European Journal of Taxonomy 947: 248–267
https://doi.org/10.5852/ejt.2024.947.2633
ISSN 2118-9773
www.europeanjournaloftaxonomy.eu
2024 · Kim J.-K. *et al.*

Research article

urn:lsid:zoobank.org:pub:D404A79E-E10C-4B42-817B-8A6A635A32AA

First record of the genus *Lissocnemis* Kohl, 1907 (Insecta: Hymenoptera: Pompilidae: Ctenocerinae) from Korea, with a new species and an unrecorded species

Jeong-Kyu KIM[1], Akira SHIMIZU[2,*] & James P. PITTS[3]

[1]Department of Bio Environment Health, Dongnam Health University, Suwon-si, Gyeonggi-do, 16328 Korea.
[2]Department of Biological Science, Tokyo Metropolitan University, Hachioji, Tokyo, 192-0397 Japan.
[2]Research Institute of Evolutionary Biology, Inc., Setagaya-ku, Tokyo, 158-0098 Japan.
[3]Department of Biology, Utah State University, Logan, UT, 84322-5305 USA.

[*]Corresponding author: aquilashimizu7@gmail.com
[1]Email: hymjkk@dongnam.ac.kr
[3]Email: james.pitts@usu.edu

[1]urn:lsid:zoobank.org:author:9202D5DB-0D26-4100-9D3F-C22CD0DA8D07
[2]urn:lsid:zoobank.org:author:F015CF83-2089-4DFF-AF69-535579E5307F
[3]urn:lsid:zoobank.org:author:9B4EC38-0687-4650-9F0E-AF2324459E10

Abstract. The genus *Lissocnemis* Kohl, 1907 of the subfamily Ctenocerinae is recorded from Korea for the first time. The diagnosis and characteristics of the genus, description of a new species, *L. koreana* Kim & Shimizu sp. nov. and redescription of another species, *L. brevipennis* hitherto known from Southeast Asia and Japan, are presented. The biogeographical distribution of the genus is discussed. *Cryptosalius* Turner, 1917 (type species: *Pseudagenia rava* Bingham, 1896; in part) and *Dinagenia* Banks, 1934 (type species: *D. apollo* Banks, 1934) are synonymized with *Lissocnemis* and the following new combinations are made: *Lissocnemis tonkinensis* (Turner, 1920) comb. nov. (= *Cryptosalius tonkinensis* Turner, 1920); *Lissocnemis apollo* (Banks, 1934) comb. nov. (= *Dinagenia apollo* Banks, 1934); and *Lissocnemis satyrus* (Banks, 1938) comb. nov. (= *Dinagenia satyrus* Banks, 1938). Lastly, *L. satyrus* (Banks, 1938) and *L. nigricoxis* Haupt, 1941 are rendered to be junior synonyms of *L. apollo* (Banks, 1934) comb. nov.

Keywords. *Cryptosalius tonkinensis*, *Dinagenia, Lissocnemis brevipennis*, *Lissocnemis koreana*, systematics.

Kim J.-K., Shimizu A. & Pitts J.P. 2024. First record of the genus *Lissocnemis* Kohl, 1907 (Insecta: Hymenoptera: Pompilidae: Ctenocerinae) from Korea, with a new species and an unrecorded species. *European Journal of Taxonomy* 947: 248–267. https://doi.org/10.5852/ejt.2024.947.2633

Introduction

The subfamily Ctenocerinae Arnold, 1934 occurs throughout Africa and Asia, but has diversified mostly in the Afrotropical Region (Matsumoto *et al.* 2018). In his revision of the African Pompilidae Latreille, 1804, Arnold (1932, 1934, 1952, 1960) treated 16 genera and two subgenera of the subfamily. In contrast, in the Asian Ctenocerinae, only two genera, *Cryptosalius* Turner, 1917 and *Lissocnemis* Kohl, 1907 are known (Turner 1917; Matsumoto *et al.* 2018). Recently, Shimizu *et al.* (2022) described a new species of *Ctenocerus* Dalbohm, 1845 from Sri Lanka and a new species of *Paraclavelia* Haupt, 1930 from Oman in the Southeastern Arabian Peninsula.

The biology of Ctenocerinae is scarcely known. The only record is that of the South African *Paraclavelia caffer* (Kohl, 1886) collected from the nest of a trapdoor spider, *Stasimopus robertsi* Hewitt, 1913 (Ctenizidae Thorell, 1887) (Arnold 1932). Females of species of most Ctenocerinae, typically *Ctenocerus* and *Paraclavelia*, have the following specialized morphological structures: (1) vertex is expanded far beyond postocellar line; (2) frons is broad (much broader than eyes); (3) lower frons is deeply depressed laterally to and ventrally to antennal socket, the depression accommodating antennal scape; (4) clypeus is narrower than lower frons, lamelliform, usually truncate apically, its surface flat or slightly convex with a basal or basolateral depressions that are continuous to lower frontal depression(s); (5) scape is curved outward and concave on its lateral face, which may fit in frontal depression; (6) pronotum is elongate (usually longer than mesoscutum at midline), dorsally flattened and low; and (7) fore tibia has a long, stout, curved spine anteromedially (Shimizu 2022). Most of the features are also found in other genera and species that are known parasitoids of trapdoor spiders, e.g., *Psorthaspis* Bank, 1912 and *Entomobora* Gistel, 1857 (Pompilinae) (Shimizu *et al.* 2021, 2022). Presumably, these structures are employed in prying up the lid of trapdoor spiders' burrow and supporting it on the anterior face of the forward and dorsally directed head and the dorsal face of the pronotum (Shimizu *et al.* 2021, 2022). Furthermore, the species known to be nest-constructing pompilids never possess such modified structures. Most species of Ctenocerinae are thus presumed to be parasitoids of trapdoor spiders living in subterranean burrows with lids.

The genus *Lissocnemis* Kohl, 1907 is a small group of the subfamily. In this genus, the head and pronotal structures are much less modified than in *Paraclavelia* and *Ctenocerus*: the vertex is not very expanded beyond the postocellar line; the frons is only slightly broader than the eyes; the lower frons is not depressed laterally to or ventrally to the antennal socket; the clypeus is not narrower than the lower frons, its surface being not depressed basally or flattened; the scape is only barely curved outward; the pronotum is shorter than the mesoscutum at the midline; and the fore tibia does not bear a long, stout, curved spine anteromesially.

In *Lissocnemis*, only four species have been recorded from the Indo-Malayan and Palearctic Regions (Matsumoto *et al.* 2018): *L. irrasa* Kohl, 1907 [Java (Kohl 1907; Haupt 1935); Jiangsu, Eastern-central China (Haupt 1938)], *L. brevipennis* (Cameron, 1902) [Khasi hills and Assam, India (Cameron 1902; Matsumoto *et al.* 2018); Bali Is., Indonesia (Matsumoto *et al.* 2018); Ninh Binh Province, Vietnam (Matsumoto *et al.* 2018); Honshu, Japan (Matsumoto *et al.* 2018)], *L. nigricoxis* Haupt, 1941 [Sarawak, Borneo (Haupt 1941)], and *L. nigra* Tsuneki, 1989 [Taiwan (Tsuneki 1989)].

In a recent publication, the Korean fauna of spider wasps has been represented by the subfamilies Ceropalinae, Pepsinae, and Pompilinae (The Korean Society of Applied Entomology & the Entomological Society of Korea 2021). In the course of the examination of specimens from Korea, we discovered specimens of two unrecorded species belonging to *Lissocnemis*: *L. brevipennis* and an undescribed species that resembles *L. nigra*.

In this paper, we record Ctenocerinae from Korea for the first time, present the diagnosis and characteristics of *Lissocnemis*, describe the new species *L. koreana* Kim & Shimizu sp. nov., and redescribe *L. brevipennis*. We also discuss the biogeographical distribution of the genus. New synonymies and new combinations are proposed.

Material and methods

Morphological terms, measurements, and photography

The terminology of general morphology, including the wing veins and cells, follows Day (1988) and Shimizu (1994). The following term is also used: antennocular line, the anterior margin of the frons, in dorsal view, from the antennal base to the eye.

Specimens were measured and photographed (and stacked) with an image analyzer and a digital camera equipped in Leica DMS 1000a. Measurements of body parts were taken at their maximally valued portions; those of the head in frontal view are from Evans (1950: fig. 1).

Abbreviations of morphological terms

AOD = anterior ocellus diameter
Fl = flagellomere
FW = fore wing
HW = hind wing
LID = lower interocular distance
MID = middle interocular distance
OOcD = posterior ocellus-occipital carina distance
OOD = ocello-ocular distance
POD = postocellar distance
S1, 2, 3… = the first, second, third, … metasomal sternum
SMC1, 2, 3 = the first, second and third submarginal cells of the fore wing
T1, 2, 3… = the first, second, third, … metasomal tergum
TFD = transfacial distance (head width)
UID = upper interocular distance

Institutional abbreviations

DHU = Dongnam Health University, Suwon, Korea
NHML = Natural History Museum, London, UK
NIBR = National Institute of Biological Resources, Incheon, Korea
NMNH = National Museum of Natural History, Washington D.C., USA
NMNS = National Museum of Nature and Science, Tsukuba, Japan

Abbreviation of Korean province names

CB = Chungcheongbuk-do
CN = Chungcheongnam-do
GB = Gyeongsangbuk-do
GN = Gyeongsannam-do
GW = Gangwon-do
JB = Jeollabuk-do
JN = Jeollanam-do
JJ = Jeju-do

Species of *Lissocnemis* examined

Lissocnemis brevipennis (Cameron, 1902), ♀♂; *L. koreana* Kim & Shimizu sp. nov., ♀♂; *L. nigricoxis* Haupt 1941, ♀♂; *Cryptosalius tonkinensis* Turner, 1920, ♀ (holotype); *Dinagenia apollo* Banks, 1934, ♀ (holotype); and *D. satyrus* Banks, 1938, ♀ (holotype).

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hymenoptera Linnaeus, 1758
Family Pompilidae Latreille, 1804
Subfamily Ctenocerinae Arnold, 1934

Genus ***Lissocnemis*** Kohl, 1907

Lissocnemis Kohl, 1907: 265.

Cryptosalius – Turner 1917: 76. [In part: *C. tonkinensis* Turner, 1920 is transferred to *Lissocnemis* (see the remarks).]

Type species

Salius (*Lissocnemis*) *irrasus* Kohl, 1907, by original designation and monotypic.

Diagnosis

Lissocnemis is distinguished from other genera of Ctenocerinae by the combination of the following features.

Female

Supra-antennal area of frons produced anteriorly (Fig. 3F); pronotum elongate but not longer than mesoscutum at midline (Figs 3G, 4A) with collar deeply depressed below level of dorsum (Fig. 3F); propodeum strongly and transversely rugulose at least posteriorly (Figs 3H, 4C), its declivity rather flattened; hind tibia with minute sparse spines, lacking scale-like integumental projections (teeth) dorsally; apical spines of hind tibia short, of similar length, not splayed out; lateral margin of metasoma, in dorsal view, not very convex (Figs 3I, 4A); T1 petiolate basally (segment narrower immediately behind articulation than its width at articulation itself; Fig. 3G); S2 with distinct transverse groove (Fig. 3J); T6 with long, dense, curled pubescence (Fig. 3K) and short, sparse, fine setae; all tarsal claws bifid, inner ray thicker than outer ray (Fig. 3E); and FW discal cell1 usually with oval, clear spot subbasally (Fig. 4A).

Male

Head in frontal view, rhomboid (Figs 1C, 4E); upper frons broader than lower frons; scape with longitudinal sharp carina ventromedially (Fig. 4E); flagellomeres beneath usually arcuately or angularly produced subbasally (Fig. 4H); propodeum densely punctate and minutely reticulate rugulose (Fig. 1H); fore and mid tarsal claws bifid as in female; hind tarsal claws edentate, acutely bent subapically (Fig. 1E), pair of claws not divergent but subparallel.

Redescription

We redescribe the genus based on the above four species as a complement to Kohl's (1907) description, which was based only on the female of the type species, *L. irrasa*.

Female

Measurements. Medium-sized wasps, 12 to 20 mm in body length.

Head. Broader than high. Vertex moderately convex above level of eye tops (Fig. 3D); juncture of its anterior and posterior faces broadly rounded (Fig. 3F). Ocelli forming right- to obtuse-angled triangle (Fig. 3C). Supra-antennal area of frons, in dorsal view, triangular, trapezoidal, or arcuate. Clypeus short and transverse, as broad as or broader than LID (Figs 3D, 4B), slightly convex medially. Labrum slightly narrower than lower margin of clypeus (Fig. 3D), moderately to fairly exposed beneath clypeus. Antennal socket separated from frontoclypeal suture by much less than half of its own diameter. Scape almost straight, or slightly curved outward with lateral face slightly concave. Malar space very short (Fig. 3F). Mandible short and stout with strong tooth subapically on inner margin. Maxillary palpomeres 4–6 not much longer than palpomere 3. Gena, in dorsal view, rather strongly receding posteriorly but not very thin (Fig. 3C). Occipital suture complete.

Mesosoma. Pronotum with streptaulus complete; declivity nearly vertical and flattened (Fig. 3F), its juncture with dorsum narrowly rounded; dorsum truncate anteriorly (Fig. 3G), rather flattened above, its lateral margin, in dorsal view, barely convex posteriorly, gradually narrowing anteriorly; juncture of dorsum and lateral face narrowly raised or carinate; lateral face vertical and flattened. Mesoscutum narrowly raised posterolaterally; parapsidal sulci divergent anteriorly. Scutellum slightly raised above level of mesoscutum (Fig. 3F). Metapostnotum shorter than half of metanotum at midline (Figs 3H, 4C). Propodeum with dorsum transversely convex, transversely rugulose or reticulate-rugulae (Figs 3H, 4C), spiracles distanced from anterior margin of propodeum by more than its own length; declivity rather flattened (Fig. 3F) but not distinctly delimited from dorsum.

Wings. FW with three SMCs (Figs 3A, 4A). Pterostigma long, its posterior base much longer than cross-vein 2*r-rs*. Marginal cell lanceolate, acute at apex. Second abscissa of vein M (lower part of basal vein) strongly curved. Crossvein 2*rs-m* straight. Cross-vein *cu-a* originating distally to fork of vein *M+CuA* by its own length.

Legs. Fore tarsomere 1 longer than tarsomeres 2–4 combined. Fore femur not swollen, almost as thick as mid femur. Fore tibia lacking stout, decurved spines apicomesially. Both hind coxae separate each other, unlike mid coxae (Fig. 4D). Basal ring on mid and hind femora distinct. Mid and hind tibiae with several short spines laterally and dorsally. Orbiculae small (Fig. 3E), its width ca 0.5× as wide as tarsomere 5; its pecten consisting of fine, straight, divergent setulae, these being much longer than orbiculae themselves. Hind tarsomere 5 with one or a few irregularly arranged spines or without spines beneath.

Metasoma. Rather slender, its width about 1.2 × as wide as mesosoma between tegulae, in dorsal view, not very convex medially. S6 moderately compressed laterally or gently arched.

Male

Measurements. Smaller and slenderer than female, 8 to 13 mm in body length.

Head. Upper frons, vertex, and gena with numerous long erect setae (Figs 1C–D, 4E). Vertex more strongly convex above level of eye tops than in female (Figs 1C vs 3D, 4E vs 4B), chevron-shaped. Inner orbits more or less divergent above. Ocelli forming right- or obtuse-angled triangle (Fig. 1D, G), anterior ocellus greater than posterior ocelli (Figs 1D, 4E). Supra-antennal ledge as in female. Clypeus almost truncate apically (Figs 1C, 4E). Antennal socket more separated from frontoclypeal suture than in female. Scape longer than Fl1 (Fig. 1B), straight or slightly curved outward, produced apicomesially (Fig. 1D), densely setose lateroventrally. Mandible short with strong tooth subapically on inner margin. Gena more gently receding posteriorly and thicker than in female (Fig. 1D vs Fig. 3C).

Mesosoma. Pronotum with declivity vertical, flattened or concave (Figs 1A, 4H), polished; dorsum declivous, gradually narrowing anteriorly (Figs 1G, 4I), with long, dense, erect pubescence and setae. Disc of scutellum triangular (Figs 1G, 4I), more strongly raised than in female. Metapostnotum longer than in female (Figs 1H, 4I). Propodeum with pubescence and setae, both very long and dense posterolaterally (Fig. 1H); dorsum longer than declivity (Fig. 1A), gradually merging into declivity.

Wings. FW discal cell 1 almost lacking clear spot subbasally. Crossvein cu-a originating distally to separation of vein M+Cu by less than its own length (Figs 1F, 4H). HW cross-vein cu-a originating at or distally to fork of vein *M+CuA*.

Legs. Pair of hind coxae closely set unlike in female. Hind tarsomeres narrowing apically. Fore and mid orbiculae smaller than in female; hind orbicula minute.

Metasoma. Slender (Fig. 4G), its width almost equal to or lesser than mesosoma width between tegulae. T1 gradually narrowing (Fig. 1H) or shortly parallel-sided basally. Subgenital plate parallel-sided basally (Fig. 2A), gradually narrowing posteriorly, truncate or rounded apically. Genitalia with paramere short (Figs 2B, 5B), wedge-shaped apically, not exceeding beyond apex of digitus volsellaris; digitus volsellaris broadened apically, club-shaped; basal hooklet single; parapenial lobe variable in shape, not exceeding beyond apex of aedeagus.

Distribution

South Asia (India), Southeast Asia (Singapore, Vietnam, Java, Borneo, Philippines), and East Asia (Taiwan, Eastern-central China, South Korea, Japan).

Remarks

AS examined the holotype of *Cryptosalius tonkinensis* (♀, Chapa, Tonkin, May and June 1916) deposited in the collection of the NHML and concluded that the species should belong to *Lissocnemis*. We propose the following nomenclatural change: *Lissocnemis tonkinensis* (Turner, 1920) comb. nov. = *Cryptosalius tonkinensis* Turner, 1920.

Dinagenia Banks, 1934 (type species: *D. apollo* Banks, 1934) includes two species, *D. apollo* Banks, 1934 from the Philippines and *D. satyrus* Banks, 1938 from Singapore. Haupt (1938), Matsumoto *et al.* (2018) and Michael C. Day (unpubl.) pointed out the genus was probably a junior synonym of *Lissocnemis*. JPP examined the holotypes of *D. apollo* (♀, "Surigao Mindanao Baker / *Dinagenia apollo* Bks type / Type No. 51162 U.S.N.M. / USNMENT 01546711 / *Lissocnemis apollo* Bks. ♀ det.M.C.Day, 1977") and *D. satyrus* (♀, "Singapore Coll. Baker / *Dinagenia satyrus* Bks type / Type No. 56021 USNM / USNMENT 01559147 / 17915 / *Lissocnemis apollo* Banks ♀ det.M.C.Day, 1977") deposited in the collection of the NMNH and concluded that *Dinagenia* should be a junior synonym of *Lissocnemis*. As such, these two species become new combinations in *Lissocnemis*: *Lissocnemis apollo* (Banks, 1934) comb. nov. (= *Dinagenia apollo* Banks, 1934) and *Lissocnemis satyrus* (Banks, 1938) comb. nov. (= *Dinagenia satyrus* Banks, 1938). Furthermore, close examination of holotype material has revealed that *Lissocnemis nigricoxis* Haupt, 1941 and *Lissocnemis satyrus* (Banks, 1938) comb. nov. are junior synonyms of *Lissocnemis apollo* comb. nov.

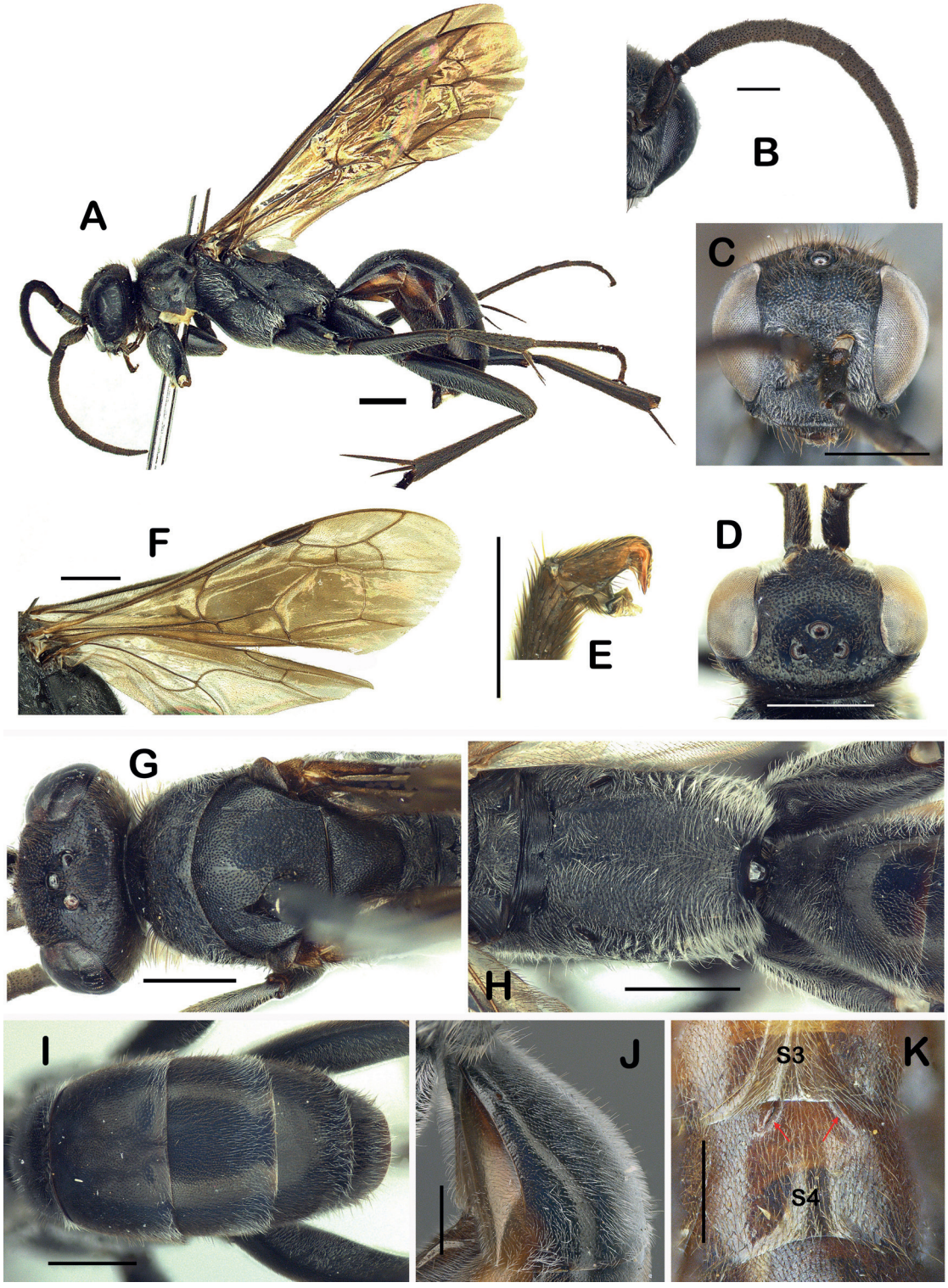

Fig. 1. *Lissocnemis koreana* Kim & Shimizu sp. nov., ♂. **A–J**. Holotype, ♂ (NIBR). **K**. Paratype, ♂ (DHU) from Gajwa-dong, Jinju-si, GN, Korea. **A**. Whole body, lateral view. **B**. Antenna. **C**. Head, frontal view. **D**. Head, dorsal view. **E**. Hind tarsal claw, lateral view. **F**. Fore and hind wings. **G**. Head and thorax, dorsal view. **H**. Posterior part of mesosoma and T1, dorsal view. **I**. Metasoma, dorsal view. **J**. T1, lateral view. **K**. S3–S4, ventral view (red arrows: a pair of linear oblique tubercles on S4). Scale bars = 1mm.

Lissocnemis koreana Kim & Shimizu sp. nov.
urn:lsid:zoobank.org:act:62EF7F7A-5642-48CA-A8A5-E4BCB5403C01
Figs 1–3

Diagnosis

The female closely resembles *L. nigra* in that the body and legs are almost black and FW is clouded with dark brown (photos of the holotype of *L. nigra*: http://n2t.net/ark:/65665/34f86a418-891c-4ad3-930e-51495fc57b4a). However, they are easily distinguished by the colour of pubescence on the body. Except for the areas covered with dense whitish pubescence and setae, pubescence on the front, mesosoma and metasoma is reddish in *L. koreana* but whitish in *L. nigra*. The scape, pedicel, Fl1–2, and basal half of Fl3 dorsally have dense appressed whitish pubescence in *L. koreana* (Fig. 3B), but such pubescence is lacking or at most sparse in *L. nigra*. The wings are much darker in *L. nigra* than in *L. koreana*. The female and male have the hind tibia with a longitudinal groove along the upper margin of the inner brush. The male is unique in having a pair of short, oblique, linear tubercles on S4 subbasally (Fig. 1K, red arrows).

Etymology

The specific epithet is derived from its type locality, Korea.

Type material

Holotype

SOUTH KOREA • ♂; "San 77-9, Bongam-ri Yeomsan-myeon, Yeonggwang-gun, JN, Kr 2020.viii.30 JK Kim", "Holotype Lissocnemis koreana Kim et Shimizu"; NIBR.

Paratypes

SOUTH KOREA • 1 ♂; Goseong-ri, Sindong-myeon, Jeongseon-gun, GW; 27 Jul. 2007; J.K. Kim leg.; DHU • 1 ♀; Yesan-gun, CN; 1 Aug. 1936; S.W. Jeon leg.; NMNS • 1 ♀; Mt Gayasan, Daegok-ri, Haemi-myeon, Seosan-si, CN; 21 Jun.–27 Jul. 2011; J.K. Kim leg.; Malaise trap; DHU • 1 ♂; National Institute of Ecology, Songnae-ri, Maseo-myeon, Seocheon-gun, CN; 36°01′47.19″ N, 126°43′35.77″ E; 16 Jun.–5 Jul. 2017; O.C. Kwon leg.; Malaise trap; DHU • 1 ♂; same data as for preceding; 10–17 Aug. 2020; Malaise trap; DHU • 2 ♂♂; Sangpan-ri, Songnisan-myeon, Boeun-gun, CB; 36°01′47.19″ N, 126°43′35.77″ E; 25 Jun.–9 Jul. 2018; S. Yang leg.; Malaise trap; DHU • 2 ♂♂; Godang-ri, Unju-myeon, Wanju-gun, JB; 36°02′.08.35″ N, 127°20′35.94″ E; 18 Aug.–1 Sep. 2017; J.K. Kim leg.; Malaise trap; DHU • 3 ♂♂; Dodeok-ri, Angye-myeon, Uiseong-gun, GB; 36°25′.49.02″ N, 128°27′35.70″ E; 24 May–6 Jun. 2017; O.C. Kwon leg.; Malaise trap; DHU • 1 ♂; same data as for preceding; NMNS • 2 ♂♂; same data as for preceding; 6–21 Jun. 2017; Malaise trap; DHU • 1 ♂; Ondang-ri, Gwanggeui-myeon, Gurye-gun, JN; 35°17′17.77″ N, 127°26′40.03″ E; 6–21 Jun. 2017; Malaise trap; DHU • 2 ♂♂; same data as for preceding; 28 Jun.–5 Jul. 2020; Malaise trap; DHU • 2 ♂♂; Gajwa-dong, Jinju-si, GN; 30 Jun.–7 Jul. 1987; J.S. Park leg.; Malaise trap; DHU • 4 ♂♂; same data as for preceding; 7–14 Jul. 1987; Malaise trap; DHU • 3 ♂♂; same data as for preceding; 25 Aug.–1 Oct. 1987; Malaise trap; DHU • 1 ♂; same data as for preceding; 1–8 Sep. 1987; Malaise trap; DHU • 5 ♂♂; same data as for preceding; 24–30 Jun. 1989; Malaise trap; DHU • 1 ♂; same data as for preceding; 1–8 Jul. 1989; Malaise trap; DHU • 1 ♂; same data as for preceding; 8–14 Jul. 1989; Malaise trap; DHU • 1 ♂; same data as for preceding; 26 Aug.–1 Sep. 1989; Malaise trap; DHU • 2 ♂♂; same data as for preceding; 2–8 Sep. 1989; Malaise trap; DHU.

Description (features of the holotype are given in parentheses)

Male

Measurements. Length: body 7.5–12.2 (12.0) mm; FW 7.0–10.0 (9.8) mm.

Colouration. Body and appendages mostly black (Fig. 1A). Antenna greyish beneath. T1 below lateral crease, T2 laterally and S1–2 translucent dark reddish brown (Fig. 1A, J), T7 creamy. Fore tibial spur yellowish brown basally, dark brown apically; mid and hind tibial spurs dark brown. Apical half of mandible dark rufous. Wings translucent with brownish tint, iridescent depending on incident lighting angle.

Pubescence and setae. Clypeus, lower frons, mandible basally, pronotum, pro-, meso- and metapleura, mesosternum, propodeum, coxae, lower half of tibiae, T1 and T6–7 with dense, whitish grey to sericeous pubescence, that on clypeus, lower frons, mesosoma laterally and ventrally, and coxae being long. Mesonotum, T2–5, and sterna with short, reddish-brown pubescence. T1–3 with short, whitish grey pubescence posterolaterally. Scape, pedicle, upper half of femora, tibiae, and tarsomeres with short, appressed, yellowish-brown pubescence. Upper frons, scape basoventrally, and pronotum dorsally and anterolaterally with dense, erect, brown setae.

Integumental sculpture. Upper frons (Fig. 1C–D), clypeus, pro-, meso- and metanota (Fig. 1G–H), mesopleuron, and lower metapleuron with dense punctures, these on upper frons larger than those on other parts. Metapostnotum with a few transverse striae anteriorly, several oblique striae laterally, and shallow smooth depression posteromedially (Fig. 1H). Upper metapleuron with fine, oblique striae and small punctures between them. Propodeum strongly punctate-rugulose medially and punctate-reticulate laterally. Metasomal terga with minute setiferous pores.

Head. 1.1–1.2 (1.2) × as broad as high. MID 0.54–0.58 (0.54) × TFD. Vertex strongly convex above level of eye tops, chevron-shaped in frontal view (Fig. 1C). Frontal sulcus forming slit-like smooth line only on lower half of frons, sometimes shallowly impressed line on upper half of frons. Antennocular line inclined, supra-antennal tubercle, in dorsal view, broad trapezoid (Fig. 1D). Inner orbits weakly sinuous, slightly emarginate above middle, closest to each other across middle of antennal sockets, slightly divergent above and convergent below. LID 0.92–0.97 (0.97) × UID. POD:OOD:OOcD 0 = 1:1.1–1.2 (1.2) :1.3–1.8 (1.7). Ocellar triangle right-angled (Fig. 1D); anterior ocellus larger than posterior ocelli. Areas anterior to and lateral to anterior ocellus and areas lateral to posterior ocelli smooth and shallowly depressed (Fig. 1D). Clypeus transverse, 2.4–2.6 (2.5) × as broad as long, slightly convex

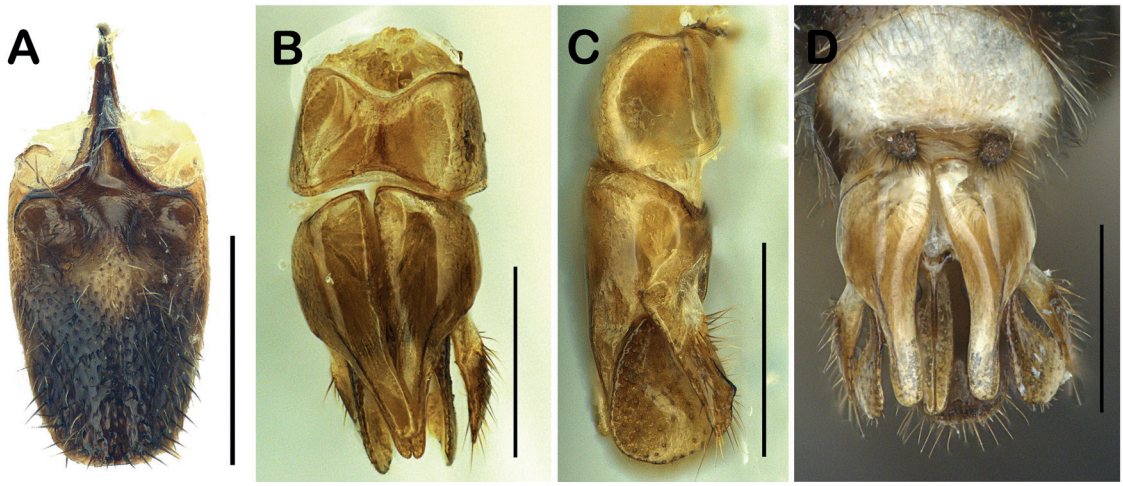

Fig. 2. *Lissocnemis koreana* Kim & Shimizu sp. nov., ♂. **A–C**. Holotype (NIBR). **D**. Paratype (DHU) from Godang-ri, Unju-myeon, Wanju-gun, JB, Korea, subgenital plate and genitalia. **A**. Subgenital plate, ventral view. **B**. Genitalia, dorsal view. **C**. Paramere and digitus volsellaris, lateral view. **D**. T7 and genitalia, dorsal view. Scale bars = 1 mm.

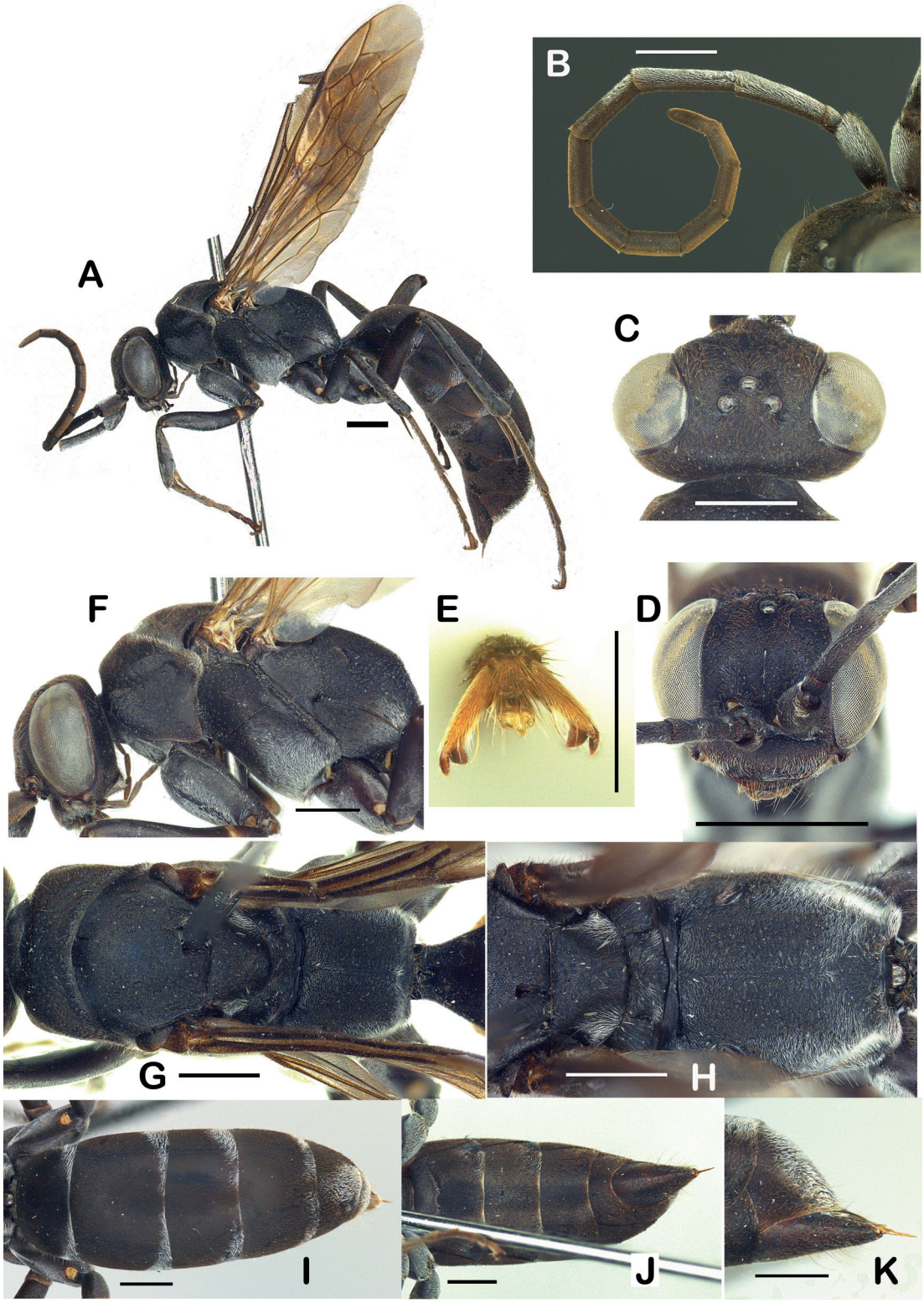

Fig. 3. *Lissocnemis koreana* Kim & Shimizu sp. nov., paratype, ♀ (DHU), from Mt Gayasan, Daegok-ri, Haemi-myeon, Seosan-si, CN. **A**. Whole body, lateral view. **B**. Antenna. **C**. Head, dorsal view. **D**. Head, frontal view. **E**. Hind pretarsus, posterior view. **F**. Head and mesosoma, lateral view. **G**. Mesosoma, dorsal view. **H**. Posterior part of mesosoma, dorsal view. **I**. Metasoma, dorsal view. **J**. Metasoma, ventral view. **K**. Apical part of metasoma, lateral view. Scale bars = 1 mm.

medially with narrow apical rim not distinctly depressed but smooth; apical margin very slightly emarginate medially. Antenna stout (Fig. 2B); scape scarcely curved outward, triangularly produced apicomesially (Fig. 1D); scape:pedicel:Fl1:Fl2 = 1.4–1.7 (1.5):0.46–0.53 (0.47):1:1.1–1.2 (1.1); Fl1 1.3–1.5 (1.5) × as long as broad; Fl11 2.7 × as long as broad, 1.3–1.4 (1.3) × as long as Fl10. Gena, in dorsal view, rather strongly receding posteriorly (Fig. 1D) but not thin, in profile, 0.41–0.48 (0.44) × as broad as eye medially, slightly narrower below than above.

Mesosoma. Pronotum with declivity flattened, smooth, and almost vertical (Fig. 1A); dorsum, in dorsal view, distinctly narrowing cephalad, truncate anteriorly; posterior margin gently arcuate as a whole but angulate at middle (Fig. 1G). Scutellum and metanotum distinctly convex (Fig. 1A); metanotum depressed laterally to disc, truncate posteromedially. Metapostnotum 0.51–0.60 (0.55) × as long as metanotum at midline, its posterior margin weakly constricted both medially and in front of spiracle, with very small, smooth, triangular depression posteromedially (Fig. 1H). Propodeal dorsum nearly parallel-sided, gently convex, gradually merging into declivity.

Wings (Fig. 1F). FW discal cell 1 with faint hyaline spot subbasally; pterostigma and veins dark brown. Pterostigma 4.0–4.3 (4.2) × as long as high. Marginal cell distanced from wing tip by 0.42–0.48 (0.44) × its own length. 2*r-rs* short, 0.62–0.69 (0.63) × as long as height of pterostigma. SMC2:SMC3 = 1:0.64–0.88 (0.65) on vein *Rs*, 1:0.92–1.1 (0.96) on vein *M*; SMC2 0.52–0.58 (0.53) × as high as long, narrowed on vein *Rs* by 0.74–0.80 (0.77) × its own length on vein *M*, receiving cross-vein *1m-cu* at its basal 0.50–0.56 (0.52); SMC3 × 0.68–0.73 (0.70) as high as long, narrowed on vein *Rs* by 0.56–0.68 (0.63) × its own length on vein *M*, receiving cross-vein *2m-cu* at its basal 0.48–0.63 (0.51). Crossvein *cu-a* originating distally to point of separation of vein *M+CuA* by almost half of its own length, oblique to vein *A*. HW cross-vein *cu-a* originating slightly posteriorly to separation of vein *M+CuA*.

Legs. Mid tibia with several short spines dorsally. Hind tibia with spines dorsally, these being weaker and sparser than those on mid tibia. Longer spur of hind tibia 0.71–0.77 (0.73) × hind tarsomere 1. Hind tibial brush very narrow (nearly half of AOD) and linear throughout, its upper groove deeply impressed. Hind tarsomeres slightly compressed laterally, narrowing apically. Fore and mid tarsal claws bifid; hind tarsal claw edentate (Fig. 1E), acutely bent subapically, pointed at apex, a pair of claws closely set, parallel to each other or slightly divergent.

Metasoma. Fusiform (Fig. 1I), narrower than mesosoma, its width ca 0.9 × as wide as mesosoma measured between posterior ends of mesoscutum. T1 gradually narrowing anteriorly but not petiolate; lateral crease finely impressed on basal 0.65–0.80 (0.70) of T1, slightly curved (Fig. 1J).

Subgenital plate and genitalia (Fig. 2). Subgenital plate transversely convex with short setae on entire surface and longer setae on apicolateral and apical margins (Fig. 2A); lateral margins subparallel in basal half and gently narrowed toward apex, apicolateral corners rounded, almost truncate apically. Paramere short (Figs 2B–D), not exceeding beyond apex of digitus volsellaris, wedge-shaped apically, setose except basally; digitus volsellaris club-shaped (Fig. 2C) but triangularly subacute apically (Fig. 2B), scattered with micropores, extending beyond apex of aedeagus; parapenial lobe nearly parallel-sided (Fig. 2D), broad and rounded apically, not extending beyond apex of aedeagus; aedeagus, in dorsal view, nearly parallel-sided (Fig. 2D), slightly convex in middle.

Female

Measurements. Body length 14.5–16.5 mm, FW length 10.4–11.0 mm.

Colouration. Body and legs mostly black (Fig. 3A). Ventral faces of Fl3–10 reddish brown (Fig. 3B). Inner side of hind tibia except apically, tarsomere 5, and all tarsal claws reddish brown; outer side of hind tibia dark rufous; tibial spurs dark brown. FW clouded with brown, iridescent on incident lighting

angle; pterostigma and veins dark brown; discoidal cell 1 with ill-defined clear spot subbasally. HW transparent with brownish tint.

Pubescence and setae. Body and appendages with short, dense, appressed pubescence, these being mostly coppery (Fig. 3C–D, F, I), silvery white on clypeus apicolaterally (Fig. 3D), scape mesially (Fig. 3B), pedicel, Fl1–2, basal half of Fl3 anteriorly, mandible basally, propleuron (Fig. 3F), lower mesopleuron except anterodorsally and posterodorsally, mesosternum, lower metapleuron posteroventrally, propodeum anteromedially and posterolaterally (Fig. 3H), coxae (Fig. 3F), trochanters, femora except dorsally, tibiae laterally, T1–4 apically (forming narrow apical bands with mesial interruptions; Fig. 3I), T5 medially (Fig. 3I), T6 dorsally (Fig. 3K), S1, S2–3 anteriorly, medially and posteriorly (Fig. 3J), and S4–5 medially. Setae on body mostly short and scarce; vertex, clypeus apically, labrum, mandible, pronotum, T6 laterally, and metasomal sterna with fine, pale brown setae, these on labrum, mandible, T6, and S6 being comparatively long; propleuron, meso- and metapleura ventrally, propodeum laterally (Fig. 3H), coxae, trochanters, and femora ventrally with short, sparse, erect, silvery white setae.

Integumental sculpture. Vertex, frons, clypeus, pro-, meso- and metanota, meso- and metapleura with minute, dense punctures, together with larger, sparser, and irregularly spaced punctures. Side of metanotum with several oblique striae. Metapostnotum with a few transverse striae and median depression. Propodeal dorsum with median groove and reticulate rugulae, these being stronger and coarser posteriorly than anteriorly; declivity granulate medially, arcuately striate laterally.

Head. 1.2 × as broad as high in frontal view (Fig. 3D); MID 0.55 × TFD. Vertex moderately convex above level of eye tops. Antennocular line strongly convex between eyes (Fig. 3C). Lower half of frons protruded anteriorly (Fig. 3F); frontal sulcus distinct, forming smooth line in its lower half, feebly impressed and more broadened in its upper part (Fig. 3D). Inner orbits slightly emarginate above middle, slightly divergent below (Fig. 3D). LID 1.2–1.3 × UID. Lower frons immediately lateral to antennal socket with linear furrow, that being deeper and broader than frontal sulcus. Ocellar triangle right-angled, slightly raised; anterior ocellus larger than posterior ocelli; POD:OOD:OOcD = 1:0.78–0.94:1.7–2.1. Clypeus transverse, slightly broader than LID, 2.6–2.9 × as broad as long, convex medially; apical rim broader medially than laterally, very slightly depressed, subpolished with fine transverse striae; apicolateral corner broadly rounded; apical margin barely convex medially. Labrum gently and arcuately convex apically. Scape barely curved outward (Fig. 3B); scape:pedicel:Fl1:Fl2 = 0.73–0.89:0.20–0.25:1:1.1; Fl1 3.7 × as long as broad, almost as long as UID; Fl11 3.8–3.9 × as long as broad, 1.3–1.4 × as long as Fl10. Gena, in dorsal view, rather strongly receding posteriorly, thinner than in male (Fig. 3C), in profile, 0.27–0.30 × as broad as eye medially, broader below than above (Fig. 3F).

Mesosoma. Pronotal dorsum declivous, truncate anteriorly; declivity almost vertical (Fig. 3F); lateral margins barely convex posteriorly, gradually converging anteriorly (Fig. 3G); posterior margin deeply arcuate, very weakly subangulate at middle (Fig. 3G). Mesoscutum raised posterolaterally with parapsidal sulci divergent anteriorly, deeply impressed posteriorly (Fig. 3G). Disc of scutellum slightly raised above level of mesoscutum. Metanotum lateral to disc depressed, steeply declined posteromedially. Metapostnotum 0.24–0.27 × as long as metanotum at midline (Fig. 3H). Propodeum with lateral margins slightly arcuate (Fig. 3H); dorsum transversely convex, not delimited from declivity (Fig. 3F, H); declivity rather flattened.

Wings. Marginal cell distanced from wing tip by half of its own length. SMC2:SMC3 = 1:0.78–0.89 on vein *Rs*, 1:1.0–1.1 on vein *M*. SMC2 0.58–0.73 × as high as broad, narrowed on vein *Rs* by 0.71–0.84 × its own length on vein *M*, receiving cross-vein *1m-cu* at its basal 0.41–0.43. SMC3 0.55–0.63 × as high as long, narrowed on vein *Rs* by 0.60–0.63 × its own length on vein *M*, receiving cross-vein *2m-cu* in its basal 0.39–0.45, distanced from outer wing margin by 1.4–1.5 × its own length. Cross-vein *2rs-m*

straight. Second abscissa of vein *M* (lower part of basal vein) distinctly curved. Cross-vein *2m-cu* curved outward. Cross-vein *cu-a* originating distally to fork of vein *M+CuA* by its own length, oblique but bent posteriorly, meeting vein *A* perpendicularly. HW cross-vein *rs-m* slightly sinuate, nearly vertical to vein *M*. Cross-vein *cu-a* originating slightly anteriorly to or at separation of vein *M+CuA*.

Legs. Fore tarsomere 1 longer than fore tarsomeres 2–4 combined. Mid and hind tibiae with several short spines laterally and dorsally; apical spines of hind tibia few and short, not splayed out. Longer spur of hind tibia 0.59–0.63 × as long as hind tarsomere 1. Tarsal claws bifid (Fig. 3E).

Metasoma. Its width at posterior ends of T2 1.2 × as broad as mesosoma at posterior ends of pronotum. T1 very shortly petiolate (Fig. 3G).

Distribution

South Korea.

Remark

A pair of subbasal tubercles on S4 are concealed by S3 in the holotype and several male paratypes.

Lissocnemis brevipennis (Cameron, 1902)
Figs 4–5

Salius brevipennis Cameron, 1902: 81, ♀♀ (syntypes), India: N. Khasi [NHML].

Lissocnemis brevipennis (Cameron) – Matsumoto *et al.* 2018: 95–98, ♀, ♂, Japan: Okayama, Hyogo and Osaka Prefectures [NMNS].

Diagnosis

This species is distinctive in having the following features: female body largely black, anterior face of head and a few apical metasomal segments with golden pubescence (Fig. 4A–B); antenna except apically, legs, and a few apical metasomal segments reddish brown; wings dark brown with an oval clear spot in FW discal cell 1 basally (Fig. 4A); male body largely black and covered with conspicuous long white pubescence; all legs mostly reddish brown (Fig. 4H); upper frons with a pair of oblique or arcuate ridge lines (Fig. 4E); and subgenital plate with a pair of deep oval depressions subbasally (Fig. 5A).

Material examined

INDONESIA • 1 ♀; Bali Island; Feb. 1997; NMNS.

JAPAN • 1 ♀; Okura Seashore, Nishiguchi, Nokazaki, Akashi, Hyogo Pref.; 14 Oct. 2017; H. Fukushima leg.; NMNS • 1 ♂; same data as for preceding; NMNS.

SOUTH KOREA • 5 ♂♂; Nature Environ. Res. Park, Bukbang-myeon, Hongcheon-gun, GW; 30 Jun.–11 Jul. 2011; J.K. Kim leg.; Malaise trap; DHU • 1 ♂; Halla Botanical Garden, Yeon-dong, JJ; 33°28′.13.60″ N, 126°29′37.45″ E, JJ; 22 Jul.–6. Aug. 2017; J.K. Kim leg.; Malaise trap; DHU • 1 ♂; Geumoreum, Geumak-ri, Hanlim-eup, JJ; 33°24′.17.13″ N, 126°18′20.00″ E; 23 Jul.–13 Aug. 2017; J.K. Kim leg.; Malaise trap; DHU.

VIETNAM • 1 ♀; Ninh Binh Pr., Cuc Phouong Park; 18 Jul. 2010; H. Kurokawa leg.; NMNS.

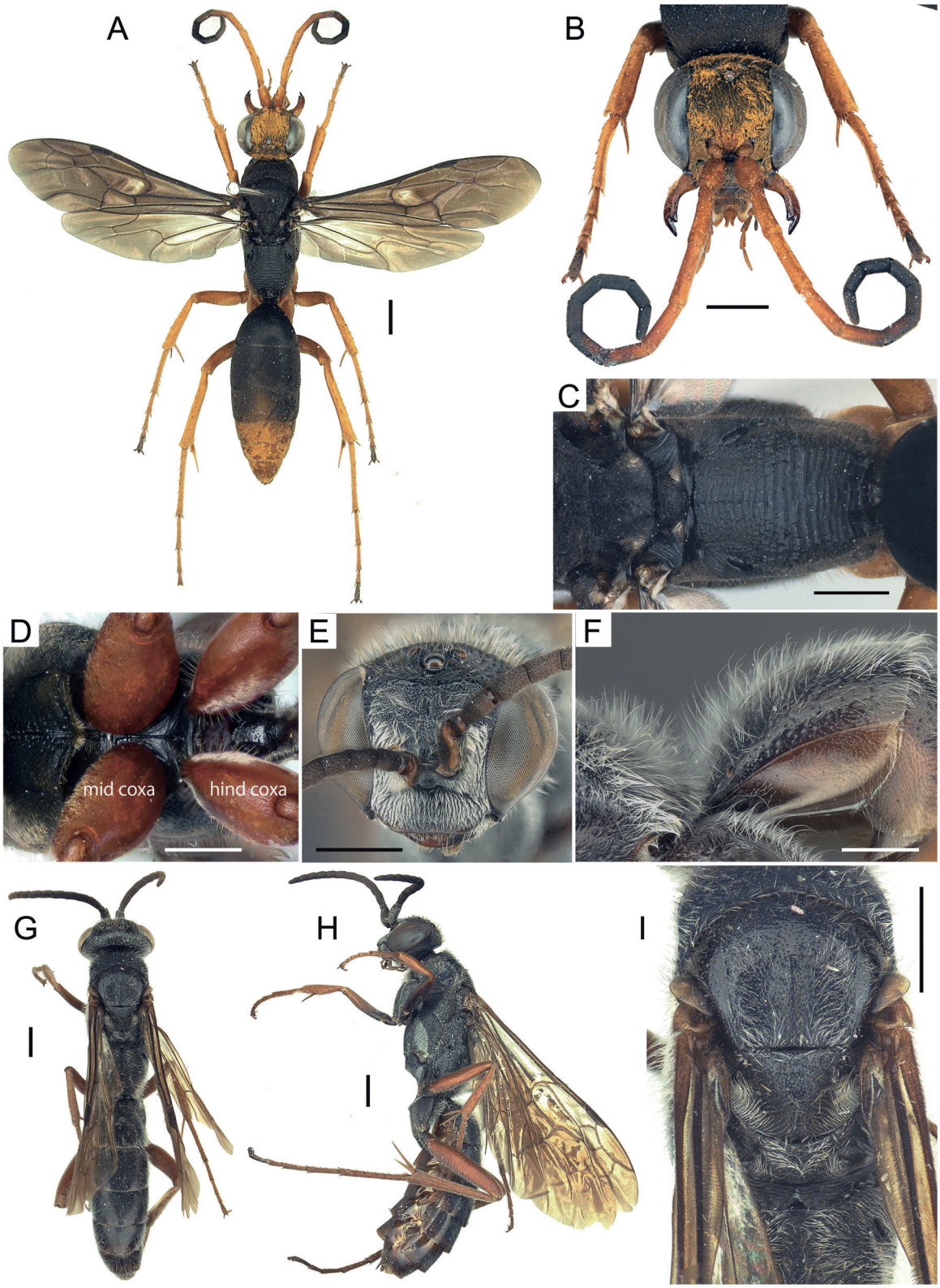

Fig. 4. *Lissocnemis brevipennis* (Cameron, 1902). **A–D**. ♀ (UMUT). **E–I**. ♂ (DHU). **A, G**. Whole body, dorsal view. **B**. Head and antennae, frontal view. **C**. Posterior part of mesosoma, dorsal view. **D**. Mid and hind coxae, ventral view. **E**. Head, frontal view. **F**. T1, lateral view. **H**. Whole body, lateral view. **I**. Mesosoma, dorsal view. Scale bars = 1 mm.

Redescription

Female (based on Indonesian and Japanese specimens)

Measurements. Length: body 13.8–17.5 mm; FW 10.7–11.6 mm.

Colouration. Body largely black. Following orange (Fig. 4A–B): interantennal tubercle, clypeus apically (apical rim dark rufous), labrum, mandible (black basally, dark rufous apically), labiomaxillary complex apically and its palpi, antenna (becoming darker or black apically), all legs (tarsomere 5 darkened), and metasomal segments 4 (apically) to 6. FW deeply infuscate (Fig. 4A). HW weakly infuscate, basal half of basal cell and subbasal cell translucent.

Pubescence and setae. Head, propleuron ventrally, mesosternum posteriorly, legs, T3 medially, T4–6, and S2–6 with appressed, orange to golden pubescence, that on head anteriorly, mesosternum, coxae, and metasomal segments 4–6 being longer and denser than pubescence on other parts. Mesosoma dorsally and laterally, T1–2, and T3 except medially with short, appressed, reddish-brown pubescence. Scutellum and metanotum lateral to their discs with patch of long silvery pubescence. Frons, vertex, gena, labrum, mandible, propleuron, mesosternum, coxae, T6, and metasomal sterna with fine, pale-yellow setae. Pro-, meso-, and metanota dorsally and T1 with short, coppery setae. Propodeum with long, dense, coppery setae laterally.

Integumental sculpture. Head and thorax with minute dense punctures, these on head being mostly covered with pubescence. In addition to these punctures, larger punctures scattered on thorax dorsally and laterally. Metanotum with a few oblique striae laterally. Metapostnotum with a few transverse striae and median deep depression. Propodeum with transverse rugulae, these becoming coarser and stronger posteriorly (Fig. 4C); dorsum with median ridge line interrupted by transverse rugulae; declivity with median vague groove.

Head. 1.2 × as broad as high. Vertex moderately convex above level of eye tops. Frontal sulcus deeply impressed below, evanescent above. Inner orbits slightly emarginate above middle (Fig. 4B), slightly divergent below, LID 1.1–1.2 × UID. Antennocular line moderately inclined. Supra-antennal tubercle, in dorsal view, strongly produced anteriorly, pentagon-shaped. POD:OOD:OOcD = 1:1–1.1:1.6–2.2. Ocellar triangle acute-angled; anterior ocellus larger than posterior ocelli; area anterior to anterior ocellus and that posterolateral to posterior ocellus more or less depressed. Clypeus transverse, 2.3–2.4 × as broad as long, slightly broader than LID, slightly convex; apical rim not depressed, narrowly impunctate and polished; apicolateral corner broadly rounded; apical margin barely concave medially. Labrum well exposed, gently convex apically. Malar space very short and linear. Gena, in dorsal view, rather strongly receding posteriorly but not very thin, in profile, 0.22–0.27 × as broad as eye medially, broader below than above. Scape slightly curved outward; scape:pedicel:Fl1:Fl2 = 1.0–1.1:0.25–0.29:1:1.2–1.3; Fl1 2.9–3.3 × as long as broad, 0.71–0.83 × UID; Fl11 3.0–3.1 × as long as broad, 1.2–1.3 × as long as Fl10.

Mesosoma. Pronotum with declivity almost vertical; dorsum rather flattened longitudinally, in dorsal view, gently narrowing anteriorly; posterior margin arcuate but subangulate medially. Mesoscutum not reflexed but slightly and narrowly raised posterolaterally with parapsidal sulcus deeply impressed, divergent anteriorly. Disc of scutellum slightly raised above level of mesoscutum; scutellum lateral to disc steeply sloped. Metapostnotum slightly depressed, 0.22–0.25 × as long as metanotum at midline (Fig. 4C). Propodeal dorsum rather flattened medially with lateral margins slightly convergent posteriorly (Fig. 4C); declivity as long as dorsum, flattened but not delimited from dorsum.

Wings (Fig. 4A). Marginal cell distanced from wing tip by 0.55–0.59 × its own length. SMC2:SMC3 = 1: 0.63–0.92 on vein *Rs*, 1:0.96–1.2 on vein *M*; SMC2 0.47–0.52 × as high as long, narrowed on vein *Rs* by 0.76–0.81 × its own length on vein *M*, receiving cross-vein *1m-cu* at its basal 0.55–0.59; SMC3

0.60–0.69 × as high as long, narrowed on vein *Rs* by 0.53–0.62 × its own length on vein *M*, receiving cross-vein *2m-cu* at its basal 0.47–0.55, distanced from outer wing margin by 1.2–1.3 × its own length. Crossvein *cu-a* originating distally to point of separation of vein *M+CuA* by more than its own length, almost vertical to vein A. HW cross-vein *rs-m* slightly sinuate; cross-vein *cu-a* originating slightly posteriorly to separation of vein *M+CuA*.

Legs. Mid and hind tibiae with several short spines laterally and dorsally. Hind tibia without longitudinal groove along upper margin of inner brush. Longer spur of hind tibia 0.44–0.56 × as long as hind tarsomere 1. Tarsal claws bifid, inner ray much thicker than outer ray, pointed apically.

Metasoma. T1 with distinct short petiole and strongly arcuate lateral crease.

Male (based on Korean and Japanese specimens)

Measurements. Length: body 8.5–12.5 mm; FW length: 7.3–9.8 mm.

Colouration. Body largely black (Fig. 4G–I). Mandible dark rufous apically. T1 below lateral crease and T2–3 lateroventrally often reddish brown. T6 with large ivory white spot apicodorsally. Legs almost entirely reddish brown (Fig. 4G–H), but in two specimens from Jeju Island, mid and hind femora and tibiae mostly black, at most mid tibia basally and inner lower margin of hind femur reddish brown. Wings translucent with brownish tint.

Pubescence and setae. Body, scape, coxae, trochanters, and femora below covered with dense, appressed, silvery white pubescence, that being long and dense on frons below middle, clypeus, mouthparts basally, gena, pronotum laterally and ventrally, scutellum and metapostnotum laterally, metanotal disc, pro- and mesopleura, lower metapleuron posteriorly, propodeum posterolaterally, and metasomal terga; tibiae and tarsi with sericeous pubescence. Frons, vertex, scape below, gena, pronotum dorsally and lateroventrally, propleuron, upper mesepisternum, propodeum, fore coxa anteriorly, mid and hind coxae above, T1 anteriorly and laterally, T2–6 laterally, and S2–6 with long, erect, silvery white to grey setae. Labrum apically and mandible with light brown setae.

Integumental sculpture. Frons regularly and densely punctate, almost punctate-reticulate. Vertex with punctures irregular in size and spacing, some of them much larger than those on frons. Clypeus with fine and dense punctures smaller than those on frons. Labrum, pronotum, mesoscutum, and mesepisternum scattered with large punctures, together with small, dense punctures. Scutellum and metanotum punctate-reticulate. Metapleuron and metasomal terga polished and minutely punctate, scattered with larger punctures. Propodeum transversely rugulose and punctate-reticulate with narrow or broad median groove, that being interrupted by transverse rugulae.

Head. 1.2–1.3 × as broad as high. Vertex (Fig. 4E) strongly convex above level of eye tops, chevron-shaped. Upper frons with a pair of oblique or arcuate ridge lines, these, in some specimens, being not distinctly raised but merely impunctate smooth lines. Frontal sulcus usually indistinct, at most shortly impressed below. Antennocular line strongly inclined; supra-antennal tubercle, in dorsal view, strongly produced, trapezoid. Inner orbits (Fig. 4E) slightly emarginate above middle, distinctly divergent above. UID 1.2–1.3 × LID. POD:OOD:OOcD = 1:1.3–1.5:1.6–1.9. Ocellar triangle right-angled; anterior ocellus much larger than posterior ocellus. Upper frons shallowly and broadly depressed. Clypeus 2.3–2.6 × as broad as long, slightly convex medially; apical rim narrow, slightly depressed; apical margin slightly concave. Scape barely curved outward, triangularly produced apicomedially. Scape:pedicel:F1:F2 = 1.2–1.4:0.36–0.52:1:1.0–1.1; Fl1 1.6–1.8 × as long as broad; Fl11 2.0–2.2 × as long as broad, 1.2–1.3 × as long as Fl10. Gena, in dorsal view, rather strongly receding posteriorly but thicker than in female, in profile, 2.6–3.3 × as broad as eye medially, of almost same thickness above and below.

Mesosoma. Pronotum with declivity almost vertical (Fig. 4H), slightly concave, smooth and polished, its juncture with dorsum narrowly rounded; dorsum declivous, in dorsal view, gradually narrowing anteriorly (Fig. 4I); posterior margin subangularly emarginate. Mesoscutum with median longitudinal ridge. Metapostnotum 0.47–0.64 × as long as metanotum at midline, slightly constricted both medially and in front of spiracle, with distinct median triangular smooth depression on its apical two-thirds. Propodeum, in dorsal view, arcuately narrowing posteriorly; dorsum, in lateral view, gently sloped and gradually merging into declivity.

Wings. Marginal cell distanced from wing tip by 0.55–0.68 × its own length. SMC2:SMC3 = 1:0.93–1.2 on vein *Rs*, 1:1.0–1.1 on vein *M*; SMC2 0.60–0.66 × as high as long, narrowed on vein *Rs* by 0.71–0.76 × its own length on vein *M*, receiving cross-vein *1m-cu* at its basal 0.44–0.52; SMC3 0.64–0.70 × as high as long, narrowed on vein *Rs* by 0.64–0.69 × its own length on vein *M*, receiving cross-vein *2m-cu* at its basal 0.48–0.58, distanced from outer wing margin by 1.4–1.6 × its own length. Crossvein *cu-a* originating distally to point of separation of vein *M+CuA* by slightly less than its own length, slightly oblique to vein *A*. HW cross-vein *cu-a* originating slightly posteriorly to separation of vein *M+CuA*.

Metasoma. Slightly narrower than mesosoma. T1 almost as long as broad, with lateral crease slightly curved unlike in female, almost reaching posterior margin of T1 (Fig. 4F).

Subgenital plate and genitalia (Fig. 5). Subgenital plate, in ventral view (Fig. 5A), gradually narrowing toward apex, rounded apically with a pair of deep oval depressions subbasally, leaving median sharp carina, that being low triangular in profile; ventral surface with short setae but bare on lateral and apical margins. Paramere (Fig. 5B) short and stout, not exceeding beyond apex of digitus volsellaris, arcuately emarginate ventrally, wedge-shaped apically with short setae except basally and a few long setae apically; digitus volsellaris broadened apically, plectrum-shaped, much extending beyond apex of aedeagus with dense micropores; parapenial lobe elliptic apically, not extending beyond apex of aedeagus; aedeagus narrowly fusiform.

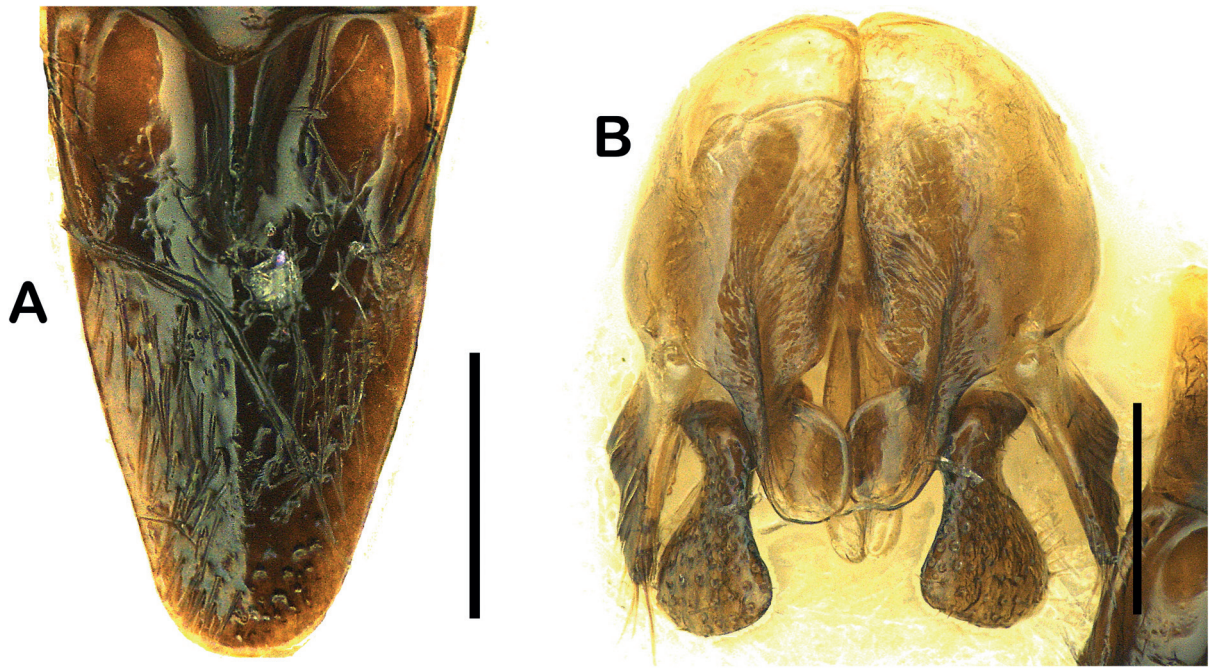

Fig. 5. *Lissocnemis brevipennis* (Cameron, 1902), ♂ (DHU), subgenital plate and genitalia. **A**. Subgenital plate, ventral view. **B**. Genitalia, dorsal view. Scale bars = 1mm.

Remark

Turner (1920: 98) stated that "*Lissocnemis* must be assigned to the Indian *Salius brevipennis*, Cam.".

Discussion

Distribution of *Lissocnemis*

Four species of *Lissocnemis* have been recorded from the Indo-Malayan and Palaearctic regions, i.e., Java (Indonesia) and Jiangsu (Eastern-central China) for *L. irrasa* (Kohl 1907; Haupt 1935, 1938); Khasi Hills and Assam (Northeastern India), Bali Is. (Indonesia), Ninh Binh Province (Vietnam), and Honshu (Japan) for *L. brevipennis* (Cameron 1902; Matsumoto *et al.* 2018); Philippines, Sarawak (Borneo), and Singapore for *L. apollo* (Banks 1934, 1938; Haupt 1941); Taiwan for *L. nigra* (Tsuneki 1989); and Hanoi, Vietnam, for *L. tonkinensis* (Turner 1920).

Of these localities, Japan must be an artificial distribution for *L. brevipennis*. Matsumoto *et al.* (2018) for the first time recorded six female specimens and one male specimen collected from Okayama and Hyogo Prefectures, together with four females observed in the field of the above mentioned two prefectures and Osaka Pref. (all localities belonging to the Kansai Region, Honshu) in 2016–2017. Despite the fact that it is easily identified because of its large body size (15–17 mm) and conspicuous body and wing colouration in the female (Fig. 4A–B; Matsumoto *et al.* 2018: figs 1a, 2), this species had not been recorded from Japan before Matsumoto *et al.* (2018). Because females and males were collected in two consecutive years (2016, 2017) from three prefectures, *L. brevipennis* seems to have recently been introduced into the Kansai Region and has been established there.

In this study, we recorded *L. koreana* Kim & Shimizu sp. nov. and *L. brevipennis* from Korea. Several specimens of these species have been collected from various localities in South Korea since 1936 (*L. koreana*) or 2011 (*L. brevipennis*). Thus, it is presumed that S Korea is the natural distribution for both species and that it is the northern and eastern limit of natural distribution of the genus.

Acknowledgements

We thank G. Broad at the NHML, UK, for the examination and loan of the specimens. J-KK was supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR202304203). This research was also supported by the Utah Agricultural Experiment Station, Utah State University, and approved as journal paper number 9567.

References

Arnold G. 1932. The Psammocharidae of the Ethiopian region. Part 2. Subfamily Claveliinae, Haupt. *Annals of the Transvaal Museum* 15: 41–122.

Arnold G. 1934. The Psammocharidae of the Ethiopian region. Part 3. Subfamily Macromerinae Haupt. *Annals of the Transvaal Museum* 15: 283–399.

Arnold G. 1952. New species of African Hymenoptera. No. 10. *Occasional Papers of the National Museum of Southern Rhodesia* 2 (17): 460–493.

Arnold G. 1960. Mission zoologique de l'I.R.S.A.C. en Afrique orientale. (P. Basilewsky et N. Leleup, 1957). XXXII. Hymenoptera Pompilidae. *Annales du Musée royal du Congo belge, Sér. 8°*: 37–445.

Banks N. 1934. The Psammocharidae of the Philippines. *Proceedings of the American Academy of Arts and Sciences* 69: 1–117. https://doi.org/10.2307/20023025

Banks N. 1938. The Psammocharidae from Singapore. *Proceedings of the Entomological Society of Washington* 40: 2361–249.

Cameron P. 1902. Descriptions of new species of fossorial Hymenoptera from the Khasia Hills, Assam. *Annals and Magazine of Natural History* (7) 10: 77–89. https://doi.org/10.1080/00222930208678635

Day M.C. 1988. Spider wasps. Hymenoptera: Pompilidae. *Handbooks for the Identification of British Insects* 6 (4): 1–60.

Evans H.E. 1950. A taxonomic study of the Nearctic spider wasps belonging to the tribe Pompilini (Hymenoptera: Pompilidae). Part 1. *Transactions of the American Entomological Society* 75: 133–270.

Haupt H. 1935. Psammocharidae. Hymenoptera aus den Sundainseln und Nordaustralien (mit Ausschluss der Blattwespen, Schlupfwespen und Ameisen). *Revue Suisse de Zoologie* 42: 306–321. https://doi.org/10.5962/bhl.part.117934

Haupt H. 1938. Psammocharidae vom unteren Yang-tse. *Notes d'Entomologie Chinoise* 5: 33–48.

Haupt H. 1941. Resultate der Oxford Universität Expedition nach Sarawak (Borneo), 1932. Beitrag zur Kenntnis der Psammochariden-Fauna. *Annals and Magazine of Natural History; including Zoology, Botany and Geology* (11) 7: 50–82. https://doi.org/10.1080/00222934108527140

Kohl F.F. 1907 [1906]. Zoologische Ergebnisse der Expedition der Kaiserlichen Akademie der Wissenschaften nach Südarabien und Sokótra im Jahre 1898–1899. Hymenopteren. *Denkschriften der Kaiserlichen Akademie der Wissenschaften. Mathematisch-Naturwissenschaftliche Klasse* 71 (1): 169–279.

The Korean Society of Applied Entomology & the Entomological Society of Korea. 2021. *Check List of Insects from Korea.* Paper and Pencil, Daegu.

Matsumoto R., Miyake H.M., Yamazaki K., Aono T. & Shimizu A. 2018. Discovery of a new, adventive, spider Wasp, *Lissocnemis brevipennis*, in Japan (Hymenoptera: Pompilidae: Ctenocerinae). *Japanese Journal of Systematic Entomology* 24: 95–98.

Shimizu A. 1994. Phylogeny and Classification of the Family Pompilidae (Hymenoptera). *Tokyo Metropolitan University Bulletin of Natural History* 2: 1–142.

Shimizu A., Pitts J.P., Rodriguez J., Wahis R. & Yoshimura J. 2021. Systematics and convergent evolution in three Australian genera of Pepsinae spider wasps (Hymenoptera: Pompilidae). *Austral Entomology* 60: 301–316. https://doi.org/10.1111/aen.12530

Shimizu A., Broad G., Yoshimura J. & Pitts J.P. 2022. First records of the spider wasps *Ctenocerus* Dahlbom and *Paraclavelia* Haupt from Asia, with discussions on the systematics of Ctenocerinae (Hymenoptera: Pompilidae). *European Journal of Taxonomy* 845: 101–131. https://doi.org/10.5852/ejt.2022.845.1957

Tsuneki K. 1989. A study on the Pompilidae of Taiwan (Hymenoptera). *Special Publication of the Japan Hymenopterists Association* 35: 1–180.

Turner R.E. 1917. New species of Hymenoptera in the British Museum. *Transactions of the Entomological Society of London* 1917: 53–84. https://doi.org/10.1111/j.1365-2311.1917.tb01402.x

Turner R.E. 1920. On Indo-Chinese Hymenoptera collected by R. Vitalis de Salvaza. IV. *Annals and Magazine of Natural History* (9) 5: 84–98. https://doi.org/10.1080/00222932008632344

Manuscript received: 24 January 2024
Manuscript accepted: 30 April 2024
Published on: 23 August 2024
Topic editor: Tony Robillard
Section editor: Gavin Broad
Desk editor: Eva-Maria Levermann