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Three species of linyphiid spiders (Araneae, Linyphiidae) new to the Bulgarian fauna

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Abstract. We report *Erigonoplus nobilis* Thaler, 1991, *Linyphia mimonti* Simon, 1885, and *Walckenaeria atrotibialis* (O. Pickard-Cambridge, 1878) as new to the Bulgarian spider fauna. This is the first record of *E. nobilis* from Southeastern Europe as well. Until now, this species was known only from its original descriptions from South Tyrol in Italy. We also provide new photographs of the habitats, the habitus, and genital morphology of the three newly recorded species, and the paratype of *E. nobilis* for comparison.

Keywords. Balkans, Belasitsa mountain, forest habitats, new records, sheetweb weavers

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Introduction

The present paper is part of a larger study of spiders on Belasitsa mountain (southwestern Bulgaria). Here, we report our first faunistic novelties. Belasitsa is a mountain on the border of Bulgaria, Greece, and North Macedonia. In Bulgaria, it is restricted by the Struma and Strumeshnica river valleys and forms the country's southwestern border. Since 2007, the Bulgarian part of the mountain has been designated a natural park for its century-old beech and chestnut forests. Since 2021, it has been included in the European ecological network Natura 2000.

All newly reported spiders belong to the species-rich family Linyphiidae Blackwall, 1859, currently comprising over 4950 species worldwide, distributed among 641 genera (World Spider Catalog 2026). In Bulgaria, the family comprises 253 species among 110 genera (Nentwig et al. 2026). The newly recorded species differ in their distribution patterns, ranging from regionally endemic to Holarctic.

Erigonoplus nobilis was described by Thaler (1991) from South Tyrol (Italian Alps) and has never been re-collected. *Linyphia mimonti* was first described by Simon (1885) from a female specimen collected in Euboea, Greece. Kulczyński (1911) described *Linyphia pulchra* based on a single male from Beirut, Lebanon. Van Helsdingen (1969) synonymized the two species based on their overall resemblance, correspondence in size, and the equally simple structures of the genitalia. To date, *L. pulchra* has been known only from the Eastern Mediterranean: Italy, Albania, Greece, Cyprus, Lebanon, and Israel (World Spider Catalog 2026). *Walckenaeria atrotibialis* is a widespread Holarctic species distributed across Europe, Central Asia, Siberia, and North America (World Spider Catalog 2026). All three species, new to the Bulgarian fauna, were found in the Bulgarian part of Belasitsa mountain. Since *L. mimonti* has been collected from one additional location in the country, we present these data here as well.

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Methods

We found most of the material for this study in a collection from Belasitsa mountain kept in the National Museum of Natural History in Sofia, Bulgaria (NMNHS). We also collected fresh specimens, either by hand sampling or in pitfall traps. In pitfalls, we used propylene glycol as a preservative. The material was then transferred to 75% ethanol and deposited in the NMNHS collection.

We studied and measured the specimens under a Zeiss Stemi 508 stereomicroscope. When necessary, the male palps and female epigynes were dissected to be further examined and photographed.

Photographs were taken with a Canon EOS1100D digital camera attached to either the stereomicroscope (for photographs of the habitus) or a Carl Zeiss Amplival compound microscope (for photographs of genitalia). Images were stacked with Helicon Focus v. 8.3.11 and further processed in Adobe Photoshop v. 2026 (27.x). The maps were generated using QGIS v. 3.34.15.

Abbreviations: Morphology: E = embolus, C = cymbium, CD = copulatory duct, DA = distal suprategular apophysis, P = paracymbium, S = spermatheca, T = tegulum, TA = tibial apophysis. Collections: NMBE = Natural History Museum, Bern, Switzerland; NMNHS = National Museum of Natural History, Sofia, Bulgaria.

All measurements are in millimetres.

The occurrence records for each species, used for distribution maps, are taken from the published literature (Simon 1885; Kulczyński 1911; Brignoli 1975; Thaler 1991; Máthé et al. 2003; Bosmans et al. 2009; van Keer et al. 2010; Russell-Smith et al. 2011; Tanasevitch 2011; IJland et al. 2012; Bosmans et al. 2013; Tanasevitch 2013; IJland and van Helsdingen 2014; van Helsdingen and IJland 2015; IJland and van Helsdingen 2016; van Helsdingen et al. 2018; Bosmans et al. 2019; Grbić et al. 2021; Dentici and Amata 2024).

Results

Family Linyphiidae Blackwall, 1859

***Erigonoplus nobilis* Thaler, 1991**

Erigonoplus nobilis Thaler 1991: 170–172, figures 15, 18–21.

Figures 1A, 2, 5

New record. BULGARIA — Blagoevgrad Province • Belasitsa mountain, Petrich town, Kongura Reserve; 41.3228°N, 023.1844°E; 1660 m alt.; VII.2010; B. Gueorguiev leg.; beech forest; pitfall traps; 2 ♂, NMNHS, BG-NMNHS-INV-000000016391.

Comparative material examined. ITALY — South Tyrol • Alps, Brixen, Neustift, Riggertal; 650 m alt.; 26.VI.1989; Noflatscher leg.; dry grassland and rocks on a xerothermic slope; pitfall traps; 1♂ (paratype), NMBE, AR 25600, ex coll. Thaler.

Distribution (Figure 5). The species is known from its type locality in the South Tyrol, Italy (Thaler 1991) and Bulgaria (new record).

Identification. The somatic characters and the shape of the embolus and tibial apophysis (Figure 2A–E) correspond well to the description and the drawings by Thaler (1991). Since the very informative retrolateral position in the latter paper (Thaler 1991: fig. 18) was taken from a slightly different angle, we examined and photographed the paratype (Figure 2F), which turned out to be entirely identical to our specimen (Figure 2C). *E. nobilis* differs from its closest congener, *Erigonoplus jarmilae* (Miller, 1943), in the unmodified shape of the cephalothorax and the absence of glandular pits (Thaler 1991). The specific lateral view of our specimen is presented in Figure 2B.

Comment. This is the first record of the species from Bulgaria and Southeastern Europe. The fact that it has never been reported since its initial description supports the suggestion for the extreme rarity of most *Erigonoplus* species, as expressed by Millidge (1975). *Erigonoplus nobilis* might be undersampled in the region due to a preference for microcavernicole structures. A targeted investigation using special traps to sample the mesovoid shallow substratum fauna (López and Oromí 2010) could provide

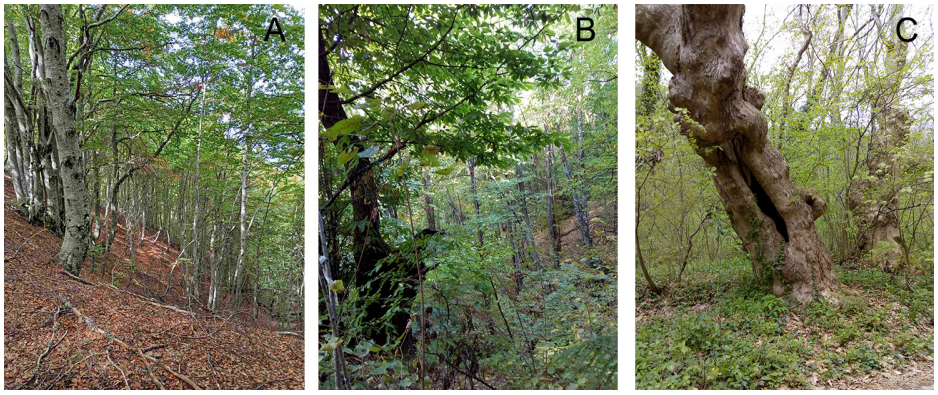

Figure 1. Habitats on Belasitsa mountain (photographs by V. Haynadzhieva). **A.** Beech forest in Kongura reserve (EUNIS: G1.6922). **B.** Chestnut–beech forest near Belasitsa hut (EUNIS: G1.7D1). **C.** Riparian plane forest along the Petrichka river (EUNIS: G1.381).

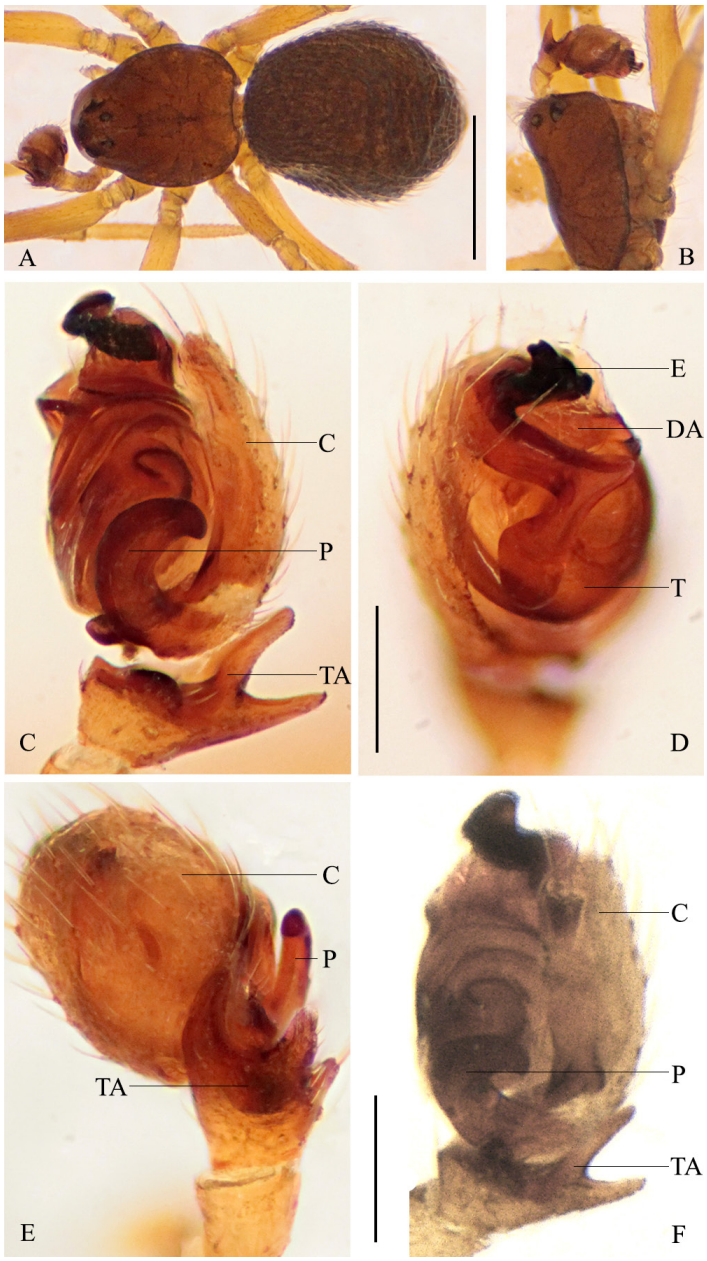

Figure 2. *Erigonoplus nobilis*, male. **A–E.** From Bulgaria. **F.** Paratype from Brixen, Italy (photograph by Yvonne Kranz, NMBE). **A.** Habitus, dorsal view. **B.** Habitus, lateral view. **C, F.** Left pedipalp, retrolateral view. **D.** Left pedipalp, prolateral view. **E.** Left pedipalp, dorsal view. Scale bars: A, B = 0.5 mm; C–E = 0.1 mm.

more accurate information in the future. The new record is consistent with the assumption that the genus is distributed primarily in Southern and Eastern Europe (Millidge 1979).

***Linyphia mimonti* Simon, 1885**

Linyphia mimonti—van Helsdingen 1969: 66, 68–73, figures 73, 76.

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

Figures 1B, 3, 6

New records. BULGARIA — Blagoevgrad Province • Belasitsa mountain, Petrich town, Belasitsa hut; 41.3692°N, 023.1874°E; 700 m alt.; 14.V.1996; B. Gueorguiev leg.; chestnut-beech forest; hand sampling; 1 ♀, NMNHS, BG-NMNHS-INV-000000016393 — Burgas Province • Black Sea coast, Kiten town; 42.2441°N, 027.7562°E; 25 m alt.; 05.V.2019; S. Indzhov leg.; oak forest margins; collected by beating on branches; 2 ♀, NMNHS, BG-NMNHS-INV-000000017014.

Distribution (Figure 6). The species is known from Italy (Brignoli 1975; IJland et al. 2012; IJland and van Helsdingen 2014; IJland and van Helsdingen 2016; Dentici and Amata 2024), Albania (van Helsdingen and IJland 2015), Greece (Simon 1885; Bosmans et al. 2009; Russell-Smith et al. 2011; Bosmans et al. 2013; van Helsdingen et al. 2018), Cyprus (Bosmans et al. 2019), Lebanon (Kulczyński 1911), Israel (Tanasevitch 2013), and Bulgaria (new records).

Figure 3. *Linyphia mimonti*, female from Bulgaria (Belasitsa mountain). **A.** Habitus, dorsal view. **B.** Vulva, ventral view. **C.** Vulva, dorsal view. Scale bars: A = 1 mm; B, C = 0.1 mm.

Identification. The colouration, especially the dorsal abdominal pattern (Figure 3A) of the collected females, as well as the genital structures (Figure 3B, C) are consistent with those described by van Helsdingen (1969).

Comment. *Linyphia mimonti* is distributed from Italy to the easternmost Mediterranean (including the Levant). The species has been previously reported from various habitats, including grassland, shrubland, broadleaf, and mixed forest up to 1360 m alt. (Bosmans et al. 2019). In Bulgaria, we collected the species in the undergrowth of two wooded habitats on Belasitsa mountain and on the coast of the Black Sea. The chestnut–beech forest is classified by the EUNIS as G1.7D1: Helleno–Balkanic *Castanea sativa* forests, and the coastal oak forest is identified as T196: Balkano–Anatolian thermophilous *Quercus* forests (European Environment Agency 2021). The habitats correspond to the previously recorded preferences and tolerance of the species.

***Walckenaeria atrotibialis* (O. Pickard-Cambridge, 1878)**

Walckenaeria melanocephala O. Pickard-Cambridge 1881: 596–597.
Erigone decipiens Kulczyński 1882: 24, 45, pl. 2 figure 15a, b.
Wideria melanocephala—Locket and Millidge 1953: 196, figs. 121D–F.
Wideria melanocephala—Wiehle 1960: 121–125, figures 212–216.
For the complete list of references, see World Spider Catalog (2026).
Figures 1C, 4, 7

New record. BULGARIA — Blagoevgrad Province • Belasitsa mountain, Petrich town, Petrichka river valley; 41.3750°N, 023.2070°E; 400 m alt.; 30.V.2022; D. Dimitrov leg.; plane forest along the river; pitfall traps; 1♂, NMNHS, BG-NMNHS-INV-000000016392.

Partial distribution (Figure 7). The species is now known from North America, Europe, Turkey, the Caucasus, Russia (from Europe to South Siberia), Kazakhstan, and Kyrgyzstan (World Spider Catalog 2026), and Bulgaria (present paper). Since the species is widely distributed across the Holarctic, we display only the records from Bulgaria and neighbouring countries on the map: Greece (van Keer et al. 2010), Serbia (Grbić et al. 2021), Romania (Máthé et al. 2003), and Turkey (Tanasevitch 2011).

Identification. Morphologically, our specimen fits well with the widely accepted interpretation of the species (Locket and Millidge 1953; Wiehle 1960). The colouration and the typical lateral profile of the

Figure 4. *Walckenaeria atrotibialis*, male from Bulgaria. **A.** Habitus, dorsal view. **B.** Habitus, lateral view. **C.** Left pedipalp, prolateral view. **D.** Left pedipalp, retrolateral view. Scale bars: A, B = 0.5 mm; C, D = 0.1 mm.

prosoma with cephalic elevation (Figure 4A, B) are consistent with the description by Pickard-Cambridge (1881). The characteristic cup-shaped palpal tibia with forked tibial apophysis (Figure 4C, D) is identical to the drawings of Kulczyński (1882: figure 15a, b).

Comment. *Walckenaeria atrotibialis* is a widespread species, inhabiting the litter of a variety of forest and grassland habitats (Millidge 1983). It occurs beneath heather, on calcareous and other grasslands, on boggy or marshy ground, in wetlands and fens, and sometimes in woodland (Harvey et al. 2002). Our new record is from a riparian plane forest, classified as G1.381: Helleno–Balkanic riparian plane

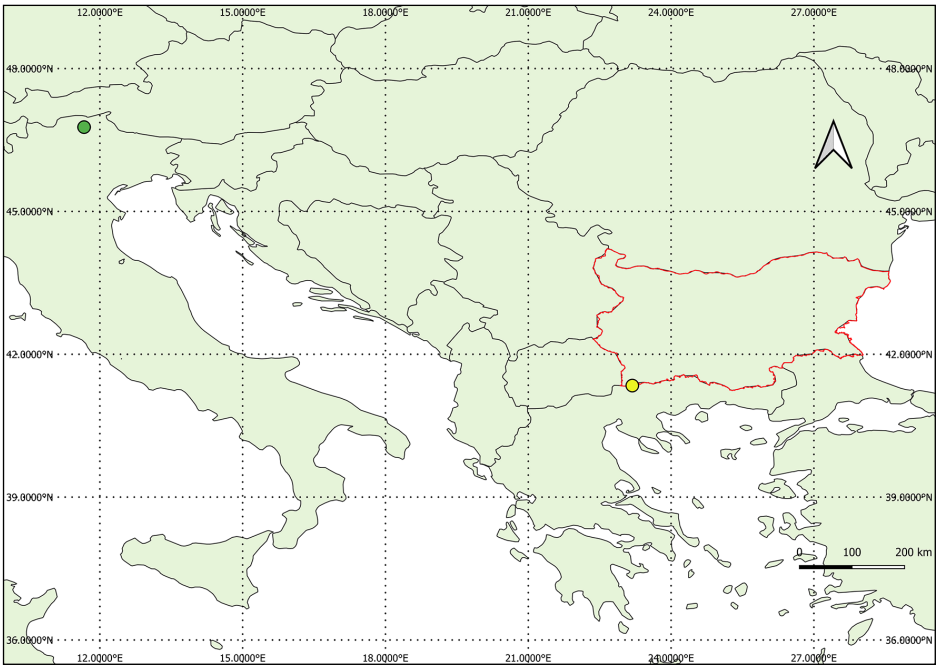

Figure 5. Map of distribution of *E. nobilis*: red outline = Bulgarian border, green circle = published record, yellow circle = new record.

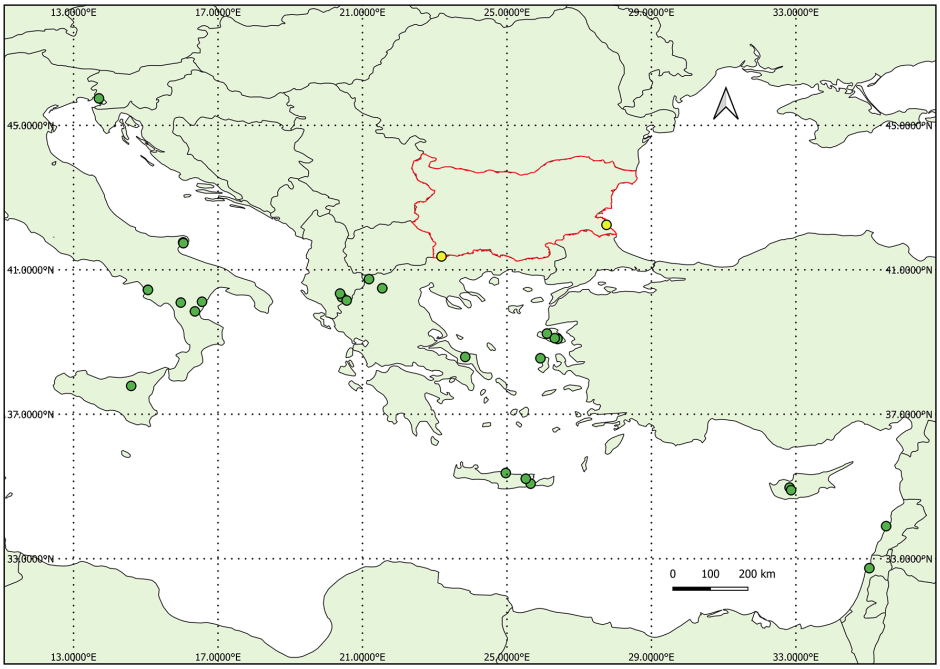

Figure 6. Map of distribution of *L. mimonti*: red outline = Bulgarian border, green circle = published records, yellow circle = new records.

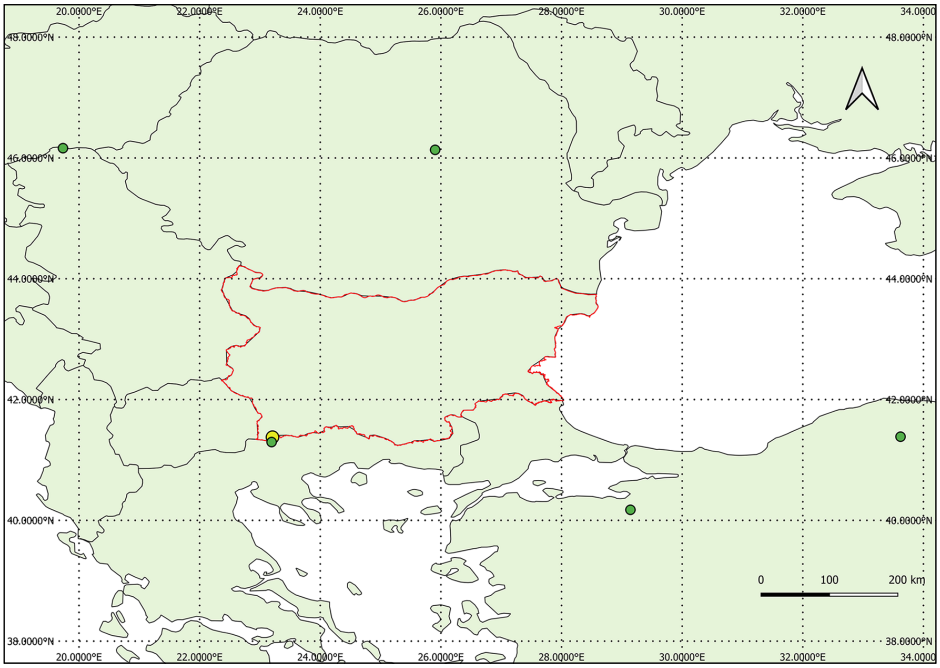

Figure 7. Map of distribution of *W. atrotibialis* in Bulgaria and neighbouring countries: red outline = Bulgarian border, green circle = published records, yellow circle = new record.

forests in the EUNIS forest and other wooded land habitat classification (European Environment Agency 2021).

Discussion

Our new record of *Erigonoplus nobilis* significantly extends its distribution range both south and east. The species is obviously not an Alpine endemic, but it reaches the Southeastern European mountains. The type specimens were collected in dry grassland and rocks on a xerothermic slope at an elevation of about 650 m (Thaler 1991). Our material is from beech forests at 1660 m. According to EUNIS forest and other wooded land habitat system of classification (European Environment Agency 2021), this forest is identified as G1.6922: Southeastern Moesian neutrophile beech forests. The new finding suggests that the species is more ecologically tolerant.

The new finding of *Linyphia mimonti* extends its distribution range north of the Mediterranean towards the inland Balkan Peninsula. Collecting fresh material, suitable for DNA sequencing, from both

sexes in the future will justify its rather intuitive synonymization with *Linyphia pulchra* from Lebanon (van Helsdingen 1969). On that note, Brignoli (1975) wrote that the two male specimens he recorded from Noah's Cave in the karst region of Trieste, Italy, are not completely identical to van Helsdingen's description. No comment was made on the other males, collected from Cyprus (Bosmans et al. 2019).

Walckenaeria atrotibialis is a Holarctic species. It is common in Northern and Central Europe (Arachnologische Gesellschaft 2026) and becomes increasingly rare in the southern regions, with just a few records from the Balkan Peninsula—Serbia (Grbić et al. 2021), Romania (Weiss and Petrisor 1999; Máthé et al. 2003), Greece (van Keer et al. 2010); from the Iberian Peninsula—Spain and Andorra (Branco et al. 2019); and from Italy (Isaia et al. 2025). In the countries bordering Bulgaria, the species is established in a variety of forest habitats: flooded woods of white and grey poplar (Grbić et al. 2021), birch and pine areas (Máthé et al. 2003), and mixed-oak forests (Tanasevitch 2011). Our specimen was collected in riparian plane forest leaf litter, which is consistent with its known habitat preferences.

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Additional information

Conflict of interest

The authors declare that no competing interests exist.

Artificial intelligence (AI) use

The authors accept full responsibility for the content of the manuscript, including the disclosure of any use of AI. No AI tools were used in the preparation of this manuscript.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: DD, SI, VH. Data curation: VH, SI. Funding acquisition: DD. Investigation: VH, SI, DD. Methodology: VH, SI, DD. Resources: VH, SI. Supervision: DD. Visualization: VH. Writing – original draft: VH, SI, DD.

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Data availability

All data that support the findings of this study are available in the main text.

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