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Taxonomic revision of the jumping goblin spider genus *Orchestina* Simon, 1882 (Araneae: Oonopidae) in Japan with descriptions of two new species

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Abstract. The goblin spider genus *Orchestina* Simon, 1882 (Araneae: Oonopidae) in Japan has been revised, recognizing nine species including two new species and four species newly recorded from Japan: *O. okitsui* Oi, 1958 (♂♀), *O. flava* Ono, 2005 (♂♀), *O. sanguinea* Oi, 1955 (♀), *O. saaristoi* Henrard & Jocqué, 2012 (♂♀, new record), *O. saltitans* Banks, 1894 (♂♀, new record), *O. colubrina* Liu, Henrard & Xu, 2019 (♂, new record), *O. pavesii* (Simon, 1873) (♂♀, new record), *O. nojimai* sp. nov. (♀) and *O. insulana* sp. nov. (♀). A literature survey revealed errors in the correspondences between figures and captions in a pictorial book, which likely led to the misidentification of the synanthropically introduced species *O. saltitans* as the forest-dwelling native species *O. okitsui*. The misrepresentation also gave rise to the erroneous assumption that the male of *O. sanguinea* had been described, although no male specimen has actually been reported. In addition, *Orchestina flagella* Saaristo & van Harten, 2006, is here synonymized with *O. saltitans* (*O. flagella* syn. nov.). This study provides photographs and illustrations of nine *Orchestina* species, including the type specimens of *O. okitsui*, *O. flava* and *O. sanguinea*, notes on their habitats, distribution maps, supplemental molecular data, and a graphical character matrix of *Orchestina* species in Japan.

Keywords. Arachnida, misidentification, type material, synanthropic species, Synspermiata.

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Introduction

Spiders of the genus *Orchestina* Simon, 1882 (Araneae: Oonopidae) are characterized by their six eyes with H-shaped arrangement, massive femora on legs IV, and jumping behavior (Tong & Li 2011; Henrard & Jocqué 2012; Izquierdo & Ramírez 2017). To date, 181 species have been described worldwide, with a high species diversity in tropical regions of Central and South America, southern China, and tropical Africa (World Spider Catalog 2026). *Orchestina* spiders inhabit diverse environments, ranging from rainforest canopies to coastal areas (Izquierdo & Ramírez 2017). Some species, such as

Orchestina pavesiiformis Saaristo, 2007, prefer artificial habitats and have achieved a cosmopolitan distribution through human-mediated dispersal (Brescovit *et al.* 2019).

In Japan, only three *Orchestina* species, namely, *Orchestina sanguinea* Oi, 1955, *Orchestina flava* Ono, 2005, and *Orchestina okitsui* Oi, 1958, have been recorded (Ono 2009; Tanikawa 2025). Detailed morphological examinations of *Orchestina* specimens, including type material, revealed the presence of several previously unrecorded and undescribed species in Japan. In addition, a review of the literature showed that miscaptioned figures in a pictorial book (Yaginuma 1986) had led to misidentifications and incorrect recognition of undiscovered sex in some *Orchestina* species. As a result of this study, nine species of *Orchestina* are now recognized from Japan, including two species new to science and four newly recorded species. This paper provides descriptions of these species, along with photographs and illustrations, detailed information on the type specimens of *O. okitsui*, *O. flava* and *O. sanguinea*, microhabitat data, distribution maps, supplemental molecular data, and a graphical character matrix of *Orchestina* species in Japan.

Material and methods

Specimen collection

Specimens were collected from various environments including deciduous forests, grasslands in coastal zones and estuaries, as well as indoor environments, and preserved in a 75–80% ethanol solution. For the field survey conducted on the Ogasawara Islands, a UNESCO World Natural Heritage Site, a training course for forest use provided by the Ogasawara Forest Ecosystem Conservation Center, Kanto Regional Forest Office, was completed in advance. An entry notification and research plan were then submitted to the National Forest Division, Ogasawara General Office, Ministry of Land, Infrastructure, Transport and Tourism, and the survey was conducted with official permission (Permit no. Ogasawara-rin 8-72).

The type specimens of *O. okitsui*, *O. flava*, and *O. sanguinea* were loaned from the Department of Zoology, National Museum of Nature and Science, Tsukuba (NSMT). The holotype and part of the paratypes of the new species described in this study have also been deposited in NSMT. The remaining paratypes and non-type specimens examined have been deposited in the arthropod collection of Tokushima Prefectural Museum (TKPM-AR). Some other non-type specimens are also deposited in the personal collections of Francesco Ballarin (FBPC), Jun-ichi Shimada (JSPC), Ryota Hidaka (RHPC), Sho Mishima (SMPC), Toshimichi Nagai (TNPC), Yuhi Hino (YHPC), and Yuya Suzuki (YSPC). Finally, type material of the species of *Orchestina* newly recorded from Japan is deposited in the Animal Specimen Museum, College of Life Sciences, Jinggangshan University (ASM-JGSU), Muséum national d'Histoire naturelle (MNHN), Museum of Comparative Zoology, Harvard University (MCZ), and Royal Museum for Central Africa (RMCA); no type specimens were directly examined.

Morphological examination

Photographs of habitus and genitalia were taken using Nikon Digital Sight 1000 attached to Nikon ECLIPSE Si LS and stacked using an imaging software (Zerene Stacker; Zerene Systems, Washington, USA). Measurements are given in millimeters. Measurements of the legs are given in the following format: femur + patella + tibia + metatarsus + tarsus = total. Morphological terminology is in accordance with Henrard & Jocqué (2012), Izquierdo & Ramírez (2017), Tong & Li (2011) and Song *et al.* (2024).

Abbreviations

ALE = anterior lateral eye
Am = ampulla
ARe = anterior receptaculum
AUS = anterior uterine sclerite

Cy = cymbium
Dc = duct
Em = embolus
Ex = dorsolateral extension
PLE = posterior lateral eye
PME = posterior median eye
Po = pocket
PP = posterior plate
Pr = lateral protrusion
Se = serrula
SD = seminal duct
Ti = palpal tibia

DNA extraction, sequencing and phylogenetic analysis

Genomic DNA was extracted from the legs and carapace of each specimen using the DNeasy Blood & Tissue Kit (QIAGEN, Venlo, the Netherlands). The mitochondrial COI gene was amplified for *O. okitsui*, *O. saltitans*, *O. flava*, *O. insulana* sp. nov., and *O. sanguinea* for subsequent phylogenetic analyses, using the primer pair C1-J-1751 "SPID" (5′-GAGCTCCTGATATAGCTTTTCC-3′) (Hedin & Maddison 2001) and ChR2 (5′-GGATGGCCAAAAAATCAAAATAAATG-3′) (Barrett & Hebert 2005). In addition, partial mitochondrial 16S rDNA sequences were amplified for *O. insulana* sp. nov. for future analyses using the primer pair 16sbr-H-mod (5′-CCGGTYTGAACTCARATCAYGT-3′) (Palumbi *et al.* 2002) and 16s1471-mod (5′-GCCTGTTTAWCAAAAACAT-3′) (Crandall & Fitzpatrick 1996). Molecular analyses were not conducted for the other species examined in this study because an insufficient number of well-preserved specimens was available.

The composition of the PCR reaction mixture (20 µL in total) is as follows: PrimeSTAR® Max DNA Polymerase (TAKARA-BIO, Kusatsu, Japan): 10.0 µL; 10 pmol/µL forward primer: 1.0 µL; 10 pmol/µL reverse primer: 1.0 µL; DNA template: 1.0 µL; distilled water: 7.0 µL. PCR was conducted using TAKARA PCR thermal Cycler Dice (TAKARA-BIO) under the following conditions: COI: [98°C: 1 m; (98°C: 15 s, 47°C: 15 s, 72°C: 15S) × 35 cycles; 72°C; 2 m]; 16S rDNA: [94°C: 2m; (94°C: 15 s, 55°C: 15 s, 72°C: 15 s) × 35 cycles; 72°C: 5m)]. The PCR products were purified using ISOSPIN PCR Product (NIPPON GENE, Tokyo, Japan). The amplified fragments were sequenced by Eurofins Genomics K.K. (Tokyo, Japan) using ABI 3730xl DNA Analyzer (Thermo Fisher Scientific, Waltham, MA, USA). The obtained chromatogram was manually checked in SnapGene Viewer ver. 7.2.1 (Insightful Science; https://www.snapgene.com) and the alignment was performed by MAFFT ver. 7.450 (https://mafft.cbrc.jp/alignment/server/). Nucleotide sequence data obtained in this study were deposited to the International Nucleotide Sequence Database Collaboration (INSDC) through the DNA Data Bank of Japan.

The molecular dataset comprises 13 sequences (431 bp) representing eight species, including specimens newly examined in this study and sequences obtained from GenBank (Table 1). Phylogenetic relationships were inferred using the Maximum Likelihood (ML) method implemented in IQ-TREE ver. 3.0.1 (Minh *et al.*, 2020). The best-fit substitution model was selected using the ModelFinder algorithm implemented in IQ-TREE, and TIM3+F+G4 was identified as the optimal model. Nodal support was assessed using 1000 ultrafast bootstrap replicates and SH-aLRT tests. The resulting consensus tree was visualized in FigTree ver. 1.4.4 (Rambaut 2018), with ultrafast bootstrap (UFBoot) and SH-aLRT support values shown at each node.

Uncorrected p-distances between the COI sequences were calculated using the dist.dna function in the ape package in R (ver. 4.4.2; R Core Team 2024).

Table 1. Accession numbers for partial mitochondrial COI sequences of species of *Orchestina* Simon, 1882 used for phylogenetic analysis, with associated information.

Species	Voucher specimen no.	Accession no.	Sex	Locality
Orchestina sp.	–	MW380700	–	South Africa
Orchestina sp.	–	MW998230	–	Spain
Orchestina sp.	–	MW998231	–	Spain
Orchestina sp.	–	MT607843	–	Spain
Orchestina flava	TKPM-AR 3561	LC919682	Female	Chichi-jima Island, Tokyo, Japan
Orchestina okitsui	TKPM-AR 3420	LC919686	Male	Tokyo, Japan
Orchestina saltitans	TKPM-AR 3433	LC919687	Female	Tottori, Japan
Orchestina sanguinea	TKPM-AR 3496	LC919680	Female	Tokyo, Japan
Orchestina sanguinea	TKPM-AR 3498	LC919681	Female	Tokyo, Japan
Orchestina insulana sp. nov.	TKPM-AR 3560	LC919683	Female	Chichi-jima Island, Tokyo, Japan
Orchestina insulana sp. nov.	TKPM-AR 3563	LC919684	Female	Ototo-jima Island, Tokyo, Japan
Orchestina insulana sp. nov.	TKPM-AR 3489	LC919685	Female	Haha-jima Island, Tokyo, Japan
Ischnothyreus sp.	–	PV031324	–	Yunnan, China

Results

Taxonomy

Class Arachnida Cuvier, 1812
Order Araneae Clerck, 1757
Family Oonopidae Simon, 1890

Genus ***Orchestina*** Simon, 1882

Orchestina Simon, 1882: 237.
Ferchestina Saaristo & Marusik, 2004: 52. Synonym of *Orchestina* according to Platnick *et al*. (2012: 37).

Type species

Schoenobates pavesii Simon, 1873 [= *Orchestina pavesii* (Simon, 1873)].

Diagnosis

Orchestina spiders can be distinguished from other oonopid genera by lacking a dorsal abdominal scutum, by their enlarged femora IV, and by their characteristic jumping behavior.

Diagnostic characters of *Orchestina* species in Japan

In terms of general appearances, *Orchestina* species occurring in Japan display three recurrent somatic color patterns (Figs 9, 21; Appendix 1). The first pattern is characterized by a carapace with brown net-

like markings and a dorsum of the abdomen showing violet pigmentation with a pale inverted V-shaped marking (e.g., Figs 1A, 3A, 4A, 5A, 6A, 7A, 10A: *O. okitsui*, *O. saaristoi* Henrard & Jocqué, 2012, *O. saltitans* Banks, 1894, *O. colubrina* Liu, Henrard & Xu, 2019). The second pattern lacks distinctive markings on both carapace and abdomen (e.g., Figs 11A, 12A, 15A, 17A, 18F, 19A, 20A: *O. pavesii*, *O. flava*, *O. insulana* sp. nov., *O. sanguinea*). The third condition is represented by a carapace with faint radial rows of pigments and dark-colored margins (Fig. 13A: *O. nojimai* sp. nov.). These color patterns are provided for descriptive purposes only. Species identification should primarily rely on the morphology of the male endites, labium and the genitalia of both sexes, as detailed below.

In males, the shape of the endites provides a useful diagnostic character, as they are highly modified and species-specific (Figs 1E–F, 2C, G, 4E–F, 10D–E, 11D–E, 15D–F) except in *O. saltitans*, which retains unmodified endites (Fig. 6E–F). More specifically, different types of modifications on the endites are useful for distinguishing species: presence of a serrula (*O. okitsui*: Figs 1E–F, 2C, G; *O. saaristoi*: Fig. 4E–F; *O. flava*: Fig. 15E–F), a subapical outgrowth (*O. okitsui*: Figs 1E–F, 2C, G, arrows), a small triangular appendix (*O. flava*: Fig. 15E–F, arrows), a small spatulate apophysis (*O. pavesii*: Fig. 11D–E, arrows), and a spine-like extension (*O. colubrina*: Fig. 10D–E, arrows). The male labium is oval in shape and shows little interspecific variation among the Japanese species, except in *O. colubrina* and *O. pavesii*, which possess two lateral conical extensions on the anterior margin (Figs 10D–E, 11D–E). In addition, the male labium of *O. colubrina* is distinguished from those of other species by the presence of five modified setae on the ventral surface (Fig. 10D–E).

Male palpal morphology also varies among species and the diagnostic features are as follows. Relative size of the palpal bulb and tibia: 1) tibia wider than bulb (*O. okitsui*: Fig. 1G–H, K–L; *O. saaristoi*: Fig. 4G–H, K, N; *O. colubrina*: Fig. 10G–H, J–K); 2) tibia as wide as bulb (*O. pavesii*: Fig. 11F–H); and 3) bulb wider than tibia (*O. saltitans*: Fig. 6 G, I–J, L; *O. flava*: Fig. 15G–H, K–L). Shape of the embolus: 1) short with a wide basal portion (*O. okitsui*: Fig. 1G–O; *O. saaristoi*: Fig. 4G–P; *O. flava*: Fig. 15G–N); 2) conspicuously long and bristle-like (*O. saltitans*: Fig. 6G–L); 3) moderately long and thin (*O. colubrina*: Fig. 10F–K); and 4) winding with a bifurcated tip (*O. pavesii*: Fig. 11F–H). Trajectory of the seminal duct: 1) long, mostly visible, forming many circular loops (*O. okitsui*: Fig. 1G, K, O; *O. saaristoi*: Fig. 4G, K, L; *O. flava*: Fig. 15G, K); and 2) short, thin, mostly inconspicuous (*O. saltitans*: Fig. 6G–L; *O. colubrina*: Fig. 10F–K; *O. pavesii*: Fig. 11F–H).

Females can be distinguished by the following external and internal characteristics of their genitalia: presence of external pockets (*O. pavesii*: Fig. 12E–F; *O. nojimai* sp. nov.: Fig. 13F–J); a sclerotized genital opening (*O. nojimai* sp. nov.: Fig. 13F–G); a longitudinal dark line formed by a thin AUS (*O. saltitans*: Fig. 7E–H); a longitudinal dark line formed by the AUS and Dc (*O. flava*: Fig. 17D, I; *O. insulana* sp. nov.: Fig. 19F, H, J; *O. sanguinea*: Fig. 20E, G); and a globular AUS visible as a dark circular marking (*O. okitsui*: Fig. 3E, G; *O. saaristoi*: Fig. 5E, G). Closely related species are further separated by the detailed morphology of the AUS and Pr of the internal genitalia (Fig. 3F, H vs 5F, H; Fig. 17E, G–H, J vs 19G, I, K vs 20F, H) and density and length of hairs on genital surface (Fig. 17D, I vs 19F, H, J vs 20E, G). For practical reasons, a graphical character matrix is provided as the identification key (Appendix 1) instead of a traditional dichotomous text key.

Habitat types also vary among species: litter layers and bushes in forests (*O. okitsui*, *O. flava*, *O. insulana* sp. nov., *O. sanguinea*), grasslands at coastal zones (*O. saaristoi*), and indoor environments (*O. saltitans*, *O. pavesii*). The habitats of *O. colubrina* and *O. nojimai* sp. nov. remain uncertain due to limited specimen data.

Orchestina okitsui Oi, 1958
Figs 1–3, 9A, 14

Orchestina okitsui Oi, 1958: 32, figs 5–7 (descriptions of ♂♀ from Tokyo, Japan).

Note

For the complete taxonomic list, see the World Spider Catalog (2026).

Japanese name

オキツハネグモ (Okitsu-hane-gumo).

Diagnosis

Males of *Orchestina okitsui* closely resemble those of *O. zhiwui* Liu, Xu & Henrard, 2019, *O. concava* Tong & Li, 2024 and *O. subclavulata* Song *et al.*, 2024 by sharing the following characteristics: violet-brown net-like markings on the dorsal carapace; violet-brown pigmentation with a pale inverted V-shaped marking on the dorsal abdomen (Fig. 1A); endites with a subapical triangular outgrowth (Figs 1E–F, 2C, G); an enlarged palpal tibia; similar relative proportion of tibia and bulb; a short embolus with a wide basal portion; and a dark-colored, elongated seminal duct that is clearly visible (Figs 1G, K, 2A–B, E–F). However, they can be distinguished by the length and trajectory of the seminal duct. In *O. okitsui*, the duct is longer, and its trajectory is more complex, forming multiple loops: three loops are visible between the inner S-shaped loop and the outer duct, and the duct beneath the outer loop ("loop 1") is distinctly winding (Figs 1G, K, 2E–F). In contrast, the seminal duct of *O. zhiwui* is shorter, forming a simple S-shaped trajectory (Liu *et al.* 2019: fig. 13b; Wang *et al.* 2021: fig. 1i); in *O. concava*, a single loop is visible between the outer duct and the inner loop (Song *et al.* 2024: fig. 5a), and in *O. subclavulata*, two loops are present between the outer duct and the inner loop (Song *et al.* 2024: fig. 9a–b). Males of *O. okitsui* also resemble those of *O. aureola* Tong & Li, 2011 and *O. clavulata* Tong & Li, 2011 in somatic coloration, abdominal markings and the general shape of the palp, but can be readily distinguished by the presence of a subapical triangular outgrowth on the endites (Figs 1E–F, 2C, G), which is absent in *O. aureola* and *O. clavulata* (Tong & Li 2011: fig. 2a–b).

Females of *O. okitsui* resemble those of *O. xui* Tong & Li, 2024 in the shape of the internal genitalia, particularly in having an anteriorly swollen AUS with short Pr situated anterolaterally (Fig. 3F, H), and a pair of semicircular sclerotized plates on the posterior side of the genital area (Fig. 3E, G, arrows; Song *et al.* 2024: "pockets"). However, they can be distinguished by the globular shape of the anterior portion of AUS and by the position of the "pockets" which are more mesial in *O. okitsui*, whereas in *O. xui* the AUS is transversely wider, and the "pockets" are positioned more laterally (Song *et al.* 2024: fig. 18c–d).

Females of *O. okitsui* also resemble those of *O. clavulata* but can be readily distinguished by the entirely serrated Pr, whereas only the distal end of Pr is serrated in *O. clavulata* (Tong & Li 2011: fig. 7e) and by the presence of a pair of sclerotized plates on the posterior margin of the genital area, which are absent in *O. clavulata* (Tong & Li 2011: fig. 7f).

Type material

Holotype (examined)

JAPAN – **Tokyo** • ♂; Higashiyamato-shi, Murayama-chosuichi; 26 Feb. 1958; S. Okitsu leg.; NSMT-Ar 1924.

Allotype (examined)

JAPAN – **Tokyo** • ♀; same data as for holotype; NSMT-Ar 1925.

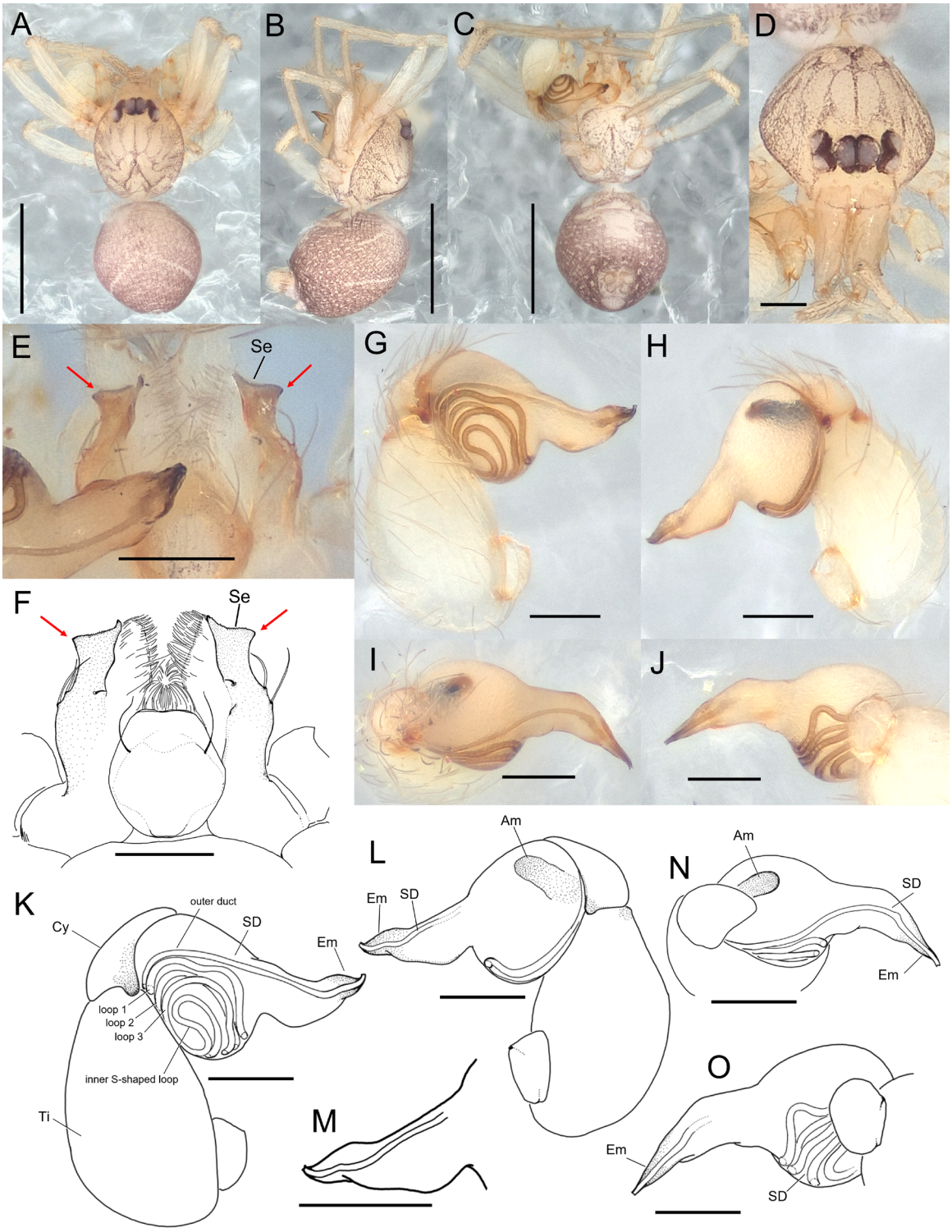

Fig. 1. *Orchestina okitsui* Oi, 1958, male (TKPM-AR 3421). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, frontal view. **E**–**F**. Endites and labium, ventral view. **G**–**L**, **N**–**O**. Left palp. **G**, **K**. Prolateral view. **H**, **L**. Retrolateral view. **I**, **N**. Dorsal view. **J**, **O**. Ventral view. **M**. Embolus tip, retrolateral view. Arrows in E and F indicate subapical outgrowths of the endites. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–O = 0.1 mm.

Other material examined

JAPAN – **Ibaraki Prefecture** • 1 ♂; Tsukuba-shi, Tennodai; Oct. 2018; Y. Suzuki leg.; YSPC-Op-1. – **Tokyo** • 1 ♀, 1 juvenile; Hachioji-shi, Hachioji-joshi; 22 Apr. 2014; T. Suguro leg.; TKPM-AR 3419 • 1 ♂; Oume-shi, Kurosawa; 23 Apr. 2019; A. Ando leg.; TKPM-AR 3565 • 1 ♂; same locality as for preceding; 3 Dec. 2024; A. Ando leg.; TKPM-AR 3420. – **Kanagawa Prefecture** • 2 ♂♂; Atsugi-shi, Iiyama, Iiyamakannon; 7 May 1977; K. Kumada leg.; NSMT-Ar 17663. – **Mie Prefecture** • 1 ♂; Ise-shi, Toyokawa-cho, Ise-jingu, Gegu-12-rinpan; 5 Oct. 2003; K. Kumada leg.; NSMT-Ar 14453 • 1 ♀; Ise-shi, Ujitachi-cho, Ise-jingu, Gegu-85-rinpan; 26 Nov. 2003; K. Kumada leg.; NSMT-Ar 14468 • 1 ♀; Ise-shi, Ujimazaike-cho, Ise-jingu, Gegu-45-rinpan; 22 May 2004; K. Kumada leg.; NSMT-Ar 14240 • 1 ♂; Ise-shi, Ujitachi-cho, Ise-jingu, Gegu-97-rinpan; 29 Dec. 2003; K. Kumada leg.; NAMT-Ar 14129 • 1 ♂; Ise-shi, Ujitachi-cho, Ise-jingu, Gegu-81-rinpan; 15 May 2004; K. Kumada leg.; NSMT-Ar 14184; all specimens collected in Mie Prefecture correspond to Kumada (2012). – **Fukui Prefecture** • 1 ♀; Onyu-gun, Natasyou-mura, Nagatani; 30 Aug. 2002; K. Kumada leg.; NSMT-Ar 15212; the specimen corresponds to Kumada (2002). – **Okayama Prefecture** • 1 ♂; Kume-gun, Misaki-cho, Nishihaga; 23 Apr. 2022; K. Nojima leg.; TKPM-AR 3421 • 2 ♀♀; same data as for preceding; TKPM-AR 3422.

Description

Male (TKPM-AR 3421)

Coloration. In ethanol (Fig. 1A–D). Carapace pale yellowish brown with violet-brown net-like markings. Base of eyes black. Clypeus pale yellowish brown. Chelicerae pale yellowish brown. Endites and labium pale yellowish brown, margins darker. Sternum pale yellowish brown, stained with violet-brown spots. Legs pale yellowish brown, without annulations. Abdomen dorsally pale yellowish white, with violet-brown pigments, bearing pale inverted V-shaped marking; ventrally covered with violet-brown pigments, except pale central part. Live specimen as in Fig. 9A. Carapace and palp orange, abdomen reddish brown, both more vivid than in preserved specimens.

Measurements. Body length 1.05. Carapace length 0.49, width 0.41, height 0.24. Eye diameter: ALE 0.064, PME 0.053, PLE 0.049. Length of legs: I 0.45 + 0.16 + 0.39 + 0.31 + 0.18 = 1.49, II 0.38 + 0.14 + 0.36 + 0.37 + 0.18 = 1.43, III 0.31 + 0.11 + 0.23 + 0.27 + 0.17 = 1.09, IV 0.49 + 0.14 + 0.30 + 0.39 + 0.17 = 1.49. Abdomen length 0.50, width 0.48, height 0.44.

Somatic morphology. Carapace oval, longer than wide, length/width = 1.20. Chelicerae without conspicuous macrosetae or apophyses (Fig. 1D). Endites markedly longer than wide, modified, divided into outer sclerotized and inner soft regions. Outer region with triangular subapical outgrowth (Fig. 1E–F, arrows); apical margin truncated, bearing serrula with fine serrations; two setae present at middle of outer margin. Inner soft region with dense brush-like tuft. Abdomen oval, as long as wide, length/width = 1.04.

Palp. Femur cylindrical. Patella small, triangular. Tibia elliptical, enlarged, length/width = 1.72, slightly wider than bulb, tibial width/bulb width = 1.17, attached subbasally to patella. Cymbium small, tapering apically. Palpal bulb pear-shaped, length/width = 1.58, strongly concave at middle of posterior margin. Seminal ducts dark colored, long, four circular loops visible in prolateral view; outermost loop ("loop 1") conspicuously winding; inner loop S-shaped (Fig. 1G, K). Five ducts visible in posterior view (Fig. 1J, O). Ampulla visible as dark thumb-shaped spot in retrolateral view (Fig. 1H, L). Embolus short; basal portion wide. Embolic tip without modified structures, directed inward in dorsal view (Fig. 1G–O).

Female (TKPM-AR 3422)

Coloration. As in male (Fig. 3A–C).

Measurements. Body length 1.27. Carapace length 0.56, width 0.44, height 0.29. Eye diameter: ALE 0.062, PME 0.044, PLE 0.043. Length of legs: I 0.46+0.16+0.43+0.40+0.18=1.63, II 0.44+0.13+0.35+0.36+0.18=1.46, III 0.33+0.12+0.24+0.20+0.17=1.06, IV 0.50+0.16+0.28+0.38+0.19=1.51. Abdomen length 0.69, width 0.58, height 0.50.

Fig. 2. Holotype male of *Orchestina okitsui* Oi, 1958 (NSMT-Ar 1924). **A**–**B**, **E**–**F**. Left palp. **A**, **E**. Retrolateral view. **B**, **F**. Dorsal view. **C**, **G**. Endites and labium, ventral view. **D**. Label of the holotype. Arrows in C and G indicate subapical outgrowths of the endites. Scale bars: 0.1 mm.

Somatic morphology. Carapace oval, narrowing anteriorly, longer than wide, length/width = 1.27. Endites pentagonal, elongate, bearing blackish serrula with fine serration on anterolateral margin (Fig. 3D). Abdomen oval, longer than wide, length/width = 1.20.

Genitalia. External genitalia (Fig. 3E, G). AUS visible as large dark reddish-brown marking on central region of genital area. Two semicircular sclerotized plates on posterior region (Fig. 3G, arrow). Internal genitalia (Fig. 3F, H). AUS globular, narrowing posteriorly. Pr short, thick, serrated, directed posterolaterally. Dc absent. ARe large, dome-shaped, anterior margin not exceeding AUS (Fig. 3H).

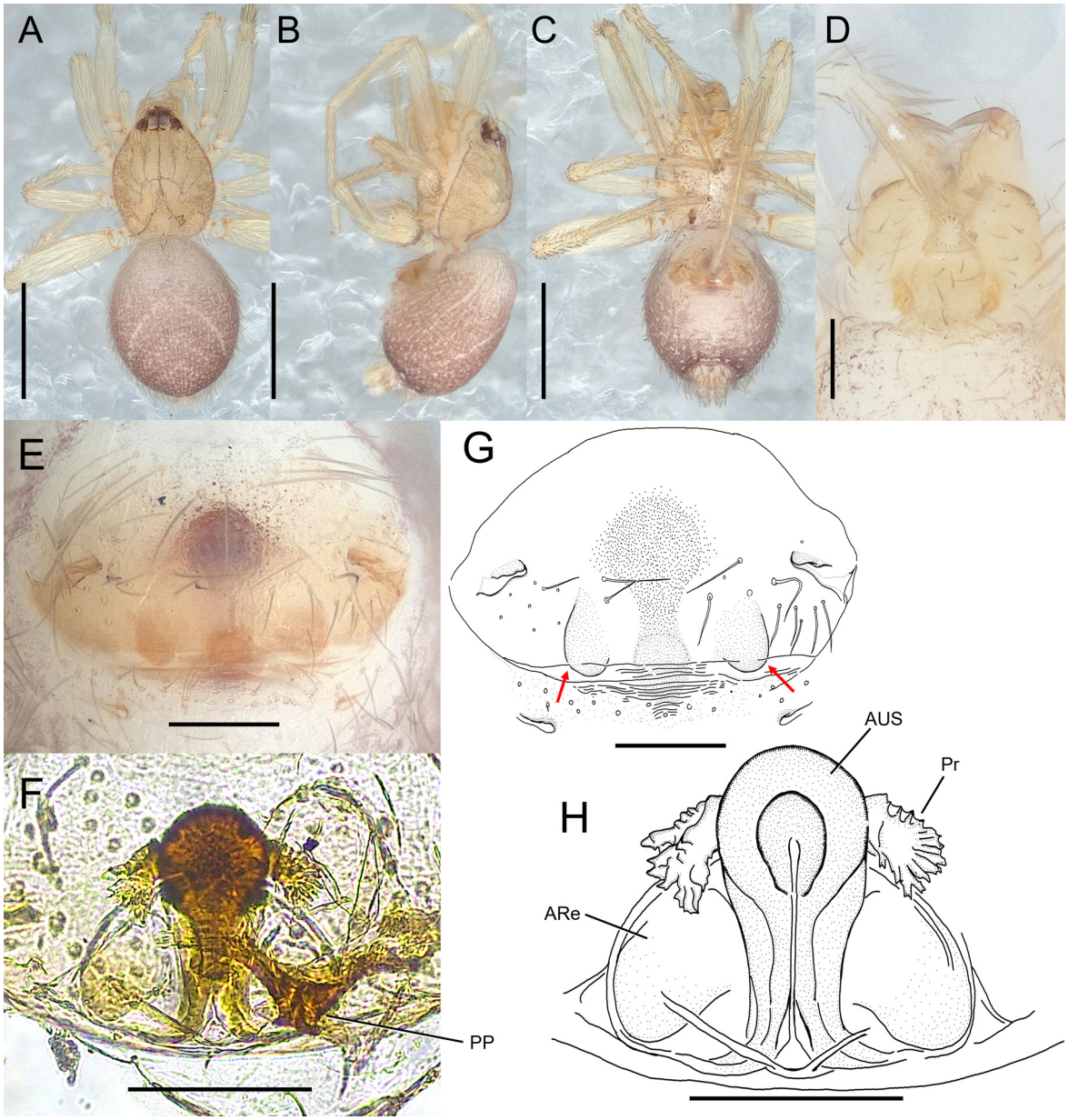

Fig. 3. *Orchestina okitsui* Oi, 1958, female (TKPM-AR 3422). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Endites and labium, ventral view. **E**, **G**. External genitalia, ventral view. **F**, **H**. Internal genitalia, dorsal view. Arrows in G indicate a pair of semicircular sclerotized plates on the posterior side of the genital area. Note that PP is omitted in H. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–H = 0.1 mm.

Table 2. Corrected correspondences between figures and captions in Yaginuma (1986: fig. 16).

Figure number	Original caption	Corrected caption
16 6p	*Segestria nipponica*	*Ariadna insulicola*
16 7p	*Orchestina sanguinea*	*Ariadna lateralis*
16 8p	*Orchestina okitsui*	*Segestria nipponica*
16 9p	*Gamasomorpha cataphracta*	"*Orchestina okitsui*" (Misidentification of *O. saltitans*)

Distribution

Japan: Hokkaido (uncertain record, detailed locality is unknown), Honshu (from north to southwest region), Shikoku and Kyushu (uncertain record, detailed locality is unknown) (Fig. 14).

Remarks

Both holotype and allotype of *O. okitsui* were seriously discolored and it was difficult to observe their detailed external morphologies, and the shapes of palp and endites of the male were barely visible (Fig. 2). As a result, it was revealed that the endites of *O. okitsui* bear a subapical triangular outgrowth and serrula (Fig. 2C, G), which were not described in the original description.

Although Yaginuma (1977) mentioned that *O. okitsui* is distributed in Hokkaido, Honshu and Shikoku, the information of voucher specimens was not provided. Furthermore, no *Orchestina* species including *O. okitsui* have been collected in Hokkaido since Yaginuma (1977) (M. Matsuda, personal communication). Considering that *O. okitsui* was confused with *O. saltitans* in Yaginuma (1986) (Fig. 8; Table 2; also see the remarks section of *O. saltitans* below), it is possible that the record of *O. okitsui* from Hokkaido is a misidentification of *O. saltitans*.

In Kyushu, two records of *O. okitsui* have been reported (Irie 2002; Shinkai & Tanikawa 2015). However, the specimen described by Shinkai & Tanikawa (2015) was reidentified as *O. saltitans* in this study. The specimen reported by Irie (2002) was not illustrated, and the voucher specimen could not be examined. Therefore, this record is regarded as uncertain.

Ecology

Orchestina okitsui inhabits litter layers and bushes in forests. In winter, adults of this species are found under tree barks. This species sometimes co-occurs with *O. sanguinea.*

DNA sequences

COI (431 bp): see Table 1.

Orchestina saaristoi Henrard & Jocqué, 2012

Figs 4–5, 14

Orchestina saaristoi Henrard & Jocqué, 2012: 88, figs 573–605 (descriptions of ♂♀ from palm plantation in Basoko, Bandundu, Congo).

Orchestina manicata – Saaristo & van Harten 2006: 148, figs 64–67 (♂♀). Misidentified.

New Japanese name

ウミベハネグモ (Umibe-hane-gumo).

Diagnosis

Males of *O. saaristoi* can be clearly distinguished from those of the allied species *O. manicata* Simon, 1893 from Sri Lanka by the shape of the endites: the outer margin is gently curved in *O. saaristoi* (Fig. 4E–F), whereas it is almost straight with an angular corner in *O. manicata* (Ranasinghe & Benjamin 2025: fig. 3d); and by the shape of the embolus: the retrolateral surface is gently curved in *O. saaristoi* (Fig. 4I, O) whereas it forms an angular ridge in *O. manicata* (Ranasinghe & Benjamin 2025: fig. 3d).

Females of *O. saaristoi* resemble those of *O. clavulata* Tong & Li, 2011 and *O. okitsui* in the shape of the internal genitalia, but can be distinguished by the following characteristics: presence of a transversely wide sclerotized region on the posterior part of the genital area beyond the epigastric furrow, forming a distinctive posterior edge (Fig. 5G, arrow); relatively slender and longer Pr situated more posteriorly to AUS; posterior region of AUS continuously wide; and dome-shaped ARe with a transverse band-like structure (Fig. 5F, H). By contrast, a distinctive posterior edge is absent in *O. clavulata* (Tong & Li 2011: fig. 7f), and a pair of semicircular sclerotized plates are present instead of the transversely wide sclerotized region in *O. okitsui* (Fig. 3E, G, arrows); Pr is relatively shorter and wider, situated more anteriorly to AUS in *O. clavulata* (Tong & Li 2011: fig. 7e), and entirely serrated in *O. okitsui* (Fig. 3F, H); the posterior region of AUS narrows posteriorly and ARe lacks a transverse band-like structure in *O. clavulata* and *O. okitsui* (Tong & Li 2011: fig. 7e; Fig. 3F, H).

Type material

Holotype (not examined)

DEMOCRATIC REPUBLIC OF THE CONGO • ♂; Bandundu, Basoko; Jul. 2009; D. De Bakker leg.; old palm plantation, 60 years old, canopy; BE_RMCA_ARA.Ara.235820.

Material examined

JAPAN – **Okayama Prefecture** • 1 ♂, 2 ♀♀; Tamano-shi, Numa; 13 Oct. 1995; K. Nojima leg.; TKPM-AR 3423. – **Tokushima Prefecture** • 1 ♂; Anan-shi, Tatsumi-cho; 2 May 2024; Y. Suzuki leg.; TKPM-AR 3424 • 1 ♀; same data as for preceding; TKPM-AR 3425. – **Kagoshima Prefecture** • 5 ♂♂; 1 ♀; Hioki-shi, Fukiagecho-nakahara, Fukiage-hama Beach; 28 Jul. 2022; Y. Suzuki leg.; TKPM-AR 3426. – **Okinawa Prefecture** • 2 ♂♂; Aka-jima Island, Shimajiri-gun; Zamami-son, Aka; 16 Mar. 2022; Y. Suzuki leg.; TKPM-AR 3427.

Description

Male (TKPM-AR 3424)

Coloration. In ethanol (Fig. 4A–D). Carapace pale yellowish brown with violet-brown net-like markings. Base of eyes black. Clypeus pale yellowish brow. Chelicerae pale yellowish brown. Endites and labium pale yellowish brown with darker margins. Sternum pale yellowish brown, stained with violet-brown spots. Legs pale yellowish brown, lacking annulations. Abdomen dorsally pale yellowish brown, with violet-brown pigmentation and pale inverted V-shaped marking; ventrally pale yellowish brown.

Measurements. Body length 1.02. Carapace length 0.53, width 0.40, height 0.25. Eye diameter: ALE 0.065, PME 0.055, PLE 0.048. Length of legs: I 0.46 + 0.14 + 0.50 + 0.46 + 0.21 = 1.77, II 0.45 + 0.14 + 0.47 + 0.42 + 0.18 = 1.66, III 0.31 + 0.12 + 0.30 + 0.25 + 0.17 = 1.15, IV 0.53 + 0.15 + 0.37 + 0.41 + 0.21 = 1.67. Abdomen length 0.49, width 0.47, height 0.42.

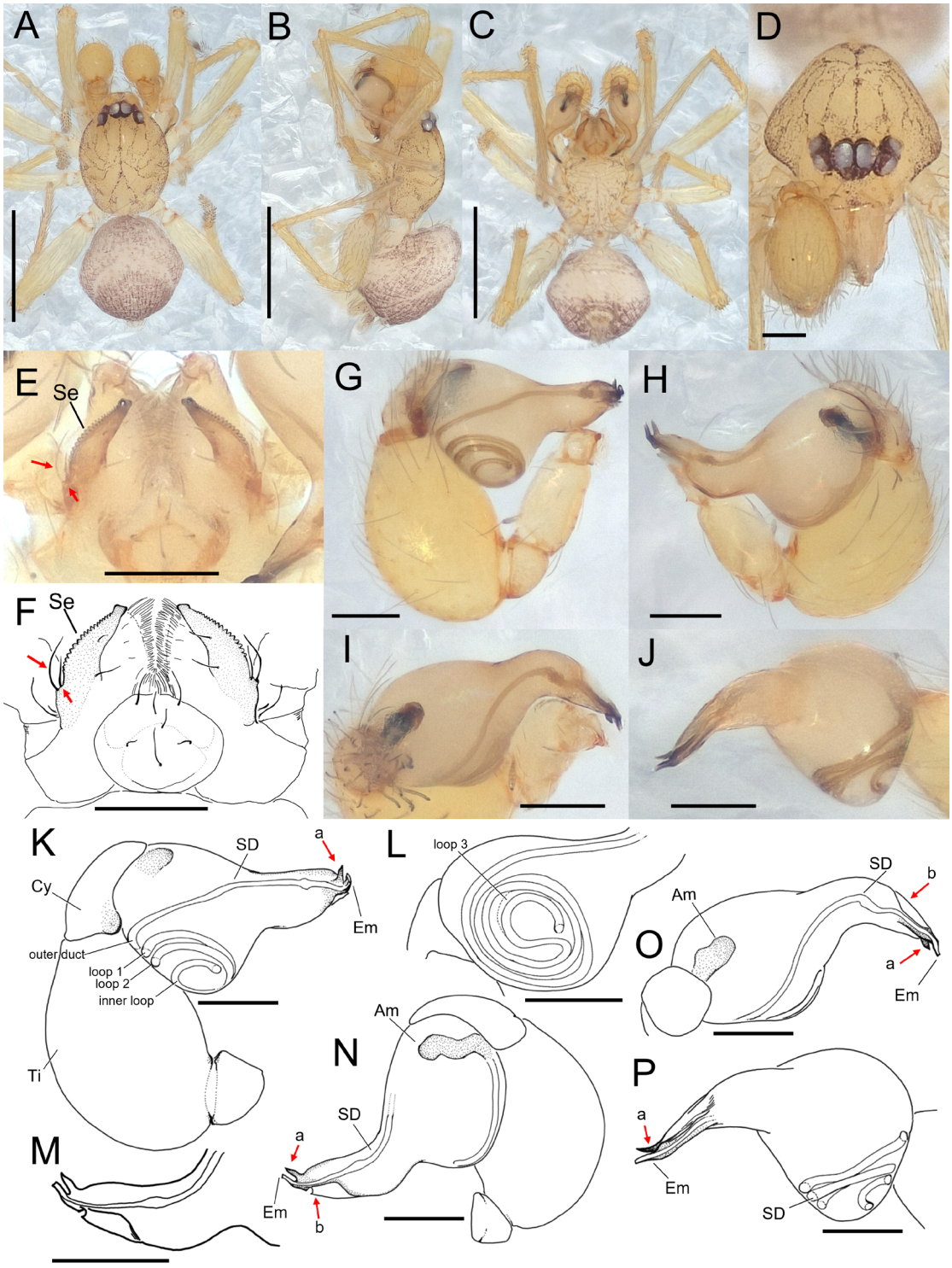

Fig. 4. *Orchestina saaristoi* Henrard & Jocqué, 2012, male (TKPM-AR 3424). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, frontal view. **E**–**F**. Endites and labium, ventral view. **G**–**K**, **N**–**P**. Left palp. **G**, **K**. Prolateral view. **H**, **N**. Retrolateral view. **I**, **O**. Dorsal view. **J**, **P**. Ventral view. **L**. Bulb, prolateral view. **M**. Embolus tip, retrolateral view. Arrows in E and F indicate two setae on the lateral margin of the endites. Arrow a and b in K, N–P indicate a small appendix and a membranous region, respectively. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–P = 0.1 mm.

Somatic morphology. Carapace longer than wide, length/width = 1.33. Endites longer than wide, modified, divided into outer sclerotized and inner soft regions. Retrolateral margin of outer region curved inwardly, narrowing apically, with serrula; basal part with two setae, outer seta about twice as long as inner one (Fig. 4E–F, arrows). Inner soft region with dense brush-like tuft. Abdomen as long as wide, length / width = 1.04.

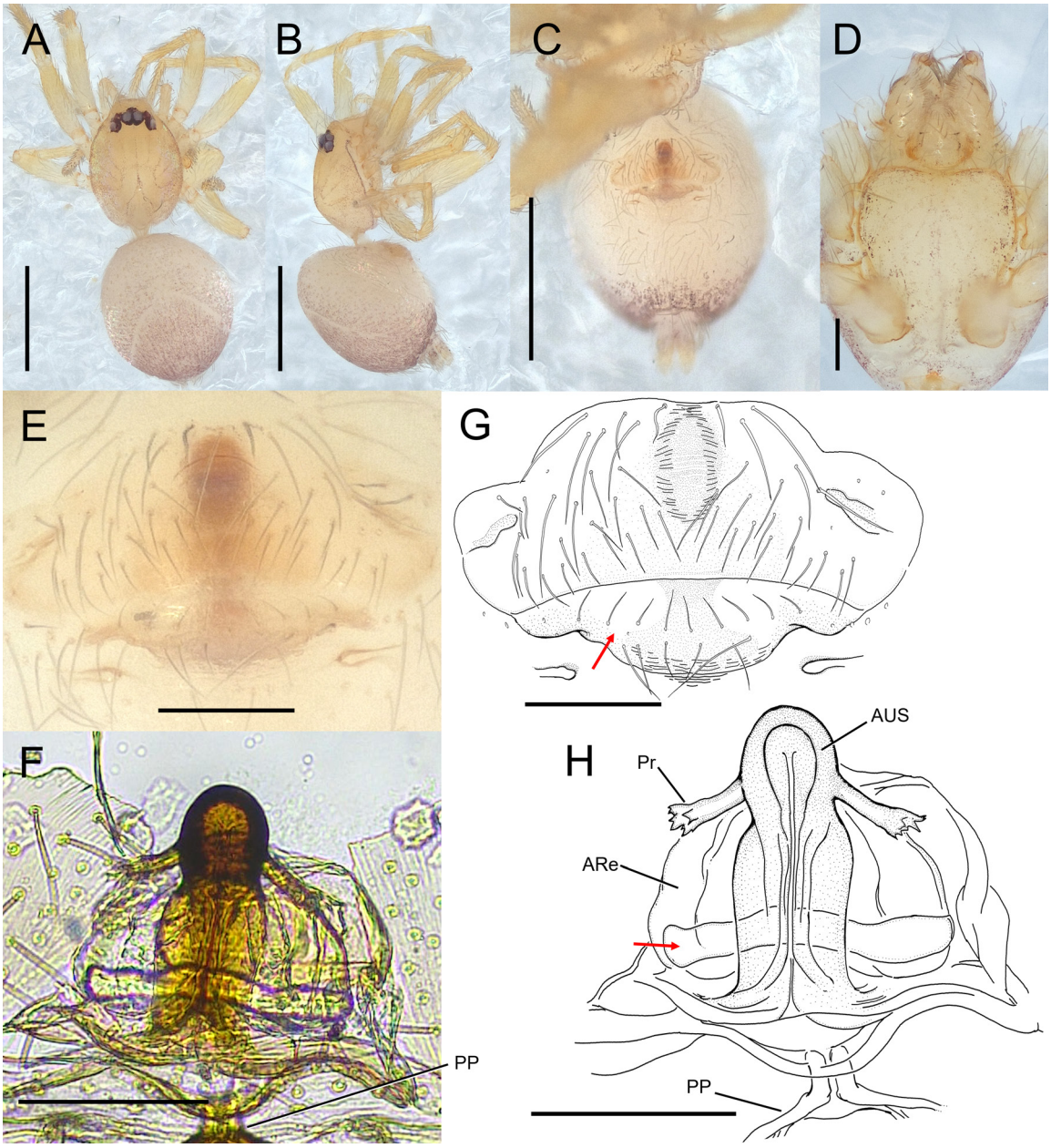

Fig. 5. *Orchestina saaristoi* Henrard & Jocqué, 2012, female (TKPM-AR 3425). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, ventral view. **E**, **G**. External genitalia, ventral view. **F**, **H**. Internal genitalia, dorsal view. Arrows in G and H indicate a transversely wide sclerotized region on the posterior part of the genital area and a transverse band-like structure, respectively. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–H = 0.1 mm.

Palp. Femur cylindrical. Patella small, triangular. Tibia elliptical, enlarged, length/width = 1.60, slightly wider than bulb, tibial width/bulb width = 1.10, attached subbasally to patella. Cymbium small, tapering apically. Bulb pear-shaped, length/width = 1.49, moderately concave at middle of posterior margin. Seminal ducts dark-colored, long; four circular loops visible in prolateral view, but third loop ("loop 3") overlapped by other loops and less conspicuous (Fig. 4L). Four ducts visible in posterior view. Ampulla visible as dark-colored winding marking in retrolateral view (Fig. 4H, N). Embolic region short with wide basal portion, directed inwardly in dorsal view; bifurcated into two parts: thin embolus and sharp appendix (Fig. 4K, M–P, arrow a). Posterior margin of embolic tip bearing membranous part (Fig. 4N–P, arrow b).

Female (TKMP-AR 3425)

Coloration. As in male.

Measurements. Body length 1.40. Carapace length 0.61, width 0.45, height 0.27. Eye diameter: ALE 0.059, PME 0.046, PLE 0.045. Length of legs: I 0.38 + 0.12 + 0.33 + 0.37 + 0.13 = 1.33, II 0.40 + 0.11 + 0.36 + 0.40 + 0.15 = 1.42, III 0.30 + 0.11 + 0.19 + 0.23 + 0.16 = 0.99, IV 0.45 + 0.10 + 0.26 + 0.29 + 0.16 = 1.26. Abdomen length 0.71, width 0.62, height 0.61.

Somatic morphology. Carapace oval, longer than wide, length/width = 1.36. Endites pentagonal, elongate, bearing blackish serrula with fine serration on anterolateral margin (Fig. 5D). Abdomen oval, longer than wide, length/width = 1.15.

Genitalia. External genitalia (Fig. 5E, G). AUS visible as dark-brown, oval marking on anteromesial region of genital area. Posterior region beyond epigastric furrow sclerotized, forming distinctive posterior edge (Fig. 5G, arrow). Internal genitalia (Fig. 5F, H). AUS oval; posterior portion continuously wide. Pr short, directed posterolaterally; distal end serrated. ARe developed, dome-shaped, with transverse, band-shaped structure on posterior region. Dc absent.

Distribution

Nigeria, Congo, Yemen, Japan: western Honshu, Shikoku, southern Kyushu and the Nansei Islands (Fig. 14).

Ecology

In Japan, this species inhabits grasslands in coastal zones and estuaries.

Orchestina saltitans Banks, 1894
Figs 6–9B, 14

Orchestina saltitans Banks, 1894: 300 (description of ♀ from the United States, New York, Sea Cliff).
Orchestina flagella – Saaristo & van Harten, 2006: 145, figs 52, 53a–b, 54 (descriptions of ♂♀ from Yemen). **Syn. nov.**

Orchestina saltitans – Emerton 1909: 214, pl. 1 fig. 4 (description of ♂). — Dalmas 1916: 239, figs 24–25, 35–36 (♂). — Petrunkevitch 1920: 158, pl. 9 figs 1–9 (♂); Kaston 1938: 12 (♀). — Comstock 1940: 311, fig. 290 (♂). — Izquierdo & Ramírez 2017: 33, figs 12a–g, 16g–i, 18e, 19e, 20l–m, 22a (♂♀).
Gamasomorpha cataphracta – Yaginuma 1986: 28, fig. 16.9 (♂). Miscaptioned and misidentified.
Orchestina saltabunda – Petrunkevitch 1910: 207, pl. 21 figs 2–3 (♂). Misidentified.
Orchestina flagella – Saaristo & Marusik 2009: 72, figs 31–32 (♂).
Orchestina okitsui – Shinkai & Tanikawa 2015: 11 (♂). — Hiramatsu & Shimada 2020: 135 (♂). — Watanabe 2021: 2, 9, 26, fig. 6 (♂). — Suzuki 2024: 86, figs 1–3 (♂). All misidentified.

New Japanese name

イエハネグモ **(**Ie-hane-gumo).

Diagnosis

Males of *O. saltitans* resemble those of *O. obscura* Chamberlin & Ivie, 1942 and *O. utahana* Chamberlin & Ivie, 1935 in somatic coloration, markings, and the general appearance of the palp, but can be readily distinguished by the absence of a conical projection on the promargin of the chelicerae (Fig. 6D), which is present in *O. obscura* and *O. utahana* (Izquierdo & Ramírez 2017: fig. 5b), and by the long embolus (Fig. 6H, K), which is comparatively shorter in *O. obscura* and *O. utahana* (Izquierdo & Ramírez 2017: fig. 15a–c, g–i).

Females of *O. saltitans* resemble those of *O. microfoliata* Henrard & Jocqué, 2012 in having a long and slender AUS as well as lacking external pockets and Dc, but can be distinguished by the following characteristics: relatively more anterior position of the Pr and the narrower anterior and posterior ends of the AUS in *O. saltitans* (Fig. 7F, H), whereas in *O. microfoliata*, the Pr is situated more posteriorly and the AUS remains nearly constant in width (Henrard & Jocqué 2012: figs 519–521).

Type material

Holotype (not examined)

UNITED STATES OF AMERICA • ♀; New York, Sea Cliff; Jul. 1894; MCZ 22976, PBI_OON 42750.

Material examined

JAPAN – **Aomori Prefecture** • 1 ♀; Hirosaki-shi, Bunkyo-cho, Hirosaki University; 29 Oct. 2025; S. Mishima, K. Narita and M. Nakayama leg.; SMPC-1143. – **Saitama Prefecture** • 1 ♂; Yashio-shi, Yashio; 17 Nov. 2025; N. Hidaka leg.; RHPC-1419. – **Chiba Prefecture** • 1 ♂; Ichikawa-shi, Minamiono; 23 Oct. 2022; R. Serita leg.; TKPM-AR 3567. – **Kanagawa Prefecture** • 1 ♂; Sagamihara-shi, Minami-ku, Nishionuma; 18 Aug. 2000; S. Okawa leg.; TKPM-AR 3428 • 1 ♂; same locality as for preceding; 25 Aug. 2000; S. Okawa leg.; TKPM-AR 3429. – **Ibaraki Prefecture** • 1 ♂; Tsukuba-shi, Tennodai; date unknown; Y. Suzuki leg.; YSPC-Op-2. – **Okayama Prefecture** • 1 ♂; Kasaoka-shi, Kasaoka; 5 May 2024; K. Nojima leg.; TKPM-AR 3430 • 1 ♀; same data as for preceding; TKPM-AR 3431 • 2 ♂♂, 6 ♀♀; same data as for preceding; TKPM-AR 3432. – **Tottori Prefecture** • 1 ♀; Tottori-shi, Yoshikata; 10 Apr. 2025; Y. Obae leg.; TKPM-AR 3433.

Material previously misidentified as *Orchestina okitsui*

JAPAN – **Akita Prefecture** • 1 ♂; Akita-shi; 15 Oct. 2008; A. Fukushima leg.; NSMT-Ar 21320 • 1 juvenile; same locality as for preceding; 21 Jun. 2004; A. Fukushima leg.; NSMT-Ar 21330 • 1 ♂; same locality as for preceding; 1 Sep. 2008; A. Fukushima leg.; NSMT-Ar 21331 • 1 ♂; Akita-shi, Yokomori; 8 Aug. 1998; A. Fukushima leg.; NSMT-Ar 25022 • 1 ♂; same locality as for preceding; 1 Nov. 1999; A. Fukushima leg.; NSMT-Ar 25023 • 1 ♂; same locality as for preceding; 14 Sep. 2003; A. Fukushima leg.; NSMT-Ar 25024 • 1 ♂; same locality as for preceding; 4 Sep. 2000; A. Fukushima leg.; NSMT-Ar 25025 • 1 juvenile; Akita-shi, Kamikitatesaruta, Ushiroyachi; 22 Jun. 2003; A. Fukushima leg.; NSMT-Ar 25039 • 1 ♂; Akita-shi, Sannai, Ichioji; 2 May 2004; A. Fukushima leg.; NSMT-Ar 25050. – **Chiba Prefecture** • 1 ♂; Kashiwa-shi, Nedo; 25 Sep. 1999; H. Ono leg.; NSMT-Ar 5851. – **Kanagawa Prefecture** • 1 ♂, 1 ♀; Sagamihara-shi; 31 Aug. 2001; H. Okawa leg.; NSMT-Ar 12204 • 1 ♀; Sagamihara-shi, Nishioonuma; 23 Jun. 1999; H. Ono leg.; NSMT-Ar 11229. – **Saitama Prefecture** • 1 ♂; Hannou-shi, Iwasawa; 7 Nov. 2019; J. Shimada leg.; JSPC-31-25. – **Nagano Prefecture** • 1 ♂; Iida-shi, Tatsue, Ikenotaira; 15 Sep. 2016; K. Kumada leg.; NSMT-Ar 16082. – **Tokushima Prefecture** • 1 ♂; Tokushima-shi, Hachiman-cho, Mukouterayama, Tokushima Prefectural Museum; 23 Oct.–26 Nov. 2023; T. Ueji leg.; collected with a sticky trap; TKPM-AR 3184. – **Fukuoka Prefecture** • 1 ♂; Fukuoka-shi, Higashi-ku, Hakozaki; 13 Dec. 2014; T. Komatsu leg.; reported by Shinkai & Tanikawa (2015), identified with a photograph.

Description

Male (TKPM-AR 3430)

Coloration. In ethanol (Fig. 6A–D). Carapace yellowish brown with violet-brown net-like markings. Base of eyes dark violet-brown. Clypeus violet-brown. Chelicerae, endites, labium and sternum pale, stained with violet-brown spots. Legs pale yellowish brown, without annulations. Abdomen dorsally pale yellowish brown, with dark violet-brown pigmentation and pale inverted V-shaped marking; ventrally

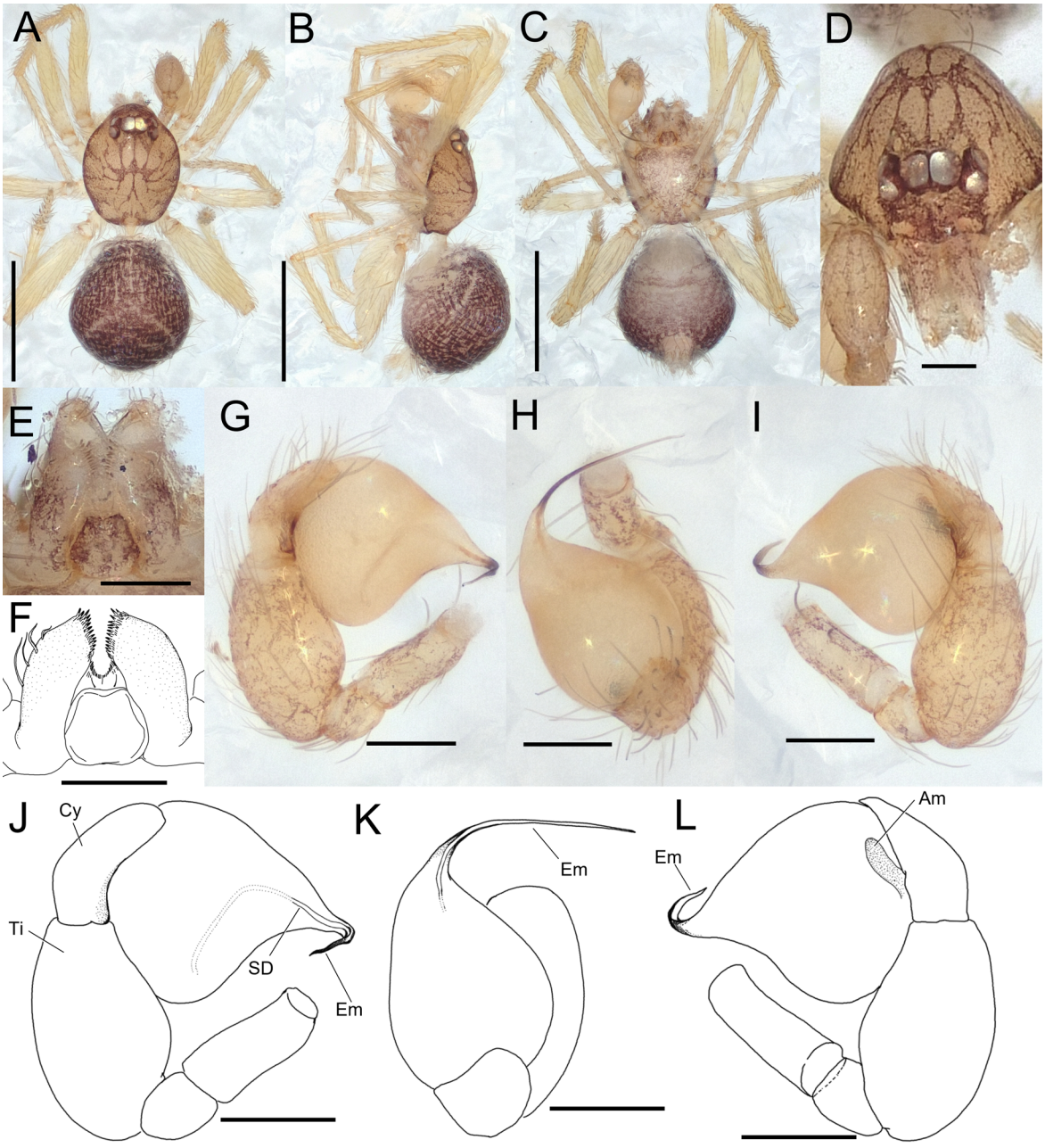

Fig. 6. *Orchestina saltitans* Banks, 1894, male (TKPM-AR 3430). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, frontal view. **E**–**F**. Endites and labium, ventral view. **G**–**L**. Left palp. **G**, **J**. Prolateral view. **H**, **K**. Dorsal view. **I**, **L**. Retrolateral view. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–L = 0.1 mm.

pale. Live specimen (Fig. 9B). Carapace yellowish brown, net-like marking clearly visible. Legs pale yellowish brown, abdomen dark violet-brown.

Measurements. Body length 1.10. Carapace length 0.50, width 0.40, height 0.22. Eye diameter: ALE 0.068, PME 0048, PLE 0.048. Length of legs: I 0.47 + 0.15 + 0.46 + 0.40 + 0.21 = 1.69, II 0.42 + 0.14 + 0.43 + 0.29 + 0.16 = 1.44, III 0.35 + 0.12 + 0.26 + 0.26 + 0.15 = 1.14, IV 0.52 + 0.16 + 0.35 + 0.41 + 0.17 = 1.61. Abdomen length 0.54, width 051, height 0.44.

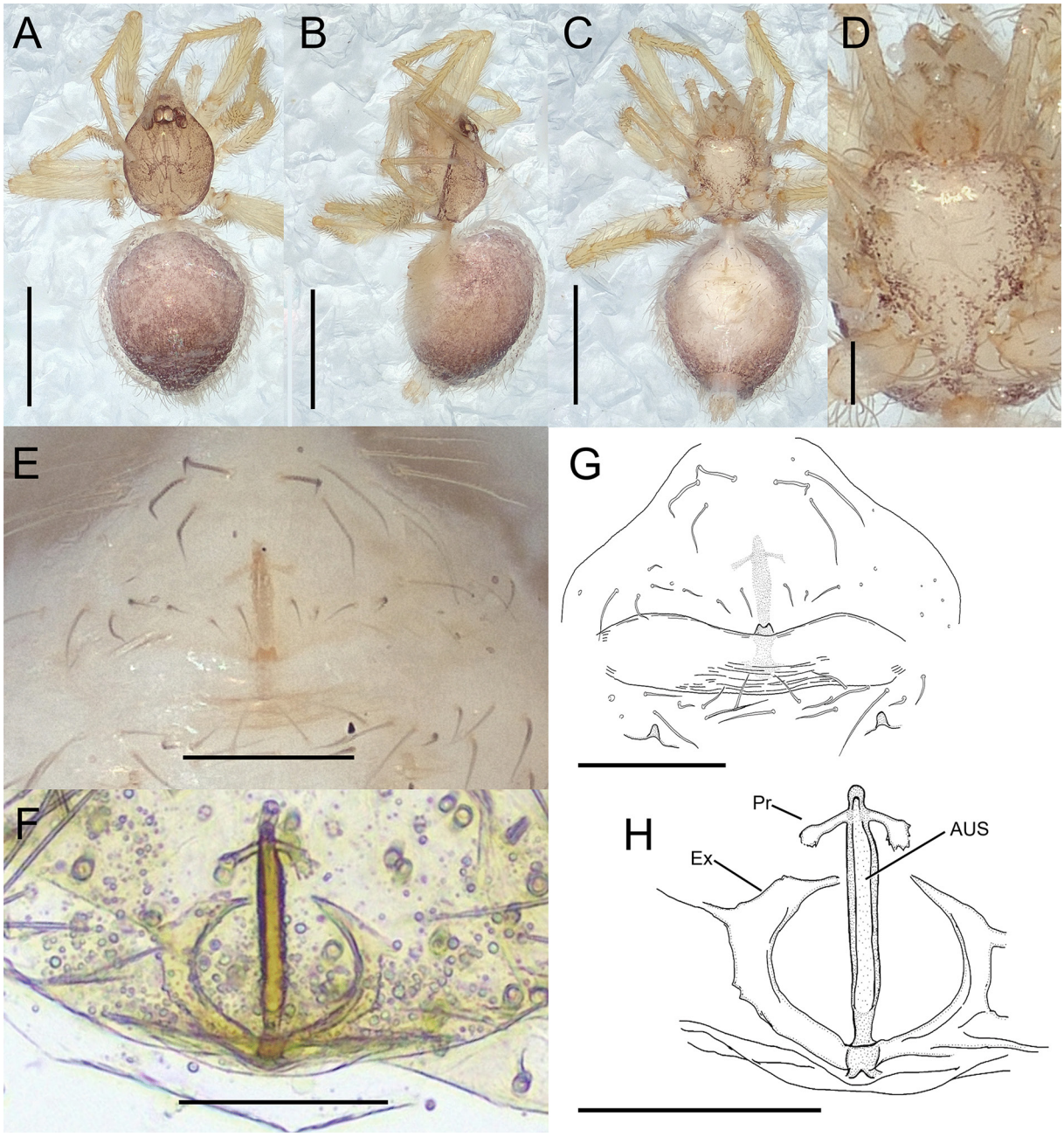

Fig. 7. *Orchestina saltitans* Banks, 1894, female (TKPM-AR 3431). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, ventral view. **E**, **G**. External genitalia, ventral view. **F**, **H**. Internal genitalia, dorsal view. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–H = 0.1 mm.

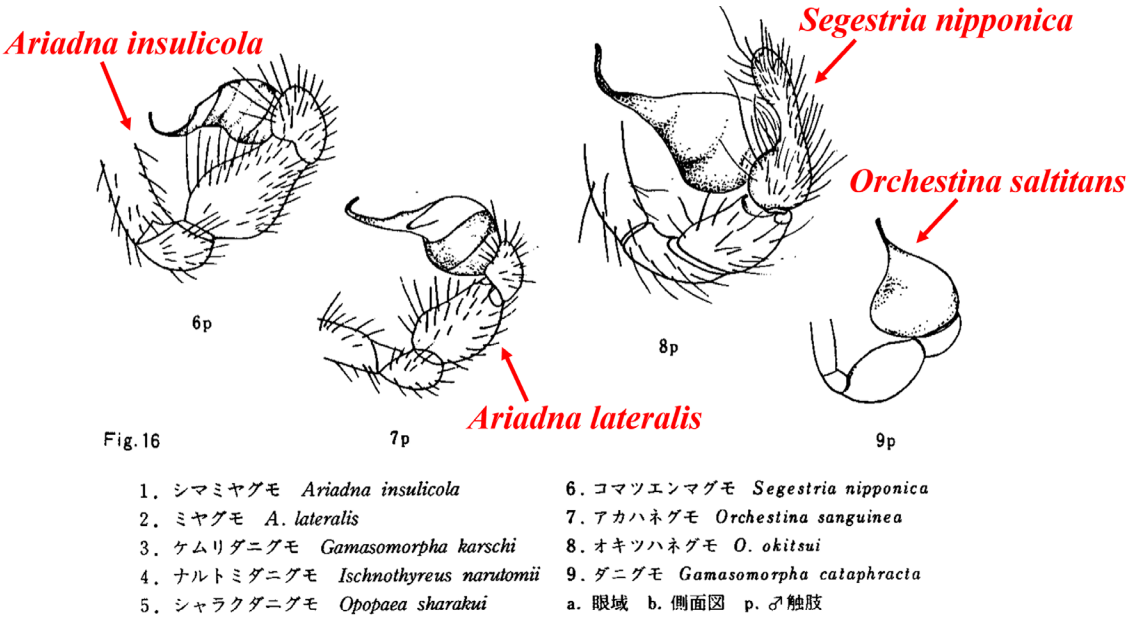

Fig. 8. Figure 16.6–9p in Yaginuma (1986: 27), with associated caption, and the corrected names indicated as red letters with arrows. **6p**. Corrected name: *Ariadna insulicola* Yaginuma, 1967; original: *Segestria nipponica* Kishida, 1913. **7p**. Corrected name: *Ariadna lateralis* Karsch, 1881; original: *Orchestina sanguinea* Oi, 1955. **8p**. Corrected name: *Segestria nipponica* Kishida, 1913; original: *Orchestina okitsui* Oi, 1958. **9p**. Corrected name: *Orchestina saltitans* Banks, 1894 (misidentified as *O. okitsui* Oi, 1958); original: *Gamasomorpha cataphracta* Karsch, 1881. See also Table 2.

Fig. 9. Live specimens of species of *Orchestina* Simon, 1882. **A**. *Orchestina okitsui* Oi, 1958, male (YSPC-Op-1). **B**. *Orchestina saltitans* Banks, 1894, male (YSPC-Op-2).

Somatic morphology. Carapace longer than wide, length/width = 1.25. Chelicerae longer than wide, without apophyses. Endites longer than wide, rounded, bearing row of brush-like hairs on anterior margin (Fig. 6E–F). Abdomen globular, as long as wide, length/width = 1.06.

Palp. Femur cylindrical. Patella small, oval. Tibia elliptical, enlarged, length/width = 1.77, attached basally to patella. Cymbium rounded. Bulb globular, conspicuously enlarged, length/width = 1.24, wider than tibia, bulb width/tibial width = 1.57, tapering toward embolic part. Embolus bristle-like, long, curved, directed prolaterally in dorsal view in left palp (Fig. 6H, K). Ampulla visible as dark-colored thumb-shaped marking in retrolateral view. Seminal duct thin, with simple trajectory, inconspicuous in most part (Fig. 6G, J).

Female (TKPM-AR 3431)

Coloration. As in male.

Measurements. Body length 1.26. Carapace length 0.50, width 0.38, height 0.18. Eye diameter: ALE 0.061, PME 0.051, PLE 0.045. Length of legs: I 0.44 + 0.13 + 0.33 + 0.31 + 0.14 = 1.35, II 0.37 + 0.11 + 0.29 + 0.28 + 0.14 = 1.19, III 0.31 + 0.11 + 0.24 + 0.19 + 0.13 = 0.98, IV 0.48 + 0.13 + 0.28 + 0.38 + 0.17 = 1.44. Abdomen length 0.68, width 0.62, height 0.55.

Somatic morphology. Carapace oval, longer than wide, length/width = 1.32. Endites unmodified, rounded, longer than wide, bearing row of brush-like hairs on anterior margins. Abdomen oval, slightly longer than wide, length/width = 1.1.

Genitalia. External genitalia (Fig. 7E, G). AUS visible as thin, dark, longitudinal line; posterior end darkly pigmented and sclerotized. Posterior part of genitalia membranous, appearing as glossy transverse area. Internal genitalia (Fig. 7F, H). AUS long, thin, tubular, with narrower anterior and posterior terminals. Pr short, thin with wide terminals, situated anterior part of AUS. Ex crescent-shaped.

Distribution

USA, Yemen, Japan: Honshu, Shikoku and Kyushu (presumably introduced; Fig. 14).

Remarks

Although Izquierdo & Ramírez (2017) stated that the holotype of *O. saltitans* is a male, the original description indicates that it is female (Banks 1894).

It should be noted that the figure of the male palp of "*O. okitsui*" (actually a misidentification of *O. saltitans*) in Yaginuma (1986) was incorrectly labeled as *Gamasomorpha cataphracta* Karsch, 1881 (Araneae: Oonopidae) (Fig. 8; Table 2; Yaginuma 1986: fig. 16.9p). Some records of *O. okitsui* from Japan (Shinkai & Tanikawa 2015; Hiramatsu & Shimada 2020; Watanabe 2021; Suzuki 2024), probably identified following Yaginuma (1986), are shown to be misidentifications of *O. saltitans* based on examination of voucher specimens.

Based on their consistent genital morphologies, *O. flagella* Saaristo & van Harten, 2006 is herein regarded as a junior synonym of *O. saltitans* (=*O. flagella* syn. nov.) (Figs 6–7 vs Saaristo & van Harten 2006: figs 53–54).

Ecology

Orchestina saltitans is a synanthropic species, inhabiting indoor environments.

DNA sequences

COI (431 bp): see Table 1.

Orchestina colubrina Liu, Henrard & Xu, 2019
Figs 10, 14

Orchestina colubrina Liu, Henrard & Xu in Liu *et al.*, 2019: 246, figs 10a–h, 11a–f (description of ♀ from Jiangxi Province, China).

Orchestina colubrina – Song *et al.* 2024: 258, figs 2a–f, 3a–i, 7e–f (♀, description of ♂).

New Japanese name

アゴトゲハネグモ (Agotoge-hane-gumo).

Diagnosis

Males of *O. colubrina* closely resemble those of *O. multipunctata* Liu, Xiao & Xu, 2016 in having a strongly swollen palpal tibia, a thin embolus, endites with a spine-like anterior extension, six long setae on the anterior margin of chelicerae and similar modified setae on the labium. However, they can be distinguished by the triangle-shaped bulb in *O. colubrina* (Fig. 10G–H, J–K), whereas drop-shaped in *O. multipunctata* (Liu *et al.* 2016: fig. 8h–i, 10d–e), labium bearing five twisted, leaf-shaped setae in *O. colubrina* (Fig. 10D–E), whereas in *O. multipunctata,* labium bears four flattened, leaf-shaped setae, and one small flattened seta (Liu *et al.* 2016: fig. 10b).

Type material

Holotype (not examined)
CHINA • ♀; Jiangxi Province, Ji'an City, Jinggangshan County Level City, Ciping Town, Xingzhou Village; 3 Oct. 2015; K. Liu *et al.* leg.; ASM-JGSU OON75.

Paratype (not examined)
CHINA • 1 ♀; same data as for holotype; ASM-JGSU OON76.

Material examined

JAPAN – **Okinawa Prefecture** • 1 ♂; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Iriomote, Hoshidate; 28 Mar. 1988; A. Tanikawa leg.; TKPM-AR 3506.

Description

Male (TKPM-AR 3506)

Coloration. In ethanol (Fig. 10A–C). Carapace pale yellowish brown, covered with dark brown net-like markings, margins darker. Base of eyes black. Chelicerae, endites and labium pale yellowish brown. Legs pale yellowish white, without annulations. Sternum pale yellowish brown with dark brown spots. Abdomen pale yellowish white with dark brown stains, bearing inverted V-shaped pale marking on dorsum.

Measurements. Body length 1.21. Carapace length 0.54, width 0.46, height 1.98. Eye diameter: ALE 0.048, PME 0.059, PLE 0.044. Abdomen length 0.63, width 0.47, height 0.45.

Somatic morphology. Carapace oval, longer than wide, length/width = 1.17. Endites longer than wide, bearing spine-like extension on anterior margin (Fig. 10D–E, arrows). Labium longer than wide, with two lateral conical extension on anterior margin and five twisted, leaf-shaped macroseta on ventral surface (Fig. 10D–E). Abdomen oval, longer than wide, length/width = 1.34.

Palp. Femur cylindrical. Patella small, rounded. Tibia enlarged, length/width = 1.38, wider than bulb, tibial width/bulb width = 1.36, attached subbasally to patella. Cymbium small, rounded. Bulb triangular.

Seminal duct thin, largely inconspicuous. Ampulla appearing as finger-shaped marking in retrolateral view (Fig. 10J). Embolus thin, moderately long, slightly curved, directed prolaterally in dorsal view in left palp (Fig. 10F, I).

For further details, see Liu *et al.* (2019).

Distribution

China, Japan: Iriomote-jima Island (Fig. 14).

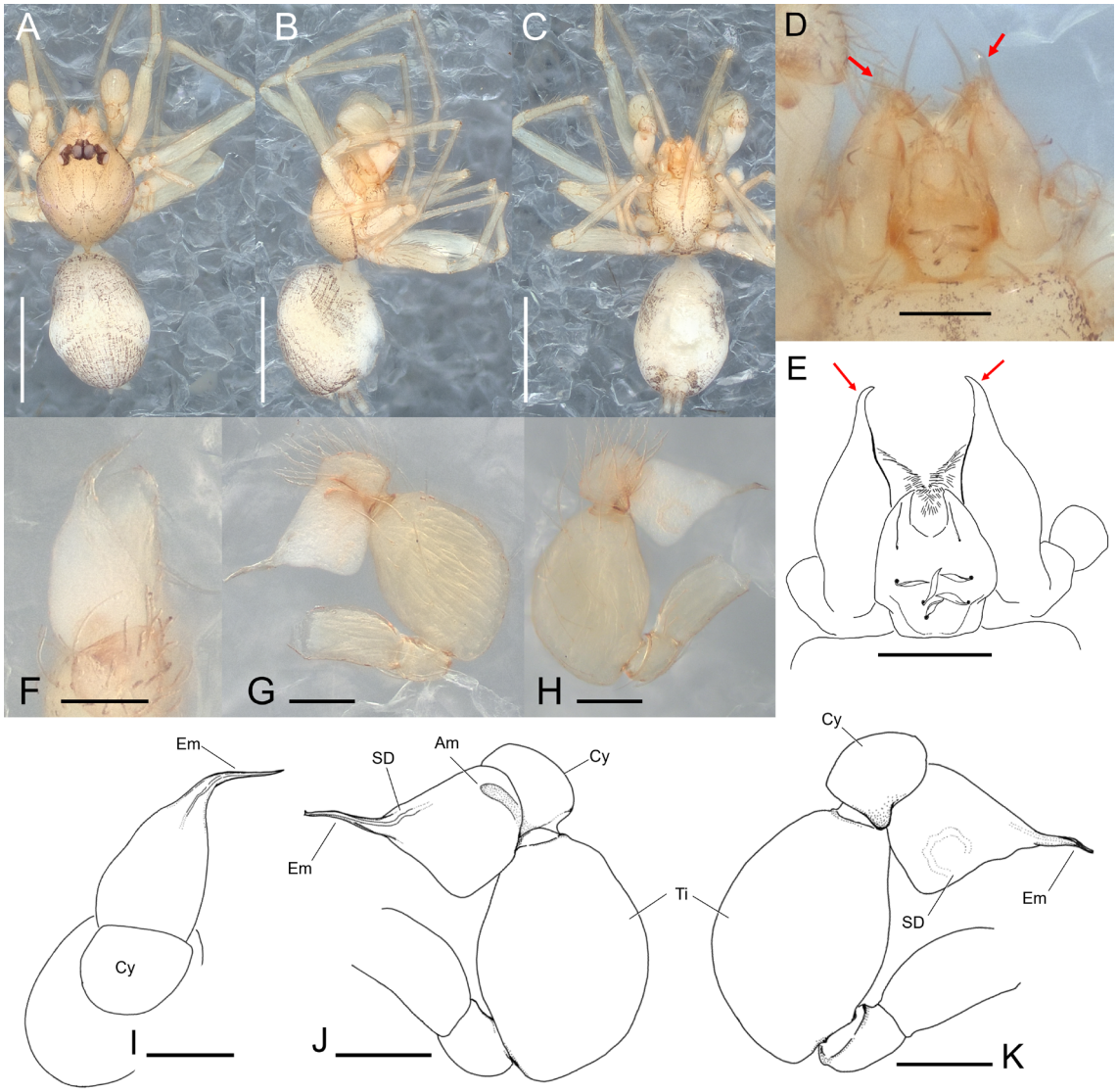

Fig. 10. *Orchestina colubrina* Liu, Henrard & Xu, 2019, male (TKPM-AR 3506). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**–**E**. Endites and labium, ventral view. **F**–**K**. Left palp. **F**, **I**. Dorsal view. **G**, **J**. Retrolateral view. **H**, **K**. Prolateral view. Arrows in D–E indicate spine-like extensions. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–K = 0.1 mm.

Remarks

Liu *et al.* (2016) stated that three pairs of dark spots on the posteroventral region of the abdomen are unique to *O. multipunctata* (Liu *et al.* 2016: fig. 10c) and distinguish it from other species including *O. colubrina*. However, these spots appear to represent internal pigmentation, probably corresponding to parts of internal organs visible through the semi-transparent exoskeleton. Therefore, it remains unclear whether these spots constitute stable diagnostic characters for species delimitation.

Orchestina pavesii (Simon, 1873)

Figs 11–12, 14

Schoenobates pavesii Simon, 1873: 45, pl. 1 figs 29–31 (description of ♂♀ from Corsica, France).

Orchestina pavesii – Simon 1882: 237; 1893: 291, figs 251–253, 259, 265 (♂). — Dalmas 1916: 222, figs 7–8, 10, 15 (♂♀). — Brignoli 1967a: 146, fig. 4 (♂); 1967b: 363, figs 10–11, 18–37 (♂♀). — Melic 1994: 114, figs 9–11 (♂♀). — Pekár & Gajdoš 2001: 51, figs 1–4 (♂♀). — Saaristo 2001: 355, fig. 183b (♂); 2007: 125, figs 17, 19 (♂♀); 2010: 147, fig. 183b (♂). — Saaristo & Marusik 2004: 52, figs 10–15 (♂♀). — Lazarov 2005: 147, figs 2–3 (♂). — Saaristo & van Harten 2006: 152, figs 72–73 (♂♀). — Le Peru 2011: 306, fig. 532 (♂♀).

New Japanese name

チチュウカイハネグモ (Chichûkai-hane-gumo).

Diagnosis

Both sexes of *Orchestina pavesii* closely resemble those of *O. pavesiiformis* Saaristo, 2007, but can be differentiated by somatic coloration and markings: in *O. pavesii*, the body is pale yellowish white to nearly white and lacks conspicuous markings on the dorsal abdomen (Figs 11A–C, 12A–C), whereas in *O. pavesiiformis*, the body is yellowish brown with pale inverted V-shaped marking on the dorsal abdomen (Izquierdo & Ramirez 2017: fig. 11 vs Brescovit *et al.* 2019: figs 49–50). Males can be distinguished by a small, spatulate apophysis on the anterior margin of the endites in *O. pavesii* (Fig. 11D–E), which is slender and less conspicuous in *O. pavesiiformis* (Saaristo 2007: fig. 20); and by the embolus, whose two apical extensions are markedly shorter in *O. pavesii* than in *O. pavesiiformis* (Saaristo 2007: figs 19 vs 18). Females can be differentiated by the shape of the external pockets: in *O. pavesii*, the lateral regions of the pockets form shallow, laterally directed invaginations (Fig. 12E–F), whereas in *O. pavesiiformis*, the anterolateral regions of the pockets form anteriorly directed invaginations (Izquierdo & Ramirez 2017: fig. 19g; Brescovit *et al.* 2019: fig. 52). They can also be distinguished by the apodeme: in *O. pavesii*, a small T-shaped apodeme is visible beyond the external pockets (Fig. 12E, arrow), whereas in *O. pavesiiformis*, a conspicuous, large V-shaped apodeme is present (Brescovit *et al.* 2019: fig. 52).

Type material

Syntypes (not examined)

FRANCE • ♂♀; Corsica; deposition uncertain but presumed to be in MNHN.

Material examined

JAPAN – **Saitama Prefecture** • 1 ♀; Yoshikawa-shi; 6 Sep. 2022; A. Kikuchi leg.; AKPC. – **Okayama Prefecture** • 1 ♂; Okayama-shi, Kita-ku, Toiya-cho; 10 Sep. 2021; K. Nojima leg.; TKPM-AR 3504. – **Fukuoka Prefecture** • 1 ♀; Itoshima-shi, Tomari; 6 Nov. 2024; S. Iwanaga leg.; TKPM-AR 3505.

Description

Male (TKPM-AR 3504)

Coloration. In ethanol (Fig. 11A–C). Body and legs entirely pale yellowish white, without conspicuous markings. Base of eyes black.

Measurements. Body length 0.95. Carapace length 0.51, width 0.34, height 0.21. Eye diameter: ALE 0.040, PME 0.059, PLE 0.043. Abdomen length 0.44, width 0.44, height 0.41.

Somatic morphology. Carapace longer than wide, length/width = 1.50. Endites longer than wide, bearing brush-like hairs on apical inner region and small spatulate apophysis on apical margin (Fig. 11D–E arrows). Labium rectangle with two lateral conical extensions on anterior margin (Fig. 11D–E). Abdomen as long as wide, length/width = 1.00.

Palp. Femur cylindrical. Patella rounded. Tibia inflated, length/width ratio = 1.33; as wide as the bulb, bulb width/tibial width = 1.02; attached basally to the cymbium. Cymbium longer than wide, rounded. Basal part of bulb globular, narrowing toward the embolic region. Seminal duct thin, mostly inconspicuous. Ampulla visible as an L-shaped dark marking in retrolateral view (Fig. 11F–H). Embolic

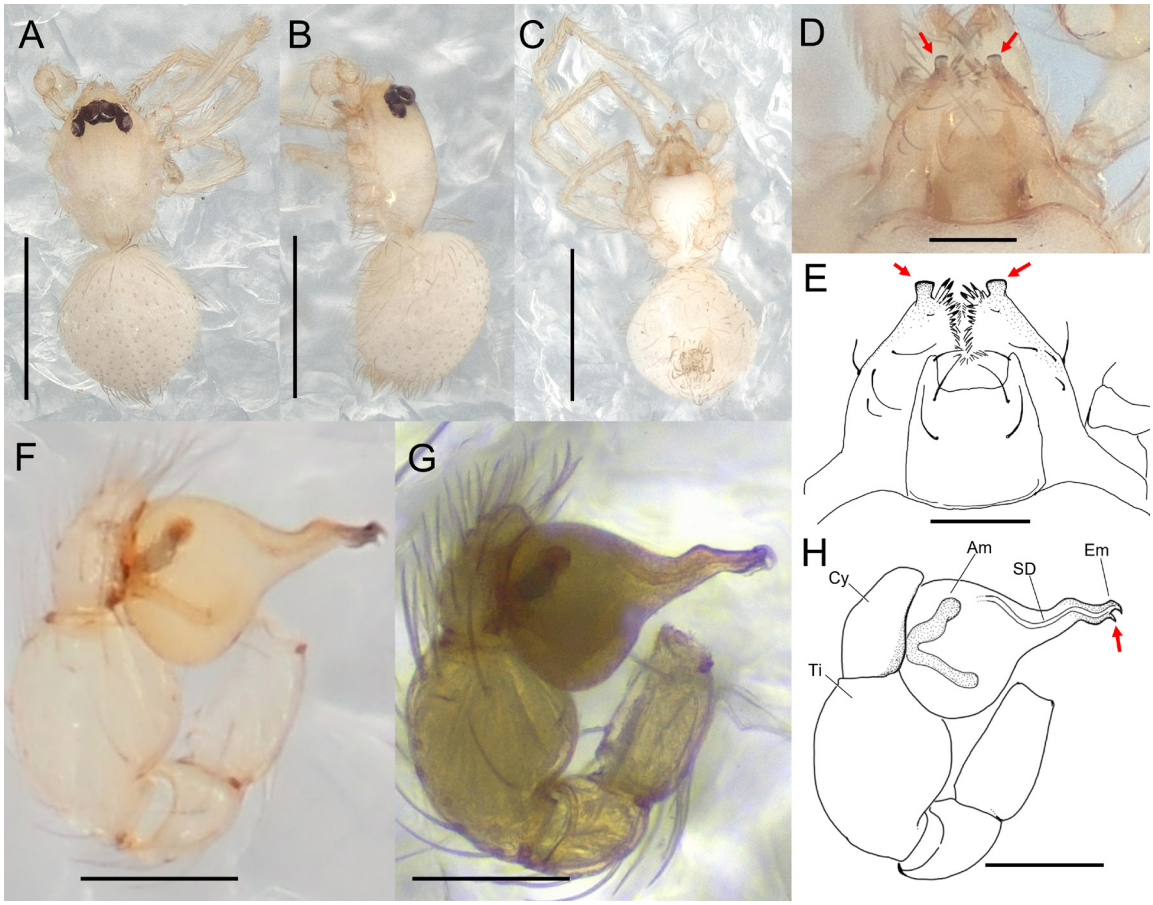

Fig. 11. *Orchestina pavesii* (Simon, 1873), male (TKPM-AR 3504). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**–**E**. Endites and labium, ventral view. **F**–**H**. Right palp, retrolateral view. Arrows in D–E and H indicate spatulate apophyses and a small appendix, respectively. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–H = 0.1 mm.

region winding, with the tip modified into two parts: a sharp, curved embolic tip and a small, pointed ventral apophysis at the posterior end (Fig. 11H, arrow).

Female (TKPM-AR 3505)

Coloration. As in male (Fig. 12A–C).

Measurements. Body length 1.40. Carapace length 0.57, width 0.43, height 0.18. Abdomen length 0.82, width 0.62, height 0.60.

Somatic morphology. Carapace longer than wide, length/width = 1.33. Endites and labium unmodified, rounded (Fig. 12D). Abdomen longer than wide, length/width = 1.32.

Genitalia. External genitalia (Fig. 12E–F). Genital area wider than long. External genital pockets transversely wide and largely fused, forming single pocket with shallow, laterally directed invaginations. AUS visible as reddish-brown marking in middle region of genitalia. Apodeme present as small, T-shaped marking beyond external pockets.

For further details, see Brignoli (1967b), Saaristo (2007) and Saaristo & Marusik (2004).

Distribution

Canary Is., Southwest Europe to Greece, Bulgaria, Algeria, Egypt, Yemen, Japan (probably introduced; Fig. 14).

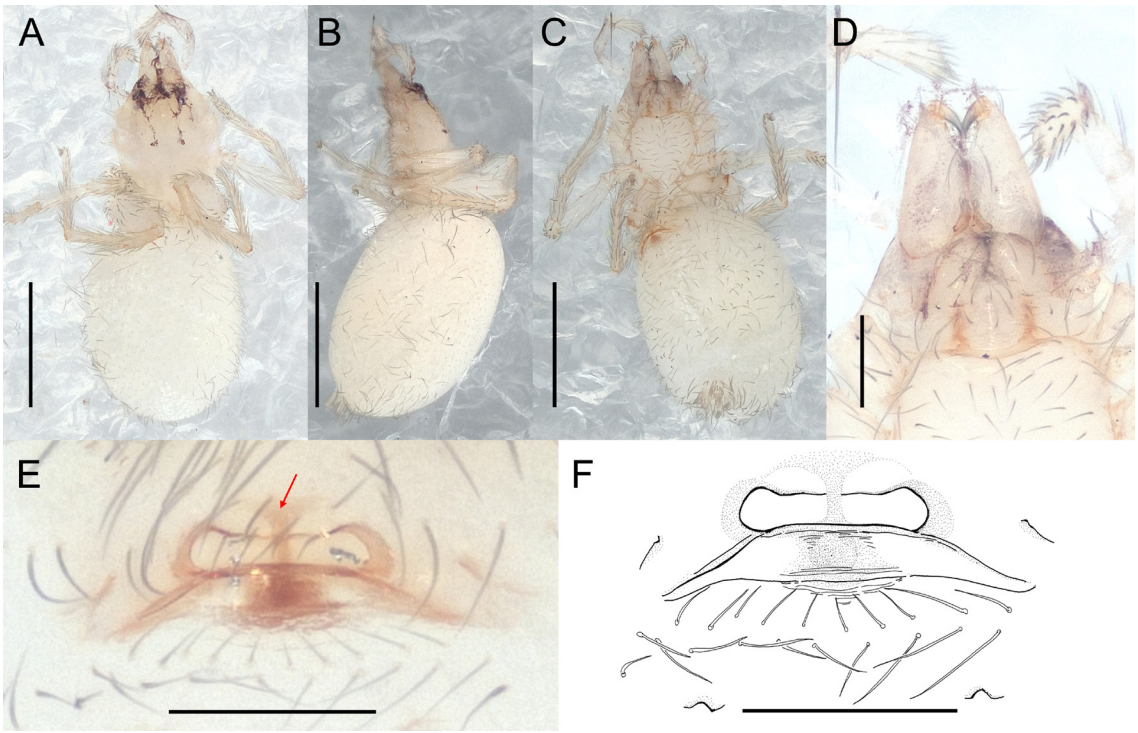

Fig. 12. *Orchestina pavesii* (Simon, 1873), female (TKPM-AR 3505). **A–C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Chelicerae, endites and labium, ventral view. **E–F**. External genitalia, ventral view. Arrow in E indicates a small T-shaped apodeme. Scale bars: A–C = 0.5 mm; D–F = 0.1 mm.

Remarks

The modification of the endites in *O. pavesii*, which may exhibit species-specific morphology, has neither been illustrated in the original description (Simon 1873) nor in subsequent publications (e.g., Simon 1893; Dalmas 1916; Brignoli 1967b; Saaristo & Marusik 2004; Saaristo 2007, 2010). Therefore, it cannot be excluded that records of "*O. pavesii*" published after the original description including the present study, may involve undescribed species resembling *O. pavesii* in genital morphology. In this study, the Japanese specimens are tentatively assigned to *O. pavesii*, pending a comprehensive taxonomic revision of this species.

Ecology

Orchestina pavesii spiders inhabit indoor environments in Japan.

Orchestina nojimai sp. nov.

urn:lsid:zoobank.org:act:62D10A3A-04A9-43EC-ABFE-E9CD6156E47E

Figs 13–14

New Japanese name

ノジマハネグモ (Nojima-hane-gumo).

Diagnosis

Females of *Orchestina nojimai* sp. nov. resemble those of *O. utahana* Chamberlin & Ivie, 1935, *O. moaba* Chamberlin & Ivie, 1935, and *O. quasimodo* Izquierdo, 2017 in having a pair of external pockets situated beyond the AUS, a longitudinally elongate, thumb-shaped AUS, and a trumpet-shaped genital opening surrounded by sclerotized ridges. However, they can be clearly distinguished by the pockets, which possess deep, mesially directed invaginations with the internal walls mostly juxtaposed (Fig. 13F–J), whereas in *O. utahana*, *O. moaba*, and *O. quasimodo* the invaginations are shallow, and the pockets remain separated (Izquierdo & Ramírez 2017: fig. 18a–c). Females of *O. nojimai* also resemble those of *O. iemanja* Izquierdo, 2017, but differ in having pockets with deep, mesially directed invaginations and juxtaposed internal walls (Fig. 13F–J), whereas in *O. iemanja* the invaginations are shallow, the pockets are clearly separated, the Pr is situated at the apical region of the AUS, and the genital opening is inconspicuous (Izquierdo & Ramírez 2017: figs 135d, 138c).

Type material

Holotype

JAPAN • ♀; Kurashiki-shi, Mabi-cho, Yata; 14 Jun. 2011; K. Nojima leg.; ivy entangled in stone walls; NSMT-Ar 26615.

Paratypes

JAPAN • 2 ♀♀; same data as for holotype; TKPM-AR 3507.

Etymology

The specific name is dedicated to Mr Koichi Nojima who discovered the new species.

Description

Female (NSMT-Ar 26615)

Coloration. In ethanol (Fig. 13A–D). Carapace pale yellowish brown, with radial rows of dark brown spots; margins darker. Base of eyes black. Chelicerae, endites, labium and sternum pale yellowish brown.

Legs pale yellowish brown, without annulations. Abdomen pale yellowish white, with violet stains posterodorsally; ventrally pale yellowish white.

Measurements. Body length 1.68. Carapace length 0.70, width 0.54, height 0.22. Eye diameter: ALE 0.053, PME 0.058, PLE 0.061. Length of legs: I 0.50 + 0.20 + 0.54 + 0.56 + 0.22 = 2.02, II 0.47 + 0.18 + 0.51 + 0.48 + 0.23 = 1.87, III 0.37 + 0.13 + 0.29 + 0.37 + 0.20 = 1.36, IV 0.64 + 0.21 + 0.43 + 0.59 + 0.25 = 2.12. Abdomen length 0.92, width 0.84, height 0.67.

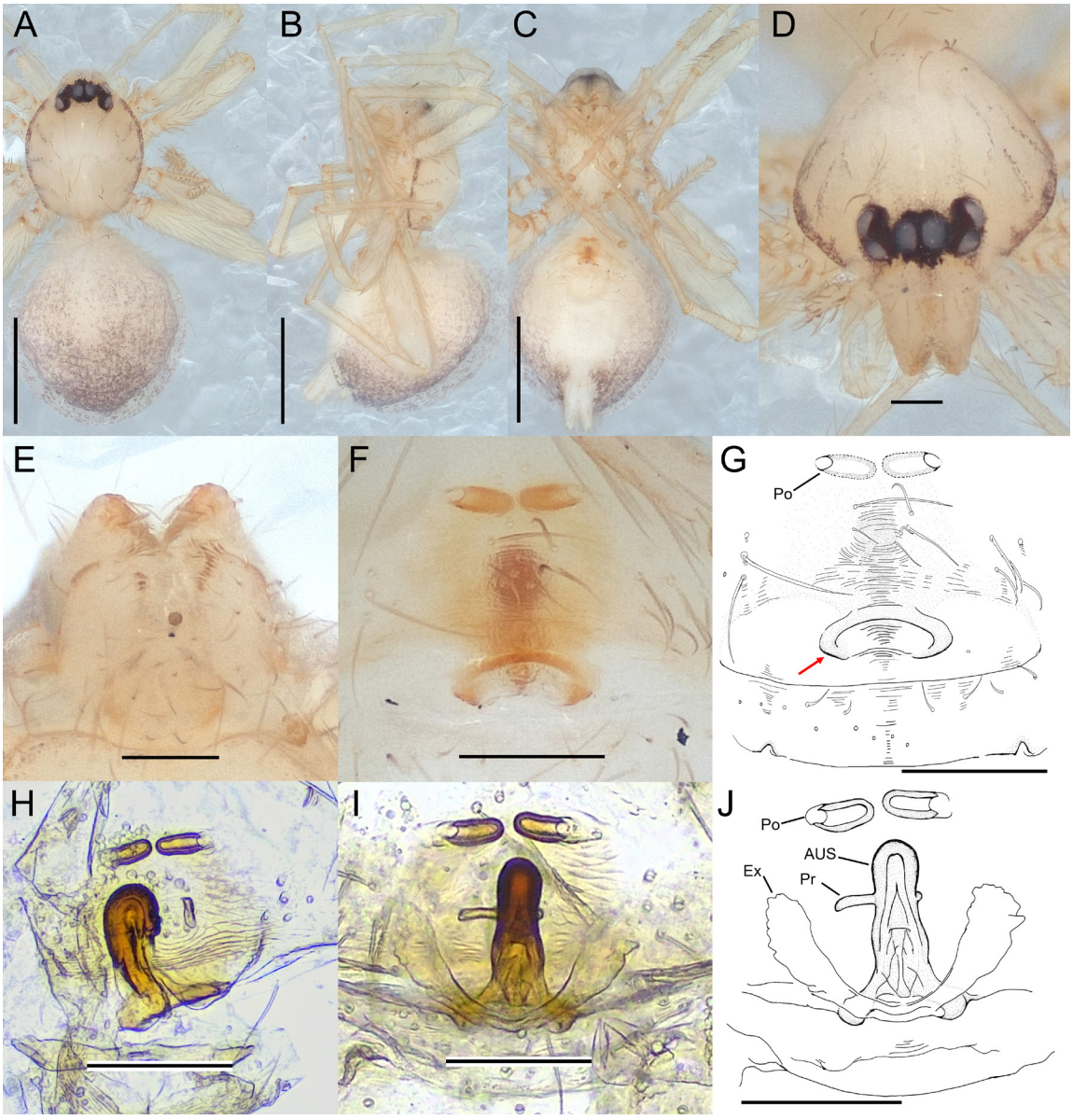

Fig. 13. *Orchestina nojimai* sp. nov., female holotype (A–H: NSMT-Ar 26615) and female paratype (I–J: TKPM-AR 3507). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, frontal view. **E**. Endites and labium, ventral view. **F**–**G**. External genitalia, ventral view. **H**–**J**. Internal genitalia. **H**. Ventral view. **I**–**J**. Dorsal view. Arrow in G indicates the trumpet-shaped genital opening surrounded by sclerotized ridges. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–J = 0.1 mm.

Somatic morphplogy. Carapace oval, longer than wide, length/width = 1.30. Endites unmodified, bearing brush-like hairs on anterior inner margin. Abdomen oval, slightly longer than wide, length/width = 1.10.

Genitalia. External genitalia (Fig. 13F–G). Two pockets situated beyond AUS, each pocket with circular opening and deep elliptical invagination directed mesially, inner walls close together, mostly juxtaposed. AUS visible as reddish-brown marking. Copulatory opening situated posteriorly, with trumpet-shaped sclerotized margin. Internal genitalia (Fig. 13H–J). AUS thumb-shaped, darker anteriorly, with short and thin Pr directed laterally. Ex feather-shaped.

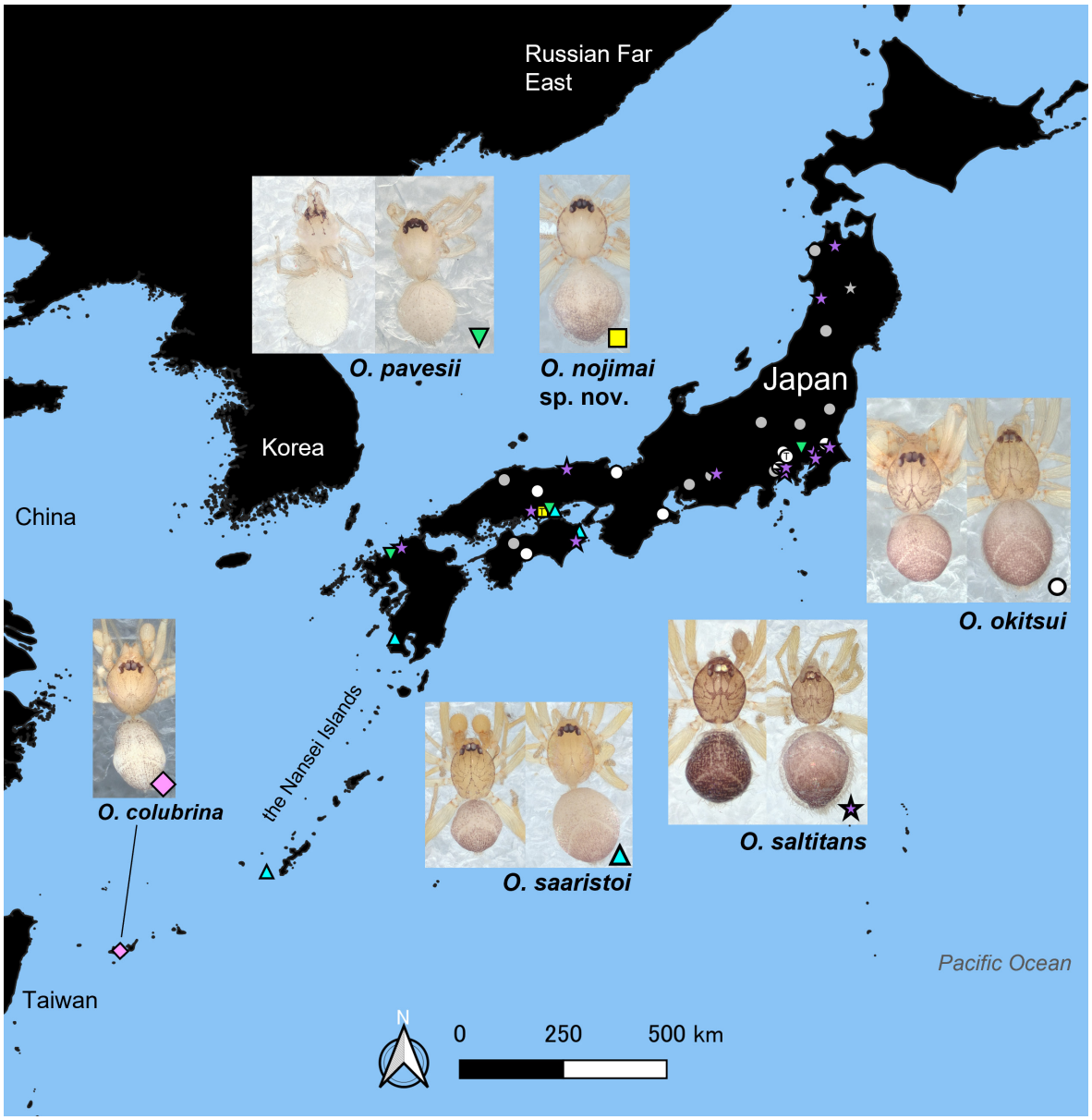

Fig. 14. Map showing the distribution of *Orchestina okitsui* Oi, 1958 (circle), *O. saltitans* Banks, 1894 (stars), *O. saaristoi* Henrard & Jocqué, 2012 (triangles), *O. colubrina* Liu, Henrard & Xu, 2019 (diamond), *O. pavesii* (Simon, 1873) (reverse triangles) and *O. nojimai* sp. nov. (square) in Japan. "T" inside plots indicates a type locality. Plots filled with grey color indicate literature-based records. Uncertain records are omitted.

Male
Unknown.

Distribution

Japan (only known from the type locality; Fig. 14).

Ecology

Specimens of *O. nojimai* sp. nov. were collected from vine plants on a stone wall at the type locality.

Orchestina flava Ono, 2005
Figs 15–18, 21A–B, 22

Orchestina flava Ono, 2005: 38, figs 1–10 (descriptions of ♂♀ from Okinoerabu-jima Is., Kagoshima, Japan).

Orchestina flava – Ono 2009: 101, figs 5–11 (♂♀); 2011: 440–441, figs 11–12 (♀). — Suzuki, Hidaka & Tatsuta 2023: 239, figs 10f–l (♂♀).

Japanese name

キハネグモ (Ki-hane-gumo).

Diagnosis

Males of *O. flava* closely resemble those of *Orchestina sinensis* Xu, 1987 in the shape of the palp, but can be distinguished by the trajectory of the seminal duct: two loops are visible between the inner S-shaped loop and the outer duct in *O. flava* (Fig. 15G, K), whereas three loops are visible in *O. sinensis* (Xu 1987: fig. 6). In addition, the tip of the embolus directs prolaterally in dorsal view in *O. flava* (Fig. 15I, M), but is almost straight in *O. sinensis* (Xu 1987: fig. 5).

Females of *O. flava* resemble those of *O. aureola* Tong & Li, 2011 in habitus and in having a thin Dc, but can be distinguished by details of the internal genitalia: in *O. flava*, the AUS is bell-shaped, with the anterior part covered with tubercles; the Pr directs anterolaterally, and its tip is wrinkled (Fig. 17E, G–H, J). In contrast, in *O. aureola*, the AUS is elliptical, the Pr directs posterolaterally, and its tip is truncate and serrated (Tong & Li 2011: fig. 6f).

Type material

Holotype (examined)
JAPAN – **Kagoshima Prefecture** • ♂; Okinoerabu-jima Island, China-cho; 20 Jan. 2005; H. Ono leg.; NSMT-Ar 5674.

Allotype (examined)

JAPAN • 1 ♀; same data as for holotype; NSMT-Ar 5675.

Other material examined
JAPAN – **Kagoshima Prefecture** • 2 ♂♂, 8♀♀; Yakushima Island, Kumage-gun, Yakushima-cho, Koseda; 23 Sep. 2021; F. Ballarin leg.; broadleaf forest litter; FBPC-FBOono020 • 1 ♀; Tokunoshima Island, Oshima-gun, Amagi-cho, Nishiagina; 29 Mar. 2018; T. Suguro leg.; TKPM-AR 3434. – **Okinawa Prefecture** • 1 ♀; Okinawa-jima Island, Kunigami-gun, Kunigami-son, Yona; 19 Mar. 2022; Y. Suzuki leg.; YSPC-Op-3 • 3 ♂♂, 4 ♀♀; Nanjo-shi, Tamagusuku, Itokazu; 8 Jan. 2024; Y. Suzuki leg.; TKPM-AR 3435 • 3 ♂♂; Aka-jima Island, Shimajiri-gun, Zamami-son, Aka; 16 Mar. 2022; Y. Suzuki

leg.; TKPM-AR 3436 • 1 ♂, 1♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Uehara; 3 Nov. 2021; Y. Suzuki leg.; NSMT-Ar 21924 • 3 ♀♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Uehara, Funaura; 1 Jan. 1987; A. Tanikawa leg.; TKPM-AR 3437 • 1 ♂; same locality as for preceding;

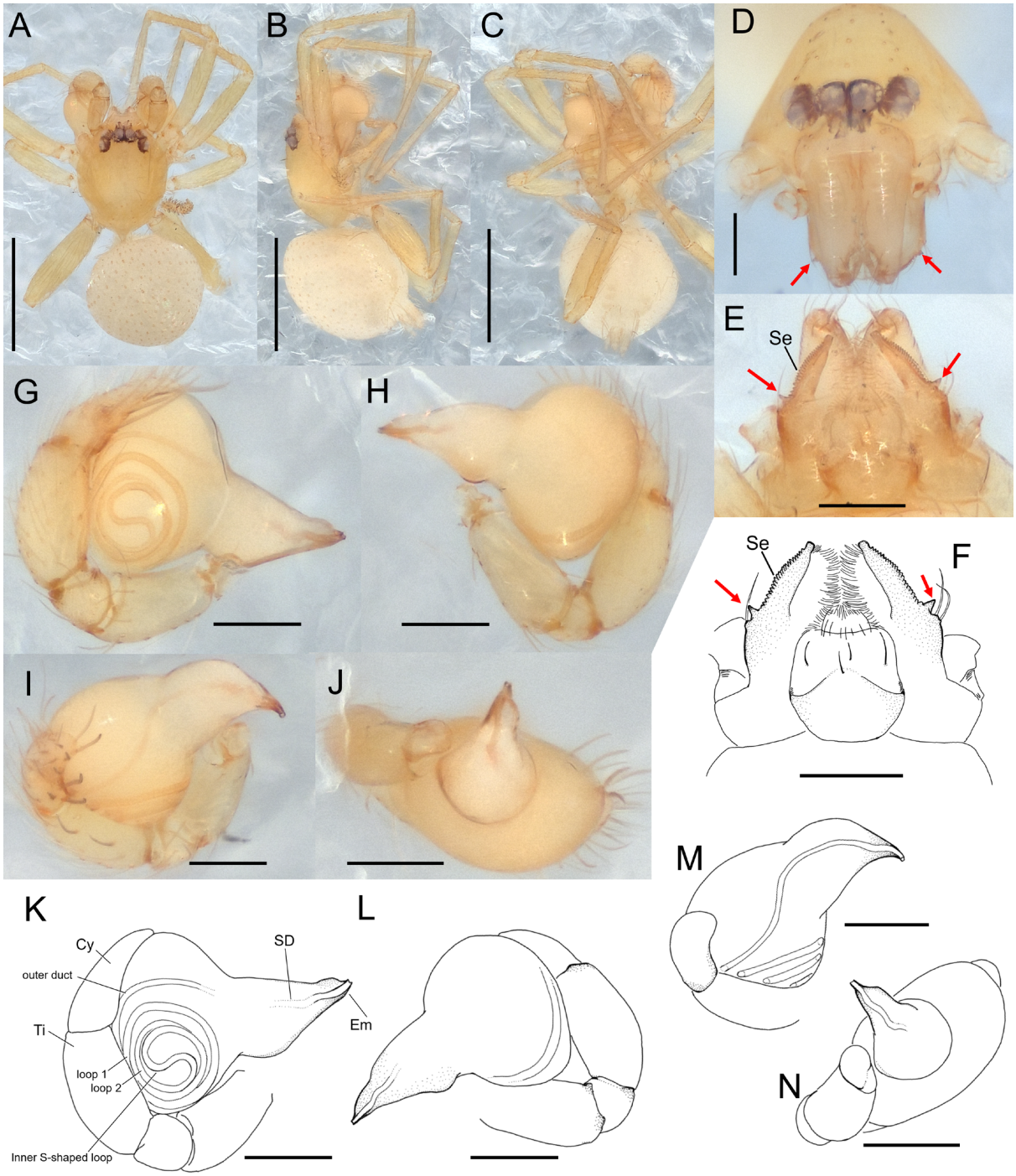

Fig. 15. *Orchestina flava* Ono, 2005, male (TKPM-AR 3455). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, frontal view. **E**–**F**. Endites and labium, ventral view. **G**–**N**. Left palp. **G**, **K**. Prolateral view. **H**, **L**. Retrolateral view. **I**, **M**. Dorsal view. **J**, **N**. Anterior view. Arrows in D–F indicate small triangular appendices. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–N = 0.1 mm.

31 Mar. 1989; A. Tanikawa leg.; TKPM-AR 3438 • 3 ♀; same locality as for preceding; 29 Mar. 1989; A. Tanikawa leg.; TKPM-AR 3439 • 1 ♂, 9 ♀♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Takana, Komi; 27 Mar. 1987; A. Tanikawa leg.; TKPM-AR 3440 • 2 ♂♂; same locality as for preceding; 6 Aug. 1987; A. Tanikawa leg.; TKPM-AR 3441 • 2 ♀♀; same locality as for preceding; 20 Aug. 1987; A. Tanikawa leg.; TKPM-AR 3442 • 4 ♀♀; same locality as for preceding; 3 Jan. 1988; A. Tanikawa leg.; TKPM-AR 3443 • 1 ♀; same locality as for preceding; 31 Dec. 1988; A. Tanikawa leg.; TKPM-AR 3444 • 2 ♂♂, 2 ♀♀; same locality as for preceding; 28 Mar. 1989; TKPM-AR 3445 • 1 ♂, 2 ♀♀; same locality as for preceding; 30 Dec. 1989; A. Tanikawa leg.; TKPM-AR 3446 • 3 ♀♀; same locality as for preceding; 1 May 1990; A. Tanikawa leg.; TKPM-AR 3447 • 1 ♂; same locality as for preceding; 1 Jan. 1991; A. Tanikawa leg.; TKPM-AR 3448 • 2 ♀♀; same locality as for preceding; 1 Jan. 1991; TKPM-AR 3449 • 2 ♀♀; same locality as for preceding; 24 Dec. 1991; A. Tanikawa leg.; TKPM-AR 3450 • 4 ♀♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Ohara; 27 Dec. 1985; A. Tanikawa leg.; TKPM-AR 3451 • 2 ♀♀; same locality as for preceding; 30 Mar. 1986; A. Tanikawa leg.; TKPM-AR 3452 • 1 ♂; same locality as for preceding; 2 Jan. 1989; A. Tanikawa leg.; TKPM-AR 3453 • 1 ♂; same locality as for preceding; 30 Mar. 1989; A. Tanikawa leg.; TKPM-AR 3454 • 1 ♂, 3 ♀♀; same locality as for preceding; 30 Apr. 1990; A. Tanikawa leg.; TKPM-AR 3455 • 1 ♀; 24 Dec. 1991; same locality as for preceding; A. Tanikawa leg.; TKPM-AR 3456 • 1 ♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Haiminaka, Otomi; 28 Mar. 1987; A. Tanikawa leg.; TKPM-AR 3457 • 2 ♂♂; same locality as for preceding; 4 Jan. 1988; A. Tanikawa leg.; TKPM-AR 3458 • 3 ♀♀; same locality as for preceding; 30 Mar. 1989; A. Tanikawa leg.; TKPM-AR 3459 • 1 ♀; same locality as for preceding; 30 Apr. 1990; A. Tanikawa leg.; TKPM-AR 3460 • 1 ♀; same locality as for preceding; 2 Jan. 1991; A. Tanikawa leg.; TKPM-AR 3461 • 1 ♀; same locality as for preceding; 23 Jun. 1991; A. Tanikawa leg.; TKPM-AR 3462 • 3 ♀♀; same locality as for preceding; 25 Nov. 1991; A. Tanikawa leg.; TKPM-AR 3463 • 1 ♀; same locality as for preceding; 12 Dec. 1992; A. Tanikawa leg.; TKPM-AR 3464 • 1 ♂; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Iriomote, Shirahama; 11 Aug. 1985; A. Tanikawa leg.; TKPM-AR 3465 • 1 ♀; same locality as for preceding; 31 Dec. 1986; A. Tanikawa

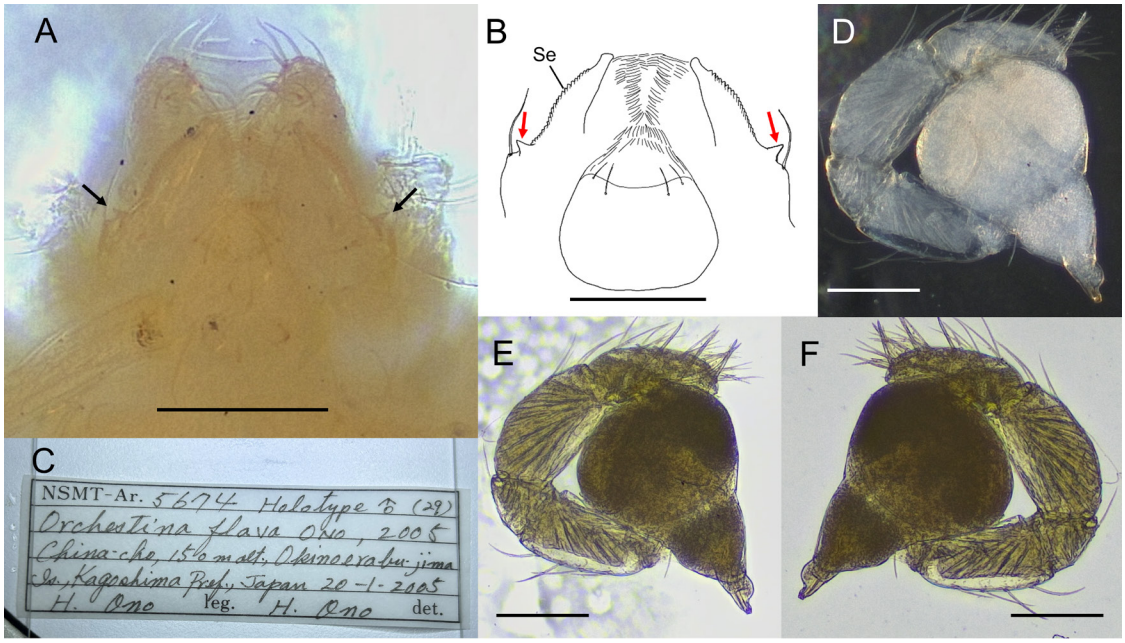

Fig. 16. *Orchestina flava* Ono, 2005, male holotype (NSMT-Ar 5674). **A**–**B**. Endites and labium, ventral view. **C**. Label of the holotype. **D**–**F**. Left palp. **D**–**E**. Prolateral view. **F**. Retrolateral view. Abbreviations: see Material and methods. Arrows in A and B indicate small triangular appendices. Scale bars: 0.1 mm.

leg.; TKPM-AR 3466 • 1 ♂; same locality as for preceding; 27 Dec.1987; A. Tanikawa leg.; TKPM-AR 3467 • 2 ♂♂, 2 ♀♀; same locality as for preceding; 3 May 1990; A. Tanikawa leg.; TKPM-AR 3468 • 1 ♀; same locality as for preceding; 24 Dec. 1990; A. Tanikawa leg.; TKPM-AR 3469 • 1 ♀; same locality as for preceding; 26 Dec. 1991; A. Tanikawa leg.; TKPM-AR 3470 • 2 ♂♂, 2 ♀♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Sonai; 1 Apr. 1986; A. Tanikawa leg.; TKPM-AR 3471 • 1 ♀; same locality as for preceding; 1 Jan. 1987; A. Tanikawa leg.; TKPM-AR 3472 • 1 ♀; same locality

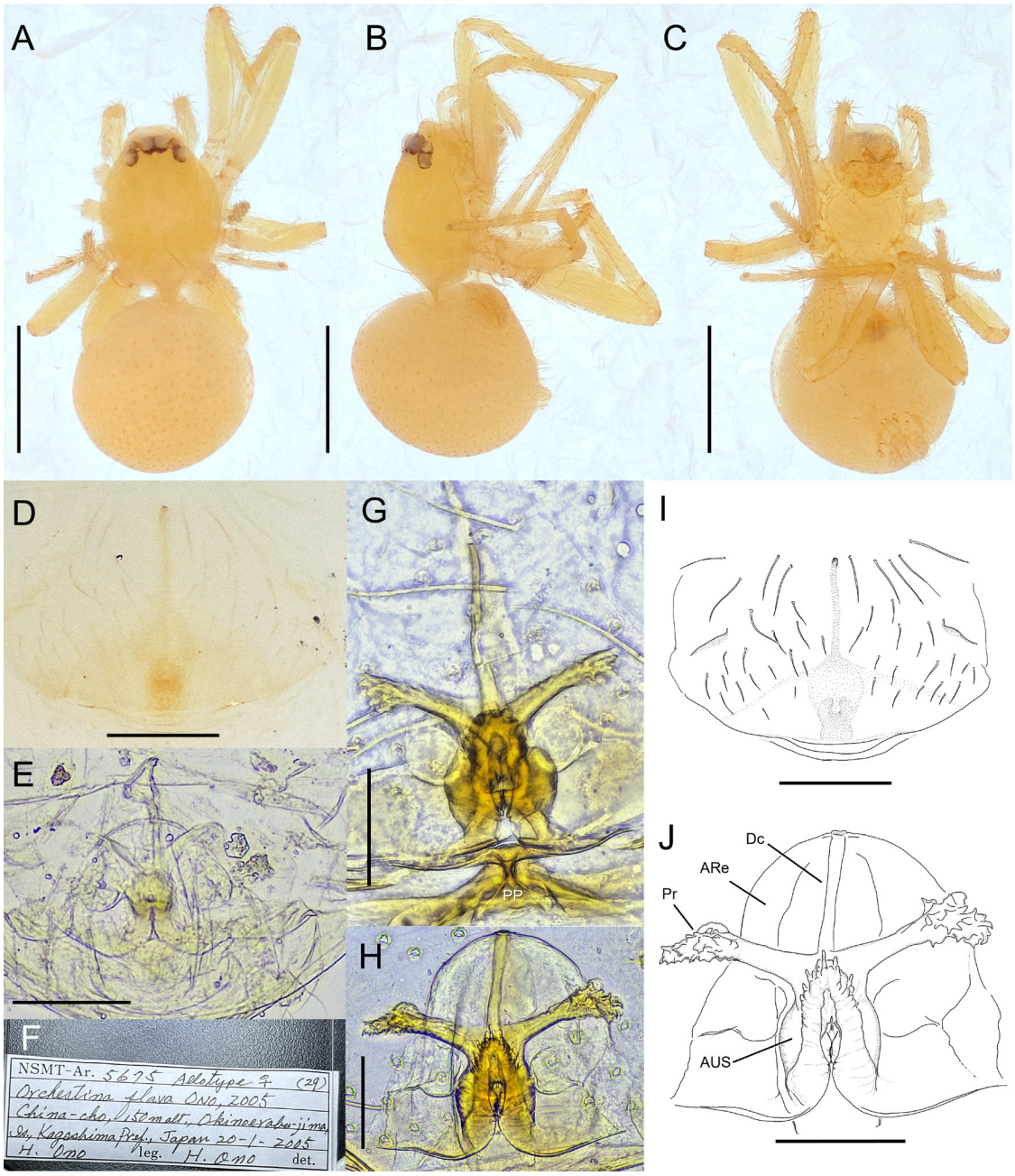

Fig. 17. *Orchestina flava* Ono, 2005, female, non-type specimens (A–C: TKPM-AR 3450; G: FBPC-FBOono020; H, J: TKPM-AR 3434) and allotype (D–F, I: NSMT-Ar 1921). **A–C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**, **I**. External genitalia, ventral view. **E**, **G–H**, **J**. Internal genitalia, dorsal view. **F**. Label of the allotype. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–E, G–J = 0.1 mm.

as for preceding; 30 Mar. 1998; A. Tanikawa leg.; TKPM-AR 3473 • 1 ♂, 2 ♀♀; same locality as for preceding; 28 Mar. 1989; A. Tanikawa leg.; TKPM-AR 3474 • 1 ♂; same locality as for preceding; 25 Dec. 1990; A. Tanikawa leg.; TKPM-AR 3475 • 1 ♀; same locality as for preceding; 26 Dec. 1991; A. Tanikawa leg.; TKPM-AR 3476 • 1♂; same locality as for preceding; 5 Jan. 1992; A. Tanikawa leg.; TKPM-AR 3477 • 1 ♀; Iriomote-jima Island, Yaeyama-gun, Taketomi-cho, Iriomote, Urauchi; 28 Dec. 1987; A. Tanikawa leg.; TKPM-AR 3478 • 1 ♀; same locality as for preceding; 28 Mar. 1988; A. Tanikawa leg.; TKPM-AR 3479 • 1 ♀; same locality as for preceding; 25 Dec. 1990; A. Tanikawa leg.; TKPM-AR 3480 • 1 ♂, 2 ♀♀; same locality as for preceding; 23 Dec. 1991; A. Tanikawa leg.; TKPM-AR 3481. – **Tokyo** • 1 ♀; Ototo-jima Island, Ai-no-sawa; 23 Sep. 2024; Y. Hisasue leg.; TKPM-AR 3482 • 1 ♀; Ototo-jima Island, Mt. Hirone-yama; 20 Oct. 2025; Y. Hisasue leg.; TKPM-AR 3564 • 2 ♀♀; Chichi-jima Island, Mt. Akahata-yama; 9 Aug. 2025; Y. Hisasue leg.; TKPM-AR 3510 • 1 ♀; Chichi-jima Island, Mt. Chuo-san; 5 Nov. 2025; Y. Hisasue leg.; TKPM-AR 3561 • 1 ♀; Chichi-jima Island, Sakaiura; 21 Nov. 2025; Y. Hisasue leg.; TKPM-AR 3562 • 1 ♀; Haha-jima Island, Mt. Kuwanoki-yama; 29 Sep. 2024; Y. Hisasue leg.; TKPM-AR 3487 • 1 ♀; Haha-jima Island, Koumori-dani; 4 May 2025; Y. Hisasue leg.; TKPM-AR 3488.

Description

See Ono (2005) and Suzuki *et al.* (2023).

Distribution

Japan: the Nansei Islands and the Ogasawara Islands (new record; Fig. 22); Korea (uncertain record).

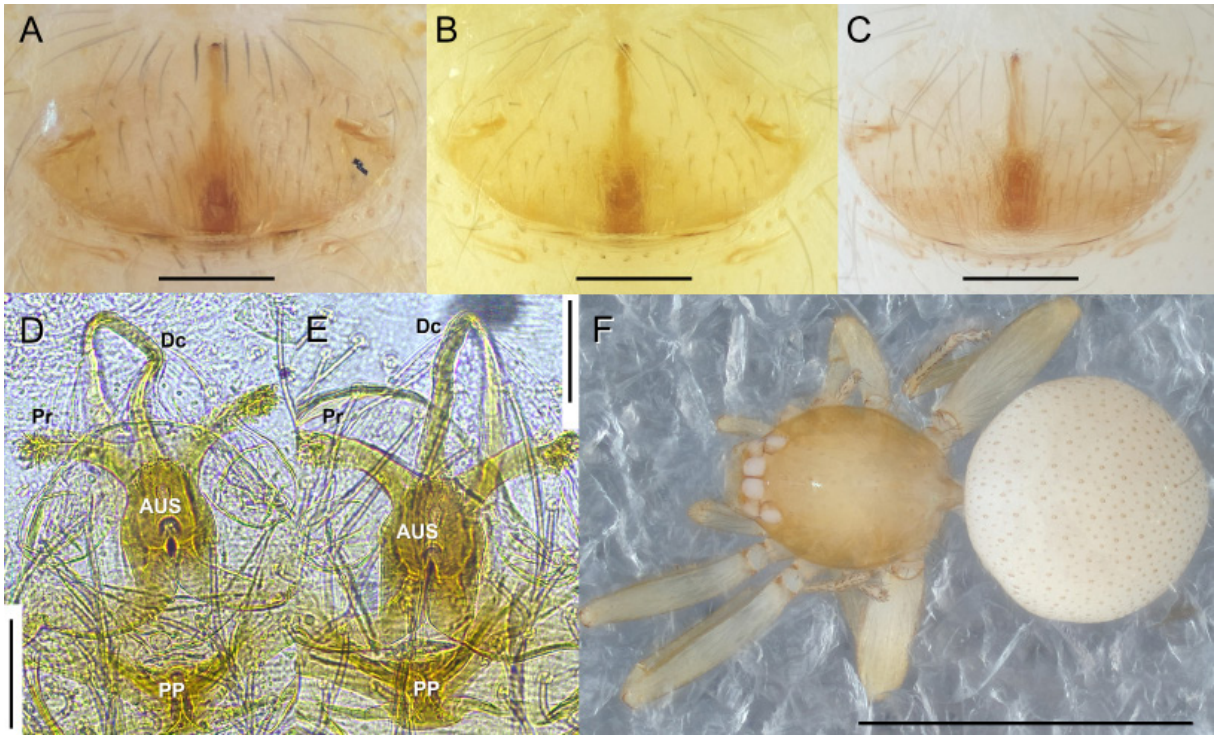

Fig. 18. *Orchestina flava* Ono, 2005, females, collected from the Ogasawara Islands (A, D: TKPM-AR 3561; B, E: TKPM-AR 3488; C, F: TKPM-AR 3510). **A**–**C**. External genitalia, ventral view. **D**–**E**. Internal genitalia, dorsal view. **F**. Habitus, dorsal view. Abbreviations: see Material and methods. Scale bars: A–C = 0.1 mm; D–E = 0.05 mm; F = 1.0 mm.

Remarks

The reexamination of the holotype confirmed the presence of a small triangular appendix on the basal region of the lateral margin of endites (Fig. 16A–B), which was not illustrated in the original description (Ono 2005).

There are some records of *O. flava* from Honshu (Hatsushiba & Kono 2009; Saitama City 2021), Shikoku (Shinkai & Tanikawa 2009), and mainland Kyushu (Irie 2006). However, the specimens reported from Saitama Prefecture, Honshu by Saitama City (2021) were later reidentified as *O. sanguinea*, based on a voucher specimen (Arai 2026). In addition, based on field surveys and examination of specimens, *O. flava* was only obtained from the Nansei Islands and the Ogasawara Islands (Fig. 22). Therefore, these records are highly likely to represent misidentifications of *O. sanguinea*.

Although *O. flava* has also been recorded from Korea based on female and male specimens collected on Hwataedo Island (Korea National Park Research Institute 2019; Lee *et al.* 2024), the genitalia of those specimens were not illustrated; instead, an illustration of the male palp of *O. flava* from Japan (Ono 2009) was reproduced. Given that the confirmed distribution of *O. flava* in Japan is mostly restricted to subtropical regions of the southern islands (Fig. 22), the Korean record is likely to represent a misidentification. Accordingly, this record is regarded as doubtful, and re-examination of the voucher specimens is strongly recommended.

Ecology

Orchestina flava inhabits litter layers and bushes in forests.

DNA sequences

COI (431bp): see Table 1.

Orchestina insulana sp. nov.

urn:lsid:zoobank.org:act:E5997317-FADC-4A69-B6BB-4FDABEC00CDF

Figs 19, 21C, 22

New Japanese name

ウナバラハネグモ (Unabara-hane-gumo).

Diagnosis

Females of *Orchestina insulana* sp. nov. resemble those of *O. flava*, *O. sanguinea*, and *O. aureola* in general appearance and genital morphology, but can be distinguished by the longitudinally short, transversely wide, garlic-shaped AUS with a serrated apical margin (Fig. 19G, K), whereas the AUS is longitudinally longer in *O. flava*, *O. sanguinea*, and *O. aureola* (Figs 17E, G–H, J, 20F, H; Tong & Li 2011: fig. 6f). *Orchestina insulana* sp. nov. and *O. sanguinea* closely resemble each other in somatic coloration of live specimens (Fig. 21C vs D), but they can be readily distinguished by the genital surface, which is covered with long, sparse fine hairs in *O. insulana* sp. nov., versus covered with dense short hairs in *O. sanguinea* (Figs 19F, J vs 20E, G).

Etymology

The specific epithet means “island” in Latin and is derived from the habitat of the new species, the oceanic islands.

Type material

Holotype

JAPAN – **Tokyo** • ♀; Chichi-jima Island, Tatsumidani; 19 Oct. 2024; Y. Hisasue leg.; NSMT-Ar 26613.

Paratypes

JAPAN – **Tokyo** • 1 ♀; Ototo-jima Island, Ai-no-sawa; 19 Oct. 2025, Y. Hisasue leg.; TKPM-AR 3563 • 1 ♀; Chichi-jima Island, Ogaguwa-no-mori; 30 Jul. 2023; Y. Hisasue leg.; NSMT-Ar 26614 • 1 ♀; Chichi-jima Island, Mt. Mikazuki-yama; 29 Feb. 2024; Y. Hisasue leg.; TKPM-AR 3483 • 1 ♀; same locality as for preceding; 10 Oct. 2025; Y. Hisasue leg.; TKPM-AR 3560 • 1 ♀; Chichi-jima Island, Renju-dani; 8 Mar. 2025; Y. Hisasue leg.; TKPM-AR 3485 • 1 ♀; Chichi-jima Island, Tatsumidani; 25 Jan. 2025; Y. Hisasue leg.; TKPM-AR 3486 • 1 ♀; Chichi-jima Island, Nagatani; 23 Feb. 2025; N. Tsuji leg.; TKPM-AR 3508 • 1 ♀; Chichi-jima Island, Higashidaira; 2 Aug. 2025; Y. Hisasue leg.; TKPM-AR 3509 • 1 ♀; Haha-jima Island, Nakanotaira; 20 Jun. 2025; Y. Suzuki leg.; TKPM-AR 3489.

Other material examined

JAPAN – **Tokushima Prefecture** • 1 ♀; Tokushima-shi, Okizuka, Hachiman-cho, Okizuka, Sonose-gawa River; 3 Jul. 2023; Y. Suzuki leg.; TKPM-AR 3490.

Description

Female (NSMT-Ar 26613)

Coloration. In ethanol (Fig. 19A–C). Entire body part pale yellowish white. Base of eyes dark brown. Abdomen darker posterodorsally. Live specimen (Fig. 21C). Carapace orange. Legs and abdomen pale yellowish white.

Somatic morphology. Carapace oval, longer than wide, length/width = 1.35. Endites pentagonal, elongate, bearing blackish serrula with fine serration on anterolateral margin (Fig. 19D–E). Abdomen as long as wide, length/width =1.00, bearing long fine hairs ventrally.

Measurements. Body length 1.18. Carapace length 0.62, width 0.46, height 0.24. Eye diameter: ALE 0.048, PME 0.059, PLE 0.056. Length of legs: I 0.42 + 0.14 + 0.38 + 0.27 + 0.14 = 1.35, II 0.49 + 0.15 + 0.48 + 0.46 + 0.14 = 1.72, III 0.29 + 0.13 + 0.25 + 0.27 + 0.11 = 1.05, IV 0.45 + 0.13 + 0.31 + 0.34 + 0.18 = 1.41. Abdomen length 0.57, width 0.57, height 0.47.

Genitalia. External genitalia (Fig. 19F, H, J). Genital surface covered with long, sparse, fine hairs. AUS visible as yellowish-brown, rounded marking on posteromesial region. Dc visible as thin, longitudinal line. Internal genitalia (Fig. 19G, I, K). AUS garlic-shaped, wider than long, with serrated apical margin. Pr directed anterolaterally, slightly curved, with moderately wrinkled tip.

Male

Unknown.

Distribution

Japan: the Ogasawara Islands (Chichi-jima, Ototo-jima and Haha-jima islands), Shikoku (Fig. 22).

Ecology

Orchestina insulana is collected from litter layers and bushes in forests in the Ogasawara islands. In Tokushima Prefecture, Shikoku, it was collected from a grassland at an estuary.

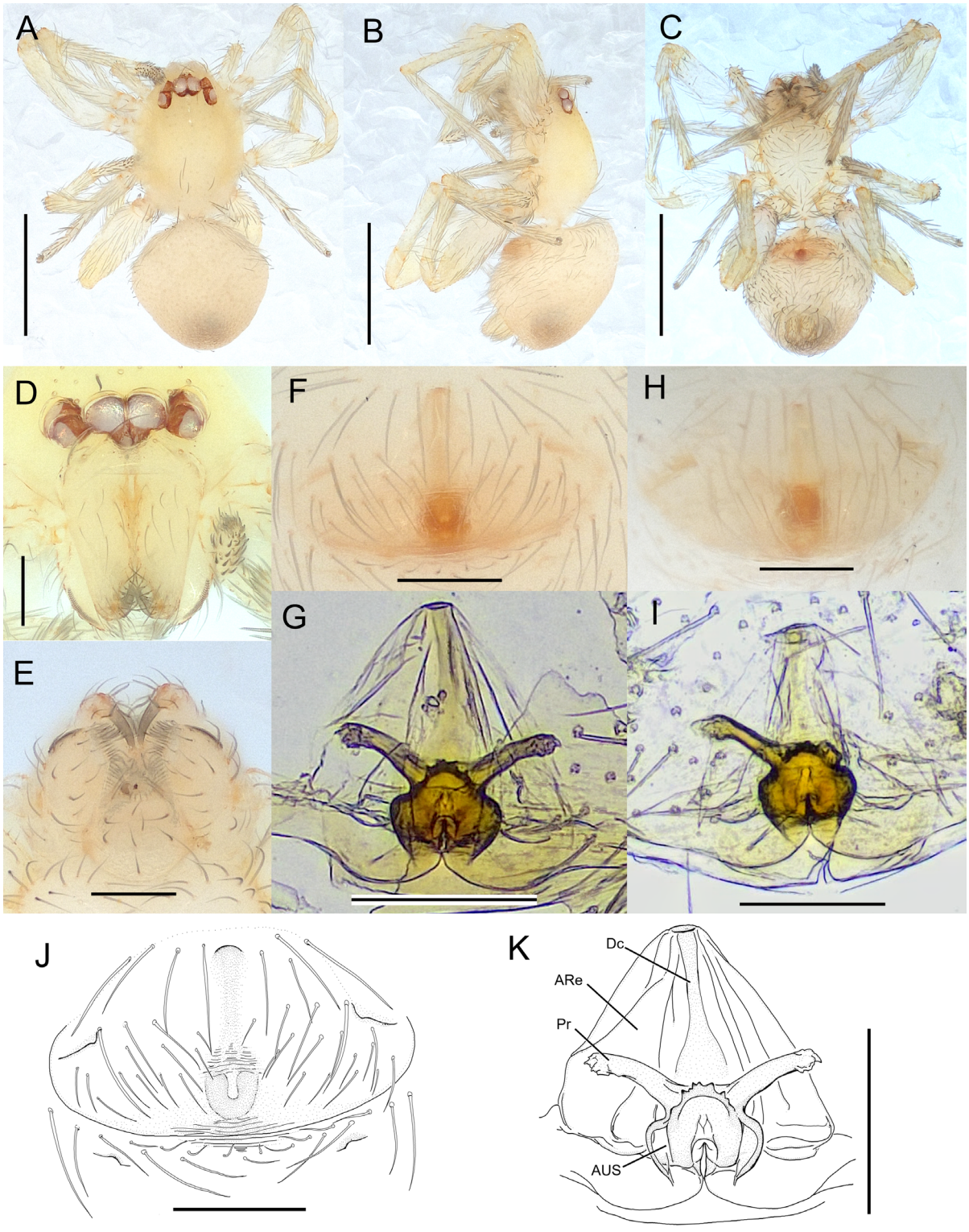

Fig. 19. *Orchestina insulana* sp. nov., female holotype (A–G, J–K: NSMT-Ar 26613) and non-type specimen (H, I: TKPM-AR 3490). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**. Carapace, frontal view. **E**. Endites and labium, ventral view. **F**, **H**, **J**. External genitalia, ventral view. **G**, **I**, **K**. Internal genitalia, dorsal view. Note that the right Pr is broken in I. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–K = 0.1 mm.

DNA sequences

COI (431 bp): see Table 1.

16S rDNA (391 bp): LC913573 (TKPM-AR 3560), LC913574 (TKPM-AR 3563), LC913575 (TKPM-AR 3489).

Orchestina sanguinea Oi, 1955
Figs 20, 21D, 22

Orchestina sanguinea Oi, 1955: 41, figs 1–5 (description of ♀ from Osaka, Japan).

Orchestina sanguinea – Ono 2009: 102, figs 12–13 (♀). — Suzuki 2019: 82, fig. 11a–b (♀); 2020: 64, fig. 1 (♀). — Hidaka *et al.* 2026: 62–63, figs 1–2 (♀).

Japanese name

アカハネグモ (Aka-hane-gumo).

Diagnosis

Females of *O. sanguinea* closely resemble those of *O. xiebao* Lin & Li, 2024 in general appearance (Fig. 20A–C; Lin *et al.* 2024: fig. 35a–b), in having the external genitalia covered with dense, short hairs, and in the general shape of the AUS (Fig. 20F, H; Lin *et al.* 2024: fig. 34b). They can be distinguished by the posterior region of the internal genitalia, which is clearly visible through the exoskeleton in *O. sanguinea* (Fig. 20E) whereas it is not conspicuous in *O. xiebao* (Lin *et al.* 2024: fig. 34a). However, this difference is slight, and the internal genitalia of the two species are otherwise very similar; therefore, further examination is required.

Females of *O. sanguinea* also resemble those of *O. infirma* Seo, 2017, known from Korea in general appearance and genital morphology, but they can be distinguished by the shape of Pr, which is relatively thicker in *O. sanguinea* than in *O. infirma* (Fig. 20F, H vs Seo 2017: fig. 2e, g).

Type material

Holotype (examined)
JAPAN • ♀; Osaka, Habikino-shi, Takawashi (original label: Osaka, Minami-kawachi-gun, Takawashi-cho); 13 Jul. 1954; Y. Oi leg.; NSMT-Ar 1921.

Paratypes (examined)
JAPAN • 5 ♀♀; same data as for holotype; NSMT-Ar 1922.

Other material examined

JAPAN – **Akita Prefecture** • 2 ♀♀; Daisen-shi; 30 Aug. 2003; A. Fukushima leg.; NSMT-Ar 21976 • 1 ♀; Akita-shi; 16 Oct. 2005; A. Fukushima leg.; NSMT-Ar 25543. – **Yamagata Prefecture** • 1 ♀; Tsuruoka-shi, Oyama; 12 Sep. 2018; R. Serita leg.; YSPC-Op-4. – **Ibaraki Prefecture** • 1 ♀; Kuji-gun, Daigo-machi, Asakawa, Nameshi; 21 Jun. 2003; Y. Suganami leg.; NSMT-Ar 17209 • 1 ♀; Tsukuba-shi, Oda, Mt. Hokyo-san; 22 Aug. 2017; Y. Suzuki leg.; TKPM-AR 3491 • 2 ♀♀; Tsukuba-shi, Tennodai; 18 Apr. 2019; Y. Suzuki leg.; TKPM-AR 3492. – **Chiba Prefecture** • 1 ♀; Kamogawa-shi, Amatsu; 20 Feb. 2020; Y. Suzuki leg.; TKPM-AR 3503. – **Saitama Prefecture** • 1 ♀; Saitama-shi, Midori-kun, Nanbu-Ryotsuji; 4 Aug. 2017; K. Arai leg.; TKPM-AR 3493. – **Tokyo** • 2 ♀♀; Suginami-ku, Horinouchi, Mt. Seibi-yama; 28 Jul. 1991; K. Kumada leg.; NSMT-Ar 8156 • 1 ♀; Hachioji-shi, Tobuki-machi, Tobuki-kita Green Conservation Area; 25 Jul. 2010; K. Arai leg.; TKPM-AR 3494 • 1 ♀; Hachioji-shi,

Naganuma-machi, Naganuma-koen Park; 8 Jul. 2011; K. Arai leg.; TKPM-AR 3495 • 1 ♀; Oume-shi, Kurosawa; 23 Apr. 2019; A. Ando leg.; TKPM-AR 3566 • 2 ♀♀, 1 juvenile; same locality as for preceding; 3 Dec. 2024; A. Ando leg.; TKPM-AR 3496 • 1 ♀; same locality as for preceding; 8 Dec. 2024; A. Ando leg.; TKPM-AR 3497 • 2 ♀♀; same locality as for preceding; 15 Dec. 2024; A. Ando leg.; TKPM-AR 3498 • 1 ♀; Hachijo-jima Island, Hachijo-machi; 13 Mar. 2025; T. Nagai leg.; TNPC-no. 788. – **Kanagawa Prefecture** • 1 ♀; Yokohama-shi, Aoba-ku, Jike-cho; 11 Jul. 1998; A. Tanikawa leg.; TKPM-AR 3499 • 1 ♀; Yamato-shi, Izuminomori; 20 Jun. 1993; A. Tanikawa leg.; TKPM-AR 3500. – **Shizuoka Prefecture** • 1 ♀; Tagata-gun, Amagi-yugashima-cho, Ichiyama; 30 Jul. 1982; K. Kumada leg.; NSMT-Ar 17745. – **Niigata Prefecture** • 1 ♀; Joetsu-shi, Uragawara-ku, Yokozumi; 7 Jun. 2005; K. Kumada leg.; NSMT-Ar 19067. – **Fukui Prefecture** • 1 ♀; Oono-shi, Kamiuchinami; 18 Jul. 2002; K. Kumada leg.; NSMT-Ar 15160. – **Nagano Prefecture** • 2 ♀♀; Iida-shi, Tatsue, Ikenotaira; 31 Jul. 2018; K. Kumada leg.; NSMT-Ar 16751. – **Aichi Prefecture** • 4 ♀♀; Higashikamo-

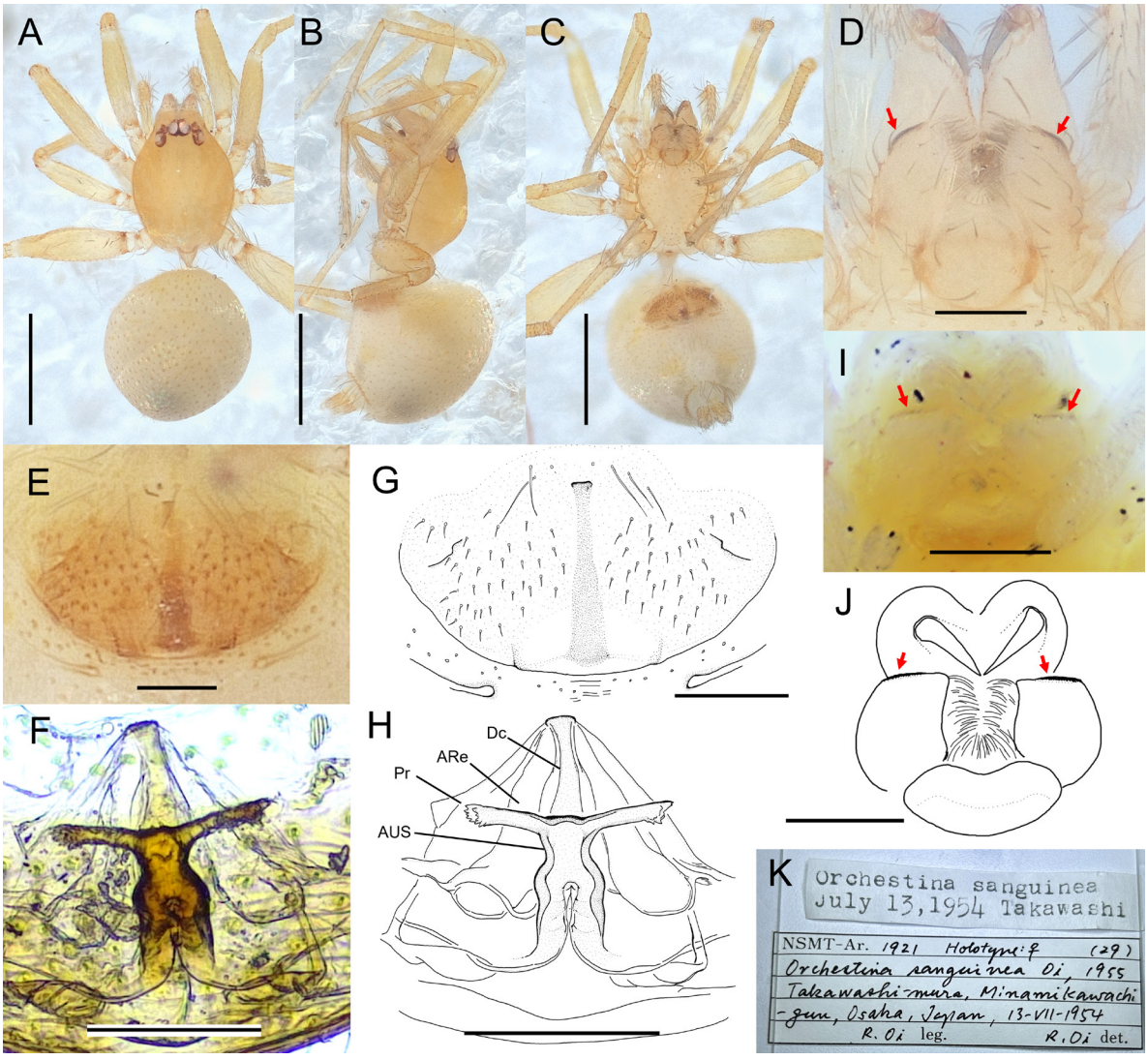

Fig. 20. *Orchestina sanguinea* Oi, 1955, female, non-type specimen (A–H: TKPM-AR 3501) and holotype (I–K: NSMT-Ar 1921). **A**–**C**. Habitus. **A**. Dorsal view. **B**. Lateral view. **C**. Ventral view. **D**, **I**–**J**. Endites and labium, ventral view. **E**, **G**. External genitalia, ventral view. **F**, **H**. Internal genitalia, dorsal view. **K**. Label of the holotype. Arrows in D, I and J indicate a blackish serrula on the anterolateral margin of the endites. Abbreviations: see Material and methods. Scale bars: A–C = 0.5 mm; D–J = 0.1 mm.

gun, Asuke-cho, Oiwake; 29 Jul. 1989; H. Ono leg.; NSMT-Ar 13532. – **Mie Prefecture** • 1 ♀; Ise-shi, Ujitachi-cho, Ise Jingu, 90 rinpan; 12 Jul. 2003; K. Kumada leg.; NSMT-Ar 13743 • 1 ♀; Ise-shi, Maeyama-cho, Ise Jingu, 8 rinpan; 27 Nov. 2003; K. Kumada leg.; NSMT-Ar 14104 • 3 ♀♀; Ise-shi, Maeyama-cho, Ise Jingu, 6 rinpan; 29 Jun. 2004; K. Kumada leg.; NSMT-Ar 14256 • 3 ♀♀; Ise-shi, Maeyama-cho, Ise Jingu, 1 rinpan; 29 Jun. 2004; K. Kumada leg.; NSMT-Ar 14299. – **Kyoto Prefecture** • 1 ♀; Kameoka-shi, Higashihonmecho-akakuma; 10 Nov. 2007; K. Kumada leg.; NSMT-Ar 19369. – **Nara Prefecture** • 2 ♀♀; Yoshino-gun, Higashiyoshino-mura, Sugitani; 5 Aug. 2001; K. Kumada leg.; NSMT-Ar 19452. – **Tokushima Prefecture** • 2 ♀♀; Anan-shi, Oi-cho, Minamidaira; 17 Aug. 2024; Y. Suzuki leg.; TKPM-AR 3501 • 1 ♀; Mima-shi, Waki-machi, Higashimatamyou, Gosho-jinjya Shrine; 10 Nov. 2024; Y. Suzuki leg.; TKPM-AR 3502 • 2 ♀♀; Awa-shi, Ichibacho-higaidani, Kawagita; 10 Nov. 2024; Y. Hino leg.; YHPC. – **Oita Prefecture** • 1 ♀; Kusu-gun, Kokonoe-machi, Nogami; 19 Jun. 2024; Y. Hino leg.; YHPC.

Description

Female (TKPM-AR 3501)

Coloration. In ethanol (Fig. 20A–C). Carapace yellowish brown, without markings. Chelicerae, endites, labium, sternum pale yellowish brown. Base of eyes dark brown. Legs pale yellowish brown, lacking annulations. Abdomen pale yellowish white, lacking markings. Live specimen (Fig. 21D). Carapace orange. Legs pale yellow. Abdomen pale yellowish white.

Fig. 21. Live specimens of species of *Orchestina* Simon, 1882. **A**–**B**. *Orchestina flava* Ono, 2005, females (TKPM-AR, voucher specimen numbers not specified). **C**. *Orchestina insulana* sp. nov., female (TKPM-AR 3489). **D**. *Orchestina sanguinea* Oi, 1955, female (TKPM-AR 3491).

Measurements. Body length 1.35. Carapace length 0.65, width 0.46, height 0.26. Eye diameter: ALE 0.052, PME 0.057, PLE 0.055. Length of legs: I 0.49 + 0.15 + 0.42 + 0.36 + 0.16 = 1.58, II 0.53 + 0.17 + 0.47 + 0.37 + 0.16 = 1.70, III 0.40 + 0.13 + 0.29 + 0.33 + 0.17 = 1.32, IV 0.55 + 0.13 + 0.29 + 0.46 + 0.22 = 1.65. Abdomen length 0.71, width 0.65, height 0.65.

Somatic morphology. Carapace oval, longer than wide, length/width = 1.41. Endites pentagonal, elongate, bearing blackish serrula with fine serration on anterolateral margin (Fig. 20D, I, J). Abdomen oval, as long as wide, length/width = 1.09.

Genitalia. External genitalia (Fig. 20E, G). Genital area pigmented darkly, covered with dense short hairs. AUS and Dc visible as dark longitudinal line, wider posteriorly. Internal genitalia (Fig. 20F, H). AUS longer than wide, constricted subapically. Pr mostly straight, directed laterally, with slightly wrinkled tips. Dc thin, long.

Male

Unknown.

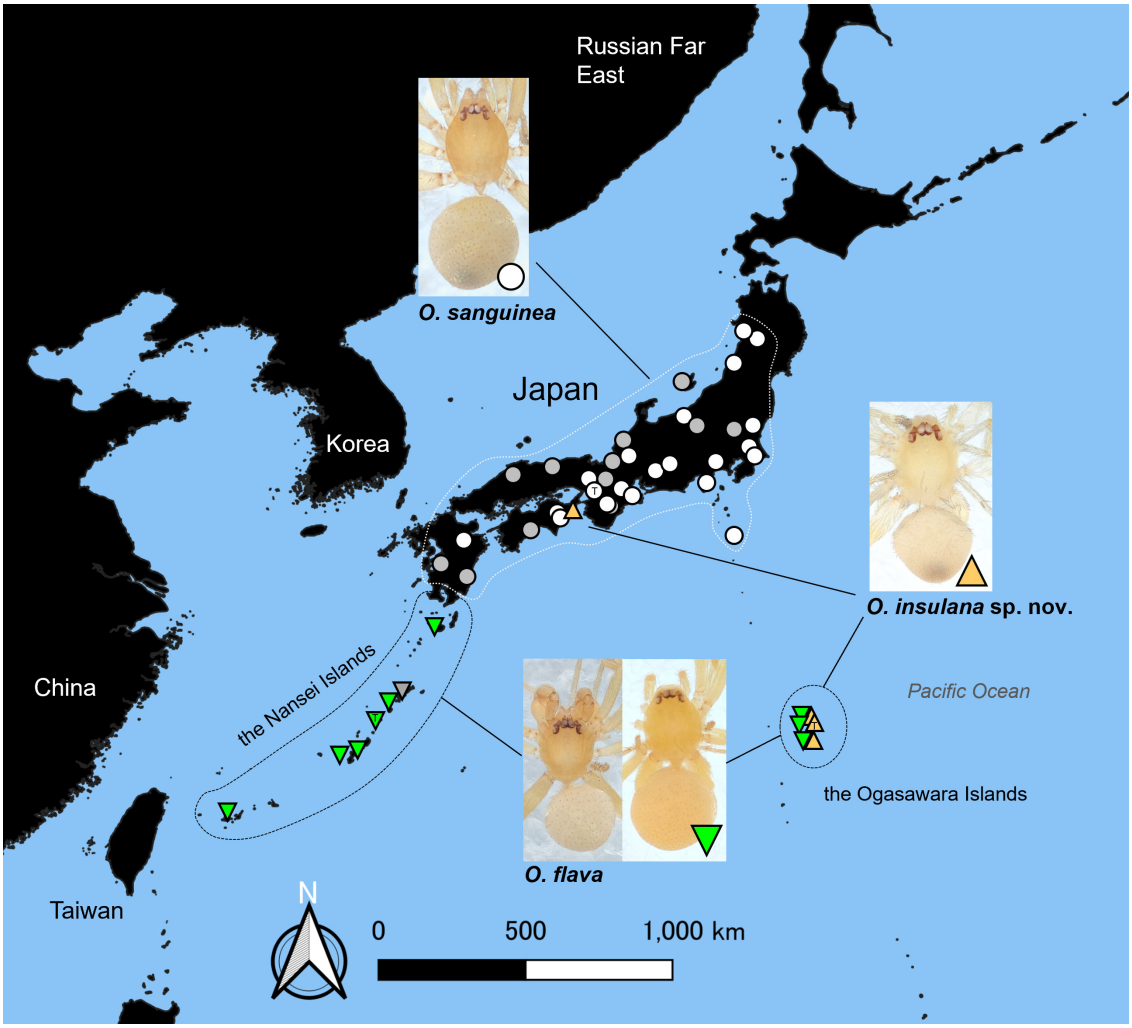

Fig. 22. Map showing distribution of *Orchestina flava* Ono, 2005 (reverse triangles), *O. insulana* sp. nov. (triangles) and *O. sanguinea* Oi, 1955 (circles) in Japan. "T" inside plots indicates a type locality. Plots filled with grey color indicate literature-based records. Uncertain records are omitted.

Distribution

Japan: Honshyu to Kyushu, Sadoga-shima Island and Hachijo-jima Island (Fig. 22).

Remarks

According to the World Spider Catalog (2026), both female and male of *O. sanguinea* have been described. However, the present study revealed that the males of this species had never been discovered and are actually unknown. This misrecognition resulted from the wrong correspondence between the figures and the captions in Yaginuma (1986): the illustration of the male palp of *Ariadna lateralis* Karsch, 1881 (Araneae: Segestriidae) was wrongly captioned as "*Orchestina sanguinea*" (Fig. 8; Table 2).

In the original description, the endites of *O. sanguinea* were described as elongated, leaf-shaped structures with pointed tips (Oi 1955: fig. 3). However, reexamination of the holotype shows that the female endites are unmodified and simple in form (Fig. 20D, I–J), resembling those of other species. Furthermore, the female genitalia illustrated in the original description were most likely depicted in posterior view (Oi 1955: fig. 4), rather than in ventral view, as indicated by the extremely narrow genital area and the absence of the dark longitudinal line formed by the AUS and Dc in the figure.

Ecology

Orchestina sanguinea inhabits litter layers and bushes of forests and parks. This species sometimes co-occurs with *O. okitsui*.

DNA sequences

COI (431 bp): see Table 1.

Preliminary molecular phylogeny

Three specimens of *O. insulana* sp. nov. formed a monophyletic clade with strong nodal support (UFBoot = 98.7; SH-aLRT = 100; Fig. 23) and exhibited low genetic divergence (uncorrected p-distances: 0–0.002; Table 3). *Orchestina flava*, *O. sanguinea*, and *O. insulana* sp. nov. were recovered as a monophyletic clade with moderate to strong nodal support (UFBoot = 90.3; SH-aLRT = 89; Fig. 23). Within the dataset, *Orchestina saltitans* was inferred to be sister to *Orchestina* sp. from South Africa (UFBoot = 94.8; SH-aLRT = 85; Fig. 23) rather than to *O. okitsui*.

Discussion

Taxonomic issues of Japanese *Orchestina* species resolved in this study

Although only three species of *Orchestina* had previously been recorded from Japan, an intensive survey of specimens revealed that nine species are now recognizable in the fauna. This increase results both from resolving earlier taxonomic confusion and misidentifications, and from the discovery of previously unrecognized species.

This study revealed confusion between the true *O. okitsui* and *O. saltitans,* as well as the absence of the male of *O. sanguinea*, both of which arose from miscaptions in Yaginuma (1986). Although the original description of *O. okitsui* accurately illustrated the male palp (Oi 1958: fig. 7; cf. Fig. 2A–B, E–F), the similarity in habitus, characterized by violet-brown net-like markings on the carapace and a pale inverted V-shaped marking on the abdomen, may have led to this misidentification because these features were considered at the time to be unique diagnostic features of *O. okitsui*. However, such coloration and markings are now known to be widespread among many *Orchestina* species (e.g., Tong & Li 2011; Henrard & Jocqué 2012; Izquierdo & Ramírez 2017). Furthermore, Oi (1958) did not describe the morphology of the male's endites, which is currently recognized as an important diagnostic character in

Orchestina. In this study, the morphology of the endites of *O. okitsui* is described for the first time, and its shape is shown to be clearly distinguishable from that of *O. saltitans* (Figs 1E–F vs 6E–F), despite their similar general appearances. Their distant relationships were also suggested from the molecular data (Fig. 23).

Native and non-native *Orchestina* species in Japan

This study also indicates that several synanthropic introduced species may be present in Japan. *Orchestina saltitans* and *O. pavesii* are strongly suspected to have been introduced artificially, based on their known distributions and association with synanthropic habitats. *Orchestina saaristoi*, native to central Africa (Henrard & Jocqué 2012), is likewise considered non-native in Japan. In Africa, this species inhabits the canopies of old palm plantations and secondary forests (Henrard & Jocqué 2012), whereas in Japan its occurrences are limited to low coastal vegetation or small islands (Fig. 14). As the habitat of *O. saaristoi* in Japan is not closely associated with synanthropic environments such as ports, its pathway of introduction remains unclear. As for *O. colubrina*, it may be either a natural inhabitant or an opportunistically introduced species from China. Finally, *O. nojimai* sp. nov. shares its genital morphology with American rather than Oriental species, strongly suggesting that it is an introduced taxon. Although this species was collected in an outdoor environment, further investigation is needed to clarify its habitat preferences and distribution range.

Therefore, at least four *Orchestina* species, *O. flava, O. insulana* sp. nov., *O. okitsui* and *O. sanguinea* can currently be confirmed as native to Japan. The species diversity and the proportion of native species in *Orchestina* is relatively low in Japan compared with those on the tropical region of the neighboring Oriental continent. The results demonstrate that the species composition of the Japanese oonopid fauna is notably influenced by the presence of introduced species (Ono 2011; Suzuki *et al.* 2023; Suzuki & Hisasue 2024), requiring continuous faunistic survey.

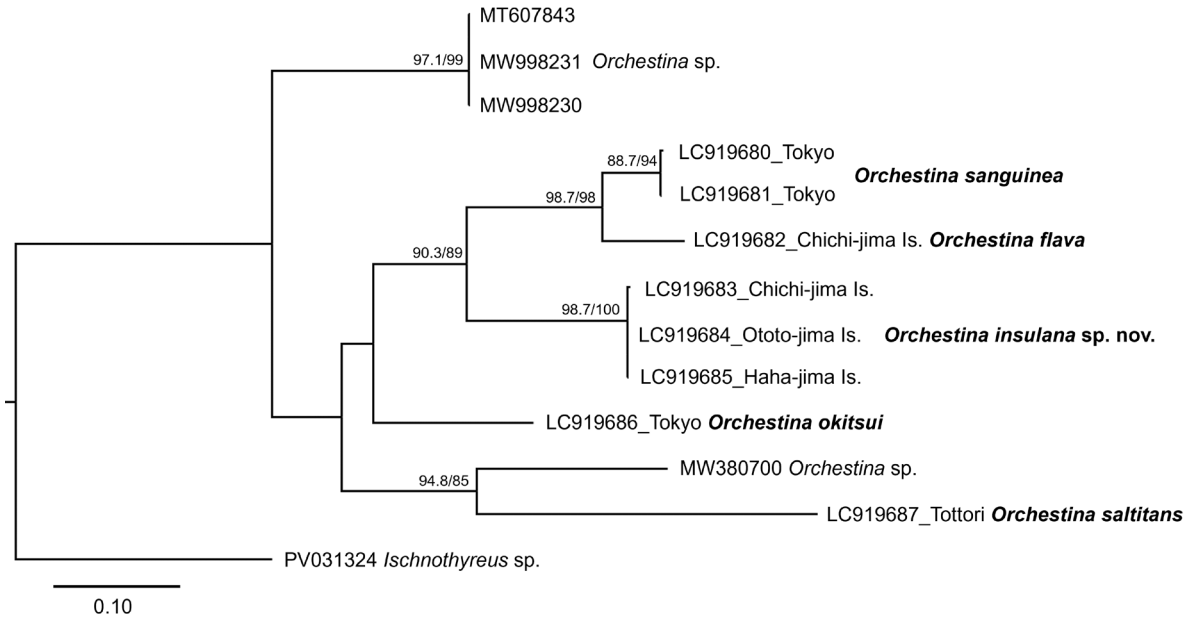

Fig. 23. Maximum-likelihood phylogeny of Japanese species of *Orchestina* Simon, 1882 examined in this study and related taxa based on partial mitochondrial COI sequences. Ultrafast bootstrap (UFBoot) and SH-aLRT support values (> 80%) are indicated at each node.

Table 3. Uncorrected p-distances between partial mt-COI sequences among species of *Orchestina* Simon, 1882 and a related taxon.

		1	2	3	4	5	6	7	8	9	10	11	12
1	MW380700 *Orchestina* sp.	–	–	–	–	–	–	–	–	–	–	–	–
2	MT607843 *Orchestina* sp.	0.217	–	–	–	–	–	–	–	–	–	–	–
3	MW998230 *Orchestina* sp.	0.217	0.000	–	–	–	–	–	–	–	–	–	–
4	MW998231 *Orchestina* sp.	0.217	0.000	0.000	–	–	–	–	–	–	–	–	–
5	LC919680 *O. sanguinea*	0.194	0.193	0.193	0.193	–	–	–	–	–	–	–	–
6	LC919681 *O. sanguinea*	0.191	0.191	0.191	0.191	0.002	–	–	–	–	–	–	–
7	LC919682 *O. flava*	0.205	0.193	0.193	0.193	0.091	0.088	–	–	–	–	–	–
8	LC919683 *O. insulana* sp. nov.	0.211	0.188	0.188	0.188	0.156	0.153	0.151	–	–	–	–	–
9	LC919684 *O. insulana* sp. nov.	0.208	0.186	0.186	0.186	0.153	0.151	0.149	0.002	–	–	–	–
10	LC919685 *O. insulana* sp. nov.	0.208	0.186	0.186	0.186	0.153	0.151	0.149	0.002	0.000	–	–	–
11	LC919686 *O. okitsui*	0.191	0.167	0.167	0.167	0.170	0.167	0.172	0.179	0.177	0.177	–	–
12	LC919687 *O. saltitans*	0.214	0.212	0.212	0.212	0.214	0.212	0.216	0.221	0.219	0.219	0.226	–
13	PV031324 *Ischnothyreus* sp.	0.237	0.219	0.219	0.219	0.228	0.228	0.233	0.235	0.235	0.235	0.233	0.228

Although several introduced species have been confirmed, they are currently presumed to have low invasiveness toward native *Orchestina* species in Japan. This is because these introduced species occupy microhabitats (e.g., coastal grasslands or inside buildings) that are largely separated from those of native species (e.g., forest undergrowth or litter layers). However, if these species continue to expand their habitat ranges and increase in population density in the future, they may potentially exert negative effects on the native oonopid fauna (Brescovit *et al.* 2019; Suzuki *et al.* 2023).

Description in *Orchestina* species on the basis of a single sex

Approximately forty-five percent of the *Orchestina* species were described based on a single sex, and the opposite sex is still unknown (World Spider Catalog 2026). Specifically, 33 species are known only from males, and 49 species are only from females. This situation makes it challenging to distinguish unknown species of a single sex from described species for which the same sex is unknown. Based on the described species, the general appearance, including somatic coloration and markings, is usually similar between males and females of the same species. However, these characters are not species-specific and therefore do not provide sufficient evidence to conclusively associate males and females of undescribed species (e.g., Izquierdo & Ramírez 2017). In addition, most *Orchestina* species do not share species-specific external morphological characters between sexes, such as modified chelicerae or

endites, which makes it difficult to correctly associate males and females when multiple undescribed species sharing similar general appearances are collected from the same locality (Izquierdo & Ramírez 2017).

In this study, two new species for which males remain unknown, *O. insulana* sp. nov. and *O. nojimai* sp. nov., were carefully compared with congeners lacking described females based on general morphology. For *O. insulana*, COI sequences were analyzed in addition to morphological characters and revealed a clear genetic divergence from other Japanese congeners (Fig. 23). However, COI sequences of *O. insulana* could not be compared with those of overseas species known only from males because DNA barcode data for such taxa are currently unavailable. The accumulation and comprehensive organization of barcode data will be essential for accurate male–female matching in this species-rich genus, in which many species have been described based on a single sex.

Undiscovered males are often attributable to insufficient effort on field sampling, but some cases may reflect biological factors such as parthenogenesis (Morgan-Richards *et al.* 2010). Although parthenogenesis is extremely rare among spiders, one case is known in oonopids: *Triaeris stenaspis* Simon, 1892, which produces offspring without mating despite females developing genitalia (Korenko *et al.* 2009). In the case of *O. sanguinea*, numerous females have been collected from a wide range of Japan (Fig. 22) since the original description, yet no males have been recorded. This suggests that males of this species either occur at very low population densities compared with other *Orchestina* species in Japan, or that the species does not produce males.

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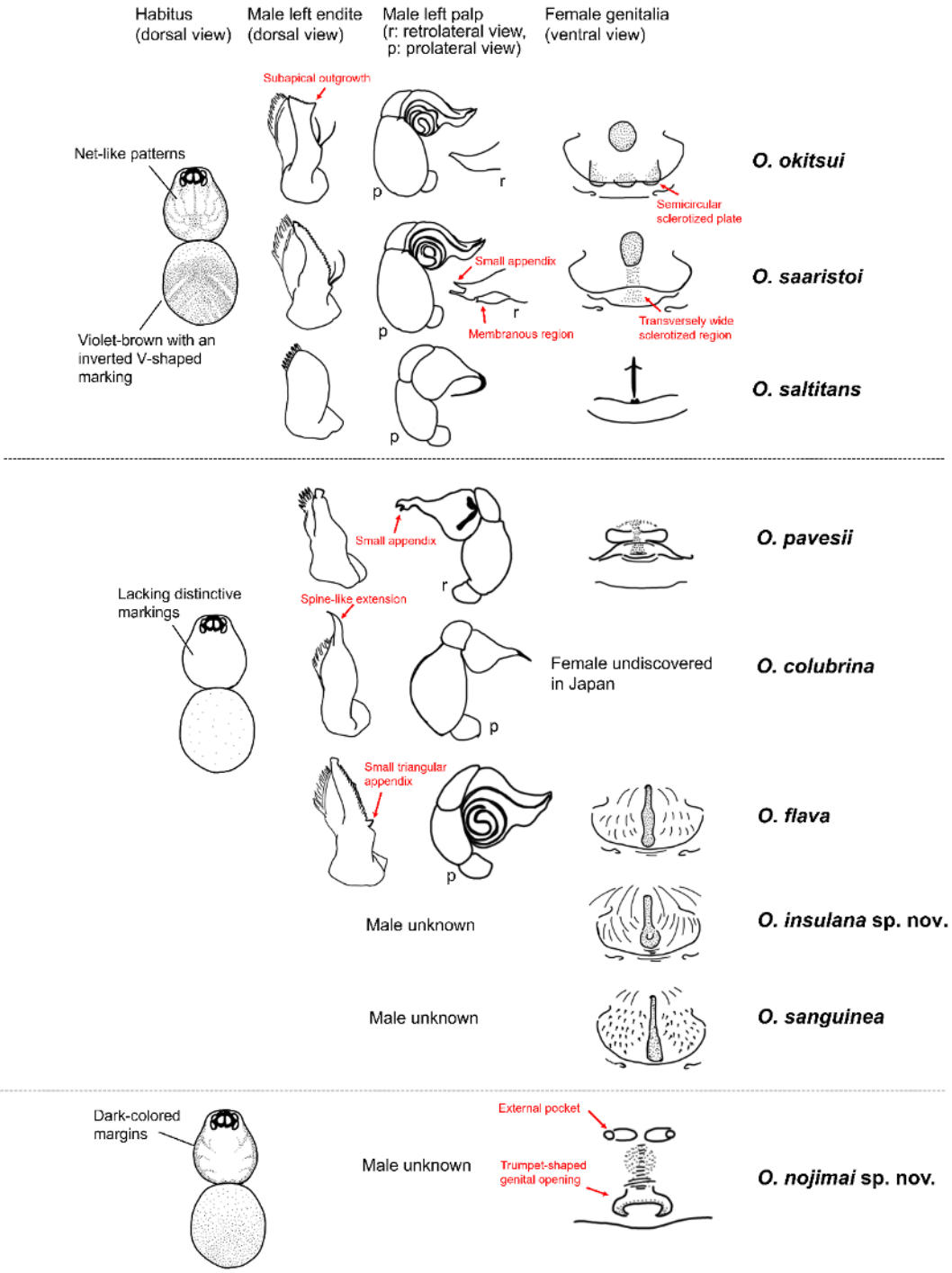
Appendix



Appendix 1. Graphical character matrix of the Japanese species of *Orchestina* Simon, 1882.