaeus* L. Koch, 1868, which inhabit the Holarctic region (Bennett 2017), are particularly diversified in the western North America and the Japanese Archipelago (Copley et al. 2009; Ihara 2009; Bennett et al. 2016, 2019, 2021). To date, 92 of the 200 known *Cybaeus* species have been described from Japan (World Spider Catalog 2021). Several Japanese *Cybaeus* species were described from caves and deemed to be subterranean (Komatsu 1961, 1968; Yaginuma 1986). In general, these subterranean species have pale body colors (Ihara 2009; Sugawara et al. 2021b). However, the ecological traits of those *Cybaeus* species have not been well elucidated.

In Yaginuma (1972), two *Cybaeus* species were described from different caves near Mt. Fuji, central Honshu, Japan: *C. communis* Yaginuma, 1972 from Yashiki-ana Cave, and *C. maculosus* Yaginuma, 1972 from Mado-ana Cave. *Cybaeus communis* was originally described on the basis of only a male specimen, and *C. maculosus* on the basis of only a female specimen. The distance between the cave entrances of their type localities is, however, no more than approximately 600 m, and the species share a similar body size and coloration. Therefore, their conspecificity has been inferred (Ihara 2009; Matsuda et al. 2020); however, their taxonomic status still remain unclarified. Moreover, judging from their relatively dark coloration (Ihara 2009), they appear to be epigean, not troglobitic, species. We examined *Cybaeus* specimens of both sexes collected from each type locality and the adjacent areas, as well as the holotypes of *C. communis* and *C. maculosus*, using nuclear and mitochondrial gene markers. Additionally, molecular phylogenetic analyses with other Japanese *Cybaeus* species, including their close congeners, were conducted.

Materials and Methods

Samples and morphological examination. Specimens of *Cybaeus* spiders, including male and female specimens from the respective type localities of *C. communis* and *C. maculosus*, collected in Shizuoka Prefecture, Honshu, Japan (Fig. 1) in 2011 were examined. The holotypes of both species, which are preserved in the arachnological collection at the National Museum of Nature and Science, Tsukuba (NSMT-Ar), were also examined.

Specimens were preserved in 70% ethanol; legs of some specimens were removed and preserved in 99% ethanol for DNA extraction. Epigynes were dissected from several female specimens and then cleared to observe their internal structure following the method described by Matsuda et al. (2020). Morphological examination of the specimens was conducted using a Leica M125C stereoscopic microscope. Images of the specimens were captured with the aid of a Leica MC170 HD digital camera mounted on the Leica M125C, and prepared using a Leica Application Suite (LAS) v. 4.12 software. Measurements were taken to the nearest 0.01 mm using LAS. Specimens examined in this study have been deposited in the Zoological Collection of Kyoto University (KUZ).

Terminology of morphological characters and the chaetotaxy of leg macrosetae follows Ihara et al. (2021). The following are the abbreviations used for macrosetae: p, prolateral; r, retrolateral; v, ventral. The following are the abbreviations used for other characters: AER, anterior eye row; AME, anterior median eyes; BG, Bennett's gland; CD, copulatory duct; CL, carapace length; CP, copulatory pore; CW,

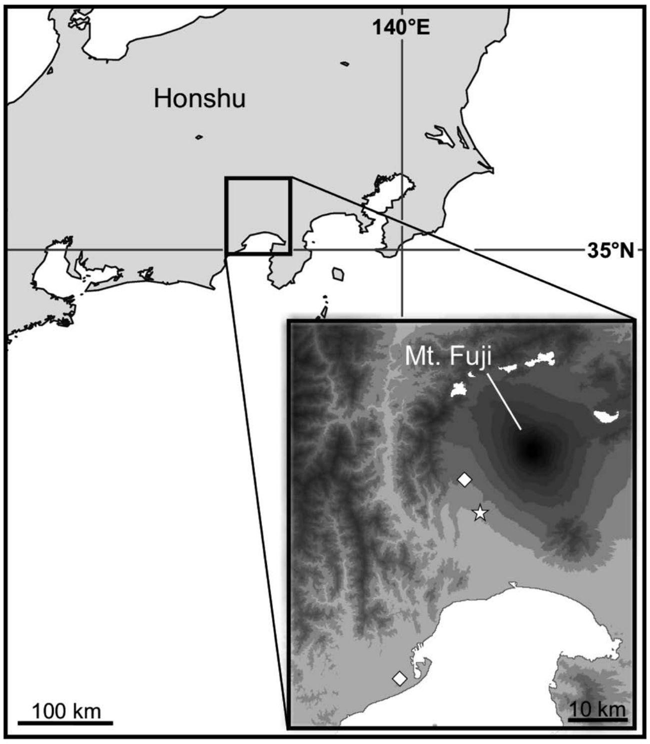

Fig. 1. Map showing collection localities of samples in the present study. Diamonds, locations of *C. communis*/*C. maculosus*; star, the type localities of both *C. communis* and *C. maculosus* in Yaginuma (1972). Shoreline data were based on Wessel and Smith (1996).

carapace width; EM, embolus; FD, fertilization duct; PA, patellar apophysis; PCO, proximal arm of conductor; PER, posterior eye row; PME, posterior margin of epigynal plate; PP, primary pore; RTA, retrolateral tibial apophysis; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk; TibIL, length of leg I tibia.

Molecular phylogenetic analyses. Nuclear internal transcribed spacer 1 (ITS-1) and mitochondrial cytochrome *c* oxidase subunit I (COI) markers were selected for molecular analyses. The methods used for genomic DNA extraction and cycle sequencing reactions were as described by Matsuda et al. (2020). The primer sets for PCR and cycle sequencing reactions used in this study were as follows: for COI, LCO1490 (5′-GGTCAACAAATCATAAAGATATTGG-3′) and HCO2198 (5′-TAAACTTCAGGGTGACCAAAAAATCA-3′) (Folmer et al. 1994) or COIARAF (5′-ACAAATCATAAAGATATTGC-3′) and COIARAR (5′-ATAGCATAAATTATTCCTAA-3′) (Ihara et al. 2021); and for ITS-1, CAS18sF1 (5′-TACCTGGTTGATCCTGCCAGTAG-3′) and CAS5p8sB1d (5′-CTTGGCAAATGCTTTCGC-3′) (Ji et al. 2003). PCR conditions and cycle sequencing reactions used in this study were published previously by Ihara et al. (2021). The PCR reactions were performed using a GeneAmp PCR System 9700 (Applied Biosystems). The newly obtained DNA sequences in this study (Table 1) were deposited with the International Nucleotide Sequence Databases through the DNA Data Bank of Japan.

Phylogenetic relationships among the *Cybaeus* spiders were inferred on the basis of the dataset comprising COI and ITS-1 sequences. The dataset of Japanese *Cybaeus* species in Sugawara et al. (2021a) was included in the analyses along with *C. nipponicus* (Uyemura, 1938), *C. kirigaminensis* Komatsu, 1963, and *C. shinkaii* (Komatsu, 1970) collected from, or near, their type localities (Table 1). Samples sharing completely identical sequences were excluded from the dataset. In total, 49 sequences of 24 species were included in our dataset (Table 1). *Cybaeus striatipes* Bösenberg and Strand, 1906 was treated as the outgroup a priori. No indels were observed in the COI sequences. The ITS-1 sequences were aligned using MAFFT L-INS-i v. 7.475 (Katoh and Standley 2013). The COI and ITS-1 fragments were 763 and 774 bp, respectively. Thus, the concatenated sequences yielded 1,537 bp of aligned positions.

Phylogenetic trees were reconstructed using maximum likelihood (ML) and Bayesian inference (BI) methods. The best-fit partition scheme and models for both analyses were identified on the basis of the corrected Akaike information criterion using PartitionFinder v. 2.1.1 (Lanfear et al. 2017) and the 'greedy' algorithm (Lanfear et al. 2012). The selected partition scheme and models were as follows: for COI 1st position, TVM+I+G (ML) or GTR+I+G (BI); for COI 2nd position, GTR+I+G; for COI 3rd position, K81UF+G (ML) or GTR+G (BI); and for ITS-1, GTR+I+G. The ML phylogenetic tree was calculated using IQ-TREE v. 1.6.12 (Nguyen et al. 2015) with non-parametric bootstrapping (BS) conducted with 1,000 replicates. The BI tree and Bayesian posterior probabilities (PP) were estimated using MrBayes v. 3.2.7a (Ronquist et al. 2012) with 2.5 million generations and tree sampling every 100 generations. The parameter estimates and convergence were checked using Tracer v. 1.7.1 (Rambaut et al. 2018), and the first 6,250 trees were discarded based on the results.

Results

Molecular analyses. The obtained BI (mean ln $L=-7244.738$, ESS=1684; Fig. 2) and ML (ln $L=-7207.428$; not shown) trees had almost identical topologies. The monophyly of *C. communis*/*C. maculosus* specimens was strongly supported (BS=99%, PP=0.99). *C. communis*/*C. maculosus*, *C. kirigaminensis*, *C. shinkaii*, and *C. daimonji* Matsuda, Ihara, and Nakano, 2020, which share morphological similarities, formed the monophyletic lineage (BS=90%, PP=1.0). However, our analyses failed to resolve the detailed relationship among these four species.

Taxonomy

Genus ***Cybaeus*** L. Koch, 1868
Cybaeus communis Yaginuma, 1972
[Japanese name: Zara-namihagumo]
(Figs 3–7)

Cybaeus communis Yaginuma, 1972: 311–312, fig. 37; Yaginuma 1986: 143, 146, fig. 78-10; Ihara 2009: 154, 155, figs 2-2-30-14, 18, 19.

Table 1. Samples of the *Cybaeus* species used for DNA sequencing. The voucher information is accompanied by the collection locality and the DNA Data Bank of Japan (DDBJ) accession number. Sequences with an asterisk (*) were obtained for the first time in this study. Samples with two asterisks (**) were excluded from the molecular phylogenetic analyses.

Taxa	Voucher #	Locality	DDBJ #	
			ITS-1	COI
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3968**	Yashiki-ana Cave, Shizuoka, Honshu: type locality of *C. communis*	LC651122*	
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3970	Yashiki-ana Cave, Shizuoka, Honshu: type locality of *C. communis*	LC651116*	LC651111*
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3971**	Mado-ana Cave, Shizuoka, Honshu: type locality of *C. maculosus*	LC651123*	
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3973	Mado-ana Cave, Shizuoka, Honshu: type locality of *C. maculosus*	LC651117*	LC651112*
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3962	Nihondaira Plateau, Shizuoka, Honshu	LC651119*	
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3963**	Nihondaira Plateau, Shizuoka, Honshu	LC651121*	LC651107*
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3965	Nihondaira Plateau, Shizuoka, Honshu	LC651118*	LC651113*
C. communis Yaginuma, 1972/*C. maculosus* Yaginuma, 1972	KUZ Z3976	Shiraito Waterfall, Shizuoka, Honshu	LC651120*	
C. daimonji Matsuda, Ihara, and Nakano, 2020	KUZ Z2755	Mt. Daimonji, Kyoto, Honshu	LC529208	LC529209
C. kirigaminensis Komatsu, 1963	KUZ Z3985	Kirigamine Plateau, Nagano, Honshu	LC651115*	LC651110*
C. shinkaii (Komatsu, 1970)	KUZ Z3986	Mt. Takano, Tokyo, Honshu		LC651109*
C. aikana Ihara, Koike, and Nakano, 2021	KUZ Z2137	Mt. Yuwandake, Amamioshima Island		LC552249
C. amamiensis Ihara, Koike, and Nakano, 2021	KUZ Z2120	Mt. Yuwandake, Amamioshima Island	LC552239	LC552237
C. ashikitaensis (Komatsu, 1968)	KUZ Z2213	Itsuki, Kumamoto, Kyushu	LC552195	LC552193
C. fujisanus Yaginuma, 1972	KUZ Z2412	Kaneyama-fûketsu Cave, Yamanashi, Honshu	LC622071	LC622070
C. fuujinensis (Komatsu, 1968)	KUZ Z2199	Fujindo Cave, Kumamoto, Kyushu	LC552190	LC552188
C. gotoensis (Yamaguchi and Yaginuma, 1971)	KUZ Z2251	Iana Cave, Fukuejima Island, Goto Islands	LC552204	LC552202
C. hikidai Ihara, Koike, and Nakano, 2021	KUZ Z2106	Mt. Nagodake, Okinawajima Island	LC552267	LC552265
C. ishikawai (Kishida, 1940)	KUZ Z2715	Near Ryugado Cave, Kochi, Shikoku	LC552278	
C. itsukiensis Irie, 1998	KUZ Z2184	Tsuzurasedo Cave, Kumamoto, Kyushu	LC552185	LC552183
C. kodama Ihara, Koike, and Nakano, 2021	KUZ Z2141	Hanayama Trail, Yakushima Island	LC552218	LC552216
C. koikei Sugawara, Ihara, and Nakano, 2021	KUZ Z3744	Hanase Pass, Kyoto, Honshu	LC601903	LC601901
C. kompiraensis (Komatsu, 1968)	KUZ Z2317	Kompirado Cave, Kochi, Shikoku	LC552181	LC552178
C. kunisakiensis Ihara, 2003	KUZ Z2303	Mt. Futagosan, Oita, Kyushu	LC552200	LC552198
C. kumadori Ihara, Koike, and Nakano, 2021	KUZ Z2143	Mt. Yaguradake, Kuroshima Island, Mishima Islands	LC552228	LC552226
C. melanoparvus Kobayashi, 2006	KUZ Z3764	Sakauchihirose, Gifu, Honshu	LC601896	LC601894
C. nipponicus (Uyemura, 1938)	KUZ Z3987	Mt. Kariyose, Tokyo, Honshu	LC651114*	LC651108*
C. okumurai Ihara, Koike, and Nakano, 2021	KUZ Z2719	Kunigami, Tanegashima Island	LC552282	
C. striatipes Bösenberg and Strand, 1906	KUZ Z2718	Mt. Rausudake, Shari, Hokkaido	LC552177	LC552175
C. tokunoshimensis Ihara, Koike, and Nakano, 2021	KUZ Z2113	Mt. Inokawadake, Tokunoshima Island	LC552256	LC552254
C. yakushimensis Ihara, Koike, and Nakano, 2021	KUZ Z2138	Shiratani-unsuikyo Valley, Yakushima Island	LC552209	

Cybaeus maculosus Yaginuma, 1972: 312–314, fig. 38; Yaginuma 1986: 144, 146, fig. 78-12; Ihara 2009: 154. syn. nov.

Emended diagnosis. "Medium-sized" Japanese *Cybaeus* (Fig. 3). Both *C. communis* sexes most closely resemble three other medium-sized brown Japanese *Cybaeus* species: *C. kirigaminensis*, *C. shinkaii*, and *C. daimonji* (see figs 2-2-30-14–23 in Ihara 2009; figs 1–5 in Matsuda et al. 2020). Males of *C. communis* can be clearly distinguished from those of the three species by the lack of a palpal PA (for *C. communis*, see Fig. 4A, B; for *C. kirigaminensis*, see figs 2-2-30-15, 16 in Ihara 2009; for *C. shinkaii*, see fig. 2-2-30-17 in Ihara 2009; for *C. daimonji*, see fig. 3 in Matsuda et al. 2020). Females of *C. communis* can be distinguished from those of the three species by the spermathecal structures: both the SH and SS in *C. communis* are more bulbous and developed than in the other species (for *C. communis*, see Figs 5B, 6; for *C. kirigaminensis*, see fig. 2-2-30-21 in Ihara 2009; for *C. shinkaii*, see fig. 2-2-30-23 in Ihara 2009; for *C. daimonji*, see fig. 5 in Matsuda et al. 2020).

Material examined. *Holotype*: male, NSMT-Ar 66, from Yashiki-ana Cave, Fujinomiya City, Shizuoka, Japan (cave entrance: 35.2693°N, 138.6210°E), collected by S. Uéno and K. Kato on 13 December 1969.

Additional materials: 1 female, NSMT-Ar 77, holotype of *C. maculosus*, from Mado-ana Cave, Fujinomiya City, Shizuoka, Japan (cave entrance: 35.2645°N, 138.6282°E), collected by S. Uéno and K. Kato on 13 December 1969, genitalia missing (Ken-ichi Okumura, personal communication); 3 males, KUZ Z3966, from the type locality of *C. communis*, collected by Naoki Koike on 12 November 2011; male, KUZ Z3967, same collection data as KUZ Z3966; male, KUZ Z3968, same collection data as KUZ Z3966; female, KUZ Z3969, same collection data as KUZ Z3966; female, KUZ Z3970, same collection data as KUZ Z3966; male, KUZ Z3971, from the type locality of *C. maculosus*, collected by Naoki Koike on 12 November 2011; 3 females, KUZ Z3972, same collection data as KUZ Z3971; female, KUZ Z3973, same collection data as KUZ Z3971; 4 males, KUZ Z3974, from Shiraito Waterfall, Fujinomiya City, Shizuoka,

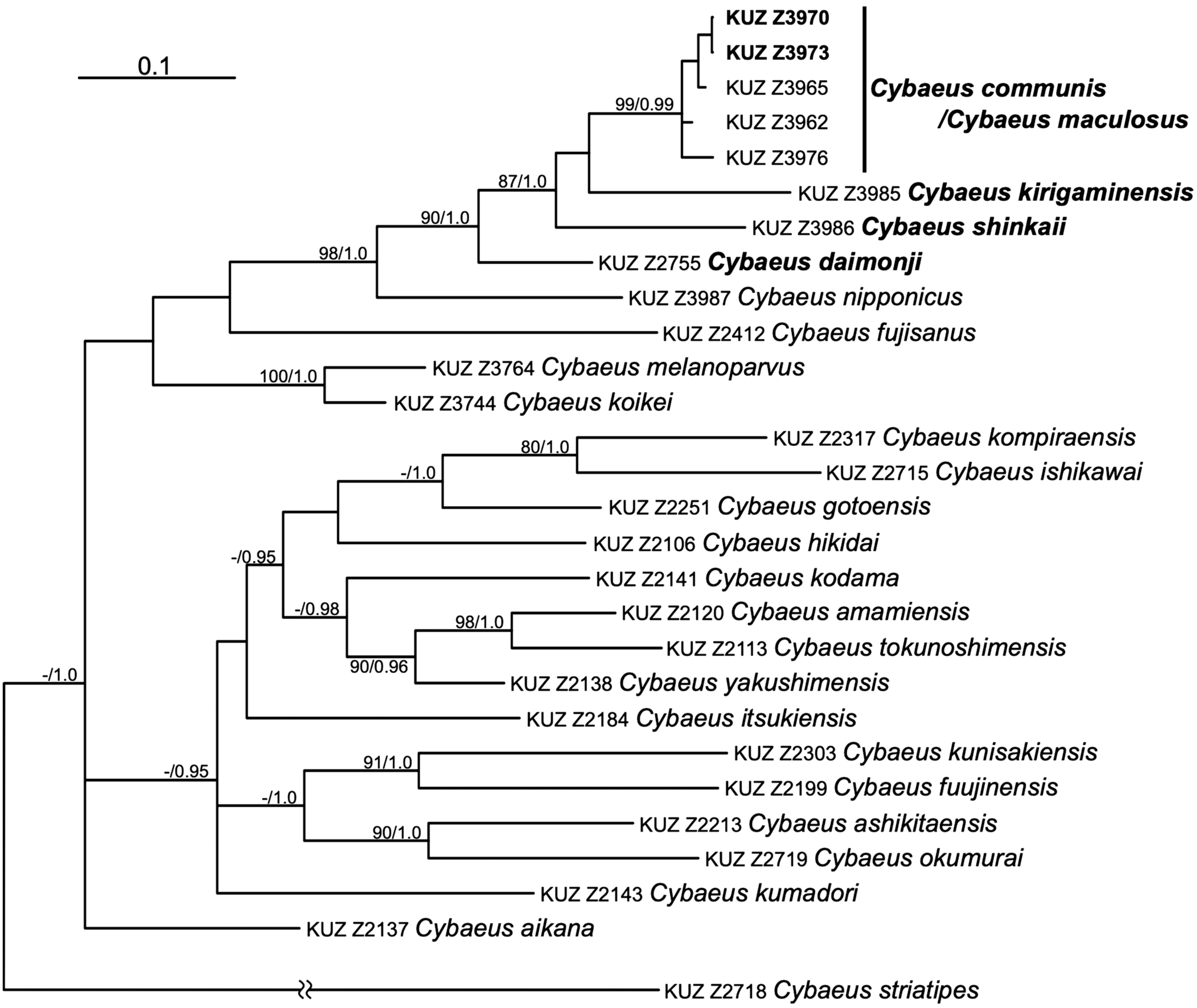

Fig. 2. Bayesian inference tree (mean ln $L=-7244.738$) for 1,537 bp of COI and ITS-1 sequences. Two specimens, KUZ Z3970 and KUZ Z3973, were collected from the type localities of *C. communis* and *C. maculosus*, respectively. Numbers on nodes represent ML bootstrap values and Bayesian posterior probabilities.

Japan (35.3141°N, 138.5896°E), collected by Naoki Koike on 12 November 2011; 3 females, KUZ Z3975, same collection data as KUZ Z3974, male, KUZ Z3976, same collection data as KUZ Z3974; 2 males, KUZ Z3961, from Nihondaira Plateau, Shizuoka City, Shizuoka, Japan (34.9855°N, 138.4633°E), collected by Naoki Koike on 11 November 2011; male, KUZ Z3962, same collection data as KUZ Z3961; male, KUZ Z3963, from Nihondaira Plateau, Shizuoka City, Shizuoka, Japan (34.9900°N, 138.4467°E), collected by Naoki Koike on 11 November 2011; female, KUZ Z3964, same collection data as KUZ Z3963; female, KUZ Z3965, from Nihondaira Plateau, Shizuoka City, Shizuoka, Japan (34.9805°N, 138.4524°E), collected by Naoki Koike on 11 November 2011.

Type locality. Yashiki-ana Cave, Fujinomiya City, Shizuoka Prefecture, Japan (cave entrance: 35.2693°N, 138.6210°E).

Description. *Male* (KUZ Z3967: Figs 3A, B, 4). Measurements (mm): CL 2.73, CW 1.86; head 1.10 wide; abdomen 2.40 long, 1.73 wide; ocular area 0.33 long, 0.68 wide; sternum 1.34 long, 1.16 wide; CW/CL 0.68, TibIL/CL 0.73. Leg formula, IV>I>II>III; length of legs (femur+patella+tibia+metatarsus+tarsus): leg I 8.03 (2.08+0.78+2.00+1.86+1.31); leg II 7.48 (2.03+0.77+1.77+1.72+1.18); leg III 6.53 (1.81+0.75+1.41+1.65+0.91); leg IV 8.44 (2.16+0.77+1.94+2.32+1.25).

Carapace (Fig. 3A). Head narrow, ca. 0.59× as wide as thoracic region; thoracic region almost as high as head. AER almost straight in frontal view; PER slightly recurved in dorsal view; AME smallest, <1/2 diameter of other eyes; ocular area ca. 2.1× wider than long. Clypeus shorter than median ocular area.

Mouthparts. Chelicerae slightly geniculate, promargin of fang furrow with 3 teeth (median one largest), retromargin with 3 teeth and 6 denticles, and basally with lateral condyle. Labium wider than long.

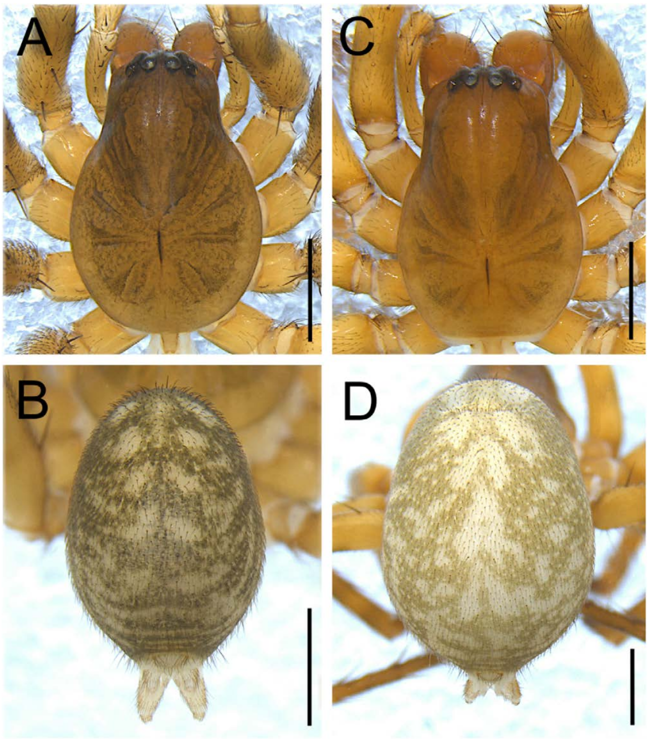

Fig. 3. *Cybaeus communis*, from the type locality, male (KUZ Z3967; A, B) and female (KUZ Z3969; C, D). A, C, Prosoma, dorsal view; B, D, abdomen, dorsal view. Scale bars: A–D, 1 mm.

Leg macrosetae. Leg I: tibia p4, r0, v2-2-2-2; metatarsus p3, r1, v2-2-3. Leg II: tibia p3, r3, v2-2-1-2; metatarsus p3, r2, v2-2-3.

Abdomen (Fig. 3B). Oval; mid-posterior part widest. Colulus two groups of 3 setae.

Palp (Fig. 4). PA lacking. Tibia longer than patella; RTA plate-like, quadrangular, occupying 1/4 of length of tibia. Cymbium relatively wide, ca. 2.2× longer than wide, slightly expanded prolaterally. Genital bulb slightly longer than wide, oval in ventral view. Conductor: distal part short; PCO short, sharply curved at right angle. EM simple, originating and terminating, respectively, at ca. 11 o'clock and ca. 4 o'clock in ventral view.

Color (Fig. 3A, B). Carapace: head brown, with reticulate brownish black markings; thoracic region yellowish brown, with radiating brownish black bands. Chelicerae, maxillary lobe and labium reddish brown. Sternum yellowish brown, darker towards margins. Legs yellowish brown, with brown vague annulations. Abdomen: dorsally brown with beige chevron-like markings, small dots, and curved lines; ventrally pale beige.

Female (KUZ Z3969: Figs 3C, D, 5, 6). Measurements (mm): CL 2.75, CW 1.89; head 1.27 wide; abdomen 4.16 long, 2.97 wide; ocular area 0.38 long, 0.79 wide; sternum 1.26 long, 1.11 wide. Leg formula, IV>I>II>III; length of legs (femur+patella+tibia+metatarsus+tarsus): leg I 6.83 (1.85+0.79+1.72+1.52+0.95); leg II 6.69 (1.96+0.83+

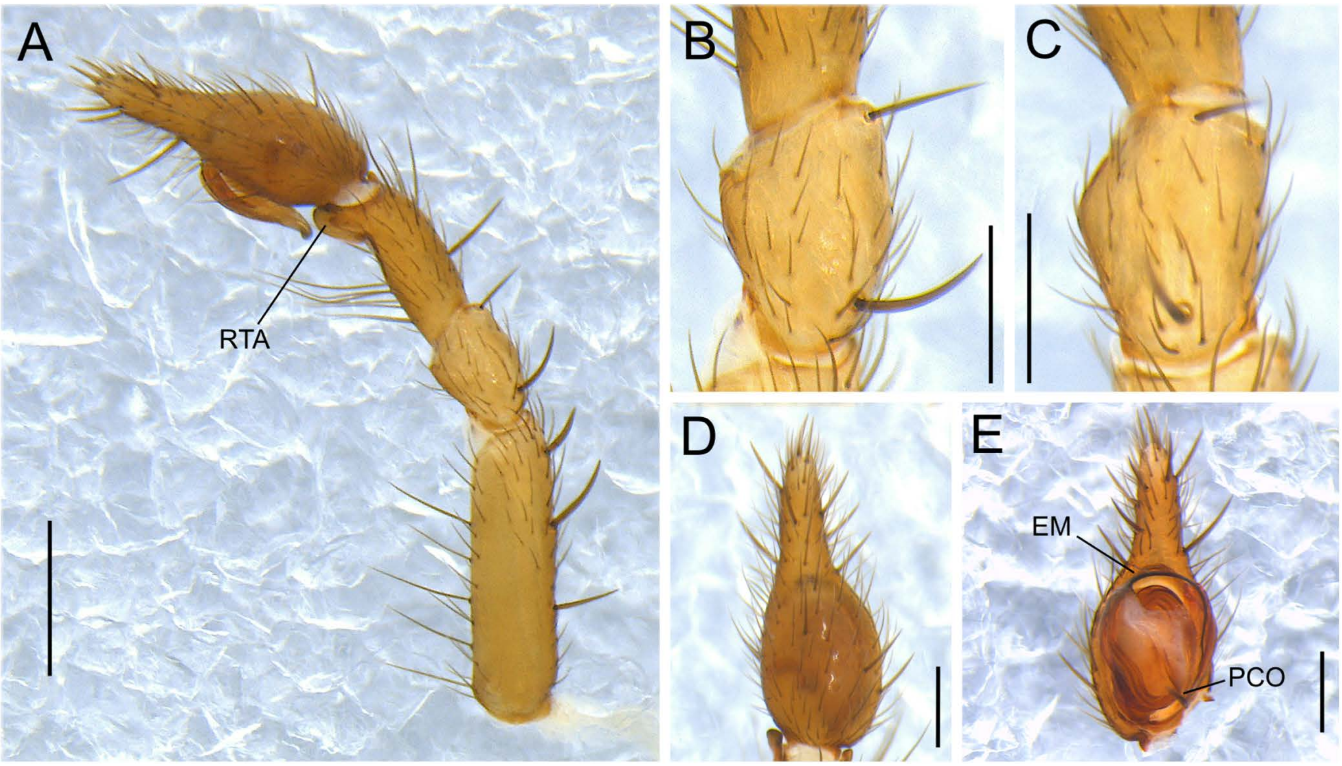

Fig. 4. *Cybaeus communis*, from the type locality, male (KUZ Z3967). A, Left palp, retrolateral view; B, patella of left palp, retrolateral view; C, patella of left palp, dorsal view; D, cymbium of left palp, dorsal view; E, genital bulb of left palp, ventral view. Abbreviations: EM, embolus; PCO, proximal arm of conductor; RTA, retrolateral tibial apophysis. Scale bars: A, 500 µm; B–E, 250 µm.

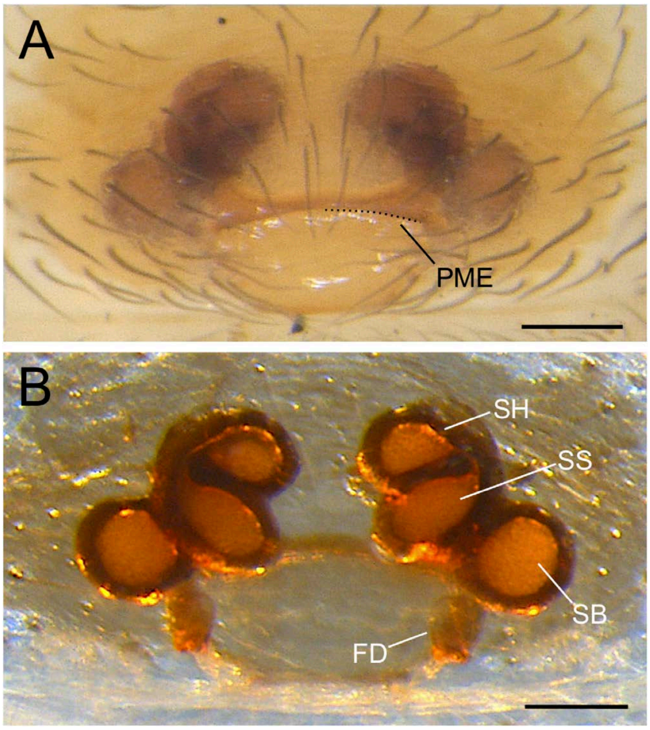

Fig. 5. *Cybaeus communis*, from the type locality, female (KUZ Z3969). A, Epigyne, ventral view; B, spermathecae, dorsal view. Abbreviations: FD, fertilization duct; PME, posterior margin of epigynal plate; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk. Scale bars: A, B, 100 µm.

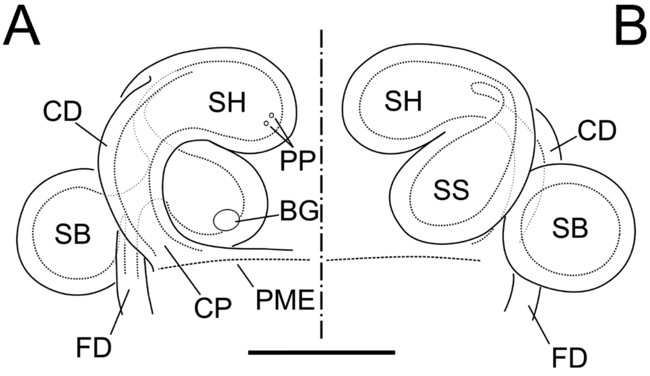

Fig. 6. *Cybaeus communis*, schematic drawing of the epigyne and spermathecae of a female specimen (KUZ Z3969). A, Ventral view; B, dorsal view. Abbreviations: BG, Bennett's gland; CD, copulatory duct; CP, copulatory pore; FD, fertilization duct; PME, posterior margin of epigynal plate; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk. Scale bars: A, B, 100 µm.

1.57+1.43+0.91); leg III 5.99 (1.68+0.78+1.25+1.45+0.83); leg IV 7.69 (1.99+0.81+1.76+2.09+1.03).

Carapace (Fig. 3C). Head ca. 0.67× as wide as thoracic region; thoracic region height slightly shorter than head. AER straight in frontal view; PER straight in dorsal view; AME smallest, <1/2 diameter of other eyes; ocular area ca. 2.1× wider than long. Clypeus shorter than median ocular area.

Mouthparts. Chelicerae geniculate, promargin of fang furrow with 3 teeth (median one largest), retromargin with 5 teeth and 6 denticles, and basally with lateral condyle. Labium wider than long.

Leg macrosetae. Leg I: tibia p4, r0, v2-2-2-2; metatarsus p2, r1, v2-2-3. Leg II: tibia p4, r1, v2-2-1-2; metatarsus p3, r1, v2-2-3.

Abdomen (Fig. 3D). Oval; mid-posterior part widest. Colulus two groups of 4 or 5 setae.

Genitalia (Figs 5, 6). PME almost straight. Atrium located posteromedially on epigyne. CPs separated on both sides of atrium; CD thick and short, running anteromedially. SH and SS bulbous; PP located on ventral side of SH; BG located posteroventrally on SS; SB spherical, located posterolaterally. FD running from connection part between SS and SB, descending posteriorly, and then turned anterodorsally.

Color (Fig. 3C, D). Carapace: head brown, with reticulate brownish black markings; thoracic region yellowish brown, with radiating light brownish black bands. Chelicerae, maxillary lobe and labium reddish brown. Sternum yellowish brown, darker towards margins. Legs yellowish brown, with brown vague annulations. Abdomen: dorsally pale brown with beige chevron-like markings and random patterns; ventrally pale beige.

Variation. *Males.* Measurements (mean±1SD, followed by ranges in parentheses; n=10): CL 2.61±0.15 (2.31–2.78); CW 1.83±0.11 (1.58–1.95); CW/CL 0.70±0.02 (0.68–0.72); TibIL 1.94±0.16 (1.68–2.16); TibIL/CL 0.74±0.04 (0.70–0.74). Legs slightly longer than those of females. *Females.* Measurements (mean±1SD, followed by ranges in parentheses; n=8): CL 2.60±0.26 (2.07–2.80); CW 1.75±0.17 (1.44–1.89); CW/CL 0.68±0.01 (0.66–0.69); TibIL 1.61±0.13 (1.33–1.72); TibIL/CL 0.62±0.02 (0.60–0.64).

Remarks. The female genitalia of the holotype of *C. maculosus* was not found, but the specimens examined in this study were clearly identified as *C. communis*/*C. maculosus* on the basis of previous descriptions (Yaginuma 1972) and because no other similar species were found at the collection localities.

The nuclear ITS-1 sequences were obtained from four specimens: male and female specimens from the respective type localities of *C. communis* and *C. maculosus*. The sequences through the overlapping aligned positions were almost identical (354/355 bp). Additionally, the specimens collected at the type locality of *C. maculosus* bear the genital characteristics (Fig. 7) that are concordant with those of *C. communis* (Figs 4, 5) in both males and females. The results thus clearly confirmed their conspecificity.

In Yaginuma (1972), *C. communis* and *C. maculosus* were distinguished using the length to width ratio of the carapace (=CL/CW in this study: 1.4 in *C. communis* and 1.5 in *C. maculosus*). The variation among specimens in this study was as follows: males, CL/CW 1.43±0.03 (1.38–1.47) and females, CL/CW 1.48±0.03 (1.44–1.52). Because the two species were described only on the basis of one sex, as mentioned above, this difference merely reflects sexual dimorphism.

The precedence between the two names by Yaginuma (1972), viz., *C. communis* and *C. maculosus*, should be fixed in accordance with Article 24.2 of the International Code of Zoological Nomenclature (hereinafter, Code; International

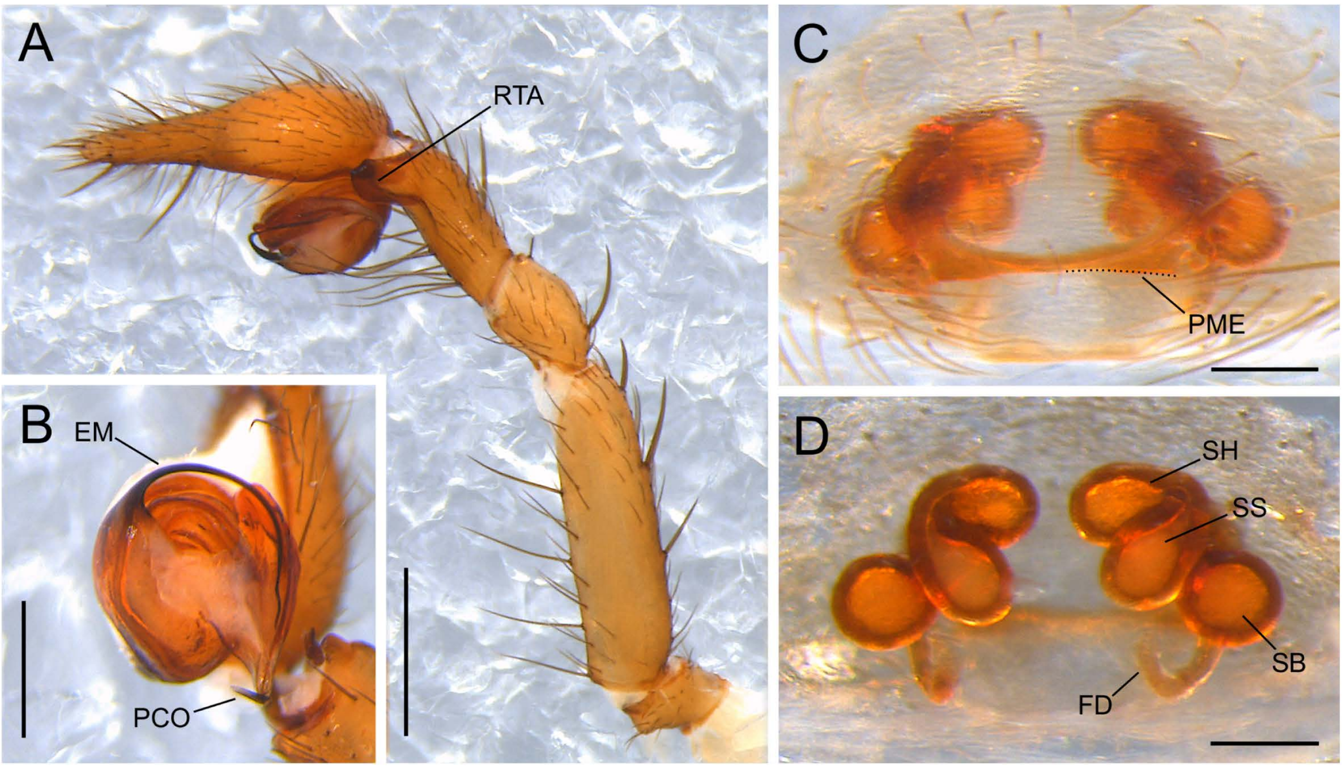

Fig. 7. *Cybaeus communis*, from the type locality of *C. maculosus*, male (KUZ Z3971; A, B) and female (KUZ Z3973; C, D). A, Left palp, retrolateral view; B, genital bulb of left palp, ventral view; C, epigyne, ventral view; D, spermathecae, dorsal view. Abbreviations: EM, embolus; FD, fertilization duct; PCO, proximal arm of conductor; PME, posterior margin of epigynal plate; RTA, retrolateral tibial apophysis; SB, spermathecal base; SH, spermathecal head; SS, spermathecal stalk. Scale bars: A, 500 µm; B, 250 µm; C, D, 100 µm.

Commission on Zoological Nomenclature 1999), because the two species names, *C. communis* and *C. maculosus*, were given in the same work. As the First Reviser, we have given precedence to the name *C. communis* over *C. maculosus* for the following reasons: 1) the genital part of the holotype of *C. communis* exists, whereas that of *C. maculosus* is currently missing; 2) *C. communis* is stated in Ihara (2009) with figures, whereas *C. maculosus* without any figures; and 3) the original description of *C. communis* (Yaginuma 1972: 311–312, fig. 37) appears earlier than that of *C. maculosus* (Yaginuma 1972: 312–314, fig. 38), and therefore, *C. communis* has the "position precedence" over *C. maculosus* in accordance with Recommendation 24 A of the 3rd Edition of the Code (International Commission on Zoological Nomenclature 1985). Accordingly, *C. communis* is the valid name for the species whenever *C. communis* and *C. maculosus* are considered as belonging to the same species-group taxon.

Cybaeus communis and *C. maculosus* were originally described based on specimens collected from caves and were deemed troglobitic. The examined specimens were also collected outside caves, and molecular analyses supported their close genetic distance despite their geographic distance. Judging from the phylogenetic relationships and the dark body color (Fig. 3), *C. communis* is considered an epigeic species that also inhabits caves.

Acknowledgements

We are grateful to Naoki Koike for providing specimens, to Dr. Ken-ichi Okumura (National Museum of Nature and Science, Tsukuba) for allowing us to examine the holotypes, and to Dr. Koshiro Eto (Kitakyushu Museum of Natural History & Human History) for allowing us to use his map-graphics. This work was supported by the Showa Seitoku Memorial Foundation (FY2020). We thank Edanz (https://jp.edanz.com/ac) for editing a draft of this manuscript, and two anonymous reviewers for their constructive comments and suggestions on this manuscript.

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