

Neriene bovista sp. nov., a new sheet-web spider (Araneae: Linyphiidae) from Korea

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Linyphiidae Blackwall, 1859 is one of the most diverse and largest families within the order Araneae Clerck, 1757. Of the currently 60 valid species of the genus *Neriene* Blackwall, 1833 worldwide, 10 species are distributed in Korea. The males of the new sheet-web spider *Neriene bovista* sp. nov. were recently collected with a sweep net between the shrubs of mixed forests from the hilly valley with well conserved nature in Uljin-gun, Gyeongsangbuk-do (the middle east coast region) during a seasonal survey of the spider fauna in hilly terrains in 2017–2018. The present study describes a new sheet-web spider, *Neriene bovista* sp. nov. with a diagnosis, detailed description, morphological illustrations, and a distribution map from Korea. The new species has a characteristic mushroom-like tip of the terminal apophysis, the truncated tip of anterior projection, and the bifurcated lateral projection of the lamella compared to the congeners of the genus *Neriene* Blackwall, 1833.

Keywords: description, morphology, *Neriene bovista* sp. nov., taxonomy, Korea

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DOI:10.12651/JSR.2022.11.2.094

INTRODUCTION

Linyphiidae Blackwall, 1859 is one of the most diverse and largest families within the order Araneae Clerck, 1757. Of the currently 60 valid species of the genus *Neriene* Blackwall, 1833 worldwide, 10 species are distributed in Korea (Kim, 2019; World Spider Catalog, 2021). The males of the genus have a characteristic spirally-coiled terminal apophysis, curved and narrow embolus (van Helsdingen, 1969), and a well developed lamella (Li *et al.*, 2018) in palpal organ. The males of the new sheet-web spider *Neriene bovista* sp. nov. were recently collected from the hilly valley with well conserved nature in Uljin-gun, Gyeongsangbuk-do (the middle east coast region) during a seasonal survey of the spider fauna in hilly terrains in 2017–2018 (Fig. 1A, B) and is described with a diagnosis, detailed description, morphological illustrations and a distribution map from Korea.

MATERIALS AND METHODS

External morphology was examined and illustrated using

a stereoscopic dissecting microscope (LEICA S8APO, Singapore). Habitus photographs were taken with a CANON 100D with 60 mm macro-lens. Measurements of body parts were made with an ocular micrometer and are recorded in millimeters. Leg and palp (left) measurements are given as leg number, total length (femur, patella, tibia, metatarsus, tarsus). Terminology of morphological characters of the male palpal organ follows van Helsdingen (1969) and Li *et al.* (2018). Abbreviations used are as follows: ALE = anterior lateral eye, AME = anterior median eye, PLE = posterior lateral eye, PME = posterior median eye, AER = anterior eye row, PER = posterior eye row in the eye area; ALP = anterior projection of lamella, DLP = dorsal projection of lamella, DSA = distal suprategular apophysis; E = embolus, EM = embolic membrane, L = lamella, LLP = lateral projection of lamella; P = paracymbium, PLP = posterior projection of lamella, R = radix, ST = subtegulum, T = tegulum, TA = terminal apophysis in the palpal organ. The examined specimens of this study were deposited in the collection of the National Institute of Biological Resources (NIBR), Korea.

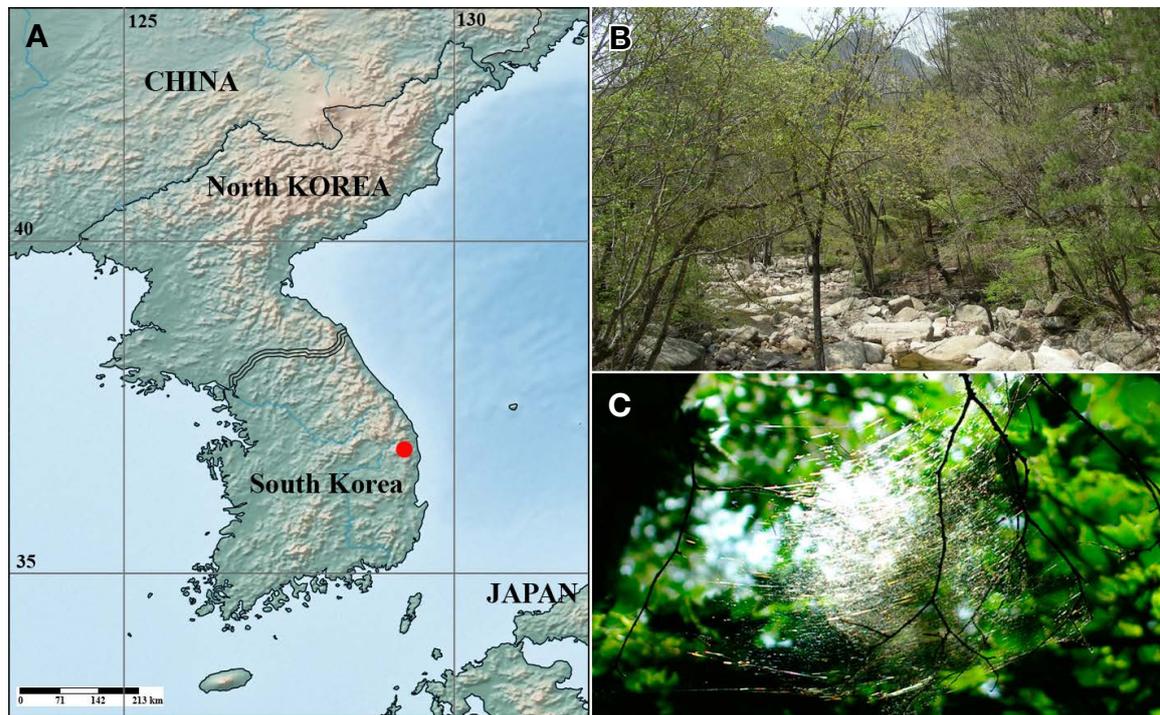


Fig. 1. Distribution of *Neriene bovista* sp. nov. in South Korea (A), collection site (B), and a sheet-web of the new species (C).

RESULTS

Taxonomic account

Family Linyphiidae Blackwall, 1859

Genus *Neriene* Blackwall, 1833

Type species: *Linyphia clathrata* Sundevall, 1830.

Diagnosis. For detailed diagnosis and description see van Helsdingen (1969).

Neriene bovista sp. nov. (Figs. 1, 2)

Types. Holotype: One male, 05 May 2017, Deokgu Valley, Deokgu-ri, Buk-myeon, Uljin-gun, Gyeongsangbuk-do (37°04'42.2"N, 129°16'31.0"E, alt. 152 m), National Institute of Biological Resources (VSJAIV0000001451). Paratypes: two males, 25 June 2018, same data as holotype, Konkuk University (KKUAraLinyNeribovi201701-03), leg. S.T. Kim.

Etymology. The species name is derived from the Latin noun 'bovista' meaning mushroom, referring to the apical shape of the terminal apophysis in the male palp.

Diagnosis. The new species is most similar to *Neriene clathrata* (Sundevall, 1830) in the body appearance, but can be easily distinguished from the latter by the shape of mushroom-like tip of terminal apophysis, the truncated tip of anterior projection and the bifurcated lateral projection

of the lamella, the long embolic membrane in palpal organ and the constricted abdomen (Fig. 2B, G–K). On the other hand, the males of *N. clathrata* have a tip of terminal apophysis with many lappets, the round tip of anterior projection and the undivided lateral projection of the lamella, the short embolic membrane in palpal organ and the unconstricted abdomen (van Helsdingen, 1969: 84, figures 82, 84–91; Li et al., 2018: 17, figures 18A–C, E, F, 19A–F, 20B).

Description. Holotype male. Total length 3.95 (habitus). Carapace: 1.83 long/1.10 wide, brown, long ovoid, longer than wide, cervical and radial furrows distinct, longitudinal fovea needle-shaped and slightly depressed, head region slightly elevated, thoracic region almost flat (Fig. 3A, B). Eyes: ALE 0.06, AME 0.06, PLE 0.05, PME 0.10, ALE–AME 0.13, AME–AME 0.04, PLE–PME 0.10, PME–PME 0.18, ALE–PLE contiguous, AME–PME 0.43, AER 0.58, PER 0.59, all eyes and encircled with black, eight eyes in two rows, AER slightly recurved and PER almost straight from above, AER and PER subequal in length (Fig. 3C). Chelicera: 0.57 long/0.30 wide, pale brown with 3 promarginal teeth and 5 retromarginal teeth (Fig. 3D). Endite: 0.40 long/0.15 wide, pale yellowish brown and mottled. Labium: 0.40 long/0.15 wide, pale yellowish brown with dusky blackish brown base, much longer than wide, conspicuously protrudent over the endite (Fig. 3E). Sternum: 0.84 long/0.70 wide, dusky yellowish brown, subcordate, longer than wide, anteromedian end

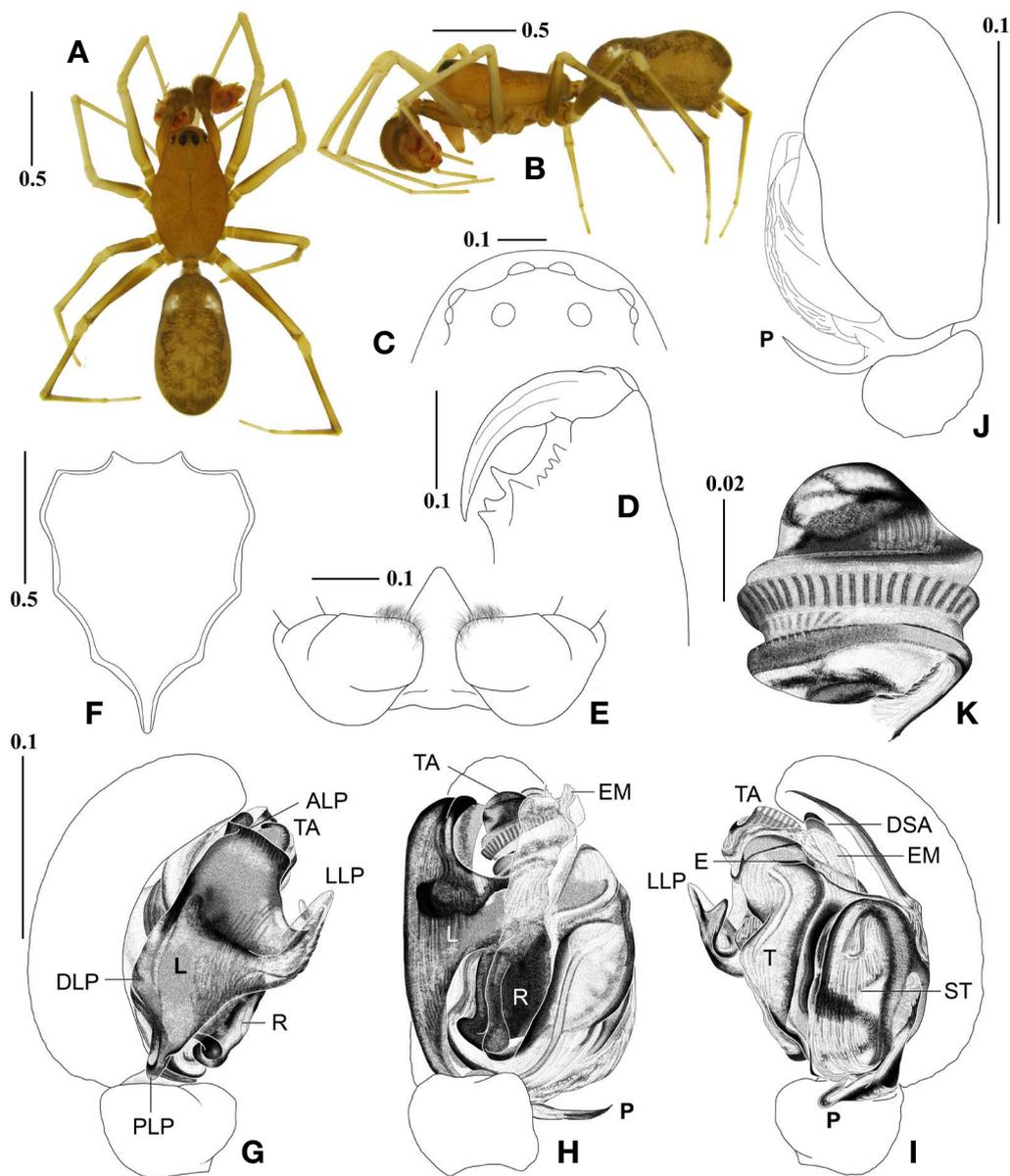


Fig. 2. *Neriene bovista* sp. nov., Holotype male: A. Habitus in dorsal view; B. Habitus in lateral view; C. Eye area from above; D. Chelicera in retrolateral view; E. Endites and labium in ventral view; F. Sternum; G. Palpus in prolateral view; H. Ditto, ventral view; I. Ditto in retrolateral view; J. Ditto in dorsal view; K. Terminal apophysis in ventral view (ALP, anterior projection of L; DLP, dorsal projection of L; DSA, distal suprategular apophysis; E, embolus; EM, embolic membrane; L, lamella; LLP, lateral projection of L; P, paracymbium; PLP, posterior projection of L; R, radix; ST, subtegulum; T, tegulum; TA, terminal apophysis). Scale bars in mm.

slightly depressed, anteromesal edge with a pair of pointed projections and slightly depressed, posterior end elongated and pointed protruding deeply between the coxae of leg IV (Fig. 3F). Legs: I 5.48 (1.50, 0.28, 1.50, 1.38, 0.82), II 4.72 (1.35, 0.25, 1.17, 1.25, 0.70), III 3.59 (1.10, 0.23, 0.86, 0.90, 0.50), IV 4.77 (1.12, 0.32, 1.22, 1.50, 0.61), pale yellowish brown, slender and long, strongly developed, femur with a dark and wide annulus, tibia of III and IV with median and distal annuli (Fig. 3A, B), leg

formula I-IV \cong II-III. Abdomen: 1.87 long/1.13 wide, pale grayish brown, long ovoid, longer than wide, murky blackish brown stripes forming a folium, constricted at middle (Fig. 3A, B). Palp: 2.26 (0.60, 0.13, 0.20, —, 0.72), cymbium much longer than tibia; paracymbium long and slender, distal arm bent upwardly, protrude heavily outward; lamella large and highly developed with four projections, anterior projection truncated, lateral projection long and bifurcated with blunt tip, dorsal projection

bent gently, posterior projection protrudent with blunt tip; embolus very thin, embolic membrane large and broad; distal suprategular apophysis slender with slightly twisted tip; terminal apophysis twice coiled spirally, apical tip mushroom shaped (Fig. 3G–K).

Distribution. Korea (Uljin-gun, Gyeongsangbuk-do). Only known from the type locality.

Remarks. The species was collected with a sweep net between shrubs of mixed forest in the hilly valley and constructs a typical sheet-web between the branches of a shrub (Fig. 1C).

Key to the males of Korean *Neriene* species

(That of *N. kimyongkii* (Paik) unknown)

1. L developed, extending beyond the apex of cymbium ..
.....*N. longipedella* (Bösenberg & Strand)
- L without extending beyond the apex of cymbium 2
2. Abdominal dorsum constricted 3
- Abdominal dorsum not constricted 6
3. P with a flattened distal arm, L auricle-shaped, ALP large and round, LLP thick without a bifurcated tip 4
- P without a flattened distal arm, L quadrangle-shaped, ALP large and truncated, LLP thick with a bifurcated tip *N. bovista* sp. nov.
4. P thick with a bent distal arm, EM short and originating from the behind of the embolic division, DSA with a hook-shaped tip, DLP smooth 5
- P slender with an unbent distal arm, EM long and originating from the anterior part of the T, DSA with bifurcated tip, DLP angular *N. radiata* (Walckenaer)
5. TA long and thick with a quadrilateral tip, PLP long, LLP thick with a bent and blunt tip
.....*N. albolimbata* (Karsch)
- TA long and slender with a moderately twisted tip, PLP short, LLP thick with a blunt tip
..... *N. jinjoensis* Paik
6. P small, short, and slender with a pointed distal arm, ALP large without a projection 7
- P large, long, and thick with a branched distal arm, ALP large with an angular projection
.....*N. oidedicata* van Helsdingen
7. P without a flattened distal arm, EM originated from the front of the DSA, TA without a twisted tip 8

- P with a flattened distal arm, EM originated from the behind of the embolic division, TA with a twisted tip ...
.....*N. emphana* (Walckenaer)
- 8. ALP without a curved tip, posterior part of the LLP and smooth 9
- ALP with a curved ALP tip, posterior part of the LLP angular *N. limbatinella* (Bösenberg & Strand)
- 9. DSA with a hook-shaped tip, L triangular, DLP smooth, TA with many lappet-shaped tip
.....*N. clathrata* (Sundevall)
- DSA with a knob-shaped tip, L quadrilateral, DLP angular, TA with a knob-shaped tip *N. japonica* (Oi)

ACKNOWLEDGEMENTS

This study was supported by a grant from the National Institute of Biological Resources (NIBR) (NIBR 2021 0211), funded by the Ministry of Environment (ME), the Republic of Korea.

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Submitted: January 19, 2022

Revised: March 17, 2022

Accepted: March 17, 2022