Zoosyst. Evol. 100 (3) 2024, 1053–1060 | DOI 10.3897/zse.100.123213

PENSOFT

MUSEUM FÜR NATURKUNDE BERLIN

The pseudoscorpion genus *Nipponogarypus* (Pseudoscorpiones, Olpiidae) found in seashore habitats in Japan and Korea

Kyung-Hoon Jeong[1,2,3,4], Danilo Harms[5,6,7], Jung-Sun Yoo[2]

1 *Seoul National University, 1, Gwanak-ro, Gwanak-gu, Seoul, 08826, Republic of Korea*
2 *National Institute of Biological Resources, Species Diversity Research Division, Environmental Research Complex, Hwangyeong-ro 42, Seo-gu, Incheon, 22689 Republic of Korea*
3 *Department of Agricultural Convergence Technology, Jeonbuk National University, Jeonju, Republic of Korea*
4 *Lab of Insect Phylogenetics & Evolution, Department of Plant Protection & Quarantine, Jeonbuk National University, Jeonju, Republic of Korea*
5 *Museum of Nature Hamburg – Zoology, Leibniz Institute for the Analysis of Biodiversity Change, Martin-Luther-King-Platz 3, Hamburg, 20146, Germany*
6 *Harry Butler Institute, Murdoch University, Murdoch, Australia*
7 *Australian Museum Research Institute, Australian Museum, Sydney, Australia*

https://zoobank.org/CF91D7F2-FC99-431C-AD78-6C5CB1DB1E9D

Corresponding author: Kyung-Hoon Jeong (ds16203@snu.ac.kr)

Academic editor: Martin Husemann ♦ **Received** 16 March 2024 ♦ **Accepted** 13 June 2024 ♦ **Published** 25 July 2024

Abstract

Some pseudoscorpions (Arachnida: Pseudoscorpions) occur in seashore habitats where they are typically found under driftwood or rocks. Here we review the genus *Nipponogarypus* Morikawa, 1955 from littoral habitats in Japan and South Korea and describe a new species, *Nipponogarypus seosanensis* **sp. nov.**, from the Korean Peninsula. We also elevate two former subspecies to species rank: *N. enoshimaensis enoshimaensis* Morikawa, 1960 = *N. enoshimaensis* Morikawa, 1955, and *N. enoshimaensis okinoerabensis* Morikawa, 1960 = *N. okinoerabensis* Morikawa, 1960, **stat. nov.** The distribution of all *Nipponogarypus* species is mapped, and an identification key for the species is provided.

Key Words

False scorpions, morphology, South Korea, systematics, taxonomy

Introduction

Most arachnids are strictly terrestrial, but some lineages occur in seashore habitats or even under water. Some pseudoscorpions (Arachnida, Pseudoscorpiones) have also adapted to littoral or coastal habitats, and these include members of diverse families such as the Garypidae (Harvey et al. 2020), Parahypidae (Harvey et al. 2007), Neobisiidae (e.g., Glynne-Williams and Hobart 1952), and some species in the Olpiidae (Beier 1932; Sato 1994). The family Olpiidae, with its 24 genera and 211 described species (World Pseudoscorpiones Catalog 2022), is most diverse in xeric environments such as semideserts and deserts (Harvey and Leng 2008). However, in 1955, Japanese zoologist Kuniyasu Morikawa discovered several small blackish olpiid pseudoscorpions between rock crevices near the seashore on Enoshima Island (Kanagawa-ken, Honshū) in Japan. These specimens differed from all other Olpiidae genera and were described as a new monotypic genus, *Nipponogarypus*. In a subsequent publication, Morikawa (1960) split his nominate species, *N. enoshimaensis*, into two subspecies: *N. enoshimaensis enoshimaensis* Morikawa, 1955, originally described from Enoshima Island near Honshu, and *N. enoshimaensis okinoerabensis* Morikawa, 1960, originally described from Okinoerabu-jima in the Satsunan Islands. At least *N. enoshimaensis* seems to be widespread in supralittoral habitats, and Morikawa (1960) listed additional

records from middle and southern Japan, but always in supralittoral habitats (Fig. 1). Nothing else has been published on this interesting genus ever since, and these two subspecies remain valid until today.

In this paper, we establish the first record of *Nipponogarypus* on the Korean Peninsula and describe a new species, *Nipponogarypus seosanensis* sp. nov., from South Korea. We also provide adequate illustrations and images for the first time since the original description of this genus, which is now outdated, and diagnose the genus within a modern taxonomic concept for the order Pseudoscorpiones. We also take the liberty to elevate Morikawa's original subspecies to species status because they are clearly diagnosable under the morphospecies concept. With this step, we recognize three species within *Nipponogarypus* and clarify the distribution of this genus in eastern Asia.

Materials and methods

All specimens used for this study are deposited in the National Institute for Biological Resources (NIBR) and were collected in Ganwoldo, Seosan-si, Chungcheongnam-Province, South Korea by the primary author. All specimens were preserved in 100% ethanol and examined using a Leica MSV266. Images were taken using a Leica Z16 AP0 attached to a Leica MSV266, and illustrations were created by hand, which were then enhanced using Adobe Illustrator 2023 and Adobe Photoshop 2023 (Adobe Inc.). Scanning electron micrographs were obtained using a Hitachi TM4000Plus scanning electron micrograph (SEM) system. Measurements and terminology follow Chamberlin (1931), Harvey (1992), Judson (2007), and Harvey et al. (2012). The distribution map was created using QGIS 3.22.10 (OGSeo). Abbreviations of chelal trichobothria: *b* – basal, *sb* – subbasal, *st* – subterminal, *t* – terminal, *ib* – internal basal, *isb* – internal subbasal, *eb* – external basal, *esb* – external subbasal, *it* – internal terminal, *ist* – internal subterminal, *et* – external terminal, *est* – external subterminal.

Systematics

Family Olpiidae Banks, 1895

Genus *Nipponogarypus* Morikawa, 1955

Type species. *Nipponogarypus enoshimaensis* Morikawa, 1955, by original designation.

Diagnosis. *Nipponogarypus* can be distinguished from other olpiid genera known to occur in East Asia as follows: from *Beierolpium* Heurtault, 1977, by trichobothrium *st* positioned distal to *sb* in *Nipponogarypus* and dorsal to *sb* in *Beierolpium* (Harvey 1988; Harvey and Leng 2008); from *Euryolpium* Redikorzev, 1938, by trichobothria *it*, *isb*, *esb*, and *eb* not clustered in *Nipponogarypus* but clustered in the latter. *Nipponogarypus* also shows similar characteristics to *Olpium* Koch, 1873, and *Indolpium* Hoff, 1945. However, *Nipponogarypus* can be distinguished from *Indolpium* by the position of trichobothria *st* and *isb*. In *Indolpium*, trichobothrium *isb* is situated proximally to trichobohtorium *st* (Murthy and Ananthakrishnan 1977). However, in *Nipponogarypus*, trichobothrium *isb* is situated distally from *st*. Furthermore, *Nipponogarypus* an easily be distinguised from *Olpium* by the length of its venom ducts. *Olpium* has long venom ducts that extend to trichobothrium *t*, whereas *Nipponogarypus*' venom ducts only extend to half of trichobothrium *t* (Mahnert 1991; Nassirkhani 2015). *Nipponogarypus* is morphologically most similar to *Olpiolum* Beier, 1931, and both have trichobothrium *est* positioned in the middle of the fixed finger; *ist* positioned between *est* and *isb*; *isb*, *esb*, and *eb* grouped together; and *sb* positioned closer to *b* than *st*. However, *Nipponogarypus* differs from *Olpiolum* by tergal chaetotaxy (four to six setae on the middle tergites in *Nipponogarypus*, always six setae on the middle tergites in *Olpiolum*) and the number of pseudotactile seta (two setae present in *Nipponogarypus*, one seta in *Olpiolum*) (Muchmore 1986).

Remarks. Subspecies are a rare concept in pseudoscorpion taxonomy since recognizable morphological divergences between populations are usually associated with morphological species. Unfortunately, Morikawa had the habit of designating subspecies (and subgenera) when morphological divergences were seen by him as too minor to warrant species- or genus status for any given taxon (e.g., Morikawa 1960). Pseudoscorpion taxonomy has advanced significantly in the past decades, and we are now aware that minor morphological divergences in cryptic lineages such as pseudoscorpions are generally indicative of species status (e.g., Hlebec et al. 2024; Muster et al. 2024). Following the recent example set by You et al. (2022), who elevated all subterranean subspecies of the genus *Spelaeochthonius* (family Pseudotyrannochthoniidae) in Japan and Korea to species status, we also elevate Morikawa's subspecies of *Nipponogarypus enoshimaensis* to species rank. Unfortunately, this taxonomic act needs to be done without reexamining the primary types that are held at Ehime University but are difficult to access and in poor condition (slide-mounted specimens in dried and contracted Hoyer's solution; see You et al. 2022). However, Morikawa's diagnoses are clear and reiterated here: *N. enoshimaensis okinoerabensis* is elevated to species rank as *N. okinoerabensis* **stat. nov**., and this name refers to specimens from the Ryuku and Satsunan Islands that have relatively short body appendages (pedipalpal femur length 0.48 mm, pedipalpal patella length 0.45 mm) and two pseudotacticle hairs that are equal in size on the palpal femur. The subspecies *N. enoshimaensis enoshimaensis* sensu Morikawa (1960) actually refers to *N. enoshimaensis* sensu Morikawa (1955) and is here recognized in its original form, *N. enoshimaensis*. This is a rather widespread morphospecies with records from Honshu and Shikoku (Fig. 1) that has slightly longer body appendages than *N. okinoerabensis* (pedipalpal

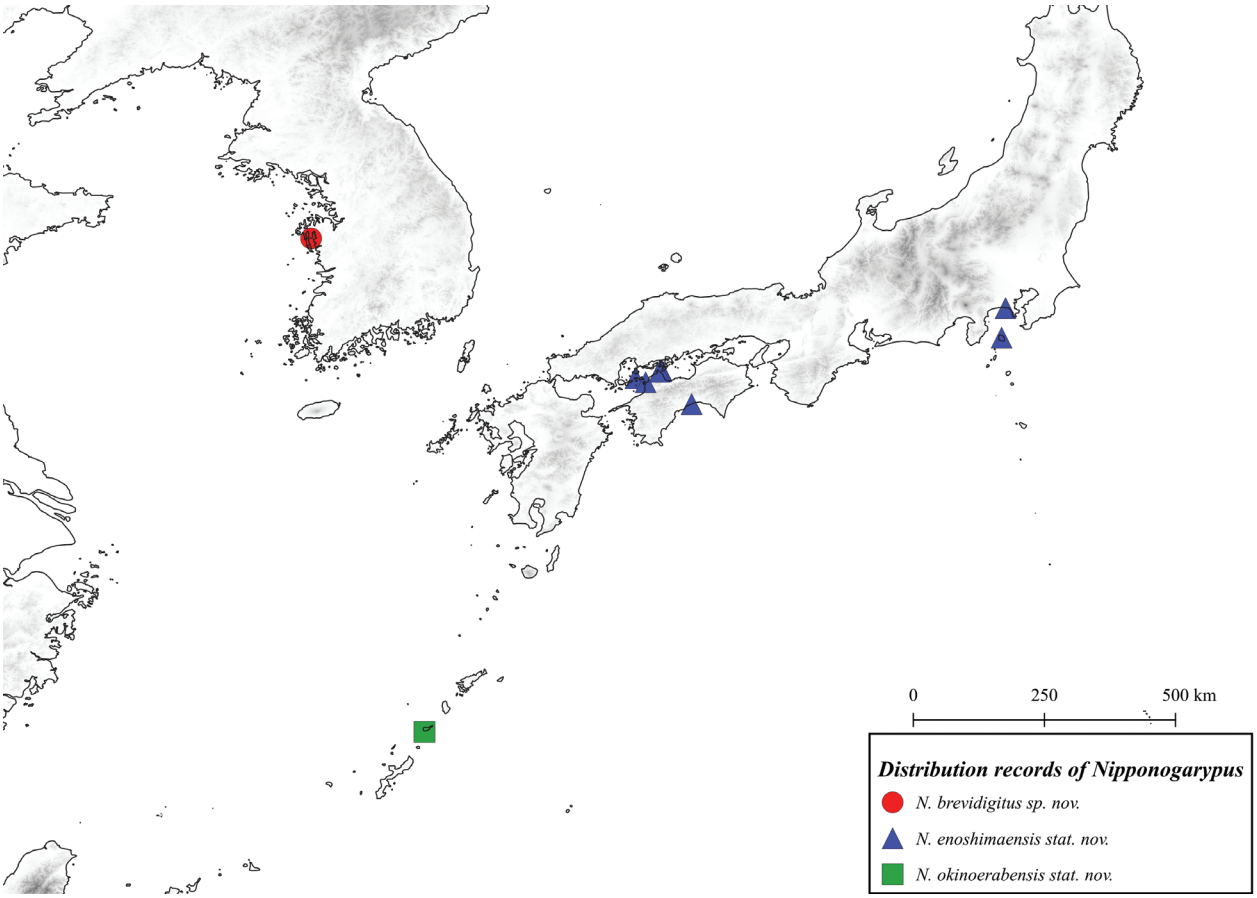

Figure 1. Distribution of the genus *Nipponogarypus* (Olpiidae) in Japan and Korea.

femur length 0.52–0.59 mm, pedipalpal patella length 0.57 mm) and unequal pseudotactile hairs (proximal hair smaller than distal hairs). A full description of both species is available in Morikawa (1960). Following this taxonomic act, the genus *Nipponogarypus* now contains three morphospecies that are found along the coastlines of the Korean Peninsula and Japan.

Nipponogarypus seosanensis Jeong & Harms, sp. nov.

https://zoobank.org/2CFFDE30-7D05-4E5B-9006-E57EE69E780F

Type material. ***Holotype.*** Female (NUHGIV0000001225). Korea: Chungcheongnam-province: Ganwoldo 1–gil, Buseok-myeon, Seosan-si, 36°36'5.56"N, 128°10'28.54"E, 03, Jul 2022, KH Jeong leg.

Paratypes**:** One female and two males (NUHGIV0000001228), same data as holotype.

Etymology. This species is named after the type locality, Seosan-si, Chungcheongnam-do, in South Korea.

Habitat. This species was collected from cracks and fissures of moist rocks in the supralittoral zone, right next to the shoreline (Fig. 2).

Diagnosis. This species is most similar to *N. enoshimaensis* by having similar L/W ratios in the pedipalpal femur (0.56–0.61/0.18–0.20 mm in *N. seosanensis* sp. nov. and 0.52–0.59/0.18 mm in *N. enoshimaensis*) and pedipalpal patella (0.53–0.59/0.21–0.23 mm in *N. seosanensis* sp. nov. and 0.57/0.22 mm in *N. enoshimaensis*). Both species can easily be distinguished by the number of marginal teeth on the fixed chelal finger (40–43 in *N. seosanensis* sp. nov., 50 in *N. enoshimaensis*). *N. seosanensis* sp. nov. can further be distinguished from *N. okinoerabensis* stat. nov. by having a longer pedipalpal femur (0.56–0.61 mm in *N. seosanensis* sp. nov. and 0.48 mm in *N. okinoerabensis* stat. nov.) and patella (0.53–0.59 mm in *N. seosanensis* sp. nov. and 0.45 mm in *N. okinoerabensis* stat. nov.).

Description. Female, adult (holotype) (Fig. 3A, B).

Color. Blackish-brown, glossy; the ventral surface darker than the end of the body appendages; the coxal region reddish-orange.

Cephalothorax (Fig. 4A, H). Carapace 1.18 times longer than the broad; carapace sub-rectangular; four conspicuous eyes; two transverse furrows on the carapace; ten lyrifissures; first furrow situated in medial position on the carapace, second furrow near the posterior margin of the carapace; carapacal chaetotaxy 4–2: 22; setae short and acuminate. Pedipalpal coxa with 10 setae; coxal chaetotaxy 5: 5: 6: 13; one lyrifissure on coxa I–III, two lyrifissures on coxa IV.

Chelicera (Figs 4C, 5A). Cheliceral margin smooth; five setae on the cheliceral hand, one seta on the movable finger; galea long and shortly three-branched at the tip in

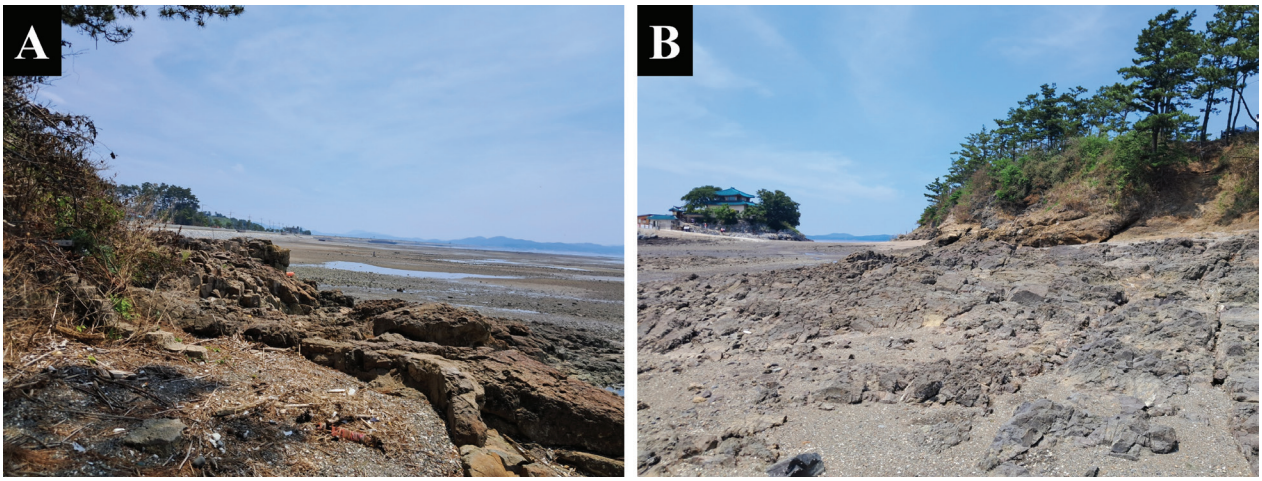

Figure 2. Habitat of *Nipponogarypus seosanensis* sp. nov. in the littoral zone of Seosan-si, Chungcheongnam-do, South Korea.

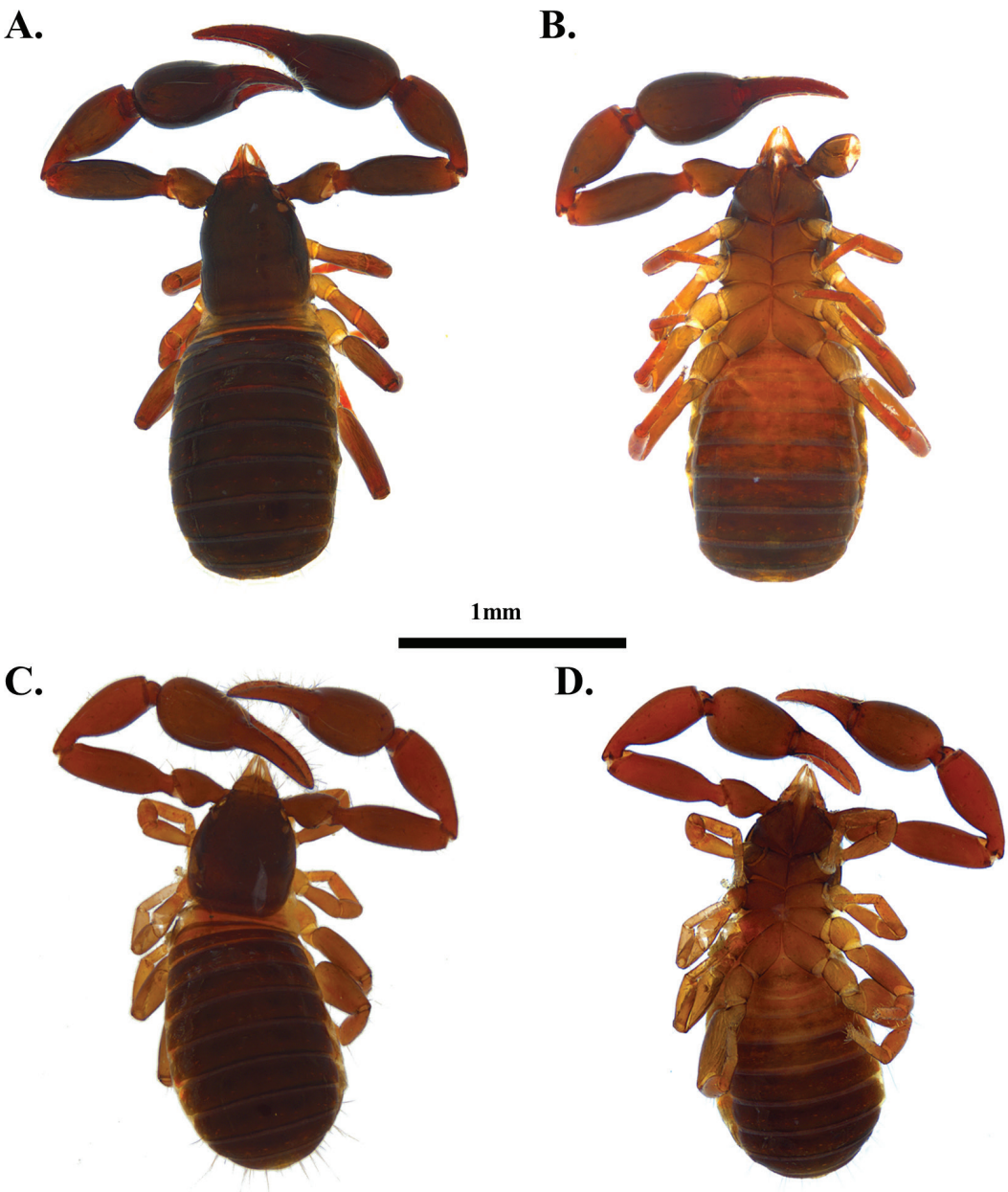

Figure 3. Habitus of *Nipponogarypus seosanensis* sp. nov. **A.** Female holotype, dorsal view; **B.** Female holotype, ventral view; **C.** Male paratype, dorsal view; **D.** Male paratype, ventral view.

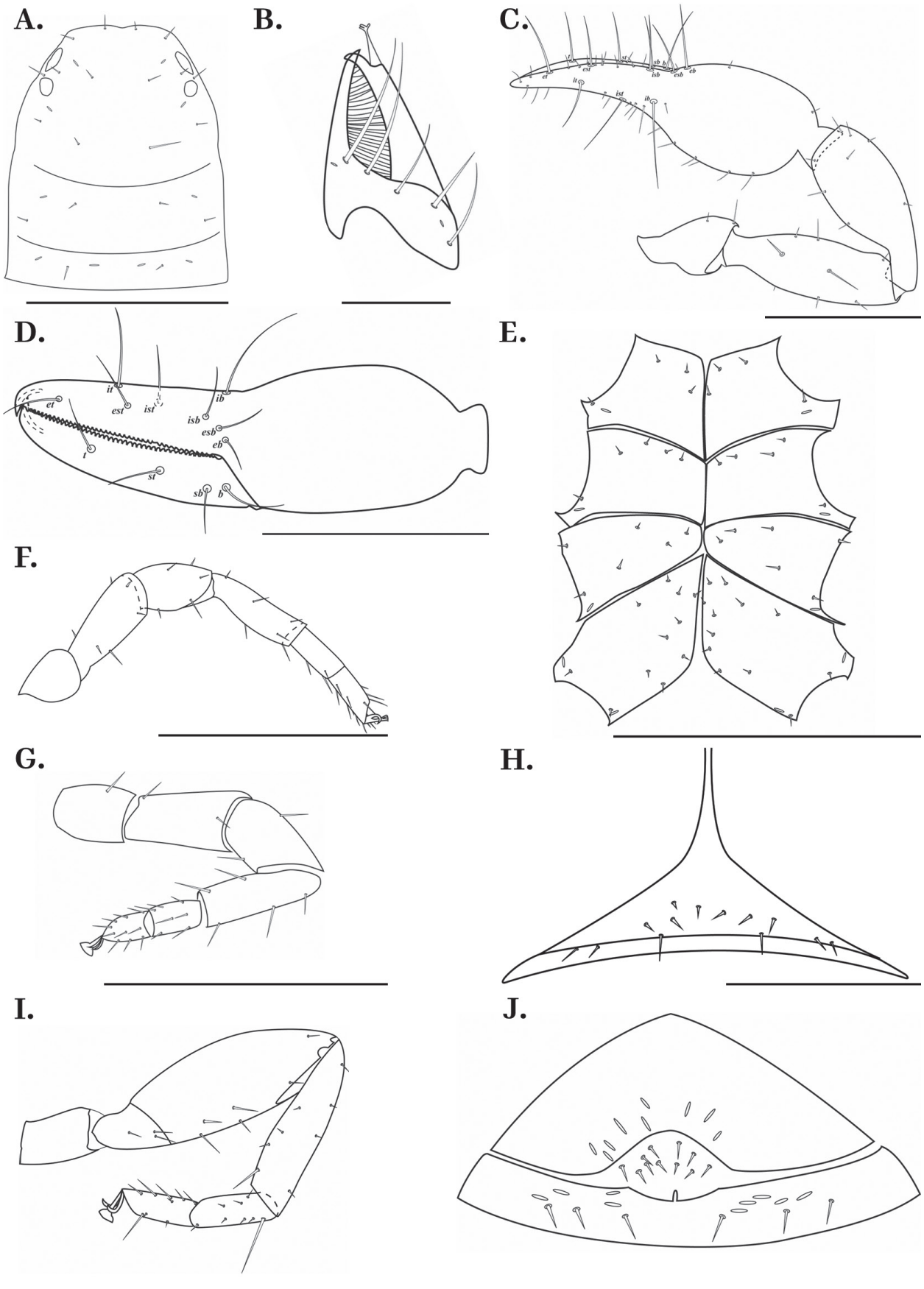

Figure 4. Appendages of *Nipponogarypus seosanensis* sp. nov., holotype female. **A.** Carapace; **B.** Chelicera in dorsal view; **C.** Left pedipalp in dorsal view; **D.** Right chela from lateral view; **E.** Coxa; **F.** Right leg I; **G.** Right leg II; **H.** Female genital sternites; **I.** Right leg IV; **J.** Male genital sternites. Scale bars: 0.5 mm (**A, C**–**G, I**); 0.2 mm (**H, J**); 0.1 mm (**B**).

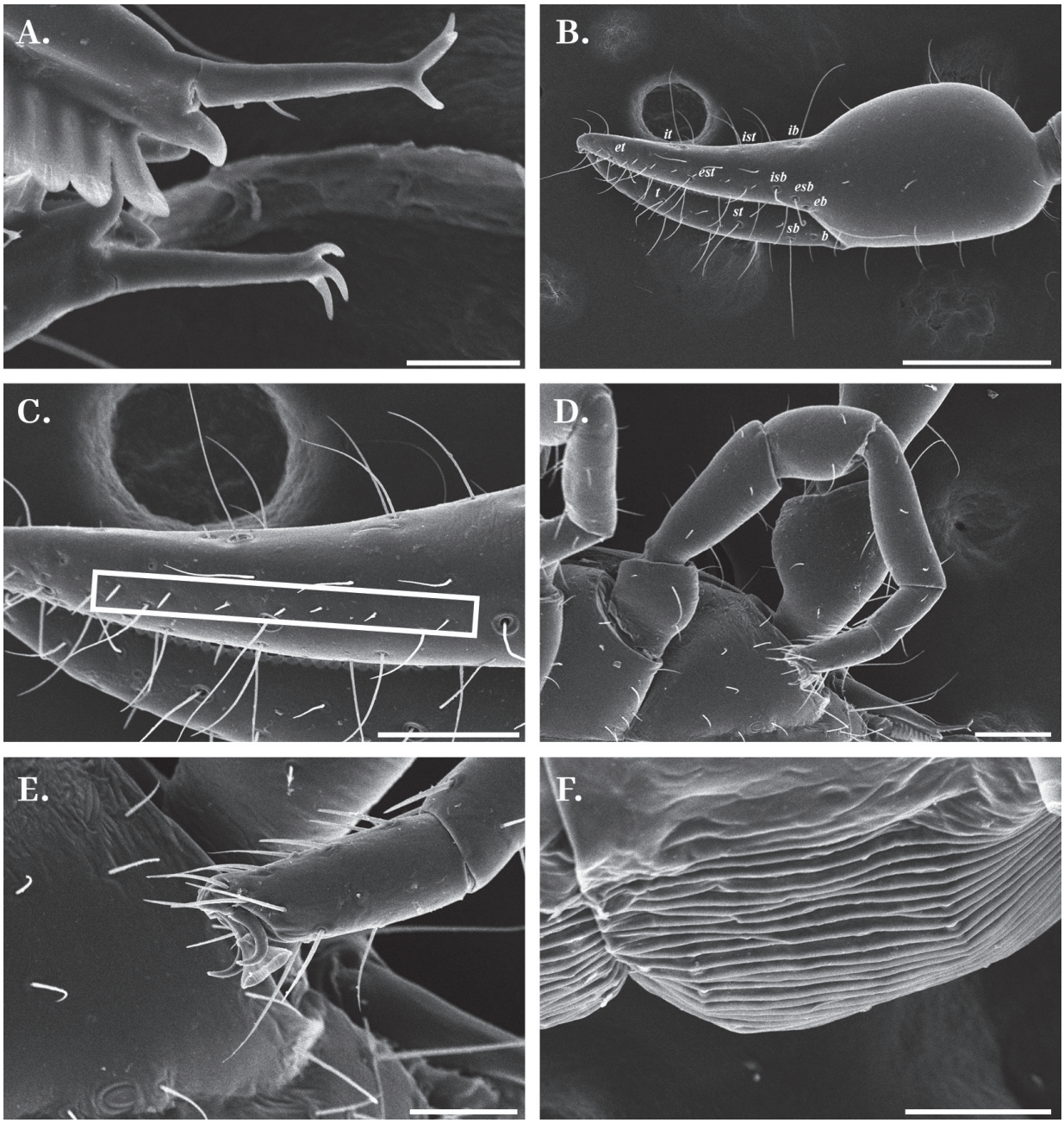

Figure 5. Appendages of *Nipponogarypus seosanensis* sp. nov., paratype female. **A.** Galea; **B.** Left chela, lateral view; **C.** Left chelal fingers, lateral view, sensory setae in the white box; **D.** Right leg I; **E.** Claws and arolium of right leg I; **F.** Pleural membrane. Scale bars: 0.02 mm (**A**); 0.3 mm (**B**); 0.1 mm (**C**, **D**, **F**); 0.05 mm (**E**).

both sexes; serrula exterior with 19 blades, rallum with three blades. Two lyrifissures on the hand.

Pedipalp (Figs 4B, 5B, C). Trochanter 1.60, femur 2.95, patella 2.46, chela 3.24 times longer than the broad, movable finger 0.99 times longer than the hand. Two pseudotactile setae on the femur. Sensory setae present between *et* and *isb*. *b* and *sb* on the basal of the finger; *st* on the middle of the *t* and *b*. *ib*, *esb*, and *eb* grouped at the base of the finger; *est* on the middle of *et* and *esb*; *it* and *ib* on the dorsal surface of the fixed finger, *it* on the middle of the finger, and *ib* on the basal of the finger; *ist* on the paraxial surface of the chela, between *isb* and *est*, but closer to *isb*; short venom ducts in both fingers, not extending past trichobothrium *et*.

Marginal teeth small and contiguous; triangular teeth on both fingers; fixed finger with 40, movable finger with 43 marginal teeth.

Legs (Figs 4D, E, 5D). Leg I: trochanter 1.56, femur 2.51, patella 1.80, tibia 3.06, metatarsus 2.08, tarsus 2.33 times longer than the broad; leg IV: trochanter 1.40, femur + patella 3.26, tibia 3.93, metatarsus 2.69, tarsus 2.98 times longer than the broad. Typical for the genus: femur and patella of leg I freely mobile; metatarsus of leg IV shorter than the tarsus; metatarsus of leg I longer than the tarsus; one each pseudotactile seta in the distal position

of the tarsus; basal position of the metatarsus; arolium undivided, longer than claws, and simple.

Abdomen (Fig. 5F). Pleural membrane striate; all tergites and sternites both undivided; all setae short and acuminate; tergal chaetotaxy 2: 4: 4: 4: 4: 4: 6: 5: 6: 4: 4: 2. Sternal chaetotaxy 10: 4: 6: 8: 6: 4: 6: 6: 4: 4: 2.

Dimensions (in mm). Body length: 1.93 cephalothorax: carapace 0.63/0.54, anterior eye 0.07, posterior eye 0.05; chelicera: total 0.22/0.12, movable finger 0.16; pedipalp: trochanter 0.31/0.19, femur 0.59/0.20, patella 0.58/0.23, chela 1.08/0.33, movable finger 0.53, hand 0.54; leg I: trochanter 0.15/0.10, femur 0.23/0.09, patella 0.18/0.10, tibia 0.21/0.07, metatarsus 0.10/0.05, tarsus 0.11/0.05; leg IV: trochanter 0.16/0.11, femur + patella 0.55/0.17, tibia 0.38/0.10, metatarsus 0.17/0.06, tarsus 0.16/0.05.

Variation (one female, paratype)

Cephalothorax. Carapace 1.16 times longer than broad.

Pedipalp. Trochanter 1.65, femur 3.13, patella 2.64, chela 3.29 times longer than broad, movable finger 0.88 times longer than hand. Fixed finger with 42, movable finger with 43 marginal teeth.

Legs. Leg I: trochanter 1.28, femur 3.29, tibia 3.34, metatarsus 2.38, tarsus 2.89 times longer than broad; leg IV: trochanter 1.50, femur + patella 3.06, tibia 3.08, metatarsus 2.25, tarsus 2.82 times longer than broad.

Abdomen. Tergal chaetotaxy 2: 4: 4: 4: 4: 6: 6: 6: 4: 2: 2. Sternal chaetotaxy 8: 4: 6: 6: 6: 6: 6: 4: 4: 4: 2.

Dimensions (in mm). Body length 1.90; cephalothorax: carapace 0.58/0.50, anterior eye 0.06, posterior eye 0.05; chelicera: total 0.20/0.12, movable finger 0.16; pedipalp: trochanter 0.33/0.20, femur 0.61/0.20, patella 0.59/0.22, chela 1.04/0.32, movable finger 0.49, hand 0.56; leg I: trochanter 0.14/0.11, femur 0.24/0.10, patella 0.19/0.10, tibia 0.25/0.08, metatarsus 0.12/0.05, tarsus 0.13/0.05; leg IV: trochanter 0.19/0.13, femur + patella 0.60/0.20, tibia 0.34/0.11, metatarsus 0.15/0.07, tarsus 0.18/0.06.

Variation (two males, paratype)

Cephalothorax. Carapace 1.20–1.23 times longer than broad.

Pedipalp. Trochanter 1.34–1.59, femur 3.07–3.13, patella 2.6, chela 3.05–3.21 times longer than the broad, movable finger 0.81–0.89 times longer than the hand. Fixed finger with 40–41, movable finger with 41–43 marginal teeth.

Legs. Leg I: trochanter 1.20–1.67, femur 2.08–2.45, patella 1.66–1.70, tibia 2.67–3.22, metatarsus 2.62–2.67, tarsus 2.86–3 times longer than broad; leg IV: trochanter 1.25–1.39, femur + patella 2.67–2.74, tibia 3.54–3.63, metatarsus 2.77–3.16, tarsus 2.5–2.7 times longer than broad.

Abdomen. Tergal chaetotaxy 2: 4: 4: 4: 4: 6: 6: 6: 6: 4: 4: 2. Sternal chaetotaxy 11: 6: 4: 6: 6: 6: 6: 5: 4: 4: 2.

Male genital sternites (Fig. 4G). Nine lyrifissures on sternites II and III; 11 setae on the genital opening area; six setae on the sternite III.

Dimensions (in mm). Body length: 1.83–1.84; cephalothorax: carapace 0.61/0.50–0.51, anterior eye 0.06, posterior eye: 0.04–0.05; chelicera: total 0.20/0.10–0.11 movable finger 0.14; pedipalp: trochanter 0.25–0.32/0.19–0.20, femur 0.56–0.60/0.18–0.19, patella 0.53–0.57/0.21–0.22, chela 0.91–0.92/0.21–0.29, movable finger 0.41–0.43, z 0.49–0.50; leg I: trochanter 0.12/0.07–0.10, femur 0.18–0.24/0.09–0.10, patella 0.15–0.16/0.09–0.10, tibia 0.17–0.23/0.06–0.07, metatarsus 0.12–0.13/0.05, tarsus 0.13/0.04; leg IV: trochanter 0.17–0.18/0.13, femur + patella 0.51/0.19, tibia 0.37/0.10, metatarsus 0.15–0.16/0.05, tarsus 0.12–0.16/0.05–0.06.

Key to the species of *Nipponogarypus*

1 Length of pedipalpal femur and patella more than 0.5 mm 2
– Length of pedipalpal femur and patella less than 0.5 mm ..... *Nipponogarypus okinoerabensis* stat. nov.
2 Fixed chelal finger with more than 45 marginal teeth ..... *N. enoshimaensis*
– Fixed chelal finger with less than 45 marginal teeth ..... *N. seosanensis* sp. nov.

Acknowledgements

KHJ would like to thank Mark Harvey (Western Australian Museum) for sending valuable reference papers and Sora Kim (Jeonbuk National University) for accessing the microscope and camera systems at Jeonbuk National University. This work has been supported by a grant from the National Institute of Biological Resources (NIBR), funded by the Ministry of Environment (MOE) of the Republic of Korea (NIBR202304103).

References

Beier M (1932) Pseudoscorpionidea I. Subord. Chthoniinea et Neobisiinea. Tierreich 57: 1–258. https://doi.org/10.1515/9783111435107.1

Chamberlin JC (1931) The arachnid order Chelonethida. Stanford University Publications, University Series (Biological Sciences) 7(1): 1–284.

Glynne-Williams J, Hobart J (1952) Studies on the crevice fauna of a selected shore in Anglesey. Proceedings of the Zoological Society of London, Wiley Online Library 122(3): 797–824. https://doi.org/10.1111/j.1096-3642.1952.tb00249.x

Harvey MS (1988) Pseudoscorpions from the Krakatau Islands and adjacent regions, Indonesia (Chelicerata, Pseudoscorpionida). Memoirs of the Museum of Victoria 49(2): 309–353. https://doi.org/10.24199/j.mmv.1988.49.13

Harvey MS (1992) The phylogeny and classification of the Pseudoscorpionida (Chelicerata: Arachnida). Invertebrate Systematics 6(6): 1373–1435. https://doi.org/10.1071/IT9921373

Harvey MS, Leng MC (2008) The first troglomorphic pseudoscorpion of the family Olpiidae (Pseudoscorpiones), with remarks on the composition of the family. Records of the Western Australian Museum 24(4): 387–394. https://doi.org/10.18195/issn.0312-3162.24(4).2008.387-394

Harvey MS, Waldock J, Teale RJ, Webber J (2007) New distribution records of the intertidal pseudoscorpion *Parahya submersa* (Pseudoscorpiones, Parahyidae). Records of the Western Australian Museum 23(4): 393. https://doi.org/10.18195/issn.0312-3162.23(4).2007.393-395

Harvey MS, Ratnaweera PB, Udagama PV, Wijesinghe MR (2012) A new species of the pseudoscorpion genus *Megachernes* (Pseudoscorpiones, Chernetidae) associated with a threatened Sri Lankan rainforest rodent, with a review of host associations of *Megachernes.* Journal of Natural History 46(41–42): 2519–2535. https://doi.org/10.1080/00222933.2012.707251

Harvey MS, Hillyer MJ, Carvajal JI, Huey JA (2020) Supralittoral pseudoscorpions of the genus *Garypus* (Pseudoscorpiones, Garypidae) from the Indo-West Pacific region, with a review of the subfamily classification of Garypidae. Invertebrate Systematics 34(1): 34–87. https://doi.org/10.1071/IS19029

Hlebec D, Harms D, Kučinić M, Harvey MS (2024) Integrative taxonomy of the pseudoscorpion family Chernetidae (Pseudoscorpiones, Cheliferoidea): Evidence for new range-restricted species in the Dinaric Karst. Zoological Journal of the Linnean Society 200(3): 644–669. https://doi.org/10.1093/zoolinnean/zlad083

Judson ML (2007) A new and endangered species of the pseudoscorpion genus *Lagynochthonius* from a cave in Vietnam, with notes on chelal morphology and the composition of the *Tyrannochthonini* (Arachnida, Chelonethi, Chthoniidae). Zootaxa 1627(1): 53–68. https://doi.org/10.11646/zootaxa.1627.1.4

Mahnert V (1991) Pseudoscorpions (Arachnida) from the Arabian Peninsula. Fauna of Saudi Arabia 12: 171–199.

Morikawa K (1955) On a new Garypidae (Pseudoscorp.) from Japan. Zoological Magazine, Tokyo 64: 225–228.

Morikawa K (1960) Systematic studies of Japanese pseudoscorpions. Memoir of Ehime University 4(2B): 85–172.

Muchmore WB (1986) Redefinition of the genus *Olpiolum* and description of a new genus Banksolpium (Pseudoscorpionida, Olpiidae). The Journal of Arachnology 14: 83–92.

Murthy VA, Ananthakrishnan TN (1977) Indian Chelonethi. Oriental Insects Monograph 4: 1–210.

Muster C, Korba J, Bogusch P, Heneberg P, Šťáhlavský F (2024) And Yet They Differ: Reconsiderations of Diversity within *Dactylochelifer latreillii* (Arachnida, Pseudoscorpiones). Diversity 16(3): 137. https://doi.org/10.3390/d16030137

Nassirkhani M (2015) Notes on Olpiidae (Arachnida, Pseudoscorpiones) from Iran: Description of *Cardiolpium bisetosum* sp. nov. and redescription of *Olpium omanense.* Arachnologische Mitteilungen 50: 1–10. https://doi.org/10.5431/aramit5001

Sato H (1994) Pseudoscorpions from the Northern Mariana Islands, Micronesia. Natural History Museum and Institute Chiba 1: 173–174.

World Pseudoscorpion Catalog (2022) World Pseudoscorpiones Catalog. Natural History Museum Bern. http://wac.nmbe.ch [Accessed 28 June 2024]